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

GB/T 18890.1-2015

**Power cables with cross-linked polyethylene insulation and
their accessories for rated voltage of 220 kV ($U_m=252$ kV) -- Part
1: Test methods and requirements**

(English Translation)

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1 Scope

This Part of GB/T 18890 specifies the test methods and requirements for fixedly- installed power cables with cross-linked polyethylene insulation, cable bodies and their accessories for rated voltage of 220 kV ($U_m=252$ kV).

This Part applies to single-core cables and their accessories used under normal installation and operating conditions. However, it does not apply to cables and their accessories used under special conditions, such as submarine cables. For these special- purpose cables and accessories, the tests in this standard may need to be modified or special test conditions may need to be established.

This Part does not include transition joints for connecting cross-linked polyethylene insulated cables and paper insulated cables.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) 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, 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 2951.14-2008, 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 sheaths

IEC 60183, Guidance for the selection of high-voltage a.c. cable systems

IEC 60229.2007, Electric cables -- Tests on extruded over sheaths with a special protective function

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 Definitions of dimensional values (thickness, cross-sectional area, etc.)

3.1.1

nominal value

A specified quantity and is often used in tables.

NOTE: In this Part, nominal values generally refer to values of quantities that have been verified by measurement taking into account stated tolerances.

3.1.2

median value

Arrange several measured values in ascending (or descending) order. If the number of values is odd, the middle value is the middle value. If the number of values is even, the

average of the two middle values is the middle value.

3.2 Definitions for relevant tests

3.2.1

routine test

A test carried out by the manufacturer on components (all manufactured lengths of cable or all accessories) to check that they comply with specified requirements.

3.2.2

sample test

A test carried out by the manufacturer at a specified frequency on samples of finished cables or components taken from finished cables or accessories to verify that the finished cables or accessories meet the specified requirements.

3.2.3

type test

A test carried out before a cable system of the type covered by this Part is supplied on a normal industrial basis to demonstrate that it has satisfactory performance under the conditions of intended use.

NOTE: Once the type test is passed, it does not need to be repeated unless the material, manufacturing process, structure or design electric field strength of the cable or accessories are changed and such change may have an adverse effect on its performance.

3.2.4

prequalification test

A test carried out before a cable system of the type covered by this Part is supplied on a normal industrial production basis to demonstrate that the complete cable system has satisfactory long-term operating performance.

3.2.5

extension of prequalification test

A test in which before a cable system of a type covered by this Part is supplied on a general industrial production basis, the system cables and accessories have each passed a prequalification test to verify that the complete cable system has satisfactory long-term operating performance.

3.2.6

electrical test after installation

A test performed on a cable system to prove its integrity after installation.

3.3 Other definitions

3.3.1

cable system

Cables fitted with various accessories, including components for use only with terminals and connectors, to suppress the thermal-mechanical forces on the system.

3.3.2

nominal electrical stress

Electric field strength at U_0 calculated based on nominal size.

4.1 Rated voltage

This Part uses the symbols U_0 , U and U_m to indicate the rated voltage of cables and accessories. The meanings of these symbols are given by IEC 60183.

4.2 Cable insulation materials

This standard applies to cables with cross-linked polyethylene (XLPE) insulation. Table 1 specifies the maximum operating temperature of XLPE insulated cable conductors and the test conditions accordingly.

Table 1 -- Cross-linked polyethylene insulation compound for cables

Insulation mixture Maximum conductor temperature/°C

Cross-linked polyethylene (XLPE)

Normal operation Short circuit (maximum duration is 5 s)

5 Water blocking measures for cables

When the cable system is laid underground, in an underground passage prone to water accumulation, or in water, it is recommended to use a radially impermeable barrier layer to cover the cable.

NOTE: There is currently no radial water permeability test method.

To prevent the need to replace long lengths of cable once the cable is damaged and water ingress occurs, longitudinal water-blocking measures can also be adopted.

The longitudinal water penetration test is given in 12.5.14.