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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 12706.1–2008

Replace GB/T 12706.1–2002

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 1: Cables for rated voltage of 1kV (U_m=1.2kV) and 3kV (U_m=3.6kV)

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 1 部分：额定电压 1Kv(U_m=1.2Kv)和 3Kv(U_m=3.6Kv)电缆

(IEC 60502-1: 2004, 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 1: Cables for rated voltages of 1 kV (U_m = 1.2 kV) and 3 kV (U_m = 3.6 kV), MOD)

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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 1kV (U_m=1.2kV) up to 35kV (U_m=40.5kV)* consists of four parts as following:

— *Part 1: Cables for rated voltage of 1kV (Um=1.2kV) and 3kV (Um=3.6kV);*

— *Part 2: Cables for rated voltages from 6kV(Um=7.2kV) up to 30kV(Um=36kV);*

— *Part 3: Cables for rated voltage of 35kV(Um=40.5kV);*

— *Part 4: Test requirements on accessories for cables with rated voltages from 6kV (Um=7.2kV) up to 35kV (Um=40.5kV).*

This is Part 1 of GB/T 12706.

This Part is revision of IEC 60502-1: 2004 *Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1.2 kV) up to 30 kV (Um = 36 kV) - Part 1: Cables for rated voltages of 1 kV (Um = 1.2 kV) and 3 kV (Um = 3.6 kV)* Second Edition (English Version).

This Part is redrafted according to IEC 60502-1: 2004. Comparison with IEC 60502-1: 2004, in addition to clause 20 and Annex D to be added, the rest are completely consistent.

Considering China's national conditions, this section was made some modifications in adoption of IEC 60502-1:2004. The related technical difference has been incorporated into the text and has been identified using vertical single line in the margin space that involved in their terms, the main technical differences and explanations are as follows:

——To clarify the requirements for armored copper belt material used for cable, added the contents of requirements for armored copper belt material (9.2.3 of this edition) and the corresponding reference standard GB/T 11091-2005 *Copper Belt for Cable* (Chapter 2 of this edition);

——To clarify the requirements for armored steel band material used for cable, added the contents of requirements for armored steel band material (12.2 of this edition) and the

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 1: Cables for rated voltage of 1kV (U_m=1.2kV) and 3kV (U_m=3.6kV)

1 Scope

This part of GB/T 12706 specifies the construction, dimensions and test requirements of power cables with extruded solid insulation for rated voltages of 1 kV (Um = 1,2 kV) and 3 kV (Um =3,6 kV) for fixed installations such as distribution networks or industrial installations.

This part includes cables which exhibit properties of reduced flame spread, low levels of smoke emission and halogen-free gas emission when exposed to fire.

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), submarine use or shipboard application.

2 Normative References

The articles contained in the following documents have become this standard 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 60811-4-1:2004, 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 3048.13-2007 Test methods for electrical properties of electric cables and wires—Part 13: Impulse voltage test (IEC 60230:1966, IEC 60060-1:1989, 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 6995.5-2008 Markings for electric wires and cables - Part 5: Identifications of insulated cores of power cables

GB/T 11091-2005 Copper strips for cables

GB/T 12706.2-2008 Power cables with extruded insulation and their accessories for rated voltages from 1kV (Um=1.2kV) up to 35kV (Um=40.5kV) - Part 2: Cables for rated voltages from 6kV(Um=7.2kV) up to 30kV(Um=36kV) (IEC 60502-2:2005,Power cables with extruded insulation and their accessories for rated voltages from 1kV(Um=1.2kV) up to 30Kv (Um=36kV)-Part 2: Cable for rated voltage of 6kV(Um=7.2kV)and 30kV(Um=36kV),MOD)

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

GB/T 17650.1-1998 Test on gases evolved during combustion of materials from cables Part 1: Determination of the amount of halogen acid gas (idt IEC 60754-1:1994)

GB/T 17650.2-1998 Test on gases evolved during combustion of materials from cables Part 2:Determination of degree of acidity of gases by measuring pH and conductivity (idt IEC 60754-2:1991)

GB/T 17651.2-1998 Measurement of smoke density of cables burning under defined conditions-- Part 2: Test procedure and requirements (idt IEC 61034-2:1997)

GB/T 18380.11-2008 Tests on electric and optical fibre cables under fire conditions - Part 11:Test for vertical flame propagation for a single insulated wire or cable – Apparatus (IEC 60332-1-1:2004IDT)

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 60332-2-1-2:2004,IDT)

GB/T 18380.13-2008 Tests on electric and optical fibre cables under fire conditions - Part 13:Test for vertical flame propagation for a single insulated wire or cable - Procedure for determination of flaming droplets/particles (IEC 60332-1-3:2004,IDT)

GB/T 18380.35-2008 Tests on electric and optical fibre cables under fire conditions - Part 35:Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C (IEC 60332-3-24:2000,IDT)

GB/T 19666-2005 Flame retardant and fire resistant wires and cables General

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

JB/T 8996-1999 Guide to the selection of high-voltage cables (eqv IEC 60183:1984)

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 60684-2:2003 Flexible insulating sleeving -- Part 2: Methods of test

IEC 60724:2000 Guide to the short-circuit temperature limits of electric cables with a rated voltage not exceeding 0,6/1,0 kV

3 Terms and definitions

For the purposes of this document, the following definitions 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

Usually, in this part, 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,

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