ICS 29.060.20

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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

中华人民共和国国家标准

GB/T 12706.3–2008

Replace GB/T 12706.3–2002

Power cables with extruded insulation and their accessories for rated voltages from 1kV (U_m=1.2kV) up to 35kV (U_m=40.5kV)

Part 3: Cables for rated voltages of 35 kV (U_m=40.5kV)

额定电压 1kV(U_m=1.2kV)到 35kV(U_m=40.5kV)挤包绝缘电力电缆及附件

第 3 部分：额定电压 35kV(U_m=40.5kV)电缆

(IEC 60502-2:2005 Power cables with extruded insulation and their accessories for rated voltages from 1 kV (U_m = 1,2 kV) up to 30 kV (U_m = 36 kV) - Part 2: Cables for rated voltages from 6 kV (U_m = 7,2 kV) up to 30 kV (U_m = 36 kV), NEQ)

Issued on December 31, 2008 **Implemented on November 01, 2009**

Issued by **General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China**

Standardization Administration of the People's Republic of China

Contents

Foreword

GB/T 12706 *Power Cables with Extruded Insulation and Their Accessories for Rated Voltages from 1*kV *(U_m=1.2*kV*) to 35*kV *(U_m=40.5*kV*)* is divided into four parts:

—Part 1: Cables for Rated Voltages 1 kV (U_m=1.2kV) and 3kV (U_m=3.6kV);

—Part 2: Cables for Rated Voltages from 6 kV (U_m=7.2kV) up to 30kV (U_m=36kV);

—Part 3: Cables for Rated Voltage 35kV (U_m=40.5kV);

—Part 4: Test requirements on Accessories of Cables for Rated Voltages from 6kV (U_m=7.2kV) up to 35kV (U_m=40.5kV).

This Part is Part 3 of GB/T 12706.

The amendments for this Part is corresponding to IEC 60502-2: 2005 *Power Cables with Extruded Insulation and Their Accessories for Rated Voltages from 1kV (U_m=1.2*kV*) to 30*kV *(U_m=36*kV*)* Part 2: *Cables for Rated Voltages from 6kV (Um=7.2*kV*) up to 30*kV *(U_m=36*kV*),* the degree of consistency is nonequivalent and the main differences are as follows:

—This Part only applies to Rated Voltage class of our country's power distribution system 35kV (U_m=40.5kV);

—Type test item has added extruded outer sheath scraped finish test;

—After the installation is done, the insulating electronic test adopt the provisions stated in IEC 60840:2004 *Test Methods and Requirements on Power Cables with Extruded Insulation and Their Accessories for Rated Voltages are greater than 30*kV *(Um=36*kV*) up to 150*kV *(U_m=170*kV*)*;

—Added informative Annex F "Test for Cable Assembly of Longitudinal Wrap Metal Foil Composite Armor Layer"

—According to the technical requirements of cable products of our country, Supplementary Terms for Cable Products" of Chapter 21 and the corresponding Annex G

Power cables with extruded insulation and their accessories for rated voltages from 1kV (U_m=1.2kV) up to 35kV (U_m=40.5kV)

Part 3: Cables for rated voltages of 35 kV (Um=40.5kV)

1 Scope

This part of GB/T 12706 specifies the construction, dimensions and test requirements of power cables with extruded solid insulation 35 kV for fixed installations such as distribution networks or industrial installations.

When deciding use of the cable, you are suggested to consider the possible risk of radial water inflow. This part includes tests of the so-called cables with longitudinal water-blocking and radial water-resistant structures (refer to annex F for the test method).

Cables for special installation and service conditions are not included, for example cables for overhead networks, the mining industry, nuclear power plants (in and around the containment area) nor for submarine use or shipboard application.

2 Normative References

The articles contained in the following documents have become this part of GB/T 12706 when they are quoted herein. For the dated documents so quoted, all the modifications (excluding corrections) or revisions made thereafter shall not be applicable to this Standard. For the undated documents so quoted, the latest editions shall be applicable to this Standard.

GB/T 156-2007 Standard voltage (IEC 60038: 2002, MOD)

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 Common test methods for insulating and sheathing materials of electric and optical cables - Part 12: Methods for general application - Thermal ageing

methods (IEC 60811-1-2:1985, IDT)

GB/T 2951.13-2008 Common test methods for insulating and sheathing materials of electric and optical cables—Part 13: Methods for general application—Measurement for determining the density—Water absorption tests—Shrinkage test (IEC 60811-1-3:2001, IDT)

GB/T 2951.14-2008 Common test methods for insulating and sheathing materials of electric and optical cables—Part 14: Methods for general application—Test at low temperature (IEC 60811-1-4:1985, IDT)

GB/T 2951.21-2008 Common test methods for insulating and sheathing materials of electric and optical cables—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 Common test methods for insulating and sheathing materials of electric and optical cables—Part 31: Methods specific to PVC compounds—Pressure test at high temperature—Test for resistance to cracking (IEC 60811-3-1:1985, IDT)

GB/T 2951.32-2008 Common test methods for insulating and sheathing materials of electric and optical cables—Part 32: Methods specific to PVC compounds—Loss of mass test—Thermal stability test (IEC 60811-3-2:1985, IDT)

GB/T 2951.41-2008 Common test methods for insulating and sheathing materials of electric and optical cables—Part 41: Methods specific to polyethylene and polypropylene compounds—Resistance to environmental stress cracking—Measurement of the melt flow index—Carbon black (IEC 60811-4-1:1985, IDT)

GB/T 3048.10-2007 Test methods for electrical properties of electric cables and wires—Part 10: Spark test of extruded protective sheaths

GB/T 3048.12-2007 Test methods for electrical properties of electric cables and wires—Part 12: Partial discharge test (IEC 60885-3: 1988, MOD)

GB/T 3048.13-2007 Test methods for electrical properties of electric cables and wires—Part 13: Impulse voltage test (IEC 60230: 1996, IEC 60060-1: 1999, MOD)

GB/T 3956-2008 Conductors of insulated cables (IEC 60228: 2004, IDT)

GB/T 6995.3-2008 Markings for electric wires and cables - Part 3：Identifications of cables and wires

GB/T 11091-2005 Copper strips for cables

GB/T 16927.1-1997 High voltage test techniques--Part 1: General test requirements (eqv IEC 60060-1: 1989)

GB/T 12706.1-2008 Power cables with extruded insulation and their accessories for rated voltages from 1kV (Um=1.2kV) up to 35kV (Um=40.5kV) - Part 1: Cables for rated voltage of 1kV (Um=1.2kV) and 3kV (Um=3.6kV) (IEC 60502-1: 2004, Power cables with extruded insulationand their accessories for rated voltagesfrom 1 kV (U m = 1,2 kV) up to 30 kV (U m = 36 kV) –Part 1:Cables for rated voltages of 1 kV ((U m = 1,2 kV)and 3 kV (U m = 3,6 kV), MOD)

GB/T 18380.12-2008 Test 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 1kW pre-mixed flame (IEC 60332-1-2: 2004, IDT)

JB/T 8137-1999 (All parts) Delivery drums for electric wires and cables

JB/T 8996-1996 Guide to the selection of high-voltage cables (eqv IEC 60183: 1984)

JB/T 10181.1-2000 Calculation of the current rating of electric cables Part 1: Current rating equations (100% load factor) and calculation of losses Section 1: General

JB/T 10181.2-2000 Calculation of the current rating of electric cables Part 1: Current rating equations (100% load factor) and calculation of losses Section 2: Sheath eddy current loss factors for two circuits in flat formation

JB/T 10181.3-2000 Calculation of the current rating of electric cables Part 2: Thermal resistance Section 1: Calculation of thermal resistance

JB/T 10181.4-2000 Calculation of the current rating of electric cables Part 2: Thermal resistance Section 2: A method for calculating reduction factors for groups of cables in

free air protected from solar radiation

JB/T 10181.5-2000 Calculation of the current rating of electric cables Part 3: Sections on operating conditions Section 1: Reference operating conditions and selection of cable type

JB/T 10181.6-2000 Calculation of the current rating of electric cables Part 3: Sections on operating conditions Section 2: Economic optimization of power cable size

JB/T 10696.6-2007 Test methods for determining mechanical physical and chemical properties of electric cables and wires-Part 6:Test for abrasion of oversheaths

YB/T 024-2008 Steel strips for cable armouring

ISO 48: 2007 Rubber, vulcanized or thermoplastic - Determination of hardness (hardness between 10 IRHD and 100 IRHD)

IEC 60229: 2007 Tests on cable oversheaths which have a special protective function and are applied by extrusion

IEC 61443: 1999 Short-circuit Temperature Limits of Electric Cables with rated Voltages above 30kV（U_m=36kV）

3 Terms and definitions

For the purpose of this standard, the following terms and definitions shall apply.

3.1 Definitions of dimensional values (thicknesses, cross-sections, etc.)

3.1.1

nominal value

value by which a quantity is designated and which is often used in tables

NOTE Usually, in this standard, nominal values give rise to values to be checked by measurements taking into account specified tolerances.

3.1.2

approximate value

value which is neither guaranteed nor checked; it is used, for example, for the calculation of other dimensional values

3.1.3

median value

when several test results have been obtained and ordered in an increasing (or decreasing) succession, the median value is the middle value if the number of available values is odd, and the mean of the two middle values if the number is even

3.1.4

fictitious value

value calculated according to the "fictitious method" described in Annex A

3.2 Definitions concerning the tests

3.2.1

routine tests

tests made by the manufacturer on each manufactured length of cable to check that each length meets the specified requirements

3.2.2

sample tests

tests made by the manufacturer on samples of completed cable or components taken from a completed cable, at a specified frequency, so as to verify that the finished product meets the specified requirements

3.2.3

type tests

tests made before supplying, on a general commercial basis, a type of cable covered by this standard, in order to demonstrate satisfactory performance characteristics to meet the intended application

NOTE These tests are of such a nature that, after they have been made, they need not be repeated, unless changes are made in the cable materials or design or manufacturing process which might change the performance characteristics.

3.2.4

electrical tests after installation

tests made to demonstrate the integrity of the cable and its accessories as installed

4 Voltage designations and materials

4.1 Rated voltages

The rated voltages $U_0/U(U_m)$ of the cables considered in this standard are as follows:

$U_0/U(U_m)$ = 21/35 (40.5) and 26/35(40.5), unit is kV.

In the voltage designation of cables $U_0/U(U_m)$:

U_0 is the rated power frequency voltage between conductor and earth or metallic screen for which the cable is designed;

U is the rated power frequency voltage between conductors for which the cable is designed;

U_m is the maximum value of the "highest system voltage" for which the equipment may be used (see GB/T 156-2007).

The rated voltage of the cable for a given application shall be suitable for the operating conditions in the system in which the cable is used. To facilitate the selection of the cable, systems are divided into three categories:

category A: this category comprises those systems in which any phase conductor that comes in contact with earth or an earth conductor is disconnected from the system within

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