BRITISH STANDARD

Supplement No. 1 (1960) to BS 546:1950

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Specification for

Plugs made of resilient material —

Two-pole and Earthing-pin Plugs, Socket-outlets, and Socket-outlet Adaptors for circuits up to 250 volts

UDC 621.316.541:678

Co-operating organizations

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Conduit Fittings Manufacturers' Association
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E.D.A. Testing House
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National Union of Manufacturers
Women's Advisory Committee of the BSI

This British Standard, having been approved by the Electrical Industry Standards Committee and endorsed by the Chairman of the Engineering Divisional Council, was published under the authority of the General Council on 30 December 1960

The following BSI references relate to the work on this standard:
Committee references ELE/4, ELE/4/2
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Foreword

This standard makes reference to the following British Standards:

BS 546, *Two-pole and earthing-pin plugs, socket-outlets and socket-outlet adaptors for circuits up to 250 volts.*

BS 903, *Methods of testing vulcanized rubber.*

BS 2719, *Pocket type rubber hardness meters. Methods of use and calibration tests.*

This supplement has been prepared to cover plugs made substantially of rubber or other suitable resilient material which are not included in the main specification.

It includes material requirements and tests designed to ensure that such plugs shall be manufactured to adequate standards of quality.

In BS 546 the provision of shutters is not mandatory and many surface mounted socket-outlet covers have dimensions which only prevent overhang by a small margin of interference.

Plugs complying with this supplement may have a slight degree of flexibility of mounting of all contact pins, but they will have sufficient rigidity to render overhang of any plug in any socket-outlet of the same rating difficult to achieve without the user being aware that misuse by incorrect insertion is being attempted.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 4 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

1 Scope

This supplement relates to 2 ampere, 5 ampere, 15 ampere and 30 ampere plugs, fused or unfused, in which the base and cover, or either of these components, are constructed of rubber or other suitable resilient material.

2 Definitions

In addition to the definitions of Clause 2 of BS 546, the following definitions have been adopted for the purposes of this supplement:

2.1
rubber

the word rubber, where used, refers to mouldings made partly or entirely of rubber or other suitable resilient material which will meet the requirements and tests of this supplement

2.2
overhang

the term overhang defines the condition arising when a multi-pin plug is inserted into a socket-outlet in such a way that at least one pin can enter a current-carrying socket-contact while the other pin or pins are exposed

3 General requirements

Plugs conforming to this supplement shall, unless otherwise specified, comply with the following Clauses of BS 546:

Section 2. General requirements. Clauses 3 to 6 and 8 to 12.

Section 3. Special requirements for plugs. Clauses 13 and 17 to 19.

Section 6. Marking. Clause 30.

Section 7. Sampling tests. Clauses 31 to 36.

Section 8. Type tests. Clauses 37 to 39.

Section 9. Gauges. Clause 41. "GO" gauge for plug.

For the purpose of this supplement, the following amendments to the clauses of BS 546 indicated are applicable:

Clause 12, *Materials.*

Where the base and cover of the plug, or either of these components, are constructed of rubber, as defined in Clause 2 and specified in Clause 4 of this supplement, then the requirements of Clause 12 of BS 546 for the base and cover shall not apply to such components.

Clause 35, *Insulation resistance.*

Clause 13, "Insulation resistance test" of this supplement replaces Clause 35 of BS 546 for plugs having live metal in contact with rubber.

4 Materials

Rubber, when used for the cover or base shall be free from blisters, cracks, embedded foreign matter and other physical properties and defects likely to affect insulating and mechanical protecting properties and shall have a hardness not less than 85 British Standard degrees when tested in an ambient temperature of 20 C ± 5 C.

NOTE The hardness may be checked by a meter specified in BS 2719, "*Pocket type rubber hardness meters. Methods of use and calibration tests*". Attention is also drawn to the requirements of BS 903, "*Methods of testing vulcanized rubber*".

5 Construction of plugs

a) *General.* Plugs shall be so designed and constructed that they cannot readily be deformed to allow access to live parts, nor shall it be possible for separated metal parts to be brought into contact with each other. The construction of the plug shall be such as to provide the user with adequate protection against shock. The plug shall be sufficiently strong to resist mechanical damage under normal service conditions and shall comply with the "Plug pin deflection test" specified in Clause 15 of this supplement.

b) *Plugs with integral flexible cord.* Where a flexible cord is moulded integrally with a plug, the size of the flexible cord shall be appropriate to the current rating of the plug. Such a plug is not subject to the provisions of Clause 18 of BS 546.

c) *Fused-plugs with integral flexible cord.* If a flexible cord is moulded integrally with a fused plug, the current rating of the fuse appropriate to the flexible cord shall be clearly marked on the plug.

6 Precautions against accidental contact

No part of the current-carrying pins, line or neutral shall be less than the minimum distance given in Table 1 from the periphery of the face of the plug measured when the plug is inserted into the appropriate socket outlet as far as the first point of contact of the current carrying pins.

Table 1

Current rating	Minimum distance
amps	inches
2	0.250
5	0.312
15	0.375
30	0.500

7 Plug pins

Plug pins shall be substantially cylindrical in form, and shall have radiused ends to facilitate entry into corresponding socket outlets. They shall not be split or slotted. The dimensions shall be as given in Table 7 of BS 546.

8 Construction of plug pins and terminals

Each plug pin of a non-fused plug, each earthing plug pin, and each neutral plug pin of a fused plug, shall be formed in one piece with the fixed part of its terminal.

Each terminal shall be of substantial construction, and the terminals of a non-fused plug, and the earthing terminal and the neutral terminals of a fused plug, shall each provide for clamping and securing of its flexible conductor so that efficient electrical connection is made directly with an integral part of the plug pin.

That contact for the fuse-link which is connected to the line terminal of a fused plug shall be formed in one piece with the fixed part of the terminal or connected to it in such a way that it cannot work loose under normal service conditions, and the other contact shall be similarly connected to the corresponding plug pin. The line terminal shall also provide for clamping and securing of the conductor so that efficient electrical connection is made with the contact for the fuse-link.

If the plug pins are removable from the plug base, the pin and/or the plug base shall be so designed that it is impossible to assemble them in such a way that the fuse is connected to the neutral terminal.

When pillar terminals are used they shall be of the dimensions given in Table 9 BS 546, and shall have cheese-headed clamping-screws long enough under the head to extend to the far side of the conductor holes and with slightly rounded ends to minimize damage to conductors.

9 Connection between cover and base of plug

The plug cover and base shall be firmly secured to one another. Any screws or other devices used for securing the plug cover and the plug base shall only be accessible from the under side of the base of the plug.

10 Ageing

Plugs shall be sufficiently resistant to ageing as proved by the type test specified in Clause 14 of this supplement.

11 Marking

Plugs complying with this supplement if marked in any way identifying them with it, shall be marked "BS 546/A".

For the marking of fused plugs with integral flexible cord, attention is drawn to the requirements of Clause 5 c).

12 Tests

In addition to the tests of Sections 7 and 8 of BS 546, the tests specified in Clauses 14 and 15 of this supplement shall be type tests.

13 Insulation resistance test

Every plug having live metal in contact with rubber shall pass the following tests in lieu of the test specified in Clause 35 of BS 546, before being subjected to a high voltage test as required by Clause 36.

The insulation resistance between line and neutral terminals and earth terminal shall be not less than 50 megohms and the test shall be made at not less than 500 volts d.c. applied for a sufficient length of time for the reading of the measuring instrument to become steady, the supply being obtained from an independent source or generated in the measuring instrument.

14 Ageing test

An accelerated ageing test is made in an atmosphere having the composition and pressure of the ambient air. The samples are suspended freely in a heating cabinet in which the air is renewed by natural draught. They are kept at a temperature of 70 C ± 2 C for 240 hours.

It is recommended that an electrically heated cabinet is used. The temperature may be measured by means of a thermometer. The natural air circulation may be provided by holes in the walls of the cabinet.

After the test and after samples have been allowed to cool to the ambient temperature, the samples shall comply in all respects with the other requirements and the test Clauses 13 and 15 of this supplement.

15 Plug pin deflection test

Plugs shall be tested for deflection of plug pins under the following conditions of test:

A suitable form of apparatus is shown in Figure 1 of this supplement.

The test shall be carried out in an ambient temperature of 20 C ± 5 C.

The plug shall be clamped in a mounting block by means of any two of the plug pins in such a manner as to ensure the face of the plug from which the plug pins project is supported and in contact with a corresponding flat surface on the mounting block. The back of the plug shall not be supported or come into contact with the fixture. The axes of the clamped plug pins shall be horizontal.

Provision shall be made in the mounting block for the application to the remaining pin of a deflecting force of 1 lb applied at a distance of 1 inch from the face of the plug and at right angles to the axis of the pin under test.

The deflection of the pin from the horizontal axis is measured at 1 inch from the face of the plug.

The mounting block shall ensure that the axis passing through the pin under test and each of the clamped pins in turn shall be in the same vertical plane as the applied deflecting force with the pin under test disposed in the lower position. Two measurements of deflection shall be recorded with either clamped pin in the upper position.

The deflection of each pin shall be the arithmetical mean of the two measurements.

The deflection of the plug pin shall not exceed 0.5 times the diameter of the pin under test.

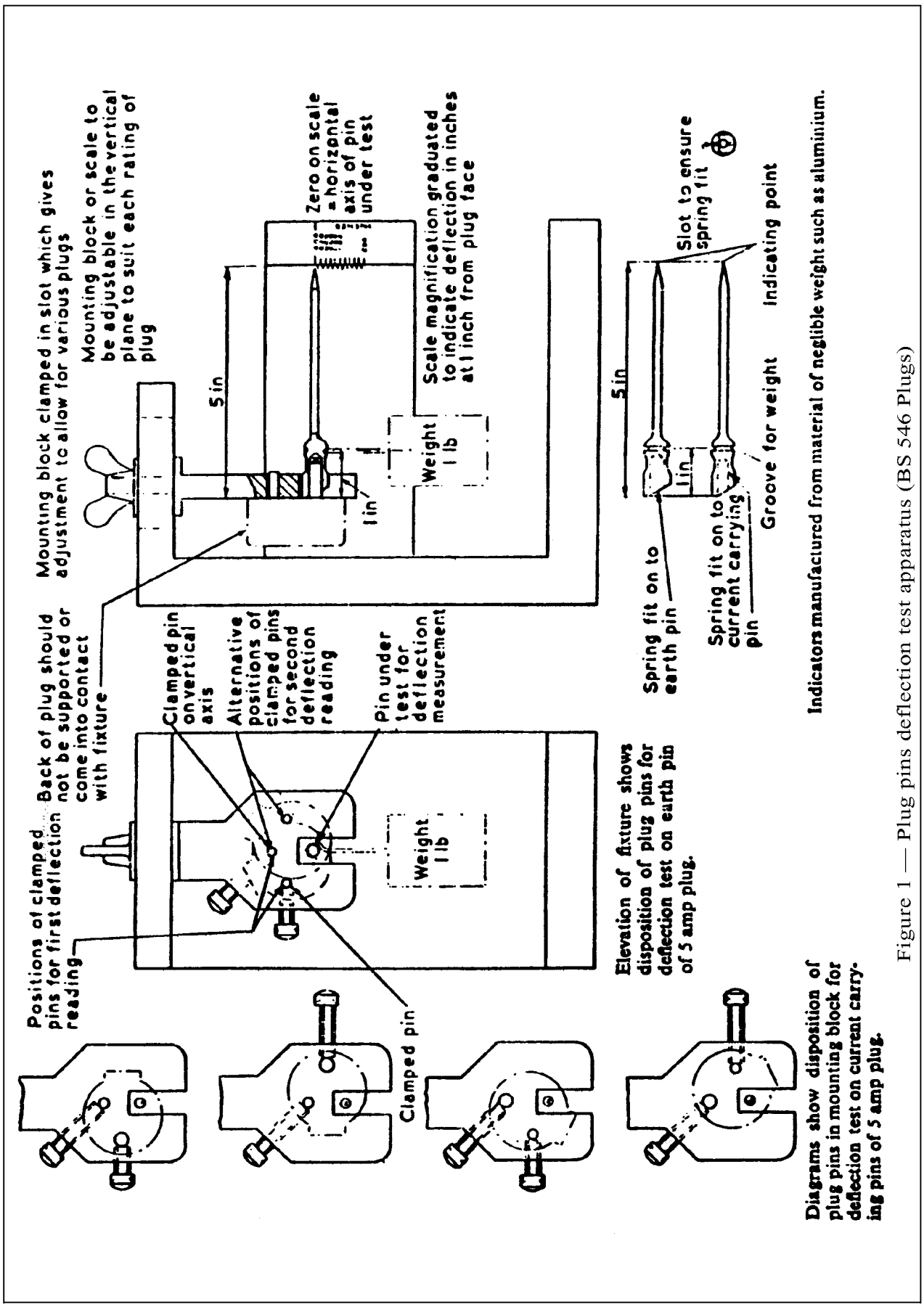

Figure 1 — Plug pins deflection test apparatus (BS 546 Plugs)

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W4 4AL