

SASO 2204

**PLUGS AND SOCKET – OUTLETS FOR
HOUSEHOLD AND SIMILAR
GENERAL USE 127 V**

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PLUGS AND SOCKET – OUTLETS FOR HOUSEHOLD AND SIMILAR GENERAL USE 127 V

1. SCOPE AND FIELD OF APPLICATION

This standard is concerned with plugs, socket outlets and socket outlets mainly used in residential buildings and the like having the following rates:

15A/127V (Phase to Neutral) for use in AC circuits of 127V .

2. SUPPLEMENTARY REFERENCES

The standard to be approved by SASO Standards concerned with “Method of Test for Plugs and Socket Outlets for Household and Similar General Use”.

3. DEFINITIONS

3.1 Rated current

The current assigned by the manufacturer as that which the plug or socket outlet will carry continuously without exceeding the permissible temperature rise.

3.2 Rated voltage

The voltage assigned by the manufacturer as the highest continuously operated voltage normally associated with the plug, or socket outlet.

3.3 Plug

A device having two or three metallic pins designed to engage with the contacts of a corresponding socket outlet, and arranged for attachment to a flexible cord or cable.

3.4 Socket outlet

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A device having two or three metallic contacts designed for engagement with corresponding plug pins and arranged for connection to fixed wiring. The socket outlet should have provisions for screening the current carrying socket contacts automatically with the shutter, when they are not in engagement with corresponding plugs.

3.5 Fused plug

A plug having a fuse link in the circuit between the line plug pin and its terminal.

3.6 Resilient plug

A plug in which the base and cover or either of these components are constructed of rubber or other suitable resilient material.

3.7 Non-rewireable plug

A plug so constructed that it forms a constructional unit with the flexible cord such that the flexible cord can't be separated from the plug without making it permanently useless.

3.8 Switched socket outlet

A socket-outlet combined with a single pole switch.

3.9 Pin

A metal part having a flat or U shaped section.

3.10 Terminal

A metal part for securing the conductor in a hole or slot or between plates by means of a screw.

4. MATERIALS, DESIGN AND CONSTRUCTION

The following requirements shall be met in the plugs, socket outlets.

4.1 Materials and construction

4.1.1 The materials used in the component parts shall be in accordance with Table-1.

Table - 1
Materials and Component Parts

Part	Material
Non resilient base and cover of a plug, socket outlet plate (non-metallic).	Moulded, tough, non ignitable insulating material.
Resilient base or resilient covers of a plug.	Rubber or other insulating materials free from blisters, cracks, embedded impurities and defects likely to affect insulating and mechanical protecting properties.
Socket outlet plates (metallic).	Sheet metal, cast metal or die-cast metal. Provision shall be for the effective earthing of all metallic parts that may become live in the event of failure of insulation of the socket outlet and are being touched during normal operation.
Socket outlet base	Urea, or any other suitable equivalent such as vitrified ceramic material or other tough non-flame propagating insulating material.
Current carrying parts	Brass, phosphor-bronze, and/or suitable equivalent material.
Shutter	Moulded, tough, non-ignitable insulating material

4.1.2 Moulded insulating material and the vitrified ceramic material shall be nonhygroscopic and shall be resistant to the formation of carbonized paths.

4.1.3 Parts made of ferrous material shall be treated to resist rusting.

4.2 **Terminals**

4.2.1 Rewireable accessories shall be provided with the terminals and shall permit the proper connection of conductors without special preparation. <http://www.china-gauges.com/>

4.2.2 The means for clamping the conductors in the terminals shall not serve to fix any other component although they may hold the terminals in position or prevent them from turning.

4.2.3 Terminals in the plug shall be provided with screws of sufficient size for effective clamping of the conductors of the flexible cord or cable. The end of the screw shall be slightly rounded so as to minimize damage to the conductors.

4.3 **Plugs**

4.3.1 Plugs shall comply with the relevant dimensions of figure 1 or 2.

4.3.2 Plug pins shall be of brass and of solid construction and shall have a chamfered end to facilitate entry into the corresponding socket contacts.

- 4.3.3 Plug pins shall be secured to the body of the plug and shall not be removable from the plug once the plug is assembled for use.
- 4.3.4 The plug shall be provided with a single hole, for the entry of a flexible cord or cable with its protective cover or sheath and shall be such that the outer cover or sheath at the place of entry is not damaged.
- 4.3.5 The rewirable plug shall be provided with a cord grip to hold the outer sheath and to ensure that the conductors are relieved from strain where they are connected to the terminals. The cord grip shall either be of insulating material or if of metal shall be provided with an insulating lining fixed to the metal parts.
- 4.3.6 Insulating barriers forming an integral part of the plug shall be provided so as to separate metallic parts at different potentials.
- 4.3.7 A finger grip or other suitable means shall be provided for inserting and withdrawing plugs without subjecting the flexible cord or cable to any stress. The grip shall be so designed as to discourage gripping the plug by the fingers at the point of entry of the flexible cord or cable.

4.3.8 **Fuses**

In the case of providing the plug with a fuse link inside it. This fuse link shall fulfill the following:

- 4.3.8.1 The fuse link shall be provided within the body of the plug and the fuse-link shall be mounted in the appropriate contacts, only between the live terminal and the corresponding plug-pin in such a way that it cannot be displaced when the plug is in use.
- 4.3.8.2 It shall be impossible to replace a fuse-link in a fused plug unless the plug is completely withdrawn from the socket-outlet.
- 4.3.8.3 Fuse links shall have rating not exceeding 15A.
- 4.3.8.4 Fuse-links shall be in accordance with the standard which will be adopted by the organization in this regard.

4.4 **Socket-outlets**

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- 4.4.1 Socket-outlets shall comply with the relevant dimensions of figure 2.
- 4.4.2 There shall be no projection on the engagement surface of a socket outlet such as would prevent the full insertion of a plug. The spacing of socket contacts shall correspond to that of the plug pins.
- 4.4.3 Socket contacts shall be so shaped at the point of entry as to provide access for appropriate plug pins. They shall be self adjusting so as to make effective electrical and mechanical contact with the corresponding plug pins.
- 4.4.4 Each socket contact shall be connected to a terminal securely fixed to it in such a way that it cannot work loose under normal service conditions. Each terminal shall provide an adequate number of screw threads for clamping the appropriate conductor.

4.4.5 **Switches**

- 4.4.5.1 If the socket outlet is provided with a switch, the switch shall be a single pole switch connected between live terminal of the socket outlet and the corresponding socket contact.
- 4.4.5.2 The actuating member of a switch shall not remain at rest in the "OFF" position whilst the switch contacts remain closed.
- 4.4.5.3 Switches shall be so constructed that undue arcing cannot occur when the switch actuating member is operated slowly.
- 4.4.6 **Shutters**
- 4.4.6.1 Socket outlets shall be provided with shutters.
- 4.4.6.2 The construction of the shuttered socket outlets shall be such that when the plug is withdrawn from it the current carrying socket contacts are automatically screened by shutters. The shutters shall be operated either by the insertion of the earthing plug pin or by the simultaneous insertion of two or more pins of the plugs.
- 4.4.7 **Boxes**
- Socket-outlets shall be put in use by fixing them on the walls using suitable boxes, these boxes shall be in accordance with the standard which will be adopted by the organization.
- 4.5 **Clearance and creepage distances**
- 4.5.1 When the accessory is correctly assembled and wired with the appropriate cable or flexible cord the minimum clearance through the air and the minimum creepage distance shall be 2.5 mm.
- 4.5.1.1 Between the live parts of opposite polarity (the value of the 2.5 mm is reduced to 1 mm for the distance between the lead wires in the pinch of a neon indicator lamp with external resistor).
- 4.5.1.2 Between live parts and any other metal parts.
- 4.5.1.3 Between live parts and the accessible external surface of the accessory.
- 4.5.1.4 Between component parts in the fused link circuit which are separated by the removal of the fuse-link. <http://www.china-gauges.com/>
- 4.5.2 Any metal parts of the plugs, other than the pins which are exposed on the engagement faces of a plug and are in contact with live parts shall be recessed at least 3 mm below the engagement face.
- 4.5.3 When detachable fuse carriers are used on plugs there shall be a minimum gap of 3 mm between live metal and the engagement face of the plug, measured with the fuse in position and the carrier removed.
- 4.5.4 The minimum clearance between switch contacts in the open position for socket-outlets shall be 1.2 mm.
- 4.5.5 In the shell of insulator to be touched by human hand, the insulation thickness of the part to which live metal contacts shall not be less than 0.8 mm.

5. RATING AND CHARACTERISTICS

5.1 Rating, shape and dimensions

The rating, shape and dimensions of plugs and socket outlets shall be as follows:

- 5.1.1 two pole plugs, 15A (figure 1).
- 5.1.2 two pole shuttered socket-outlet and plug with earthing contact (figure 2).

5.2 Protection against electric shock

- 5.2.1 Plugs and socket outlet shall be so constructed that when they are mounted and wired as in normal use, live parts are not accessible.
- 5.2.2 The earthing pin if any shall be prevented from making contact with a current carrying part in any circumstances.
- 5.2.3 A current carrying pin shall be prevented from making contact with current carrying contact while either or both of the other pins are completely exposed.
- 5.2.4 The earthing pin (if any) shall make and break contact with the corresponding earthing socket part respectively before and after the current carrying plug pins make and break contact with the corresponding current socket contacts.
- 5.2.5 The current carrying socket-outlet contacts shall be sunk below the surface in such a way as to make it impossible for them to be touched accidentally.
- 5.2.6 The mechanism for screening the current carrying contacts shall ensure returning the shutter to its normal position when the plug is withdrawn from the socket outlet.
- 5.2.7 The force necessary to withdraw a plug from the corresponding socket outlet shall be within the limits laid out in table 2.

Table - 2
Withdrawal Force

Rating	Number of Pole	Force in newtons	
		Max.	Min.
15A/127V	2	50	8
15A/127V	3	54	9

5.3 Insulation resistance

- 5.3.1 The insulation resistance for the plugs and socket outlets shall be not less than 5 megohms, and shall be not less than 2 megohms across switch contacts with switch open, where applicable when measured after one minute of application of a DC voltage of 500 V between the following parts:

- Current carrying terminals.
 - Current carrying terminals connected together and any other parts insulated therefore, including earthing terminals.
- 5.3.2 For resilient and non-rewireable plugs, the insulation resistance shall not be less than 50 megohms.
- 5.4 **Electrical strength**
- 5.4.1 Plugs and socket outlets shall withstand a high voltage of 1500 V (r.m.s.) of approximately sinusoidal wave form at a frequency of 60 Hz applied for one minute between the following parts.
- Current carrying terminals.
 - Current carrying terminals connected together and any other parts insulated therefrom, including earthing terminals.
- 5.4.2 Each switched socket outlet shall pass a momentary high voltage of 750 V (r.m.s.) applied across the switch contacts with the switch open without any flash over or breakdown of insulation.
- 5.5 **Temperature rise**
- The temperature rise of any terminal shall not exceed 35 degree C after sufficient time has elapsed for the temperature to become steady.
- 5.6 **Contact resistance**
- The contact resistance between the earthing pin of a plug or adaptor and the earthing terminal of a socket outlet and each earth accessible metallic part shall not exceed 0.05 ohm.
- 5.7 **Current breaking capacity of socket contacts**
- Socket-outlets shall be capable of breaking a current of 130% of the rated value (in substantially non inductive AC circuit) at rated voltage ten times in succession at intervals of 30 s, the plugs being withdrawn from the socket-outlet at a speed of approximately 15 cm/s immediately after insertion, without suffering permanent damage to any part.
- 5.8 **Current breaking capacity of switches**
- Switches (if any) shall be capable of making and breaking a current of 130% of the rated value (in substantially non-inductive AC circuits) at 110% of the rated voltage, ten times in succession at intervals of 30 seconds, without causing permanent damage to any parts.
- 5.9 **Electrical endurance of socket-contacts**
- Socket outlets shall be capable of making and breaking the rated current 15000 times in a substantially non-inductive a.c. circuit.
- 5.10 **Electrical endurance of switches**
- Switches (for switched socket-outlets) shall be capable of making and breaking the rated current 15000 times, in a non-inductive a.c. circuit, at a rate not exceeding six complete cycles per minute at regular intervals.

5.11 Resistance to heat

Plugs, socket outlets and socket outlet adapters shall withstand a temperature of 100 degrees C for a period of 1 hour, without showing any marked deformation, softening of the insulator or other defects harmful to service.

5.12 Mechanical strength

5.12.1 Plugs, socket outlet and socket outlet adaptors shall be so constructed as to withstand such handling as may be expected in normal use.

5.12.2 After the relevant test is carried out, no external damage which might affect the safety is shown and the components shall not have become detached.

5.13 Resistance to abnormal heat and fire

5.13.1 Units shall be proof against abnormal heat and fire. Compliance shall be checked by the test given in SASO "Methods of testing plugs and socket outlets (127 V, 250 V) for household and similar general use.

5.13.2 The glow-wire test shall be applied to ensure that an electrically heated test wire under defined test conditions does not cause ignition of insulating parts 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.

5.14 Resistance to humidity

5.14.1 Plugs, socket-outlets and socket outlet adaptors shall be proof against humid condition which may occur in normal use.

5.14.2 The insulation resistance after humidity treatment shall not be less than 5 megohms, except across switch contacts (if any) where it shall be not less than 2 megohms.

5.14.3 Units shall be resistant to ageing.

5.15 Resistance to excessive residual stresses and to rusting

5.15.1 Press-formed or similar current-carrying parts of copper alloy containing less than 80% of copper shall be resistant to failure in use due to stress corrosion.

5.15.2 Ferrous parts, the rusting of which might cause the connection unit to become unsafe, shall be adequately protected against rusting.

Compliance shall be checked by the test given in SASO .../...."Methods of testing plugs and socket outlets (for voltages up to 250 V), for household and similar general use.

6. SAMPLING

For all types of plugs, socket outlets and socket outlet adaptors which are newly produced or delivered for the first time, a sample shall be selected at random for type approval as detailed below:

Plug

15 units

Switched socket outlets	27 units
Unswitched socket outlets	21 units

(The selected sample provides 3 units for each test or series of tests plus 3 units in case of retest).

7. TESTS

The following type tests shall be carried out as mentioned in table 3 on the samples selected in accordance with item 6 taking a set of 3 units for each test. Each unit tested shall pass visual inspection test, an insulation resistance test and an electrical strength test before being subjected to the relevant test according to table 3.

Table - 3

Table	Device
Measurement of dimensions	P, SO, SS,
Withdrawal force test	SO, SS,
Contact resistance test	SO, SS,
Temperature rise test	P, SO, SS,
Current breaking capacity of socket contacts	SO, SS,
Current breaking capacity of switches	SS
Electrical endurance of socket contacts	SO, SS,
Electrical endurance of switches	SS
Heat resistance	P, SO, SS,
Mechanical strength	P, SO, SS,
Resistance to abnormal heat and fire	P, SO, SS,
Resistance to humidity	P, SO, SS,
Resistance to ageing	P, SO, SS
Resistance to excessive residual stresses and to rusting	P, SO, SS

P	Plugs
SS	Switched socket outlet
SO	Unswitched socket-outlet

The first four tests shall be carried out in the order given on one set of three units.

8. CRITERIA FOR TECHNICAL CONFORMITY

8.1 Each consignment of plugs and socket-outlets covered by this standard shall be

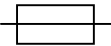

accompanied with a certificate stating its compliance with this standard.

- 8.2 For a sample subjected to type tests (type approval).
- 8.2.1 The product shall be considered conforming to this standard if all the sample units pass the type tests.
- 8.2.2 Should more than one unit in any one sample fail in any one of the tests, the product shall be considered non-conforming.
- 8.2.3 Should one unit fail a test, a second set of 3 units shall be subjected to the test, which the previous unit failed. The product shall be considered conforming if all the units in the second set pass the repeated tests otherwise it will be considered non-conforming.

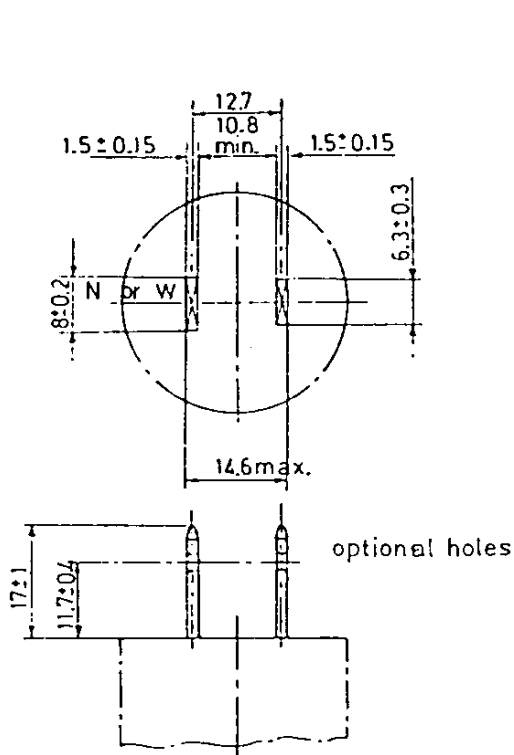
9. MARKING

Each plug or socket-outlet shall have the following information clearly and durably marked on it, in Arabic or English.

- 9.1 Country of origin.
- 9.2 Manufacturer's or responsible vendor's name, or trade-mark or both.
- 9.3 Rated current in amperes.
- 9.4 Rated voltage in volts.
- 9.5 Identification of each of the live, the neutral and the earthed pole (if any).
- 9.6 For fused plugs, the word "Fuse" or "Fused" or symbol.
- 9.7 If symbols are used they shall be as follows:

- Amperes : A
- Volts : V
- Fuse : 
- Neutral : N or W
- Earth : G or E or 
- Fused live : L

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Notes:

- a. When not polarized width of blade shall be 6.3 ± 0.3 mm. The chamfering of hole of blade may be carried out on both sides of blade.
- b. For the bent blade, the thickness of material shall be not less than 0.6 mm, and rib or the like may be added.

Dimensions: Millimeters

Magnification of blade tip

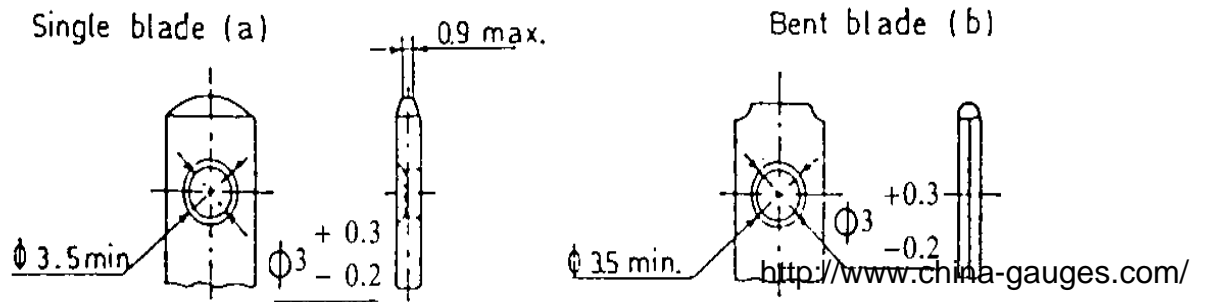
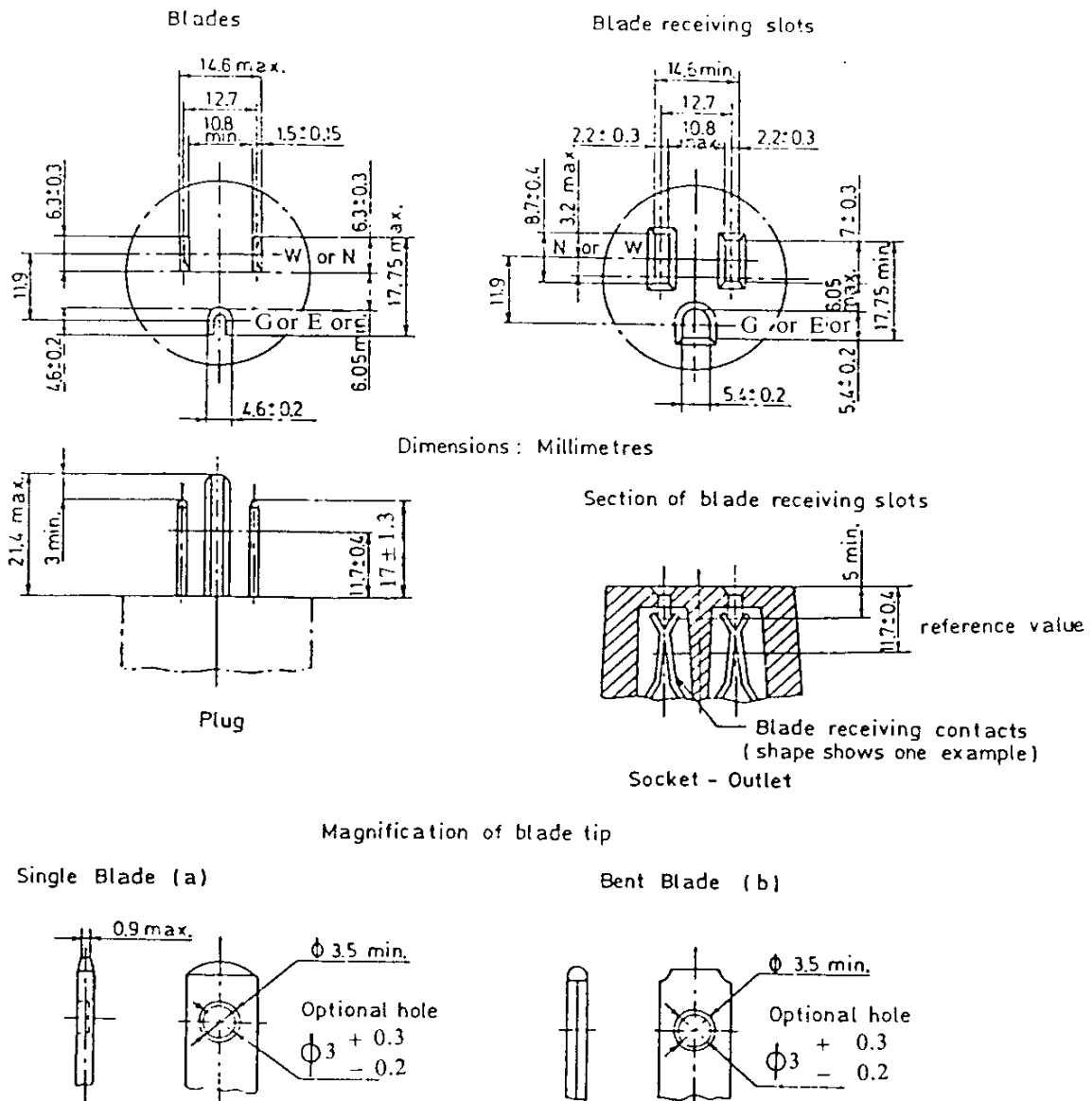


FIG. 1

Two-Pole Plug , 15A/127V



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Notes:

- a) The chamfering of hole of blade may be carried out on both sides of blade.
- b) In the case of bent blade, the thickness of material shall be not less than 0.6 mm, and rib or the like may be added.

FIG. 2
Two-pole socket-outlet and plug with earthing-contact
15 A/ 127 V

REFERENCES

- SASO 444/1985
Plugs and socket outlet for household and similar general use.
- SASO 443/1985
Method of testing for plugs and socket Outlet for household and similar general Use.
- American National Standard
ANSI C73: 1973
- Dimensions of Attachment Plugs and Receptacles”.
- British Standards
BS 1363:1997
“13 A plugs, Switched and Unswitched Socket-outlet and boxes”.
- BS 6458: Section 2.1:1984
“Fire Hazard Testing for Electrotechnical Product – Section 2.1: Glow-Wire Test”.
- International Electrotechnical Commission,
IEC 83:1997
“Plugs and Socket—Outlets for Domestic and Similar General Use”.
- Japanese Industrial Standard
JIS C8303: 1988 “Plug and Socket- outlets for Domestic and Similar General Use”.
- JIS C8306: 1988 “Testing Methods for Wiring Devices”

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The draft standard was studied and the comments received thereon from concerned bodies discussed. It has been adopted, in its present form, by the following members of Technical Committee No. (5).

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