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

GB/T 5023.1-2008

Replacing GB 5023.1-1997

**Polyvinyl chloride insulated cables of rated voltages up to and
including 450/750 V - Part 1: General requirements**

额定电压450/750V及以下聚氯乙烯绝缘电缆 第1部分：一般要求

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Foreword

GB/T 5023 "Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V" is published in seven parts: Part 1: General requirements; Part 2: Test methods; Part 3: Non-sheathed cables for fixed wiring; Part 4: Sheathed cables for fixed wiring; Part 5: Flexible cables (cords); Part 6: Lift cables and cables for flexible connections; Part 7: Two-core or multicore screened and unscreened flexible cables.

This part is Part 1 of GB/T 5023. It is identical (IDT) to IEC 60227-1:2007 "Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 1: General requirements", edition 3.0 (English version).

For ease of use, the following editorial changes were made: the decimal comma was replaced by the decimal point; the foreword of IEC 60227-1:2007 was deleted; and the informative Annex B was added.

This part replaces GB 5023.1-1997 "Polyvinyl chloride insulated cables of rated voltages 450/750 V and below - Part 1: General requirements". Compared with GB 5023.1-1997, the main changes are as follows: the continuity of marks in 3.1.1 was revised; in 4.1.1 the requirement that red, grey and white shall not be used in any multicore cable was deleted and a note recommending that red and white be avoided was added; in 4.1.2 the note stating that the cores of unsheathed twin parallel cords need no identification was deleted and the colour schemes for three-, four- and five-core cables were revised; the light blue of the note to 4.1.3 was changed to blue; the ageing conditions of the non-contamination test for PVC/E in Table 1 were changed to $(100 \pm 2) ^\circ\text{C}$, 10 x 24 h; 5.5.1 added the 90 °C

polyvinyl chloride sheathing compound PVC/ST10, whose full performance data were added to Table 2; for item 8, the low temperature impact test, in Tables 1 and 2, the test temperature was set at -15 °C to suit the climatic conditions of China, and may also be adjusted at the customer's request; and cable types 56, 57 and 71c were added to Annex A - 56, 90 °C heat-resistant light polyvinyl chloride sheathed cord (60227 IEC 56); 57, 90 °C heat-resistant ordinary polyvinyl chloride sheathed cord (60227 IEC 57); and 71c, circular polyvinyl chloride sheathed lift cable and cable for flexible connection (60227 IEC 71c).

Annex A of this part is normative; Annex B is informative.

This part was proposed by the China Electrical Equipment Industry Association and is under the jurisdiction of the National Technical Committee on Wires and Cables of Standardization Administration of China (SAC/TC 213).

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The previous editions of the standard replaced by this part are GB 5023.1-1985 and GB 5023.1-1997.

1 General

1.1 Scope. This part of GB/T 5023 applies to polyvinyl chloride insulated and, where present, polyvinyl chloride sheathed flexible and rigid cables of rated voltage U_0/U up to and including 450/750 V, used in power installations of nominal AC voltage not exceeding 450/750 V.

NOTE: for certain types of flexible cable the term "cord" may be used.

The individual cable types are specified in GB/T 5023.3, GB/T 5023.4 and the other product parts; the method of designating cable types is given in Annex A. The test methods specified in Parts 1, 3 and 4 of GB/T 5023 are given in GB/T 5023.2, GB/T 18380.12-2008 and the relevant parts of GB/T 2951-2008.

1.2 Normative references. The provisions of the following documents become provisions of this part through reference in it. For dated references, subsequent amendments (excluding corrections) or revisions do not apply to this part; however, parties to agreements based on this part are encouraged to investigate whether the latest editions may be used. For undated references, the latest edition applies.

GB/T 2951.11-2008 Common test methods for insulating and sheathing materials of

electric and optical cables - Part 11: Methods for general application - Measurement of thickness and overall dimensions - Tests for determining the mechanical properties (IEC 60811-1-1:2001, IDT) · GB/T 2951.12-2008 Part 12: Methods for general application - Thermal ageing methods (IEC 60811-1-2:1985, IDT) · GB/T 2951.14-2008 Part 14: Methods for general application - Tests at low temperature (IEC 60811-1-4:1985, IDT) · GB/T 2951.21-2008 Part 21: Methods specific to elastomeric compounds - Ozone resistance, hot set and mineral oil immersion tests (IEC 60811-2-1:2001, IDT) · GB/T 2951.31-2008 Part 31: Methods specific to PVC compounds - High temperature pressure test - Test for resistance to cracking (IEC 60811-3-1:1985, IDT) · GB/T 2951.32-2008 Part 32: Methods specific to PVC compounds - Loss of mass test - Thermal stability test (IEC 60811-3-2:1985, IDT) · GB/T 3956-1997 Conductors of insulated cables (idt IEC 60228:1978) · GB/T 5023.2-2008 Polyvinyl chloride insulated cables of rated voltages up to and including 450/750 V - Part 2: Test methods (IEC 60227-2:2003, IDT) · GB/T 5023.3-2008 Part 3: Non-sheathed cables for fixed wiring (IEC 60227-3:1997, IDT) · GB/T 5023.4-2008 Part 4: Sheathed cables for fixed wiring (IEC 60227-4:1997, IDT) · GB/T 5023.5-2008 Part 5: Flexible cables (cords) (IEC 60227-5:2003, IDT) · GB/T 18380.12-2008 Tests on electric and optical fibre cables under fire conditions - Part 12: Test for vertical flame propagation for a single insulated wire or cable - Procedure for 1 kW pre-mixed flame (IEC 60332-1-2:2004, IDT) · IEC 173:1964 Colours of the cores of flexible cables and cords · IEC 62440 Electric cables of rated voltages up to and including 450/750 V - Guide to use

2 Terms and definitions

The following terms and definitions apply to all parts of GB/T 5023.

2.1 Definitions relating to insulating and sheathing materials. 2.1.1 Polyvinyl chloride compound (PVC): a material whose characteristic constituent is polyvinyl chloride or one of its copolymers, suitably selected, compounded and processed; the term also covers a compound containing polyvinyl chloride together with a polyvinyl chloride polymer. 2.1.2 Type of compound: compounds are classified by the performance measured in the specified tests; the type has no direct relation to the composition of the compound.

2.2 Definitions relating to the tests. 2.2.1 Type tests (symbol T): tests carried out before supplying, on a general commercial basis, a type of cable covered by GB/T 5023, in order to demonstrate that the cable has satisfactory performance and meets the intended service requirements. Type tests are by nature such that, once carried out, they need not be repeated; they shall be repeated if a change in cable materials or design would affect the performance of the cable. 2.2.2 Sample tests (symbol S): tests carried out on samples of completed cable, or on components taken from completed cable, to verify that the finished product complies with the design specification.

2.3 Rated voltage. The rated voltage is the reference voltage for which the cable is designed and on which its electrical tests are based. It is expressed as U_0/U in volts. U_0 is

the r.m.s. voltage between any insulated conductor and "earth" (the metallic covering of the cable or the surrounding medium). U is the r.m.s. voltage between any two phase conductors of a multicore cable or of a system of single-core cables.

In an alternating current system, the rated voltage of a cable shall be at least equal to the nominal voltage of the system in which it is used; this condition applies to both the U_0 value and the U value. In a direct current system, the nominal voltage of the system shall be not greater than 1.5 times the rated voltage of the cable.

NOTE: the operating voltage of a system may permanently exceed the nominal voltage of that system by 10 %; a cable whose rated voltage is at least equal to the nominal voltage of the system may be used at an operating voltage 10 % above its rated voltage.

3 Marking

3.1 Indication of origin and cable identification. The cable shall bear a continuous mark giving the manufacturer's name, the product type and the rated voltage; the manufacturer's mark may be an identification thread or a repeated mark of the name or trade mark of the manufacturer. The method of designating the product type is given in Annex A. For a cable used where the conductor temperature exceeds 70 °C, the identification mark may state the type or the maximum conductor temperature. Marks may be printed in ink or embossed on the insulation or the sheath.

3.1.1 Continuity of marks. The distance between the end of one complete mark and the beginning of the next shall not exceed 550 mm on the outer sheath of the cable, and shall not exceed 275 mm on the insulation or on the tape of the following cables: a) the insulation of non-sheathed cables; b) the insulation of sheathed cables; c) the tape inside a sheathed cable.

3.1.2 Durability. Printed ink marks shall be durable. Compliance shall be checked by the test specified in 1.8 of GB/T 5023.2-2008.

3.1.3 Legibility. All marks shall be legible. The colour of an identification thread shall be readily identifiable or easily recognizable, if necessary after cleaning with petrol or another suitable solvent.

3.2 Product designation. The product shall be designated by its type, its specification and the standard number. The specification includes the rated voltage, the number of cores and the nominal cross-sectional area of the conductor. The cable packaging shall carry a label or mark stating the product type, the specification, the standard number, the manufacturer's name and the place of origin. The designation of the GB 5023.1 to GB 5023.3-1985 products and its cross-reference with the GB/T 5023-2008 product types is given in Annex B.