

# INTERNATIONAL STANDARD

## NORME INTERNATIONALE

**Power cables with extruded insulation and their accessories for rated voltages above 150 kV ( $U_m = 170$  kV) up to 500 kV ( $U_m = 550$  kV) – Test methods and requirements**

**Câbles d'énergie à isolation extrudée et leurs accessoires pour des tensions assignées supérieures à 150 kV ( $U_m = 170$  kV) et jusqu'à 500 kV ( $U_m = 550$  kV) – Méthodes et exigences d'essai**



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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**POWER CABLES WITH EXTRUDED INSULATION AND  
THEIR ACCESSORIES FOR RATED VOLTAGES  
ABOVE 150 kV ( $U_m = 170$  kV) UP TO 500 kV ( $U_m = 550$  kV) –  
TEST METHODS AND REQUIREMENTS**

## FOREWORD

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International Standard IEC 62067 has been prepared by IEC technical committee 20: Electric cables.

This second edition of IEC 62067 cancels and replaces the first edition, published in 2001, and its Amendment 1 (2006), and constitutes a technical revision.

The significant technical changes with respect to the previous edition are as follows:

- addition of the extension of prequalification test, requiring significant less time to be completed compared with the full prequalification test;
- during the routine tests on the main insulation of prefabricated accessories the required sensitivity level for the partial discharge test is reduced from 10 pC to 5 pC.

NOTE For a more detailed history of events leading up to this second edition, see the Introduction.

The text of this standard is based on the following documents:

FDIS	Report on voting
20/1268/FDIS	20/1278A/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

## INTRODUCTION

As a result of major developments in cable systems with extruded insulation for voltages above 150 kV, CIGRE Study Committee (SC) 21 set up Working Group (WG) 21.03 in 1990. The terms of reference of WG 21.03 were *"to prepare recommendations for electrical type tests, sample and routine tests, based on extending IEC 60840:1988 up to 400 kV and to make proposals for prequalification/development tests which, as a minimum, should be performed"*.

WG 21.03 reported that the extension of IEC 60840 to voltages above 150 kV needed extra consideration because of the following factors:

- such cables form part of the backbone of the transmission system and, therefore, reliability considerations are of the highest priority;
- these cables and their accessories operate with higher electrical stresses than cables up to 150 kV and, as a result, have a smaller safety margin with respect to the intrinsic performance boundaries of the cable system;
- such cables and accessories have a thicker insulation wall than those up to 150 kV and, as a result, are subjected to greater thermomechanical effects;
- the design and coordination of the cables and accessories becomes more difficult with increasing system voltage levels.

The recommendations of the WG 21.03 were published in *Electra* No. 151 in December 1993 and taken into account by IEC in 1995 in the preparation of this standard for cable systems with extruded insulation for voltages above 150 kV. IEC considered that the new standard should also cover the 500 kV level. Thus, at its meeting in September 1996, CIGRE SC 21 set up task force 21.18 to study the extension of the initial recommendations to the 500 kV level. The updated recommendations were cited in *Electra* No. 173 in December 2000 and thus were also taken into account by IEC Technical Committee (TC) 20 in the preparation of the first edition of this standard.

On the advice of CIGRE, a long term accelerated ageing test was introduced in the first edition, in order to gain some indication of the long term reliability of a cable system. This test, known as the "prequalification test", was to be performed on the complete system comprising the cable, joints and terminations in order to demonstrate the performance of the system.

In addition, CIGRE WG 21.09, published recommendations for "tests after installation on high-voltage extruded insulation cable systems" in *Electra* No. 173 in August 1997. These recommendations (which state amongst other things, that d.c. tests should be avoided on the main insulation, as they are both ineffective and potentially damaging) were also taken into account in the first edition of this standard.

At its meeting in November 2004, TC 20 concluded that the next revision of IEC 62067 should include the recommendation for testing of HV and EHV extruded cables that was under preparation by the CIGRE SC B1 (previously SC 21) WG B1.06. This was made available as a CIGRE Technical Brochure 303 before the meeting of TC 20 in October 2006, which confirmed this view. Therefore Technical Brochure 303 has been considered by TC 20 and major parts implemented in this standard. This has resulted in some modifications to the prequalification test requirements, a major change being the addition of the extension of prequalification test. The latter test requires approximately one quarter of the time to complete when compared with the full prequalification test.

A list of relevant CIGRE references is given in the bibliography.

# POWER CABLES WITH EXTRUDED INSULATION AND THEIR ACCESSORIES FOR RATED VOLTAGES ABOVE 150 kV ( $U_m = 170$ kV) UP TO 500 kV ( $U_m = 550$ kV) – TEST METHODS AND REQUIREMENTS

## 1 Scope

This International Standard specifies test methods and requirements for power cable systems, cables with extruded insulation and their accessories for fixed installations, for rated voltages above 150 kV ( $U_m = 170$  kV) up to and including 500 kV ( $U_m = 550$  kV).

The requirements apply to single-core cables and to their accessories for usual conditions of installation and operation, but not to special cables and their accessories, such as submarine cables, for which modifications to the standard tests may be necessary or special test conditions may need to be devised.

This standard does not cover transition joints between cables with extruded insulation and paper insulated cables.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE The IEC 60811 series is currently undergoing a revision, which will lead to a restructuring of its parts. A description of this, as well as a cross-reference table between the current and planned parts will be given in IEC 60811-100.

IEC 60060-1 *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60183, *Guide to the selection of high-voltage cables*

IEC 60228, *Conductors of insulated cables*

IEC 60229:2007, *Electric cables – Tests on extruded oversheaths with a special protective function*

IEC 60230, *Impulse tests on cables and their accessories*

IEC 60287-1-1:2006, *Electric cables – Calculation of the current rating – Part 1-1: Current rating equations (100 % load factor) and calculation of losses – General*

IEC 60332-1-2, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*

IEC 60811-1-1:1993, *Common test methods for insulating and sheathing materials of electric cables and optical cables – Section 1-1: Methods for general application – Measurement of thickness and overall dimensions – Tests for determining the mechanical properties*  
Amendment 1 (2001)