

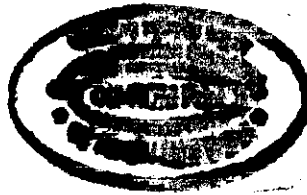
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Indian Standard

SPECIFICATION FOR
PLUGS AND SOCKET-OUTLETS OF 250 VOLTS
AND RATED CURRENT UP TO 16 AMPERES
(Second Revision)

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Indian Standard

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AND RATED CURRENT UP TO 16 AMPERES**

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0. FOREWORD

0.1 The Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards on 26 February 1988, after the draft finalized by the Electrical Wiring Accessories Sectional Committee had been approved by the Electrotechnical Division Council.

0.2 This standard was first published in 1958. The first revision was brought out in 1967. This second revision has been undertaken to bring it in line with the latest IEC Publication and to take into account the developments within the country.

0.3 This standard covers the requirements and test methods for 3 pin (two pole and earthing) plugs and socket outlets suitable for ac and dc circuits having a rated voltage not exceeding 250 V.

0.4 Two pin plugs are intended to be used only for Class II appliances, the use of which in the country is extremely limited. In order to keep the variety limited and to enable such appliances to be conveniently used with the available three pin socket outlets, the Committee desired that even in Class II appliances, three pin plugs as intended for normal application be used with earth terminal remaining unconnected.

0.5 In preparing this standard, assistance has been derived from the following standards:

IEC Publication 83 (1975) Standards for plugs and socket-outlets for domestic and similar general use. International Electrotechnical Commission (IEC).

IEC Doc : 23B (Central Office) 43 : Draft standard for plugs and socket-outlets for household and similar purposes: Part 1 General requirements. International Electrotechnical Commission (IEC).

SABS 164 : 1953 Three-pin plugs and socket-outlets. South African Bureau of Standards.

BS 546 : 1950 Two-pole and earthing-pin plugs socket-outlets and socket-outlet adaptors. British Standards Institution.

0.6 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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

1. SCOPE

1.1 This standard covers the requirements and tests for three-pin two-pole and earthing plugs and socket-outlets of surface and flush type (shuttered and non-shuttered) suitable for ac and dc circuits having voltages up to 250 volts.

Note — 2 pin plugs and socket outlets are considered non-standard (see 0.4).

2. TERMINOLOGY

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

2.1 Plug — A device carrying three metallic contacts in the form of pins, intended for engagement with corresponding socket contacts and arranged for attachments to a flexible cord or cable.

2.2 Fused Plug — A plug with a fuse link within it, in circuit before the line plug pin and its terminal.

2.3 Socket-Outlet — A device carrying three metallic contacts designed for engagement with corresponding plug pins and arranged for connection to fixed wiring.

2.4 Fixed Socket-Outlet — A socket-outlet which is connected to the fixed wiring.

2.5 A Portable Socket-Outlet — A socket-outlet intended to be connected to, or integral with, flexible cables or cords, and which can easily be moved from one place to another while connected to the supply.

2.6 A Multiple Socket-Outlet — A combination of two or more socket-outlets.

2.7 Shuttered Socket-Outlet — A socket-outlet having provision for screening its line and neutral socket contacts automatically with a shutter when they are not in engagement with the corresponding plug pins.

2.8 A Rewirable Plug or Portable Socket-Outlet — An accessory so constructed that the flexible cable or cord can be replaced.

2.9 A Non-Rewirable Plug or a Non-Rewirable Portable Socket-Outlet — An accessory so constructed that it forms a complete unit with the flexible cable or cord after connection and assembly by the manufacturer of the accessory (*see also 13.1*).

2.10 Socket Contact — Metallic contacts in the socket-outlet which engage with the pins of the plug.

2.11 A Pillar Terminal — 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 the pressure is applied by the shank of the screw.

Examples of pillar terminals are given in Fig. 1.

2.12 A Screw Terminal — 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 antispread device.

Examples of screw terminals are given in Fig. 2.

2.13 A Stud Terminal — 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 antispread device.

Examples to stud terminal are given in Fig. 2.

2.14 Rated Voltage — Voltage assigned to the plug or socket-outlet by the maker.

2.15 Rated Current — Current assigned to the plug or socket-outlet by the maker.

2.16 Type Tests — Tests carried out to prove conformity with the requirements of the specification. These are intended to prove the general qualities and design of the given type of plug or socket-outlet.

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

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

NOTE 1 — The word 'accessory' is used in this standard which shall cover the plugs and socket-outlets.

NOTE 2 — The word 'socket-outlet' where used in this standard shall include both fixed and portable socket-outlets except where the reference is specific to one type of the others.

3. GENERAL REQUIREMENTS

3.1 Accessories shall be so designed and constructed that in normal use their performance is reliable and without danger to the user or the surroundings.

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

4. GENERAL NOTES ON TESTS

4.1 Unless otherwise specified, the samples are tested as delivered and under normal conditions of use.

Non-rewirable accessories are tested with the type and size of a flexible cable or cord, as delivered, at least 1 m long.

4.2 Unless otherwise specified, the tests are carried out in the order of the clauses, at an ambient temperature between 15° and 35°C.

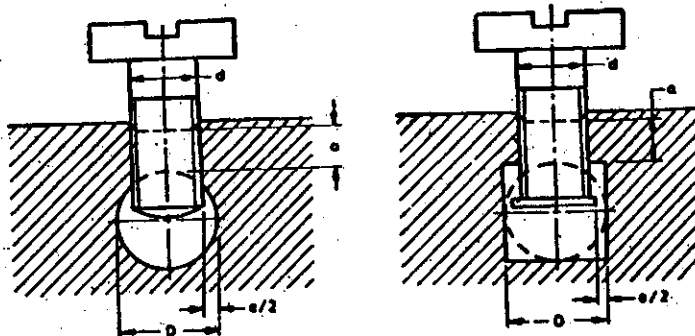


FIG. 1 PILLAR TYPE TERMINALS

- i) surface-type socket-outlets,
- ii) flush-type socket-outlets,
- iii) semi-flush type socket-outlets, and
- iv) portable type socket-outlets.

7. MARKING AND VISUAL INSPECTION

7.1 The following shall be marked clearly and indelibly on both plugs and socket-outlets:

- a) Manufacturer's name or trade-mark or both;
- b) Current rating;
- c) Voltage rating;
- d) The words 'for ac only' in the case of plugs and socket-outlets intended for use on ac circuit only;
- e) The symbols \perp , L and N, to indicate the terminals corresponding to the earthing, line and neutral socket contacts respectively, shall be marked clockwise when the socket-outlet is viewed in the front position. The marking shall be as close as practicable to the corresponding terminals. The terminals of the plug pins shall also be marked \perp , L and N corresponding to the terminals of the socket-outlets; and
- f) Country of manufacture.

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

- a) Amperes.....A,
- b) Volts.....V,
- c) Alternating current.....~,
- d) Neutral.....N,
- e) Earth..... \perp .

Lines formed by the construction of the tool are not considered as part of the marking.

For markings for rated current and rated voltage, figures may be used alone. These figures shall be placed on one line separated by an oblique line or the figure for rated current shall be placed above the figure for rated voltage, separated by a horizontal line. The marking for nature of supply shall be placed next to the marking for rated current and rated voltage.

The marking for current, voltage and nature of supply may be, for instance, as follows:

$$16 \text{ A } 240 \text{ V or } 16/240 \text{ or } \frac{16}{240}$$

7.3 Marking shall be durable and easily legible.

Compliance is checked by inspection and by rubbing the marking by hand for 15s with a piece of cloth soaked with petroleum spirit. The markings shall remain legible after the test.

Marking made by impression, moulding, pressing or engraving is not subjected to this test.

7.4 The plugs and socket-outlets may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

7.5 The accessories shall be visually examined for compliance with the relevant requirements specified under 7 and 12 to 14.

8. CHECKING OF DIMENSIONS

8.1 Dimensions of Plugs and Socket-Outlets— The dimensions of plugs and socket-outlets shall be in accordance with Table 1.

8.1.1 Socket contacts shall be self adjusting for centres 0.15 mm greater or less than A and B.

NOTE — In case of socket-outlets, dimensions C and D shall comply with requirements of 8.5, A-2 and A-3.

8.1.2 In case of multiple socket-outlets, the wall thickness of the insulating material between the respective pin holes for the 6A and 16A pins shall not be less than 2 mm.

8.1.3 The pins may be slotted axially with a single slot but shall not close below the specified diameter. If slotted, the dimensions shall be as given in Table 1.

The pins having slots for the purpose of tightening only shall have slot depths of 3 mm for 6A plugs and 4 mm for 16A plugs.

8.2 Unless there is a shutter intended to prevent current-carrying socket contacts from being touched, the diameter of holes in the socket-outlet plate or cover for the reception of current-carrying plug pins shall not be greater than K in Table 1.

8.3 Design and Construction — The plugs and socket-outlets shall be so designed and constructed that it is not possible for any pin of a plug to touch a live contact except during normal insertion.

8.3.1 The current-carrying socket contacts shall be sunk below the surface of the socket-outlet in such a way as to make it impossible for them to be touched unintentionally.

8.3.2 The mechanism for screening live and neutral contacts automatically shall be designed to ensure positive operation of shutters when plug is withdrawn from a socket outlet. The shutters shall not operate without the insertion of the earthing-pin into the socket-outlet.

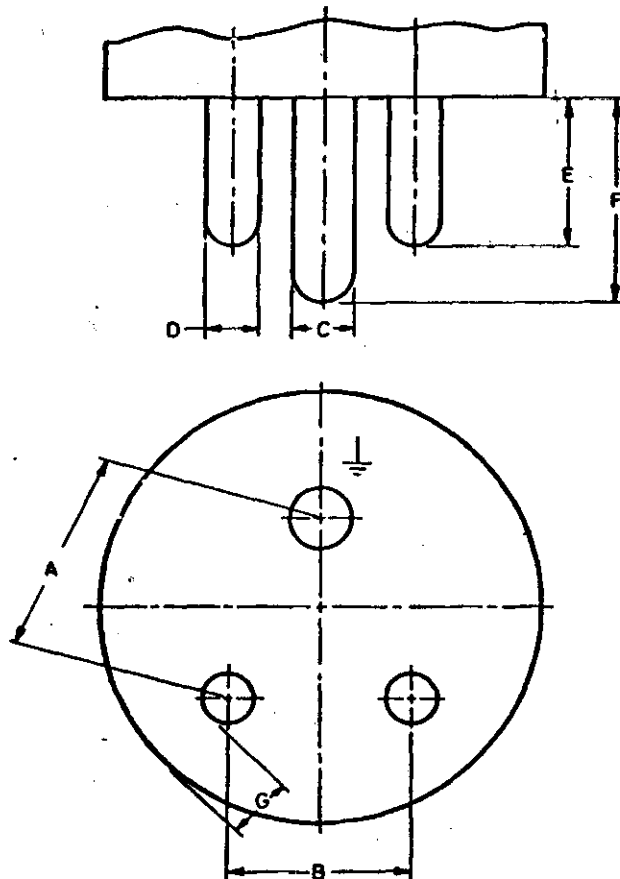


TABLE 1 DIMENSIONS OF PLUGS AND SOCKET-OUTLETS

(Clauses 8.1, 8.1.3, 8.2 and 9.1)

	RATING	
	8A mm	16A mm
A	22.2	28.6
B	19.1	25.4
C	7.06 ^{+0.025} _{-0.050}	8.71 ^{+0.025} _{-0.050}
D	5.08 ^{+0.025} _{-0.050}	7.06 ^{+0.025} _{-0.050}
E	15.9 ^{+1.04} _{-0.13}	20.6 ^{+1.04} _{-0.13}
F	20.6 ^{+1.04} _{-0.13}	28.6 ^{+1.04} _{-0.13}
G, Min	7.94	9.52
H	5.16 to 7.54	6.76 to 9.12
K	6.0	8.0
Nominal width of slot:		
Current-carrying pin	0.6	0.8
Earthing-pin	0.8	0.8
Minimum length of slot:		
Current-carrying pin	7.5	10.5
Earthing-pin	10.5	17.0

H = distance between the base of plug and socket-outlet at position of first contact of live pins.

Note—The measurement of width of slot of current carrying pin and earthing pin shall be carried out at the bottom of the slot.

8.4 During normal insertion of the plug into a socket-outlet with the face of the plug and socket-outlet parallel it shall not be possible to touch a live pin with the standard test finger (see IS : 1401-1970*) after contact has been established between the pins and its socket contacts.

8.5 Interchangeability — The accessories shall be tested for interchangeability and correctness of spacing of pins and socket contacts by means of 'GO' gauges described in Appendix A.

9. PROTECTION AGAINST ELECTRIC SHOCK

9.1 Socket-outlets shall be so designed that, when they are mounted and wired as in normal use, live parts are not accessible.

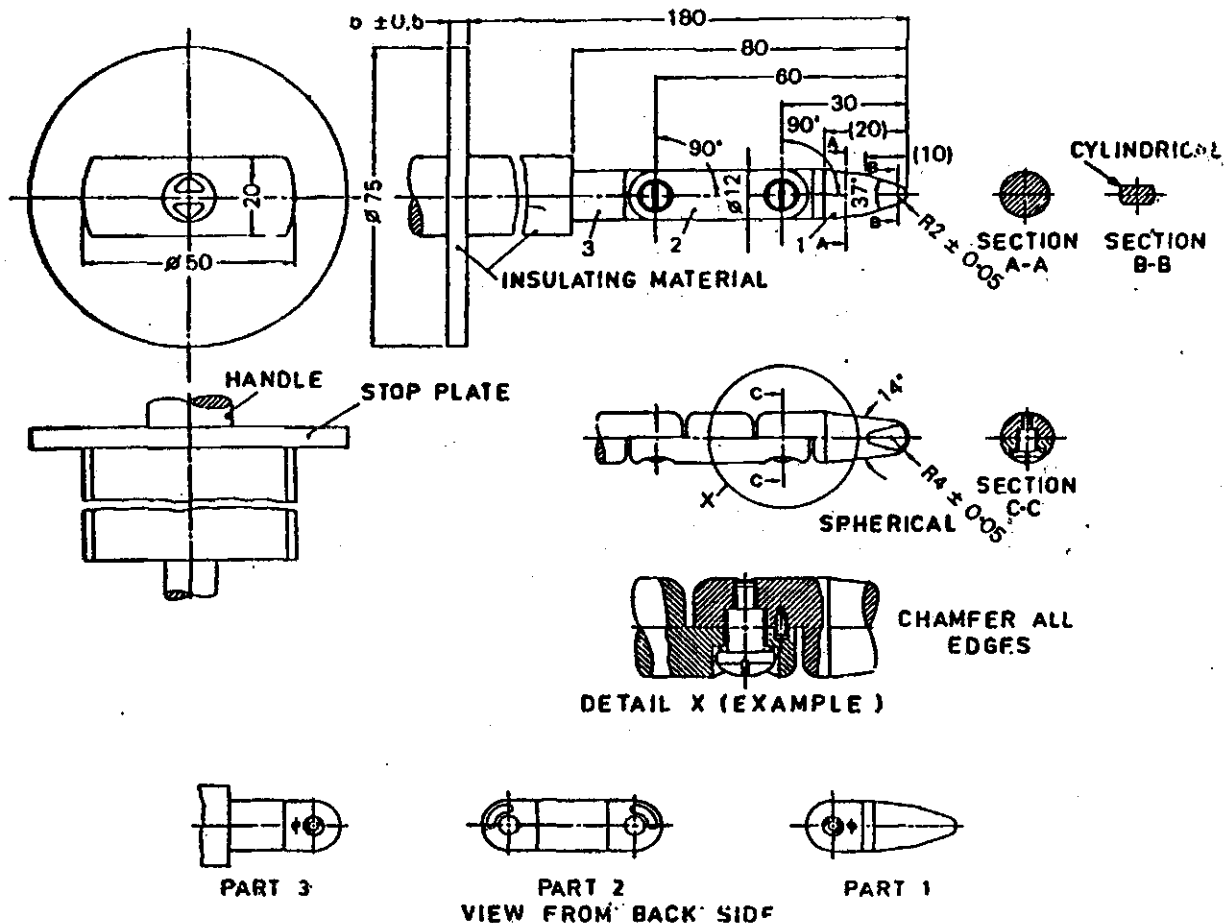
Live parts of plugs shall not be accessible when the plug is in partial or complete engagement with a socket-outlet.

Compliance is checked by inspection, and if necessary, by the following test.

The sample is mounted as in normal use and fitted with conductors of appropriate cross sectional areas.

For socket-outlets, the standard test finger shown in Fig. 3 is applied in every possible position.

*Specification for accessibility test probes (first revision).



All dimensions in millimetres.

Tolerances on dimensions without specific tolerance:

on angles : $\begin{matrix} +0 \\ -10 \end{matrix}$

on linear dimensions:

up to 25 mm : $\begin{matrix} 0 \\ -0.05 \end{matrix}$ mm

over 25 mm : ± 0.2 mm

Material of finger: e.g. heat-treated steel!

Both joints of this Finger may be bent through an angle of $90^{\pm 10}_0$, but in one and the same direction only.

Using the pin and groove solution is only one of the possible approaches in order to limit to bending angle to 90° . For this reason, dimensions and tolerances of these details are not given in the drawing. The actual design must ensure a 90° bending angle with a 0 to $+10^\circ$ tolerance.

FIG. 3 STANDARD TEST FINGER

For plugs, the test finger is applied in every possible position when the plug is in partial or full engagement with a socket-outlet.

As electrical indicator with a voltage not less than 40 V and not more than 50 V, is used to show contact with the relevant part.

For accessories, where the use of elastomeric or thermoplastic material is likely to

influence the requirements, the test is repeated but at an ambient temperature of $35 \pm 2^\circ\text{C}$, the accessories being at this temperature.

During this addition test, the accessories are subjected for 1 min to a force of 75 N, applied through the tip of a straight unjointed test finger of the same dimensions as the standard test finger. This finger, with an electrical indicator as described above, is applied to all

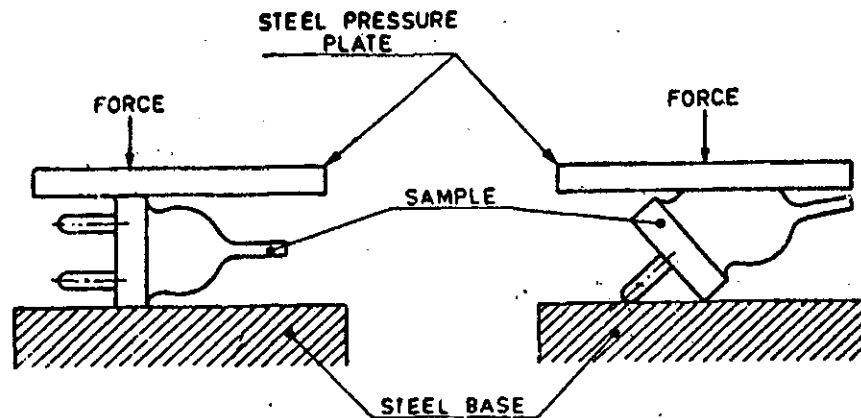


FIG. 4 ARRANGEMENT FOR COMPRESSION TEST

places where yielding of the insulating material could impair the safety of the accessory but it is not applied to thin walled knock-outs.

During this test, the accessory with its associated mounting means shall not deform to such an extent that those dimensions which ensure safety are unduly altered and no live part shall be accessible.

Each sample of plug or portable socket-outlet is then pressed between two flat surfaces with a force of 150 N for 5 min, as shown in Fig. 4. Fifteen minutes after removal of the test apparatus, the samples shall not show such deformation as would result in undue alteration of those dimensions shown in Table 1.

9.2 It shall not be possible to make connection between a pin of a plug and a live socket-contact of a socket-outlet while any other pin is accessible.

Compliance is checked by manual test.

For accessories with enclosures or bodies of thermoplastic material, the test is made at an ambient temperature of $35 \pm 2^\circ\text{C}$, both the accessory and the gauge being at this temperature.

9.3 External parts of plugs and socket-outlets, with the exception of assembly screws and the like, current carrying and earthing pins, earthing straps and metal rings around pins, shall be of insulating material.

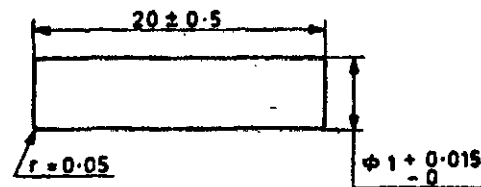
The overall dimensions of rings, if any, around pins shall not exceed 8 mm concentric with respect to the pin.

Compliance is checked by inspection.

Lacquer or enamel is not deemed to be insulating material for the purpose of 9.1 to 9.3.

9.4 Shuttered socket-outlets shall be so constructed that live parts shall not be accessible,

without a plug in engagement, with the gauge shown in Fig. 5 nor with a plug partially inserted with the test finger shown in Fig. 3.



All dimensions in millimetres.

FIG. 5 GAUGE FOR CHECKING NON-ACCESSIBILITY THROUGH SHUTTERS

To ensure this degree of protection, socket-outlets shall be so constructed that the live contacts are automatically screened when the plug is withdrawn.

The means of achieving this shall be such that they cannot easily be operated by anything other than a plug and it shall not depend upon parts which are liable to be lost.

The gauge shall be applied to the entry holes corresponding to the live contacts.

For socket-outlets with enclosure or bodies of thermoplastic material, the test is made at an ambient temperature of $35 \pm 2^\circ\text{C}$, both the socket-outlets and the gauge being at this temperature.

9.5 Earthing contacts of a socket-outlet shall be so designed that they cannot be deformed by the insertion of a plug to such an extent that safety is impaired.

Compliance is checked by the following test:

The socket-outlet is placed in such a position that the socket-contacts are in the vertical position.

A test plug, corresponding to the type of socket-outlet, is inserted into the socket-outlet with a force of 150 N which is applied for 1 min.

After this test, the socket-outlet shall still comply with the requirement of 8.

10. PROVISIONS FOR EARTHING

10.1 Accessories shall be so constructed that, when inserting the plug the earth connection is made before the current carrying contacts of the plug become live.

When withdrawing the plug, the current carrying contacts shall separate before the earth connection is broken.

Compliance is checked by checking the samples against Table 1.

Conformity to relevant dimensions ensure compliance with this requirement.

10.2 Earthing terminals of rewirable accessories shall comply with the appropriate requirements of 11.

10.3 Accessible metal parts of socket-outlets which may become live in the event of an insulation fault, shall be permanently and reliably connected to the earthing terminal.

For the purpose of this requirement, small screws and the like, isolated from live parts, for fixing bases, covers or cover plates, are not considered as accessible parts which may become live in the event of an insulation fault.

10.4 Connection to Earthing Pin — The connection of flexible conductor to the earthing pin of the plug shall be visible through an opening in the plug.

11. TERMINALS AND SCREWS

11.1 Terminals — The material, design and proportion of all terminals shall be such that connections made there to do not slacken or overheat under the normal conditions of use. They shall allow a conductor to be connected without special preparation, for example, soldering of strands, use of cable lugs and formation of eyelets.

11.1.1 Terminals shall be so designed that they clamp the conductors between metal surfaces with sufficient contact pressure and without damage to the conductor.

11.1.2 All terminals shall be of sufficient size relative to the rated current of plugs and socket-outlets.

11.1.3 All connections shall be made in such a way that strands of the conductors are prevented from slipping or spreading at the terminal.

11.1.4 Terminals shall be so located that provided the conductors are correctly fitted, there is no risk of accidental contact between live parts of different polarity or between such parts and accessible metal parts.

11.1.5 When pillar type terminals are used, they shall conform to the dimensions given in Table 2.

TABLE 2 DIMENSIONS OF TERMINALS
(Clause 11.1.5)

All dimensions in millimetres.

CURRENT RATING	NOMINAL THREAD DIAMETER, Min	DIAMETER OF HOLE FOR CONDUCTOR, Min	LENGTH OF THREAD IN PILLAR, Min	DIFFERENCE BETWEEN DIAMETER OF HOLE AND NOMINAL DIAMETER OF SCREW, Max
(A)	d	D	a	e
(1)	(2)	(3)	(4)	(5)
6	2.5	2.5	2.0	0.6
16	3.0	3.0	2.5	0.6

11.1.6 The socket-contacts and its terminals shall either be formed from one piece or be riveted or firmly screwed to each other to give robust construction and good electrical contact.

11.2 Screws

11.2.1 Terminal screws used for gripping the conductors shall be rounded or chamfered at the ends so as to prevent damage to the conductors, and in pillar type terminals they shall be long enough to extend to the far end of the terminals and shall be of a diameter approximately equal to that of the hole.

11.2.2 Screwed connections, electrical or otherwise, shall withstand mechanical stresses occurring in normal use.

11.2.3 Screws transmitting contact pressure, and those operated while the plugs and socket-outlets are being mounted and connected, and having a nominal diameter less than 3.5 mm, shall screw into metal nuts or metal inserts.

12. CONSTRUCTION OF FIXED SOCKET-OUTLETS

12.1 Socket-contact assemblies shall have sufficient resiliency to ensure adequate contact pressure on the plug pins.

Compliance is checked by inspection and the tests of 8 and 19.

12.2 Socket-contacts and pins of socket-outlets shall be resistant to corrosion and abrasion.

12.3 Insulating linings, barriers and the like shall have adequate mechanical strength and shall be secured in a reliable manner.

Compliance is checked by inspection and by the tests of 23.

12.4 Socket-outlets shall be so constructed as to permit:

- easy introduction and connection of the conductors in terminals;
- easy fixing of the base to a wall or in a mounting box;

- c) correct positioning of the conductors; and
- d) adequate space between the underside of the base and the surface on which the base is mounted or between the sides of the base and the enclosure (cover or mounting box) so that after installation of the socket-outlet, the insulation of the conductors does not come in contact with live parts of different polarity.

This requirement does not imply that the metal parts of the terminals are necessarily protected by insulating barriers or insulating shoulders, to avoid contacts, due to incorrect installation of the terminal metal parts, with the insulation of the conductor.

For surface type socket-outlets to be mounted on a mounting plate, a wiring channel may be needed to comply with this requirement.

In addition, socket-outlets shall permit easy positioning and removal of the cover or cover-plate, without displacing the conductors.

Compliance is checked by inspection and by an installation test with conductors of the largest cross-sectional area.

12.5 Socket-outlets shall be so designed that full engagement of associated plugs is not prevented by any projection from their engagement face. Compliance is checked by determining that the gap between the engagement faces of the socket-outlet and a plug does not exceed 1 mm when the plug is inserted into the socket-outlet as far as it will go.

12.6 If covers are provided with bushings for entry holes for the pins, it shall not be possible to remove them from the outside or to become detached inadvertently from the inside, when the cover is removed.

12.7 Covers or cover plate may be held in place at two or more points by effective fixing such that their removal requires the use of a tool.

Covers or cover-plates may be fixed by means of a single screw, provided that they are kept in position by another means (for example, by shoulder).

For socket-outlets, the fixings of covers or cover-plates shall not serve to fix any other part.

12.8 Surface type socket-outlets shall be so constructed that, when they are fixed and wired as in normal use, there are no free openings in the enclosures other than the entry openings for the pins of the plug.

Compliance is checked by inspection and by an installation test with conductors of the smallest cross-sectional area.

Small gaps between enclosures and conduits or cables or between enclosures and earthing contacts, if any, are neglected.

12.9 Screws are other means for mounting the socket-outlet on a surface or in a box or enclosure shall be easily accessible from the front. These means shall not serve any other fixing purpose.

12.10 Multiple socket-outlets with a common base shall be provided with fixed links for interconnection of the contacts in parallel; the fixing of these links shall be independent of the connection of the supply wires.

12.11 The mounting plate of surface-type socket-outlets shall have adequate mechanical strength.

Compliance is checked by inspection after the test of 23.1.

12.12 Socket-outlets shall not be combined with lampholders or lamp caps.

Compliance is checked by inspection.

12.13 Earthing pins shall have adequate mechanical strength.

Compliance is checked by inspection and, for pins which are not solid, by the test of 13.2 which is made after the tests of 19.

12.14 Earthing contacts and neutral contacts shall be locked against rotation and removable only with the aid of a tool after dismantling the socket-outlet.

Compliance is checked by inspection and by manual test.

A design permitting the removal of a contact without the aid of a tool, after removal of an enclosure requiring the use of a tool, is not allowed.

12.15 Metal strips of earthing circuit shall have no burrs which might damage insulation of the supply conductors.

Compliance is checked by inspection.

12.16 Socket-outlets to be installed in a box shall be so designed that the conductor ends can be prepared after the box is mounted in position but before the socket-outlet is fitted in the box.

Compliance is checked by inspection.

13. CONSTRUCTION OF PLUGS AND PORTABLE SOCKET-OUTLETS

13.1 A non-rewirable plug or a non-rewirable portable socket-outlet shall be such that:

- a) the flexible cable or cord cannot be separated from the accessory without making it permanently useless, and
- b) the accessory cannot be opened by hand or by using a general purpose tool, for example, a screw-driver.

NOTE — An accessory is considered to be permanently useless, when for re-assembling the accessory, parts or materials other than the original are to be used.

13.2 Pins of plugs and portable socket-outlets shall have adequate mechanical strength.

Compliance is checked by the tests of 23 and, for pins which are not solid, by the following test which is made after the test of 19.

A force of 100 N exerted on the pin which is supported as shown in Fig. 6, for 1 min in a direction perpendicular to the axis of the pin, by means of a steel rod having a diameter of 4.8 mm, the axis of which is also perpendicular to the axis of the pin:

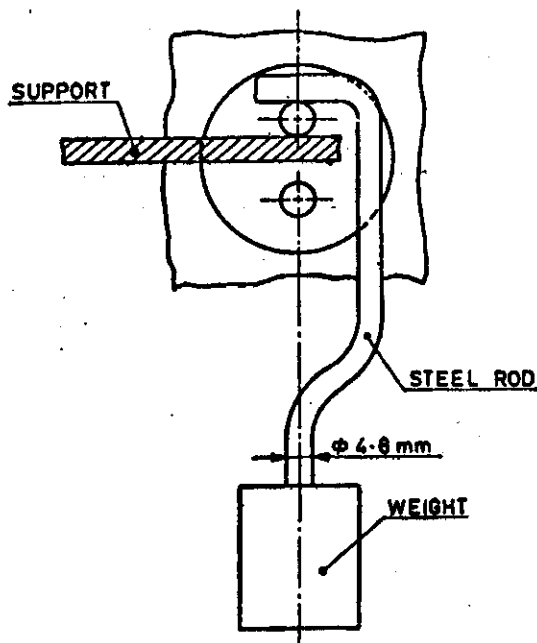


FIG. 6 DEVICE FOR TESTING NON-SOLID PINS

During the application of the force, the reduction of the dimension of the pin at the point where the force is applied shall not exceed 0.15 mm.

After removal of the rod, the dimension of the pin at other places shall not have changed by more than 0.06 mm in any direction.

13.3 Pins of plugs shall be locked against rotation and shall not be removable without dismantling the plug.

It shall not be possible to replace the earthing or neutral pins or contacts or plugs in an incorrect position.

Compliance is checked by inspection, by manual test and by the test of 23.2.

13.4 Earthing contacts and neutral contacts of portable socket-outlets shall be locked against rotation and shall not be removable except with the aid of a tool after dismantling the socket-outlet. Compliance is checked by inspection, by manual test and for portable socket-outlets by the test of 23.2.

13.5 Socket-contact assemblies shall have sufficient resiliency to ensure adequate contact pressure.

Compliance is checked by inspection and by the tests of 19 and 21.

13.6 The enclosure of rewirable accessories shall completely enclose the terminals and the ends of flexible cable and cord.

The construction shall be such that the conductors can be properly connected and that, when the accessory is wired as in normal use, there is no risk that:

- a) the cores are pressed against each other;
- b) a core, the conductor of which is connected to a live terminal, comes into contact with accessible metal parts; and
- c) a core, the conductor of which is connected to the earthing terminal, comes into contact with live parts.

13.7 Rewirable accessories shall be so designed that terminal screws or nuts cannot become loose and fall out of position in such a way that they establish an electrical connection between live parts and the earthing terminal or metal parts connected to the earthing terminal. Compliance with the requirements of 13.6 and 13.7 is checked by inspection and by manual test.

13.8 Rewirable accessories with earthing contact intended by connection of flexible external conductors shall be designed with ample space for slack of the earthing conductor in such a way that if the strain relief should fail, the connection of the earthing conductor is subjected to strain after the connections, of the current-carrying conductors and that, in case of excessive stresses, the earthing conductor will break after the current-carrying conductors. Compliance is checked by the following test.

The flexible cable or cord is connected to the accessory in such a way that the current-carrying conductors are led from the strain relief to the corresponding terminals along the shortest possible path.

After they are correctly connected, the core of the earthing conductor is led to its terminal and cut off at a distance 8 mm longer than that necessary for its correct connection.

The earthing conductor is then connected to the terminal as well. It must then be possible to house the loop which is formed by the protective conductor owing to its surplus length, freely in the wiring space without squeezing or pressing the core when the shell or cap of the accessory is remounted and fixed correctly.

13.9 Terminals of rewirable accessories shall be so located or shielded that they comply with the following test.

A 6 mm length of insulation is removed from the end of a flexible conductor. One wire of the stranded conductor is left free and the remaining wires are fully inserted into and clamped in the terminal, as in normal use.

The free wire is bent, without tearing the insulation back, in every possible direction, and without making sharp bends round barriers. The free wire of a conductor connected to a live terminal shall not touch any accessible metal part or be able to emerge from the enclosure when the accessory has been assembled.

The free wire of a conductor connected to an earthing terminal shall not touch a live part.

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

The prohibition against making sharp bends round 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 plug or portable socket-outlet, for example, when a cover is pushed on.

13.10 Insulating parts which keep the live parts in position shall be reliably fixed together, and it shall not be possible to dismantle the accessory without the aid of a tool.

Compliance is checked by inspection and by manual test.

13.11 If covers of portable socket-outlets are provided with bushes for the entry holes for the pins, these bushes shall not be allowed to be removed from the outside or to become detached inadvertently from the inside, when the cover is removed.

13.12 Screws intended to allow the access to the accessory shall be captive. The use of tight fitting washers of cardboard or the like is deemed to be an adequate method for securing screws which must be captive.

Compliance with the requirements of **13.11** and **13.12** is checked by inspection.

13.13 The engagement face of plugs shall have no projections other than the pins, when the plug is wired as in normal use.

Compliance is checked by inspection, after fitting with conductors.

13.14 Portable socket-outlets shall be so designed that full engagement of associated plugs is not prevented by any projection from their engagement face.

Compliance is checked by the test of **12.5**.

13.15 Plugs shall be shaped in such a way and made of such a material that they can easily be withdrawn by hand from the relevant socket-outlet.

In addition, the gripping surfaces shall be so designed that the plug can be withdrawn without having to pull on the flexible cable or cord.

14. MATERIALS

14.1 The component parts of the plugs and socket-outlets shall be manufactured from the following material specified against each:

Part	Material
a) Plug base, plug cover, socket-outlet cover and shutter	Tough, non-ignitable insulating material
b) Socket base	Tough, non-ignitable insulating material or vitrified ceramic material
c) Pins, terminals and current-carrying parts, including earthing-pin and earthing contact	Phosphor-bronze, brass, aluminium alloy or suitable material
d) Non-current carrying parts	Mild steel, aluminium alloy, brass or similar alloys, or insulating material

14.2 Vitrified ceramic material shall be resistant to water absorption which shall not depend on glaze.

15. RESISTANCE TO AGEING AND MOISTURE

15.1 Resistance to Ageing — Accessories shall be resistant to ageing.

Parts intended for decorative purposes only, such as certain lids, are to be removed before the test.

Compliance is checked by the following test.

Accessories, mounted as in normal use, are subjected to a test in a heating cabinet with an atmosphere having the composition and pressure of the ambient air and ventilated by natural circulation.

The temperature in the cabinet is $70 \pm 2^\circ\text{C}$.

The samples are kept in the cabinet for 7 days (168 h).

The use of an electrically heated cabinet is recommended.

Natural circulation may be provided by holes in the walls of the cabinet.

After the treatment, the samples are removed from the cabinet and kept at room temperature and relative humidity between 45 and 55 percent for at least 4 days (96 h).

The samples shall show no crack visible with normal or corrected vision without additional magnification, nor shall the material have become sticky or greasy, this being judged as follows.

With the forefinger wrapped in a dry piece of rough cloth, the sample is pressed with a force of 5 N.

No traces of the cloth shall remain on the sample and the material of the sample shall not stick to the cloth.

After the test, the samples shall show no damage which would lead to non-compliance with this standard.

The force of 5 N can be obtained in the following way.

The sample is placed on one of the pans of a balance and the other pan is loaded with a mass equal to the mass of the sample plus 500 g. Equilibrium is then restored by pressing the sample with the forefinger wrapped in a dry piece of rough cloth.

15.2 Resistance to Humidity — Accessories shall be proof against humidity which may occur in normal use.

Compliance is checked by the humidity treatment described in this subclause, followed immediately by the measurement of the insulation resistance and by the electric strength test specified in 16.

Inlet opening in the enclosure, if any, is left open; if knockouts are provided, one of them is opened.

Parts which can be removed without the aid of a tool, are removed and subjected to the humidity treatment with the main part; spring lids are open during this treatment.

The humidity treatment is carried out in a humidity cabinet containing air with a relative humidity maintained at not less than 95 percent. The temperature t of the air, where samples are placed, is maintained at $40 \pm 5^\circ\text{C}$. The humidity treatment is carried out for a period of 48 hours.

Before being placed in the humidity cabinet, the samples are brought to a temperature between t and $t+4^\circ\text{C}$, where t is the temperature in the humidity cabinet. In most cases, the samples may be brought to the specified temperature, by keeping them at this temperature for at least 4 h before the humidity treatment.

A relative humidity of 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 samples shall meet the requirements of 16 within 2 to 3 minutes of their removal from the humidity cabinet.

16. INSULATION RESISTANCE AND ELECTRIC STRENGTH

16.1 Insulation Resistance

16.1.1 At the Prevailing Atmospheric Conditions — The test may be carried out at prevailing atmospheric condition with relevant humidity not exceeding 80 percent.

16.1.1.1 The insulation resistance (dry) shall be measured at a voltage of 500 volts dc after 1 minute of electrification between the parts specified in 16.2.1.

16.1.1.2 The insulation resistance thus measured shall be not less than 100 megohms.

16.1.2 The insulation resistance shall then be measured within 2 to 3 minutes after the removal of plug or socket-outlet from the conditioning chamber in accordance with 15.2.

16.2 Electric Strength

16.2.1 Plugs and socket-outlets shall satisfactorily withstand the application of an ac voltage of 1 500 V rms for a period of 1 minute without arcing or puncture amongst the following parts:

- a) Between line and neutral, and
- b) Between line and neutral connected together and any other parts insulated therefrom including earthing terminal.

16.2.2 The test voltage shall be approximately of sine-wave form having any convenient frequency between 40 and 60 cycles per second.

16.2.3 The test voltage shall be applied gradually. The initial voltage shall not exceed 30 percent of the full test voltage and shall be increased uniformly to full voltage within 30 seconds. The full test voltage shall be maintained for 1 minute after which the voltage shall be diminished rapidly to 30 percent of its full value before switching it off.

16.2.4 Immediately following the test for high voltage, the insulation resistance (dry) shall be measured in accordance with 16.1.

16.2.5 Flesh Test — As a routine test, the high voltage test may be carried out in the form of flash test, an ac voltage of 2 000 V rms being applied for a period of 1 second between the parts specified in 16.2.1 without arcing.

17. EFFECTIVENESS OF CONTACT

17.1 The effectiveness of contact between a plug pin and the corresponding socket-outlet shall be such that in the completely engaged position, the voltage drop at full current rating shall not exceed 15 millivolts when measured between the terminal of the plug pin and the terminal of the socket-contact.

18. TEMPERATURE RISE

18.1 Accessories shall be so constructed that they comply with the following temperature rise test.

Rewirable accessories are fitted with polyvinyl chloride insulated conductors having a nominal cross-sectional area as shown in Table 3.

RATED CURRENT OF ACCESSORY	NOMINAL CROSS-SECTIONAL AREA (mm ²)	
	Flexible Conductors for Portable Accessories	Rigid Conductors (Solid or Stranded) for Fixed Accessories
(1)	(2)	(3)
5	1	1.5
15	1.5	2.5

The terminal screws or nuts are tightened with a torque equal to two third of that specified in Table 4.

DIAMETER OF SCREW*	TORQUE	
	Screws Without Head†	Other Screws
(1)	(2)	(3)
mm	Nm	Nm
3	0.25	0.5
3.5	0.4	0.8
4	0.7	1.2
5	0.8	2.0
6	—	2.5

*See IS : 1362-1962 'Dimensions for screw threads for general purposes (diameter range 1.6 to 39 mm) (revised)'.
†This also includes screws which do not protrude from the holes when tightened.

To ensure normal cooling of the terminals, the conductors connected to them must have a length of at least 1 m.

18.2 The temperature-rise measured by means of a thermocouple shall not exceed 20°C on any part after the plugs and socket-outlets have carried their full rated current and attained a steady temperature.

18.3 The temperature rise shall be measured by thermocouples attached by low melting point alloy or by some other equally effective means of attachment.

19. BREAKING CAPACITY

19.1 Plugs and socket-outlets shall be capable of breaking current 125 percent of the rated

current at a voltage not less than 110 percent of the rated voltage, 10 times in succession, at intervals of 30 seconds, the plug being withdrawn from the socket-outlet by hand at the rate of approximately 15 cm per second. The earthing socket-contact and neutral-contact shall be connected together, and the socket-outlet shall be mounted as it is normally done in service.

19.2 After completion of the test, the voltage drop across the plug and socket-outlet shall not exceed 50 millivolts.

20. ENDURANCE TEST FOR SHUTTERS

20.1 Shutters shall be capable of continuing to work after having been operated mechanically 5 000 times by the pins of the corresponding plugs not carrying any current, at a rate not exceeding 20 complete cycles per minute and at regular intervals. The means used for moving pins shall be such as to give a speed approximately 15 cm/s both during insertion and during withdrawal.

21. WITHDRAWAL PULL

21.1 The socket-outlets are mounted as in normal use and the pulling force is applied in such a place and direction as to simulate normal use. The socket-outlet should be so held that the gauge (see Appendix A) is substantially vertical and the projecting part of it is downmost. The gauge shall not slide down under its own weight.

21.2 Force necessary to withdraw the plug from the socket-outlet shall be between the limits given in Table 5.

CURRENT RATING	FORCE IN NEWTONS	
	Min	Max
(A)	(2)	(3)
5	3.0	60
15	4.0	80

22. CORD GRIP

22.1 The plug is fitted with the flexible cord or cable, the cord grip being appropriately used. The conductors are introduced into the terminals and the terminal screws are tightened by applying two-thirds of the torque specified in Table 4 so that the conductors may not easily change the position. After reassembling, the parts of the body shall fit closely together, and it shall not be possible to push the cord further into the plug.

22.2 The flexible cord is then subjected 100 times, each for 1 second, to a pull of 60 N applied gradually; the pull shall not be applied in jerks.

22.3 Immediately afterwards, the cord is subjected for a period of 1 minute to a torque of 0.15 Nm. During the test, no damage shall be caused to the flexible cord.

22.4 At the end of the test, the cord shall not have displaced by more than 2 mm in the cord grip and the end 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 or cable under strain at a distance of approximately 2 cm from the cord grip. At the end of the test, the displacement of this mark in relation to the cord grip is measured while the cord or cable is still under strain.

23. MECHANICAL STRENGTH

23.0 Accessories, surface mounting boxes and screwed glands shall have adequate mechanical strength to withstand the stresses imposed during installation and use.

Compliance is checked by the following tests.

23.1 For Socket-Outlets

23.1.1 Mechanical strength of the fixed socket-outlets and specially mechanical strength of covers and boxes for flush type socket-outlets is tested in the impact test apparatus described in Appendix B.

23.1.2 The socket-outlets are mounted on the support as in normal use and subjected to blows from a suitable impact test apparatus.

23.1.3 Flush type socket-outlets are placed in recess in a block of hard-wood so that the front of the box, if any, is flush with the block.

23.1.4 Boxes for flush type socket-outlets are also tested separately, held against the support with the bottom towards the hammer. The sample is so placed that the point of impact lies in a vertical plane through the axis of the pendulum.

23.1.5 Ten blows are applied to points evenly distributed over the sample as specified below:

- a) For flush type socket-outlets, one blow in the centre, one at each extremity of the area which covers the box, and the other two midway between the other blows, preferably on the ridge, if any, the sample being moved horizontally; five more blows are then applied in the same way after the sample has been turned through 90 about its axis (perpendicular to the support); and
- b) In all other cases, one blow in the centre, one on each side with the sample turned as far as possible, up to 60, and the other two midway between the other blows, preferably on the ridge, if any, the sample being turned around a vertical axis; five more blows are then applied in the same way after the sample has been turned through

90 about its axis (perpendicular to its support).

If cable entries are provided, the two lines of the blows on the surface of the samples are chosen so as to be as nearly as possible, equidistant from the entry holes.

23.1.6 The impact energy for each blow shall be 0.25 Nm for covers of flush type socket-outlets and for those parts of their covers which are protected by a ridge having a height of at least one-fourth of the largest dimension of the protected part, and 0.4 Nm for all other parts.

23.1.7 During the test, cracks may appear and small pieces may become detached, but provided the external parts, such as, covers, cover plates and boxes can be removed and replaced and the protection against electric shock is not impaired, the socket-outlet shall be deemed to have passed the test.

23.2 Test for Mechanical Strength (for Plugs Only)

23.2.1 The plugs are tested for mechanical strength in the tumbling barrel as shown in Fig. 7.

23.2.2 The sample is fitted with flexible cord or cable with the corresponding current rating and a length of 100 mm. The terminals and assembly screws are tightened to two-thirds of the test torque specified in Table 4. The sample falls from a height of 50 cm on to a steel plate of 3 mm thickness. The barrel is turned at a rate of 5 rev-min, 10 falls per minute thus taking place. Only one sample is tested at a time.

The sample is dropped:

- a) 1 000 times if the weight of the sample is not over 100 g,
- b) 500 times if the weight of the sample is over 100 g and up to 200 g, and
- c) 100 times if the weight of the same is over 200 g.

23.2.3 After the test, the sample shall show no signs of damage within the meaning of the specification. No parts shall have become detached or loosened, specially the connection of the flexible cord or cable to the terminals.

23.2.4 Pins shall not be deformed to an extent that they no longer comply with the requirements of 8.1 and 9. They shall be able to withstand for 1 minute a torque of 0.8 Nm applied in both directions, without turning.

24. RESISTANCE TO HEAT

24.0 Accessories made of moulded insulating material shall be resistant to heat. Compliance is checked by the following test.

24.1 The sample shall be kept in a heating cabinet at a temperature of $100 \pm 5^\circ\text{C}$ for a period of 1 hour.

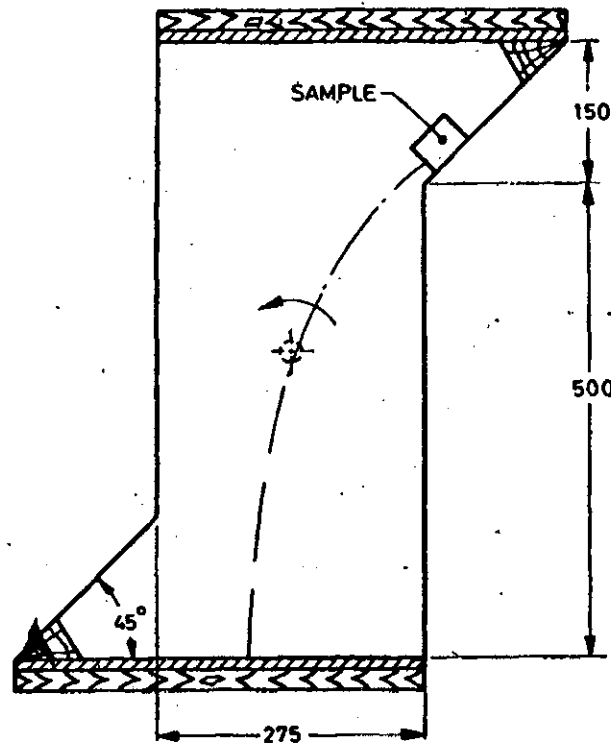


FIG. 7 TUMBLING BARREL

24.1.1 The sample shall not undergo any change impairing its further use and sealing compound shall not flow to such an extent that live parts are exposed.

24.1.2 External parts of insulating material are subjected to a ball pressure test by means of the apparatus shown in Fig. 8. A steel ball of 5 mm diameter is pressed by a force of 20 N on any external surface placed in the horizontal position. The test is made at a temperature of $125 \pm 5^\circ\text{C}$.

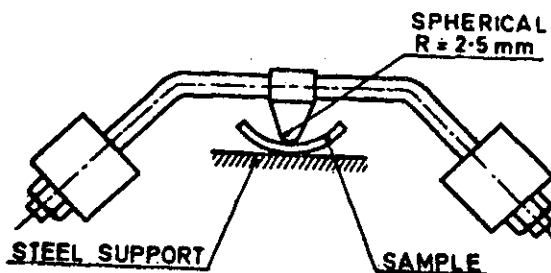


FIG. 8 BALL PRESSURE APPARATUS

24.1.2.1 After 1 hour, the ball is removed and the diameter of impression measured. The diameter shall not exceed 2 mm.

25. SCREWS, CURRENT CARRYING PARTS AND CONNECTIONS

25.1 Connections, electrical or mechanical, shall withstand the mechanical stresses occurring in normal use.

Screws or nuts which transmit contact pressure shall be in engagement with a metal thread.

Compliance is checked by inspection and, for screws and nuts transmitting contact pressure or which are operated when connecting up the accessory, by the following test.

The screws or nuts are tightened and loosened:

- a) 10 times for screws in engagement with a thread of insulating material and for screws of insulating material, and
- b) 5 times in all other cases.

Screws or nuts in engagement with a thread of insulating material and screws of insulating material are completely removed and reinserted each time.

The test is made by means of a suitable screw driver or other tool, a torque as given in Table 4 applied.

During the test, no damage impairing the further use of the screwed connections shall occur, such as breakage of screws or damage to the head slots, threads, or washers.

Screws or nuts which are operated when connecting up accessories include screws for fixing covers or cover plates, etc, but not connecting means for screwed conduits and screws for fixing the base of a fixed socket-outlets.

The shape of the blade of the test screw driver must match the head of the screw to be tested. The screws and nuts must not be tightened in jerks. Damage to covers is neglected.

25.2 Screws in engagement with a thread of insulating material and which are operated when connecting up the accessory, shall have a length of engagement of at least 3 mm plus one-third of the nominal screw diameter or 8 mm, whichever is shorter.

Correct introduction of the screw into the screw hole or nut shall be ensured.

Compliance is checked by inspection, by measurement and by manual test.

The requirement with regard to correct introduction is met if introduction of the screw in a slanting manner is prevented, for example, by guiding the screw by the part to be fixed, by a recess in the female thread or by the use of a screw with the leading thread removed.

25.3 Screws and rivets which serve as electrical as well as mechanical connections, shall be locked against loosening or turning.

Compliance is checked by inspection and by manual test.

Spring washers may provide satisfactory locking.

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

Sealing compound which softens on heating provides satisfactory locking only for screw connections not subjected to torsion in normal use.

26. CREEPAGE DISTANCES AND CLEARANCES

26.1 Creepage and clearance distance shall be not less than the value specified below:

Parts	Creepage Distance mm
Between live parts of different polarity	3.0
Between live parts and accessible metal parts, earthing contact screws or devices for fixing base or cover of fixed socket-outlets and assembly screws of plugs (except screws on the front surface of plugs)	3.0

NOTE — Gaps or grooves less than 1 mm wide are ignored when measuring creepage distances.

Parts	Clearances mm
Between live parts of different polarity	3.0
Between live parts and accessible metal parts, earthing contacts screws or devices for fixing base or cover of fixed socket-outlets and assembly screws of plugs (except screws on the front surface of plugs)	3.0

27. TEST FOR WATER ABSORPTION

27.1 The vitreous ceramic and moulded insulating material shall be resistant to water absorption which shall not depend on glaze or varnish.

27.1.1 Vitreous Ceramic Material

27.1.1.1 Clean, dry plug bases and socket-outlet bases made of vitreous ceramic material from which metallic portions have been removed, shall be broken into pieces having a size within the range of 6 to 12 mm. A number of these pieces, not less than 40 g nor more than 50 g in weight, shall be taken for testing.

27.1.1.2 The test pieces shall be heated to $110 \pm 1^\circ\text{C}$ in a dry atmosphere for at least 2 hours and cooled in a desiccator to remove the residual moisture, if any.

27.1.1.3 The conditioned test pieces shall then be weighed and immersed in distilled water for 24 hours, after which the test pieces shall be taken from water and the residual drops of water are removed by rolling them over a piece of filter paper or dry cloth.

27.1.1.4 The test pieces shall be re-weighed to the nearest milligram within 10 minutes after removal from the water.

27.1.1.5 The percentage of water absorption shall be calculated from these measurements.

27.1.1.6 The ceramic material shall not have absorbed more than 0.5 percent of water.

27.1.2 Moulded Insulating Material — Test pieces having a size within the range of 12 to 20 mm shall be prepared from parts of plugs and socket-outlets made of moulded insulating materials and subjected to water absorption test in accordance with 27.1.1 except that the sample pieces shall be heated at a temperature of $50 \pm 3^\circ\text{C}$ for 24 hours for driving away the residual moisture.

The moulded insulating material shall not have absorbed more than 2.0 percent of water.

NOTE — To avoid retention of water on the surface, test pieces should be wiped individually.

28. RESISTANCE TO RUSTING

28.1 All ferrous parts shall be rendered rust proof.

28.2 All ferrous parts including fixing fasteners shall be subjected to the test specified in 28.2.1 and 28.2.2.

28.2.1 All grease shall be removed from the parts to be tested by immersion in carbon tetrachloride for 10 minutes. The parts shall then be immersed for 10 minutes in an aqueous solution of 10 percent ammonium chloride at a temperature of $27 \pm 5^\circ\text{C}$.

28.2.2 Without drying but after shaking off any drops of the solution, the parts shall then be placed for 10 minutes in a box containing air saturated with moisture at a temperature of $27 \pm 5^\circ\text{C}$. The samples shall then be dried for 10 minutes in a heating cabinet at a temperature of $100 \pm 5^\circ\text{C}$.

28.2.2.1 At the end of this treatment, surfaces shall show no signs of rust.

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

29. TESTS**29.1 Classification of Tests**

29.1.1 Type Tests — The following shall be carried out as type tests on selected samples of, plugs and socket-outlets, the samples being drawn preferably at random from regular production lot:

- a) Visual examination (*see* 7.5),
- b) Checking of dimensions (*see* 8, 11 and 26),
- c) Protection against electric shock (*see* 9),
- d) Construction (*see* 12 and 13),
- e) Interchangeability (*see* 8.5),
- f) Resistance to ageing and moisture (*see* 15),
- g) Insulation resistance and electric strength (*see* 16),
- h) Effectiveness of contact (*see* 17),
- j) Temperature rise (*see* 18),
- k) Breaking capacity (*see* 19),
- m) Endurance test for shutters (*see* 20),

- n) Withdrawal pull (*see* 21),
- p) Cord grip (*see* 22),
- q) Mechanical strength (*see* 23),
- r) Resistance to heat (*see* 24),
- s) Screws and connections (*see* 25),
- t) Water absorption (*see* 27), and
- u) Resistance to rusting (*see* 28).

29.1.1.1 Number of samples shall be five and each shall be subjected to the tests specified in 29.1.1 in the orders specified therein.

29.1.1.2 Criteria for approval — All samples subjected to type tests shall pass all the tests for proving conformity with the requirements of this standard. If one or more failures occur, the testing authority at its discretion may call for twice the original number of samples and subject them to all tests or those in which failure occurred. No failure shall be permitted in the repeat test(s).

29.1.2 Acceptance Tests

The following shall constitute acceptance tests:

- a) Visual examination,
- b) Dimensions,
- c) Interchangeability,
- d) Resistance to moisture,
- e) Insulation resistance and electric strength,
- f) Effectiveness of contact,
- g) Temperature rise,
- h) Breaking capacity,
- j) Endurance test for shutters,
- k) Withdrawal pull, and
- m) Mechanical strength.

29.1.2.1 A recommended sampling procedure for acceptance tests is specified in Appendix C.

29.1.3 Routine Tests

29.1.3.1 The following shall constitute routine tests:

- a) Visual inspection,
- b) Interchangeability, and
- c) High voltage.

APPENDIX A

(*Clauses* 8.1.1, 8.5 and 21.1)

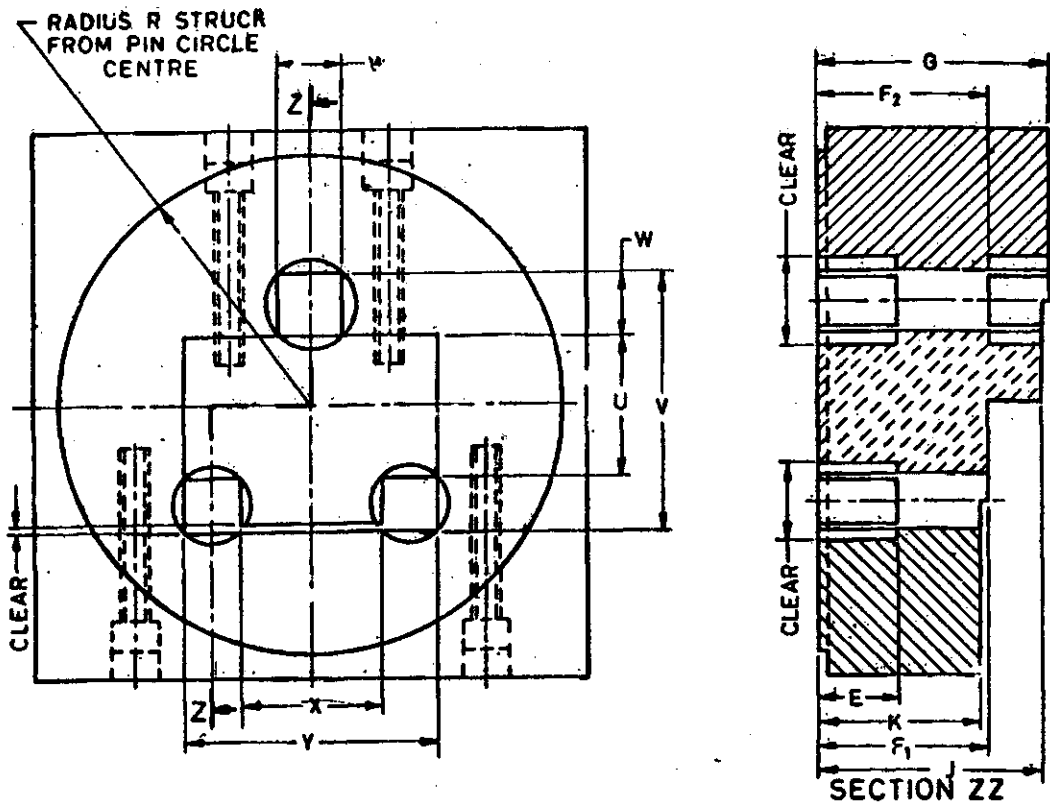
GAUGES FOR PLUGS AND SOCKET-OUTLETS**A-1. 'GO' GAUGE FOR PLUGS**

A-1.1 The gauge (*see* Table 6) is to prove correct spacing of plug pins. It accepts the

plugs with plug pins at any centres that can be accepted without interference in socket-outlets gauged by the maximum and minimum socket-gauges.

TABLE 6 'GO' GAUGE FOR PLUG
(Clause A-1.1)

All dimensions in millimetres.



RATING	U	V	W	X	Y	E	F ₁	G	J	K	R	F ₂
A												
6	13.83	26.33	7.24	13.79	24.31	7.6	16.92	21.67	20.50	15.75	27.18	17.02
16	17.53	33.66	8.89	18.16	32.64	10.2	21.67	29.62	28.45	20.50	32.26	21.59
Tolerances	+0.01 -0.00	+0.00 -0.01	+0.00 -0.01	+0.00 -0.01	+0.00 -0.01	+0.25 -0.25	+0.01 -0.00	+0.01 -0.00	+0.00 -0.01	+0.00 -0.01	— —	+0.25 -0.25

NOTE — The drawings are not intended to be mandatory regarding details of construction.

A-1.1.1 In addition, it proves the absence of axial projections on the face of the plug base when a plug is fully inserted into the gauge, and it also indicates accuracy of projection of the plug pins from the face of the plug if the end of each plug pin lies within the appropriate step on the back of the gauge when the plug is fully inserted.

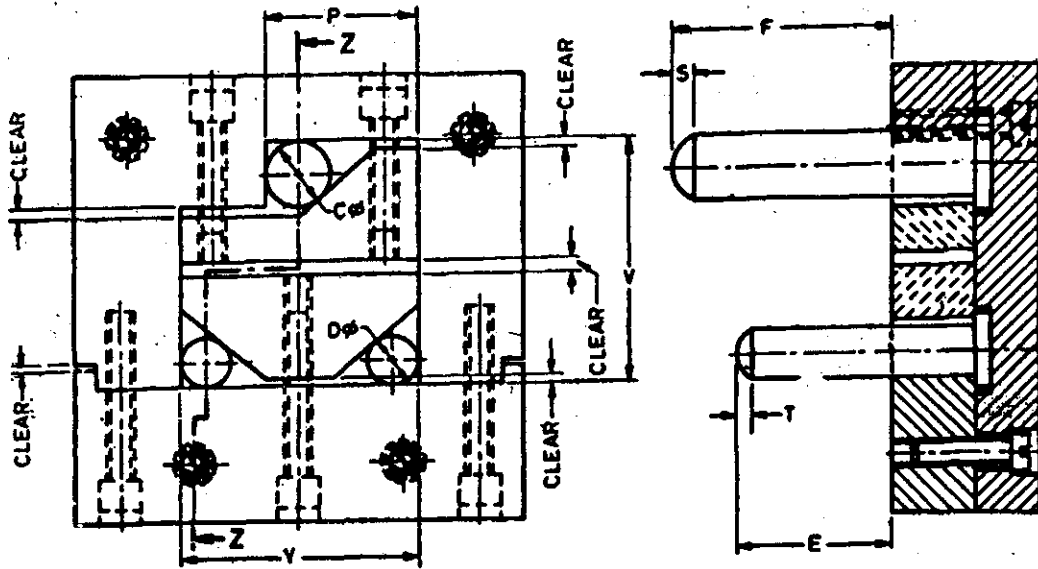
A-2. 'GO' GAUGES FOR SOCKET-OUTLETS

A-2.1 Two gauges (see Tables 7 and 8) are required, each having pins of the maximum

diameters specified in 8.1, but one gauge having its pins so set that its complete insertion into socket-outlet proves that the socket-outlet will accept without interference, a plug having plug pins at the maximum centre distance and the other gauge having its pins so set that its complete insertion into a socket-outlet proves that the socket-outlet will accept without interference a plug having plug pins at the minimum centre distance. The socket-outlet gauges also prove the absence of axial projections on the face of the socket-outlet.

TABLE 7 MAXIMUM 'GO' GAUGE FOR SOCKET-OUTLET
(Clause A-2.1)

All dimensions in millimetres.



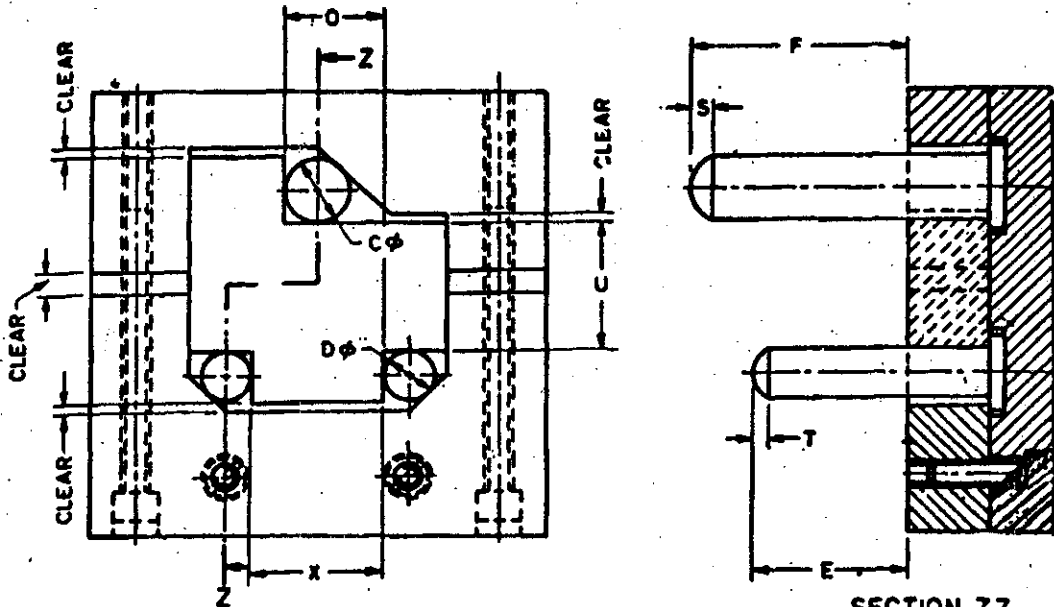
SECTION ZZ

RATING A	V	Y	C	D	E	F	$P = Y + \frac{C}{2}$	S	T
6	26.33	24.31	7.09	5.10	16.92	21.67	15.70	1.98	1.57
16	33.66	32.64	8.74	7.09	21.67	29.62	20.69	2.36	1.98
Tolerances	+0.01 -0.00	+0.01 -0.00	+0.00 -0.01	+0.00 -0.01	+0.00 -0.01	+0.00 -0.01	+0.005 -0.000	+0.25 -0.00	+0.25 -0.00

Notes — The drawings are not intended to be mandatory regarding details of construction.

TABLE 8 MINIMUM 'GO' GAUGE FOR SOCKET-OUTLET
(Clause A-2.1)

All dimensions in millimetres.



SECTION ZZ

RATING A	U	X	C	D	E	F	$O = X + \frac{C}{2}$	S	T
6	13.83	13.79	7.09	5.10	16.92	21.67	10.44	1.98	1.57
16	17.53	18.15	8.74	7.09	21.67	29.62	13.45	2.36	1.98
Tolerances	+0.00 -0.01	+0.00 -0.01	+0.00 -0.01	+0.00 -0.01	+0.00 -0.01	+0.00 -0.01	+0.00 -0.005	+0.25 -0.00	+0.25 -0.00

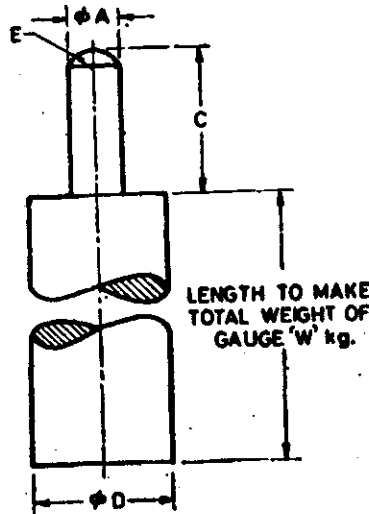
Notes — The drawings are not intended to be mandatory regarding details of construction.

A-3. WITHDRAWAL PULL GAUGES FOR EFFECTIVENESS OF CONTACT

A-3.1 These gauges (see Table 9) are to test the withdrawal pull specified in 21 and shall be used in individual socket-contacts of

complete socket-outlets. They shall be applied, when used, after the maximum 'GO' gauge for socket-outlet. When gauging, line and neutral socket contacts, the shutter, if any, shall be kept clear of the gauge.

TABLE 9 WITHDRAWAL PULL GAUGES
All dimensions in millimetres.



RATING	CONTACTS	A	C	D	E	W kg
A						
6	Current-carrying	5.06	15.9	15.9	2.7	0.23
	Earthing	7.04	20.6	19.1	4.0	0.23
16	Current-carrying	7.04	20.6	19.1	4.0	0.35
	Earthing	8.69	28.6	22.2	5.0	0.35
Tolerances		+0.00 -0.01	+0.025 —	— —	+0.1 —	+0.03 -0.00

APPENDIX B

(Clause 23.1.1)

IMPACT TEST APPARATUS

B-1. DESCRIPTION OF APPARATUS

B-1.1 A typical impact apparatus has been shown in Fig. 9.

B-1.2 The pendulum consist of a steel tube with an external diameter of 9.0 mm and a thickness of 0.5 mm. It is suspended in such a way that it swings only in a vertical plane. A striking element weighing 0.15 kg is rigidly fixed to the lower end of the pendulum with its axis one metre below the axis of suspension. The striking element has a hemispherical face made of hardwood, polyamide or the like, of hardness of 80 to 100 Rockwell R Scale.

B-1.3 The support for the sample shall be such that the sample can be so placed that the point

of impact lies in a vertical plane through the suspension axis of the pendulum. The sample can be turned about an axis perpendicular to the support, the sample can be turned about a vertical axis and the sample can be moved horizontally and vertically.

B-1.4 The sample shall be mounted on the support as in normal use. Cable entries shall be left open. Fixing screws of bases and covers are tightened to two-thirds the torque specified in Table 4.

B-1.5 The height of fall shall be as under:

Impact Energy	Height of Fall
0.25 Nm	170 mm
0.40 Nm	270 mm

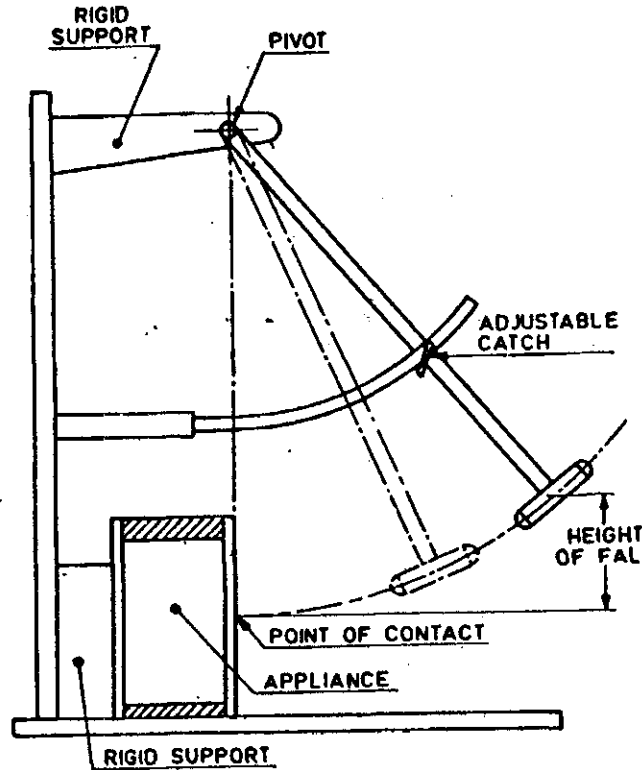


FIG. 9 APPARATUS FOR IMPACT TEST

APPENDIX C
(Clause 29.1.2.1)

SAMPLING PROCEDURE

C-1. LOT

C-1.1 In any consignment, all plugs and socket-outlets of the same type manufactured by the same factory during the same period shall be grouped together to constitute a lot.

C-1.2 From each lot, a certain number of plugs and socket-outlets as specified in Table 10 shall be selected at random and subjected to tests specified in 29.1.2.

C-2. CRITERION FOR CONFORMITY

C-2.1 In Table 10, N_1 is the size of the first sample. If the number of failures found in this sample is less than or equal to C_1 , the lot shall be considered to be conforming to this standard and accepted. If the number of failures is greater than or equal to C_2 , the lot shall be rejected. If the number of failure is between C_1 and C_2 , further sample of N_2 pieces shall be taken and subjected to all tests.

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

TABLE 10 SAMPLING PLAN
(Clauses C-1.2 and C-2.1)

LOT SIZE (1)	N_1 (2)	N_2 (3)	(N_1+N_2) (4)	C_1 (5)	C_2 (6)
51 to 100	10	20	30	0	3
101 to 200	13	26	39	0	5
201 to 300	20	40	60	1	5
301 to 500	25	50	75	1	6
501 to 800	35	70	105	2	7
801 to 1 300	50	100	150	3	10
1 301 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 consumer's risk depends on the lot size and it would be minimum when the lot size is the maximum.

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AMENDMENT NO. 1 OCTOBER 1989
TO
IS : 1293 - 1988 SPECIFICATION FOR
PLUG AND SOCKET-OUTLETS OF 250 VOLTS
AND RATED CURRENT UPTO 16 AMPERES

(Second Revision)

(Page 12, clause 15.2, para 5) — Substitute the following for the existing para:

'The humidity treatment is carried out in a humidity cabinet containing air with a relative humidity maintained at not less than 90 percent. The temperature *t* of the air, where samples are placed, is maintained between 15°C and 35°C. The humidity treatment is carried out for a period of 48 hours.'

(Page 16, clause 27.1.1.2, line 2) — Substitute '100 ± 5°C' for '110 ± 1°C'.

(Page 17, clauses 28.2.1 and 28.2.2) — Substitute the following for the existing clauses:

28.2.1 All grease shall be removed from the parts to be tested by immersion in carbon tetrachloride for 10 minutes. The parts shall then be immersed for 10 minutes in an aqueous solution of 10 percent ammonium chloride at a temperature between 15°C and 35°C.

28.2.2 Without drying but after shaking off any drops of the solution, the parts shall then be placed for 10 minutes in a box containing air having relative humidity not less than 90 percent at a temperature between 15°C and 35°C. The samples shall then be dried for 10 minutes in a heating cabinet at a temperature of 100 ± 5°C.'

(ETDC 43)

AMENDMENT NO. 2 DECEMBER 1989
TO
IS : 1293 - 1988 SPECIFICATION FOR PLUGS AND
SOCKET-OUTLETS OF 250 VOLTS AND RATED
CURRENT UP TO 16 AMPERES

(Second Revision)

(Cover page, page 1, title) — Substitute the following for the existing title:

'SPECIFICATION FOR PLUGS AND SOCKET
OUTLETS OF RATED VOLTAGE UP TO AND
INCLUDING 250 VOLTS AND RATED
CURRENT UP TO AND INCLUDING 16
AMPERES

(Second Revision)'

(Page 1, clause 1.1) — Substitute the following for the existing clause:

'This standard covers the requirements and tests for three-pin two-pole and earthing plugs and socket outlets (shuttered and non-shuttered) suitable for ac and dc circuits having voltages up to and including 250 Volts.

NOTE — 2 pin plugs and socket outlets are considered non-standard (see 0.4).'

[*Page 4, clause 6.1(c)(iii)*] — Delete the existing matter and renumber '6.1(c) (iv)' as '6.1(c) (iii)'.

[*Page 4, clauses 7.1(e) and 7.2(e)*] — Substitute '≡' for the existing symbol for earthing.

(Page 4, clause 8.1) — Insert the following at the end of the clause:

'Dimensions *A* and *B* are for the guidance of the manufacturer. Compliance with these shall be checked by the tests of 8.5.'

(Page 4, clause 8.1.1, Note) — Substitute the following for the existing note:

'NOTE — In case of socket-outlets, dimensions *C* and *D* shall comply with the requirements of 8.5.'

(Page 4, clause 8.3) — Delete the existing matter and give the heading of the clause, that is, 'Design and construction' under 8.3.1. Also renumber 8.3.1 and 8.3.2 as 8.3 and 8.3.1 respectively.

(Page 5, Table 1) — Substitute '6A' for '8A' in col 2 and insert the following additional note at the end of the table:

'NOTE — Dimension G shall be applicable to the earthing terminal also with effect from 1 January 1991.'

(Page 5, clause 8.4, line 5) — Substitute 'see Fig. 3' for 'see IS : 1401-1970'.

(Page 6, clause 9.1) — Substitute as under:

'An' for 'As' in the first line of para 7.

'Additional' for 'addition' in the first line of Para 9.

(Page 7, clause 9.2) — Delete and renumber the subsequent clauses.

(Page 8, Table 2) — Substitute the following for the existing table:

TABLE 2 DIMENSIONS OF TERMINALS

(Clause 11.1.5)

All dimensions in millimetres.

CURRENT RATING	NOMINAL THREAD DIAMETER	DIAMETER OF HOLE FOR CONDUCTOR	LENGTH OF THREAD IN PILLAR	DIFFERENCE BETWEEN DIAMETER OF HOLE AND NOMINAL DIAMETER OF SCREW
	<i>Min</i>	<i>Min</i>	<i>Min</i>	<i>Max</i>
(A)	(d)	(D)	(a)	(e)
For Plugs				
6	3	3.0	2.0	0.6
16	4	4.0	3.0	0.6
For Socket Outlets				
6	3.5	3.5	2.5	0.6
16	4	4.5	3.0	0.6

(Page 9, clause 12.4) — Substitute 'incorrect' for 'incurrect' in para 2, line 4.

(Page 10, clause 13.3) — Delete the clause and renumber the subsequent clauses.

(Page 12, clause 16.1.2) — Substitute the following for the existing clause:

16.1.2 The insulation resistance shall also be measured within 2 to 3 minutes after the removal of the plug or socket-outlet from the conditioning chamber in accordance with 15.2. The insulation resistance thus measured shall be not less than 2 megohms.

(Page 12, clause 16.2.5) — Substitute 'Flash' for 'Flesh' in the heading.

(Page 13, clause 21.1) — Delete and renumber 21.2 as 21.1.

(Page 13, Tables 3 and 5) — Substitute '6' and '16' for '5' and '15' respectively in the first column.

(Page 14, clause 23.0, lines 1 and 2) — Delete the words 'surface mounting boxes and screwed glands'.

(Page 14, clause 23.1.5) — Substitute '90°', '60°' and '90°' for '90', '60' and '90' respectively.

(Page 14, clause 23.2) — Substitute the following for the existing heading:

'Test for Mechanical Strength (for Plugs and Portable Socket Outlets Only)'

[Page 14, clause 23.2.2(c)] — Substitute 'sample' for 'same'.

(Page 16, clause 27.1.1.6, line 2) — Substitute '1.0 percent' for '0.5 percent'.

(Page 17, clause 29.1.2) — Insert the following note at the end of the clause:

Note — For the purpose of acceptance test, the humidity treatment is done for 24 hours while carrying out the test for resistance to moisture (15).

(Page 20, clause A-3 and Table 9) — Delete.

(Page 21, Fig. 9) — Substitute 'Sample' for 'Appliance'.

(Page 21, Table 10) — Renumber the table as 'TABLE 9'.

(ETDC 44)

AMENDMENT NO. 3 DECEMBER 1992
TO
IS 1293 : 1988 SPECIFICATION FOR PLUGS AND
SOCKET-OUTLETS OF 250 VOLTS AND RATED
CURRENT UP TO 16 AMPERES

(Second Revision)

(Page 1, clause 0.3) — Substitute the following for the existing clause:

‘0.3 This standard covers the requirement and test methods for 3 pin (two-pole and earthing) plugs and socket-outlets (including multiple socket-outlets) suitable for ac and dc circuits having a rated voltage not exceeding 250 V.’

[Page 1, clause 1.1 (see also Amendment No. 2)] — Substitute the following for the existing clause:

‘1.1 This standard covers the requirements and tests for three-pin two-pole and earthing plugs and socket-outlets (shuttered and non-shuttered) including multi-socket outlet (shuttered and non-shuttered) suitable for ac and dc circuits with a rated voltage above 50 V but not exceeding 250 volts and a rated current of 6A or 16A.’

NOTE — 2-pin plugs and socket outlets are considered non-standard.’

(Page 4, clause 8.1.2) — Substitute the following for the existing clause:

‘8.1.2 In case of multiple socket-outlets, the wall thickness of the insulating material between respective pin holes for the 6A and 16A pins shall not be less than 2 mm. In case of shuttered socket-outlets, the wall thickness may not be provided.’

(Page 4, clause 8.1.3, para 2) — Substitute the following for the existing para:

‘The pins having slots for the purpose of tightening only shall have slot-depths between 3 mm minimum and 4 mm maximum for both 6A and 16A plugs.’

[Page 5, Table 1 (see also Amendment No. 2)] — Insert the following Notes as Note 1 and 2 and re-number the existing Note as Note 3:

‘NOTE 1 — ‘G’ is the minimum distance between the pins (live and neutral) and the periphery of the plug.’

NOTE 2 — Dimension ‘G’ shall also be applicable to the earthing pin with effect from 1 January, 1993.’

(Page 8, clause 12.2) — Substitute the following for the existing clause:

‘12.2 Socket-contacts and terminals of socket-outlet shall be resistant to corrosion and abrasion.’

(Page 17, clause 28.2.2.2) — Insert the following as clause 29 and renumber the subsequent clauses:

‘29 RESISTANCE TO ABNORMAL HEAT AND FIRE

29.1 Parts made from moulded insulating material shall be resistant to abnormal heat and fire as shown by the following test.

29.2 Test pieces shall be conditioned in accordance with Appendix D before the test is carried out.

29.3 The test shall be carried out in an oven as shown in Fig. 18 of IS 302-1 (1979) ‘Safety of household and similar electrical appliances: Part 1 General requirements (fifth revision)’.

The oven is heated by passing a suitably regulated electric current through a nichrome resistance wire surrounding the heating tube.

29.4 The opening at the top of the oven shall be in the form of a square with 25 mm sides and the inlet at the bottom of the oven shall be in the form of nine 3 mm diameter holes giving approximately 65 mm². The gas flame shall be of 16 to 22 mm high and fixed so that its base is immediately above and centrally placed over the top opening of the oven. The temperature of the oven shall be measured with a thermocouple situated at the level of the centre of the basket containing the specimens and equidistant from the inner surface of the heating tube and the basket which is suspended centrally in the chamber with its top 25 mm below the base of the pilot flame. The wire sizes shall be as given in IS 7358 : 1984 ‘Specification for thermocouples.’

29.5 The samples of the material to be tested shall be broken from an actual plug or socket outlet into small pieces and placed in a cylindrical wire mesh basket and the following conditions shall be complied with:

- a) *Size of basket* — 19 mm in diameter, 51 mm long with 2×2 mm openings.
- b) *Size of sample* — Just large enough to be retained in the basket. The total weight of the samples being approximately 6 g.

29.6 The heat chamber shall be raised to 300°C and the basket with samples shall be inserted from the top and suspended as specified in 29.4. The temperature shall then be readjusted to 200 ±10°C within a period of 3 minutes and this temperature shall be maintained until a period of 5 minutes has elapsed from the time of insertion of the

basket. At the end of the period of 5 minutes the basket shall be removed from the chamber.

29.7 The material shall be deemed to have passed the test if it has not, during the test period, given off vapours in sufficient quantity to ignite at the pilot flame. Any form of halo occurring during the specified time shall be ignored. Three tests on each material shall be carried out.

NOTES

1 It is recommended that a light stirrup of nichrome wire, supported by a length of nichrome wire, be used for supporting the basket which may also be made of this material.

2 It is not necessary to perform this test on materials that are obviously resistant to abnormal heat and fire, for example, ceramic or metal parts."

[Page 17, clause 29.1.1 (Renumbered 30.1.1)] — Insert the following at the end:

'v) Resistance to abnormal heat and fire (see 29).'

[Page 17, clause 29.1.1.1 (Renumbered 30.1.1.1), line 3] — Substitute '30.1.1' for '29.1.1'.

(Page 19, Table 7, col 8, formula) — Substitute the following for the existing formula:

$$P = \frac{Y + C}{2}$$

(Page 19, Table 8, col 8, formula) — Substitute the following for the existing formula:

$$O = \frac{X + C}{2}$$

(Page 21, Appendix C) — Insert the following Appendix after Appendix C:

'APPENDIX D

(Clause 29.2)

CONDITIONING OF SPECIMENS FOR RESISTANCE TO ABNORMAL HEAT AND FIRE TEST

The specimen shall be subjected for not less than 18 hours to a controlled atmosphere of 75 percent relative humidity, at a temperature of 15 to 25°C. Every specimen shall be tested as soon as possible after removal from the controlled atmosphere and in any case before three minutes have elapsed.

The specified relative humidity may be obtained by the use of lumps of sodium chloride*, which shall be sprinkled occasionally with water. The surface of the salt shall be moist, care being taken that the lumps are not flooded with water, and shall be large per unit volume of air space, or the rate of attainment of equilibrium will be very slow.

Sulphuric acid shall not be used for obtaining the specified relative humidity.

In order to ensure that the relative humidity of the controlled atmosphere is maintained at the correct value, it is necessary either that the temperature be kept very constant or that the air be circulated within the chamber.

The following method has been found satisfactory for maintaining constant the relative humidity of the controlled atmosphere.

The specimens are placed on a shelf half-way up in a cubical box with sides 0.6 m long. The floor of the box is nearly covered by a dish containing lumps of salt. Air is circulated by means of a small fan over the salt up through holes cut at two corners of the shelf, over the samples and down through holes at the opposite corners of the shelf.

The humidity of the air may be measured by wet and dry bulb thermometers. If the velocity of the air past the thermometers is greater than 3 m/sec, the humidity attains a constant value in about three minutes after the box has been closed and the fan has been started, unless the prevailing conditions are extreme.

As an alternative to wet and dry bulb thermometers, which may require a known air velocity, a dew point thimble may be inserted in the box and used when the fan is working. With either method a window is necessary to avoid opening the box.

*Common table-salt varies considerably in composition and is thus not always satisfactory for this purpose.

(ETD 14)

AMENDMENT NO. 4 JULY 1995
TO
IS 1293 : 1988 SPECIFICATION FOR PLUGS AND
SOCKET-OUTLETS OF RATED VOLTAGE UP TO
AND INCLUDING 250 VOLTS AND RATED
CURRENT UP TO AND INCLUDING 16 AMPERES
(Second Revision)

[*Page 4, clause 8.1.2 (see also Amendment No. 3)*] — Substitute the following for the existing clause:

'In the case of multiple socket-outlets, the minimum wall thickness of the insulating material of top cover (plate) between the holes for 6A and 16A pins shall be not less than 2 mm. In case of shuttered socket outlets wall thickness may not be provided.'

[*Page 5, Table 1 (see also Amendments No. 2 and 3)*] — Substitute the following for the existing notes:

'NOTE 1 — Dimension 'G' is the minimum distance between the pins (live and neutral) and the periphery of the plug.'

NOTE 2 — Dimension 'G' shall not be applicable for earth pin.'

(*Page 8, Table 2*) — Add the following note in this table:

"NOTE — The screw thread shall be as given in IS 4218 (Part 1) 'ISO metric thread'."

(*Page 11, clause 15.1, para 1, lines 3 and 4 of page 12*) — Substitute '65 and 75 percent' for '45 and 55 percent'.

(*Page 13, Table 4, col 1, heading*) — Substitute 'SCREW DESIGNATIONS' for 'DIAMETER OF SCREW'.

[*Page 17, clause 29.6, line 3 (see also Amendment No. 3)*] — Substitute '290+ 10°C' for '200 + 10°C'.

(ETD 14)

**AMENDMENT NO. 5 AUGUST 1996
TO
IS 1293 : 1988 SPECIFICATION FOR PLUGS AND
SOCKET-OUTLETS OF 250 VOLTS AND RATED
CURRENT UP TO 16 AMPERES**

(Second Revision)

(Page 4, clause 8.1.3, para 1) — Delete the words 'If slotted, the dimensions shall be as given in Table 1'.

(Page 4, clause 8.1.3, para 2) — Delete.

(Page 5, Table 1, 'Nominal width of slot' and 'Minimum length of slot') — Delete all entries.

[Page 17, clause 29.7 (see also page 3 of Amendment No. 3)] — Insert the following new clause after notes under 29.7:

29.8 Glow-Wire Test

29.8.1 As an alternative to tests at 29.1 to 29.7, the moulded insulated parts of plugs or socket-outlet may be tested for resistance to abnormal heat and fire in accordance with method given in Appendix E.

[Page 21, Appendix D (see also Amendment No. 3)] — Insert the following new Appendix E after Appendix D:

**“APPENDIX E
(Clause 29.8.1)**

GLOW WIRE TEST

The test is performed according to IS 11000 (Part 2/Sec 1) : 1984 'Fire hazard testing : Part 2 Test methods, Section 1 Glow wire test and guidance', under the following conditions:

- a) For parts of insulating material necessary to retain current-carrying parts, and parts of the earthing circuit, in position by the test made at a temperature of 850°C.
- b) For parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position, even they are in contact with them, by the test made at a temperature of 650°C.

Amend No. 5 to IS 1293 : 1988

If the tests specified have to be made at more than one place on the same plug or socket-outlet, care shall be taken to ensure that any deterioration caused by previous test does not affect the result of the test to be made.

Small parts, such as washers, are not subjected to these tests.

The tests are not made on parts of ceramic material.

If possible, the samples should be a complete plug or socket-outlet. If the test cannot be made on a complete plug or socket-outlet, suitable part may be cut from it for the purpose of the test.

The test is made on one sample. In case of dispute, the test shall be repeated on two further samples.

The sample shall be stored for 24 h at standard ambient atmospheric conditions before the test.

The test is made applying the glow-wire once.

The sample shall be positioned during the test in the most unfavourable position of its intended use (with the surface tested in a vertical position). The tip of the glow-wire shall be applied to the specified surface of the specimen taking into account the conditions of the intended use under which a heated or glowing element may come into contact with the plug or socket-outlet.

During the application time of the glow-wire and during a period of 30 s from the end of the application time, the sample and the surrounding parts, including the layer under the sample, shall be observed.

NOTE:

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 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 from the tested part falling down on to the pine-wood board covered with tissue paper.

The time when the ignition of the sample occurs and/or the time when the flames extinguish during or after the application time shall be measured and recorded.

The plug or socket-outlet is regarded as having passed the glow wire test if:

- there is no visible flame and sustained glowing, and
- flames and glowing at the plug or socket-outlet extinguish within 30 s after the removal of the glow wire.

There shall be no ignition of the tissue paper or scorching of board.''

(ETD 14)

AMENDMENT NO. 7 APRIL 2000
TO
IS 1293 : 1988 SPECIFICATION FOR PLUGS AND
SOCKET OUTLETS OF RATED VOLTAGE UP TO AND
INCLUDING 250 VOLTS AND RATED CURRENT UP TO
AND INCLUDING 16 AMPERES

(Second Revision)

[Page 1, clause 0.3, line 4 (see also Amendment No. 3)] — Delete the words 'and dc'.

[Page 1, clause 1.1, line 5 (see also Amendments No. 2 and 3)] — Delete the words 'and dc'.

[Page 1, clause 1.1, Note (see also Amendment No. 3)] — Insert the following note as Note 2 and number the existing note as Note 1:

NOTE 2 — Fused plugs are not covered under the scope of this standard.

(Page 1, clause 1.1) — Insert the following sub-clause after the note:

'1.2 The plugs and socket outlets may also be incorporated with pilot lamps.'

(Page 1, clause 2.2) — Delete and renumber subsequent clauses.

(Page 4, clause 8.2) — Delete and renumber the subsequent clauses.

(Page 5, Table 1, Dimension K) — Delete all entries.

(Page 8, Table 2, col 2, heading) — Substitute 'SCREW DESIGNATION' for 'NOMINAL THREAD DIAMETER, Min'.

(Page 8, Table 2, col 2, rows 1 and 2) — Substitute 'M 2.5 and M 3' for '2.5 and 3.0'.

(Page 12, clause 16.1.1) — Insert the following note at the end:

NOTE — In the case of plugs and socket-outlets incorporating pilot lamp, the test shall be carried out by disconnecting the pilot lamps.'

Price Group 1

Amend No. 7 to IS 1293 : 1988

(Page 12, clause 16.2.1) — Insert the following note at the end:

'NOTE — In the case of plugs and socket-outlets incorporating pilot lamps, the test at 16.2.1(a) and (b) shall be carried out by disconnecting the pilot lamp.'

(Page 13, Table 4, col 1) — Substitute 'M3, M3.5, M4, M5 and M6' in place of '3, 3.5, 4, 5 and 6'.

(Page 14, clause 23.1.7) — Insert the following new sub-clause after this clause:

'23.1.7.1 After the test on a lens (window for pilot lamp), the lamp may be cracked and/or dislodged but it shall not be possible to touch the live parts with:

- the standard jointed test finger under the conditions stated in 9.1,
- the standard unjointed test finger under the conditions stated in 9.1, but with force of 10 N.'

(Page 14, clause 23.2.3) — Insert the following new sub-clause after the clause:

'23.2.3.1 After the test on a lens (window for pilot lamps), the lamp may be cracked and/or dislodged but it shall not be possible to touch the live parts with:

- the standard jointed test finger under the conditions stated in 9.1, but with force of 10 N.
- the standard unjointed test finger under the conditions stated in 9.1, but with force of 10 N.'

(Page 14, clause 24) — Substitute the following for the existing text except for Figure 8:

24 RESISTANCE TO HEAT

Accessories and surface-mounting boxes shall be resistant to heat.

Compliance is checked by:

- a) For surface-mounting boxes, separable covers, separable cover-plates and separable frames by the test of 24.3;
- b) For portable accessories, with the exception of the parts, if any covered by (a), by the tests of 24.1 and 24.4 with the exception of parts made from natural or synthetic rubber or a mixture of both, by the test of 24.3;

Amend No. 7 to IS 1293 : 1988

- c) For fixed socket-outlets, with the exception of the parts, if any, covered by (a), by the tests of 24.1, 24.2 and, with the exception of parts made from natural or synthetic rubber or a mixture of both, by the test of 24.3.

Parts intended only for decorative purposes, such as certain lids, are not submitted to this test.

24.1 The specimens are kept for 1 h in a heating cabinet at a temperature of $100^{\circ} \pm 2^{\circ}\text{C}$.

During the test, they shall not undergo any change impairing their further use and sealing compound, if any, shall not flow to such an extent that live parts are exposed.

After the test, the specimens are then allowed to cool down to approximately room temperature. There shall be no access to live parts which are normally not accessible when the specimens are mounted as in normal use, if the standard test finger is applied with a force not exceeding 5 N.

After the test, markings shall still be legible.

Discoloration, blisters or slight displacement of the sealing compound is disregarded provided that safety is not impaired within the meaning of this standard.

24.2 Parts of insulating material necessary to retain current-carrying parts and parts of the earthing circuit in position, and parts of the front surface zone of thermoplastic material of 2 mm width surrounding the phase and neutral pin entry holes of socket outlets, shall be subjected to a ball-pressure test by means of the apparatus shown in Fig. 9, except the insulating parts necessary to retain the earthing terminals in position in a box shall be tested as specified in 24.3.

NOTE — When it is not possible to carry out the test on the specimens, the test should be carried out on a piece at least 2 mm thick which is cut out of the specimen. If this is not possible, up to and including four layers, each cut out of the same specimen, may be used, in which case the total thickness of the layers shall be not less than 2.5 mm.

The part under test shall be placed on a steel plate at least 3 mm thick and in direct contact with it.

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

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

The test is made in a heating cabinet at a temperature of $125^{\circ} \pm 2^{\circ}\text{C}$.

After 1 h, the ball shall be removed from the specimen, which is then immersed, in cold water for cooling down within 10 s to approximately room temperature.

The diameter of the impression caused by the ball is measured and shall not exceed 2 mm.

24.3 Parts of insulating material not necessary to retain current-carrying parts and parts of the earthing circuit in position, even though they are in contact with them, are subjected to a ball-pressure test in accordance with 24.2, but the test is made at a temperature of $70^{\circ} \pm 2^{\circ}\text{C}$, or $40^{\circ} \pm 2^{\circ}\text{C}$ plus the highest temperature rise determined for the relevant part during the test of 18 whichever is the higher.

24.4 The specimens are subjected to a compression test by means of an apparatus as shown in Fig. 9, the test being made in heating cabinet at a temperature of $80^{\circ} \pm 2^{\circ}\text{C}$.

The apparatus comprises two steel jaws, having a cylindrical face of 25 mm radius, a width of 15 mm and a length of 50 mm. The length of 50 mm can be increased, depending on the size of the accessory to be tested.

The corners are rounded with a radius of 2.5 mm.

The specimen is clamped between the jaws in such a way that these press against it in the area where it is gripped in normal use, the centre line of the jaws coinciding as nearly as possible with the centre of the area. The force applied through the jaws is 20 N.

After 1 h, the jaws are removed and the specimens shall show no damage within the meaning of this standard.'

(Page 15, Figure 8) — Insert the following figure as Figure 9:

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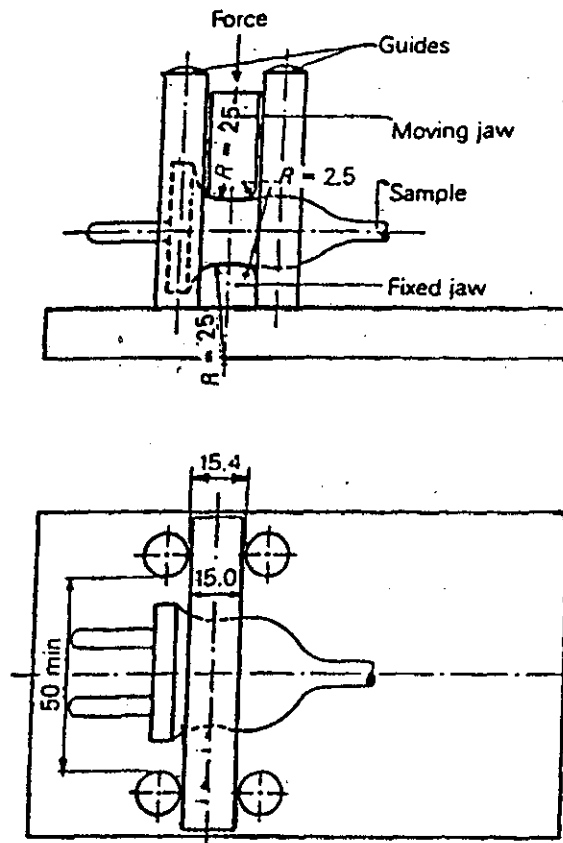


FIG. 9 APPARATUS FOR COMPRESSION TEST FOR THE VERIFICATION OF RESISTANCE TO HEAT OF 24.4

(Page 17, Annex A, line 1) — Substitute clause reference '8.4' for '8.5'.

(Page 20, clause B-1.1, line 2) — Substitute the words 'Fig. 10' in place of 'Fig. 9'.

(Page 21, Figure 9) — Renumber 'FIG. 9' as 'FIG. 10.'

(ETD 14)