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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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**Electrical insulation conduits and fittings of unplasticized
poly(vinyl chloride) (PVC-U) inside buildings**

建筑用硬聚氯乙烯(PVC-U)绝缘电工套管及配件

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1 Scope

The document specifies the materials, the classification and type designation, the requirements, the inspection rules, and the marking, packaging, transport and storage of unplasticized poly(vinyl chloride) (PVC-U) electrical insulation conduits, referred to below as conduits, and of conduit fittings, referred to below as fittings; it also describes the corresponding test methods.

It applies to the production, inspection and sale of round electrical conduits and fittings made of unplasticized poly(vinyl chloride) (PVC-U) material and used inside buildings or structures.

2 Normative references

The normative references listed are GB/T 192, GB/T 196, GB/T 1033.1, GB/T 2406.2, GB/T 2828.1, GB/T 2918, GB/T 5761, GB/T 8806, GB/T 19278 and GB/T 26125-2011. For dated references only the edition corresponding to that date applies; for undated references the latest edition, including all amendments, applies.

3 Terms and definitions

The terms and definitions given in GB/T 19278 and the following ones apply to the document.

3.1 electrical conduit; conduit: the pipe used in building electrical installation work, into which wires or cables are allowed to be drawn and from which they can be replaced, and which protects and secures the wires or cables. Note: also called a duct or a sleeve.

3.2 plain conduit; solid-wall conduit: a conduit whose cross section is the same ring at every point and whose wall is solid. Source: GB/T 19278-2018, 2.2.2, modified.

3.3 corrugated conduit: a conduit with regular corrugations along its axis.

3.4 pliable conduit: a conduit that can be bent at the natural ambient temperature, without heating, with the help of equipment or tools.

3.5 conduit fittings: all the accessories connected to or assembled with the conduit. Note: commonly used fittings such as couplers and junction boxes are given in Annex A.

4 Materials

4.1 The material for producing conduits and fittings is based on poly(vinyl chloride) (PVC) resin, with the necessary additives; the additives are dispersed evenly and lead-bearing additives are not to be used.

4.2 The PVC resin complies with GB/T 5761; the K value of the PVC resin used for producing conduits is not less than 66 and the K value of the PVC resin used for producing fittings is not less than 55.

4.3 A small amount of clean rework material from the same product made in the same works may be used.

5 Classification and designation

5.1.1 By mechanical performance the conduits are divided into the low mechanical stress type, called the light type, whose conduit code is 2; the medium mechanical stress type, called the medium type, whose conduit code is 3; and the high mechanical stress type, called the heavy type, whose conduit code is 4.

5.1.2 By the structural form of the conduit wall they are divided into plain conduits and corrugated conduits.

5.1.3 By temperature class they are divided into the -25 type, the -15 type, the -5 type, the 90 type and the 90/-25 type; the temperature classes of the conduits are given in Table 1. Table 1 has five columns - temperature class, code, ambient temperature not lower than (in degrees Celsius) for transport and storage, ambient temperature not lower than (in degrees

Celsius) for installation and use, and long-term service temperature range in degrees Celsius - and five rows. The -25 type has code 25, -25 °C for transport and storage, -15 °C for installation and use, and a long-term service range of -15 °C to 60 °C. The -15 type has code 15, -15 °C, -15 °C and -15 °C to 60 °C. The -5 type has code 05, -5 °C, -5 °C and -5 °C to 60 °C. The 90 type has code 90, -5 °C, -5 °C and -5 °C to 60 °C. The 90/-25 type has code 95, -25 °C, -15 °C and -15 °C to 60 °C. A footnote states that conduits of the 90 type and of the 90/-25 type can withstand the action of a temperature of 90 °C while the concrete is setting and hardening.

5.2 The conduit designation is built from, in order, the product code (G for conduit), the structural form of the conduit (Y for plain conduit, W for corrugated conduit), the mechanical performance (2 for light type, 3 for medium type, 4 for heavy type), the temperature class (25, 15, 05, 90 or 95), the nominal size in millimetres, and, where applicable, the word for cold bending. The example given is a pliable rigid conduit of plain wall, medium mechanical performance, temperature class -5 type and nominal size 20 mm, designated GY 305-20 followed by the Chinese words for cold bending, a separating dot being printed between the letter group and the digit group.

6 Requirements

6.1.1 The inner and outer surfaces of plain conduits are smooth, flat and clean, without obvious scratches, uneven colour, dents, bubbles, foreign matter or similar defects; the inner and outer walls of corrugated conduits are free from bubbles, uneven colour, obvious foreign matter, irregular corrugations and other obvious defects. The end face of the conduit is cut flat and is perpendicular to the axis.

6.1.2 The surface of the conduit fittings is smooth and flat, without cracks, bubbles, peeling, obvious foreign matter, dents, uneven colour or similar defects.

6.2 The colour is agreed between the supplier and the purchaser.

6.3.1.1 The conduit sizes comply with Table 2. For conduits with a socket, the socket dimensions comply with Table 3 and the mean wall thickness of the socket is not less than 90 % of the specified wall thickness of the conduit. Table 2 is in millimetres and has seven columns - nominal size DN, mean outside diameter d(em) not less than, mean outside diameter d(em) not more than, corrugated conduit inside diameter d(i) not less than, and plain conduit wall thickness e(y) not less than for the light type, the medium type and the heavy type. The rows read: DN 16, 15.7, 16.0, 10.7, 1.0, 1.2, 1.5; DN 20, 19.7, 20.0, 14.1, 1.1, 1.3, 1.7; DN 25, 24.6, 25.0, 18.3, 1.3, 1.5, 1.8; DN 32, 31.6, 32.0, 24.3, 1.5, 1.7, 2.0; DN 40, 39.6, 40.0, 31.2, 1.8, 1.9, 2.1; DN 50, 49.5, 50.0, 39.6, 1.9, 2.0, 2.2; DN 63, 62.4, 63.0, 52.6, 2.1, 2.3, 2.5.

6.3.1.2 The length of plain conduits is generally 3 m or 4 m and the length of corrugated conduits is generally 25 m to 100 m; other lengths may be agreed between the supplier and

the purchaser. The conduit length is not to have a negative deviation.

6.3.2.1 The wall thickness of the body of a fitting is not less than the wall thickness of the conduit of the same size and the same mechanical performance class, and the mean wall thickness of the socket is not less than 90 % of the specified wall thickness of the body.

6.3.2.2 Fittings and conduits joined by socket connection fit together tightly and the socket dimensions meet the requirements of Table 3. Table 3 is in millimetres and has four columns - nominal size DN, socket depth L not less than, mean inside diameter at the socket mouth d_{sm} not less than, and mean inside diameter at the socket mouth d_{sm} not more than. The rows read: DN 16, 16, 16.0, 16.3; DN 20, 20, 20.0, 20.3; DN 25, 25, 25.0, 25.4; DN 32, 28, 32.0, 32.4; DN 40, 32, 40.0, 40.4; DN 50, 40, 50.0, 50.4; DN 63, 50, 63.0, 63.4. A footnote states that the socket depth of fittings with DN not less than 50 mm may also be agreed between the supplier and the purchaser.

6.3.2.3 The basic dimensions of the threads of the fittings comply with GB/T 196 and the basic thread profile complies with GB/T 192.

6.4 The physical and mechanical performance of the conduits and the fittings complies with Table 4. Table 4 has four columns - item, and the requirement for plain conduits, for corrugated conduits and for fittings. Density: not more than 1 580 kg per cubic metre, one value covering all three. Compression performance: for plain conduits, with the load held for 60 s the deflection $D(f)$ is not more than 25 % and, 60 s after the load is removed, not more than 10 %; for corrugated conduits, with the load held for 60 s not more than 25 % and, 15 min after the load is removed, not more than 10 %; not applicable to fittings. Impact performance: for plain conduits and for corrugated conduits, 10 out of 12 or more of the specimens are undamaged; not applicable to fittings. Bending performance: for plain conduits, no visible crack; for corrugated conduits, no visible crack and the gauge passes under its own weight; not applicable to fittings. Flattening performance: the gauge passes under its own weight for plain conduits and for corrugated conduits; not applicable to fittings. Drop performance: not applicable to conduits; for fittings, no damage and no crack. Heat resistance: the gauge passes under its own weight for plain conduits and for corrugated conduits; for fittings, $D(i)$ is not more than 2 mm. A footnote to the bending and flattening rows states that they apply to plain conduits of nominal size DN16 mm, DN20 mm and DN25 mm and to all corrugated conduits, plain conduits of DN32 mm and above being non-pliable rigid conduits.

6.5 The flame retardance of the conduits and the fittings complies with Table 5: the self-extinguishing time $t(e)$ is not more than 30 s and the oxygen index (OI) is not less than 32.

6.6 The electrical performance of the conduits and the fittings complies with Table 6: the dielectric strength is such that no breakdown occurs within 15 min, and the insulation resistance is not less than 100 megaohm.