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Single phase plugs and socket-outlets for household and similar purposes—Types, basic parameters and dimensions

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Foreword

This document is drafted in accordance with the provisions of GB/T 1.1-2020 Directives for Standardization—Part 1: Rules for the Structure and Drafting of Standardization Documents.

This document replaces GB/T 1002-2021 Plugs and Socket-outlets for Household and Similar Purposes—Types, Basic Parameters and Dimensions. Compared with GB/T 1002-2021, in addition to structural adjustments and editorial revisions, the main technical changes are as follows:

——Modified the scope of application of the standard (see Chapter 1, Chapter 1 of the 2021 edition);

——Added the definition of direct-plug-in equipment (see 3.1);

——Added the content of arrangement and combination of socket-outlet openings (see 4.1.3) and typical schematic diagrams (see Figure 7);

——Added the content of positions of sleeves for two-pole socket-outlets with earthing and positions of pins for corresponding plugs (see 4.1.4);

——Added the requirement that individual pins of plugs shall not undergo axial rotation that changes the position of their types (see 4.1.5);

——Added requirements for the inner frame of fixed pins of non-rewirable plugs (see 4.1.6);

——Added requirements for the protruding parts on the mating face of plugs and measurement requirements for the length of plug pins (see 4.2.1);

——Modified the requirements for the insulation sleeves of plug pins (see 4.2.2, 4.2.2 of the 2021 edition);

——Modified the content of single-phase two-pole plugs without earthing (see 4.2.3, 4.2.3 of the 2021 edition);

——Added the content of plugs for direct-plug-in equipment (see 4.3);

——Modified the requirements for the distance between live sleeves of socket-outlets and the mating face (see 4.4.1, 4.3.1 of the 2021 edition);

——Added the minimum distance between live sleeves of socket-outlets and the mating face as specified in Figure 6 (see Table 1);

——Added the insertion depth of plug pins into the corresponding cavities of socket-outlet openings (see 4.4.3);

——Added the measurement method for the pin length of plugs for direct-plug-in equipment (see 5.1);

——Added the pin bending test method (see 5.3);

——Added the tumbler drop test method (see 5.5);

——Added Chapter 6 on the implementation of the standard (see Chapter 6);

——Modified the thickness t dimension and tolerance of plug pins (see Figure 1, Figure 3, Figure 1 and Figure 3 of the 2021 edition), as well as the corresponding dimensions and tolerances of gauges (see Figure 12, Figure 13, Figure 23 and Figure 24, Figure 13, Figure 14, Figure 15 and Figure 16 of the 2021 edition);

——Added examples of the shape of pin ends (see Figure 1, Figure 3);

——Added the type dimensions and gauges of 32 A plugs and socket-outlets, as well as the corresponding technical content (see Figure 5, Figure 6, Figure 14, Figure 18, Figure 21, Figure 25);

——Modified the dimensions of gauges (see Figure 16, Figure 17, Figure 19, Figure 20, Figure 22, Figure 8, Figure 9, Figure 10, Figure 11, Figure 12 of the 2021 edition).

Please note that certain content of this document may involve patents. The issuing body of this document shall not be liable for identifying such patents.

This document is proposed and administered by the Ministry of Industry and Information Technology of the People's Republic of China.

The release history of this document and the documents it replaces is as follows:

——First released as GB 1002-1967 in 1967, revised for the first time in 1980, the second time in 1996, the third time in 2008, and the fourth time in 2021;

——This is the fifth revision, and it is revised as a mandatory national standard.

Single phase plugs and socket-outlets for household and similar purposes—Types, basic parameters and dimensions

1 Scope

This document specifies the types, basic parameters and dimensions of single-phase plugs and socket-outlets for household and similar purposes, and describes the corresponding test methods.

This document applies to single-phase plugs and socket-outlets for household and similar purposes, with an AC frequency of 50 Hz, a rated voltage of 250 V and a rated current not exceeding 32 A.

Note: Examples of products to which the type dimensions of this document apply are as follows:

——Socket-outlets used in household scenarios;

——Plugs equipped with electrical appliances;

——Plugs for direct-plug-in equipment;

——Fixed integrated AC power supply socket-outlets with a rated voltage of 220 V for conductive charging of electric vehicles;

——Charging socket-outlets in centralized charging facilities for electric bicycles and electric motorcycles.

2 Normative References

The contents of the following documents are incorporated into this document as indispensable provisions through normative reference in the text. For dated referenced documents, only the edition corresponding to the date applies to this document; for undated referenced documents, the latest edition (including all amendments) applies to this document.

GB/T 1184-1996 Geometric Tolerances — Undertoleranced Values

GB/T 2099.1-2021 Plugs and Socket-outlets for Household and Similar Purposes — Part 1: General Requirements

GB/T 2099.3 Plugs and Socket-outlets for Household and Similar Purposes — Part 2-5: Particular Requirements for Adapters

GB/T 2900.70-2008 Electrotechnical Terminology — Electrical Accessories

3 Terms and Definitions

The terms and definitions defined in GB/T 2900.70-2008 and GB/T 2099.1-2021, as well as the following ones, apply to this document.

3.1 direct plug-in equipment

Equipment in which the power plug forms an integral part of the equipment enclosure.

Note: Examples of direct plug-in equipment include: shavers with rechargeable batteries; night lights installed on power socket-outlets; plug-in transformers and power adapters, etc.

[Source: GB 4943.1-2022, 3.3.3.1, with modifications]

4 Technical Requirements

4.1 General Requirements

4.1.1 Single-phase plugs and socket-outlets for household and similar purposes are classified into two basic types: two-pole without earthing and two-pole with earthing.

4.1.2 The types, basic parameters and dimensions of single-phase plugs and socket-outlets for household and similar purposes shall comply with the provisions of Figures 1 to 6.

4.1.3 Except for fixed socket-outlets, the openings of socket-outlets specified in Figure 2 and Figure 4 are allowed to be arranged and combined for movable (portable) socket-outlets, adapters and appliance socket-outlets. However, the openings of socket-outlets specified in Figure 2 and Figure 4 shall not overlap or be shared, with a schematic diagram given in Figure 7.

Note 1: The arrangement and combination of socket-outlet openings referred to herein shall not be interpreted as adding corresponding plug types.

Note 2: The schematic diagram in Figure 7 does not exclude other forms of combinations.

Note 3: Examples of fixed socket-outlets include socket-outlets installed on walls.

4.1.4 For the positions of sleeves of two-pole socket-outlets with earthing, when facing the socket-outlet, the earthing conductor (PE terminal) shall be at the top, the neutral conductor (N terminal) on the left, and the line conductor (L terminal) on the right. The positions of pins of two-pole plugs with earthing shall correspond to those of the socket-outlets.

4.1.5 Individual pins of plugs shall not undergo axial rotation that would change the position of the plug type.

Note: Axial rotation refers to, for example, twisting the pins to convert the two parallel pins of the plug shown in Figure 1 into the arrangement of line and neutral poles as illustrated in Figure 3.

4.1.6 The strength of the inner frame of fixed pins of non-rewirable plugs shall ensure the dimensional stability of the pins, and the type dimensions shall comply with the requirements of the corresponding dimension drawings.

4.2 Plugs

4.2.1 External Shape of Plugs

The external shape of plugs is not specified, but the distance from the root of the live pins to the edges of the plug shall not be less than 6.5 mm.

Note 1: If insulation sleeves are provided, the root shall refer to the metal pins with insulation sleeves stripped off.

Note 2: If the mating face of the plug is not a flat surface, the intersection line formed by offsetting a plane perpendicular to the pin axis from the highest point of the mating face towards the plug body by 1 mm and the outer surface of the body shall be regarded as the edge of the plug, as indicated by value B in Figure 8.

The protruding parts on the mating face of the plug shall not exceed 0.5 mm. The length of plug pins shall be measured from the vertical plane passing through the highest point of the plug mating face to the top end of the pins.

Note 3: Examples of "protruding parts" include injection-molded marks such as electrical parameters and trademarks on the plug mating face, or other external structures that may affect the mating of the plug.

Note 4: For plugs with functional components on the mating face, after the plug is inserted into the socket-outlet, the gap between the plug mating face and the socket-outlet surface shall not exceed 1 mm.

Note 5: The length of plug pins is considered as the effective length of the metal pin part inserted into the socket-outlet.

4.2.2 Insulation Sleeves of Pins

4.2.2.1 The live pins of plugs shall be equipped with insulation sleeves.

Note: Insulation sleeves can be manufactured by processes such as insert molding and adhesive backing.

4.2.2.2 For the plugs specified in Figure 1, the height of the insulation sleeves shall be $7.0^{+0.5}$ mm; for the plugs specified in Figures 3 and 5, the height of the insulation sleeves shall be $9.0^{+0.5}$ mm; see the indication of value G in Figure 9.

4.2.2.3 The thickness (t) of the pin body with insulation sleeves removed (see Figure 10):

——≤10 A: shall not be less than 1.0 mm;

——16 A: shall not be less than 1.2 mm;

——32 A: shall not be less than 1.7 mm.

The width (w) of the pin body with insulation sleeves removed (see Figure 10):

——≤10 A: shall not be less than 5.2 mm;

——16 A: shall not be less than 6.7 mm;

——32 A: shall not be less than 9.0 mm.

4.2.2.4 For non-rewirable plugs, rewirable plugs and adapters complying with GB/T 2099.3, the color of insulation sleeves shall be black, white or gray.

For plugs of direct plug-in equipment, the color of insulation sleeves may be selected by the manufacturer, but shall not be yellow, green, or yellow-green combination.

4.2.2.5 The live pins of plugs with insulation sleeves shall undergo the bending test in accordance with Clause 5.3.

Note 1: This requirement is intended to simulate the damage that may occur when bent pins are straightened after the plug is stepped on.

After the test, the pins shall not fracture.

Note 2: Cracks smaller than the pin thickness shall not be deemed as fracture.