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GROUP SAFETY PUBLICATION

Tests for electric cables under fire conditions – Circuit integrity – Part 3: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV tested in a metal enclosure

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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TESTS FOR ELECTRIC CABLES UNDER FIRE CONDITIONS – CIRCUIT INTEGRITY –

Part 3: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV tested in a metal enclosure

FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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This Redline version provides you with a quick and easy way to compare all the changes between this standard and its previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60331-3 has been prepared by IEC technical committee 20: Electric cables.

This second edition cancels and replaces the first edition published in 2009. It constitutes a technical revision.

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

– extension of the scope to include metallic data and telecom cables and optical fibre cables, although details for the specific point of failure, continuity checking arrangement, test sample, test procedure and test report relevant to metallic data and telecom cables and optical fibre cables are not given by IEC 60331-3;
– improved description of the test environment;
– mandatory use of mass flow meter/controllers as the means of controlling accurately the input flow rates of fuel and air to the burner;
– improved description of the information to be included in the test report.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
20/1782A/FDIS	20/1794/RVD

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

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

It has the status of a group safety publication in accordance with IEC Guide 104.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result 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.

IMPORTANT – The “colour inside” logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this publication using a colour printer.

INTRODUCTION

IEC 60331 consists of the following parts under the general title: *Tests for electric cables under fire conditions – Circuit integrity:*

Part 1: *Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter exceeding 20 mm*

Part 2: *Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter not exceeding 20 mm*

Part 3: *Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV tested in a metal enclosure*

Part 11: *Apparatus – Fire alone at a flame temperature of at least 750 °C*

Part 21: *Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV*

Part 23: *Procedures and requirements – Electric data cables*

Part 25: *Procedures and requirements – Optical fibre cables*

NOTE 1 Parts 21, 23 and 25 relate to fire-only conditions at a flame temperature of at least 750 °C.

NOTE 2 Parts 11, 21, 23 and 25 are no longer subject to maintenance. IEC 60331 Parts 1 and 2 are the recommended test procedures

Since its first edition (1970), IEC 60331 has been extended and has introduced a range of test apparatus in order that a test may be carried out on large and small power, control, data and optical fibre cables.

IEC 60331-3 introduces apparatus and a procedure to allow cables to be tested in a metal enclosure under conditions of mechanical shock as well as fire at temperature of at least 830 °C.

TESTS FOR ELECTRIC CABLES UNDER FIRE CONDITIONS – CIRCUIT INTEGRITY –

Part 3: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV tested in a metal enclosure

1 Scope

~~This part of IEC 60331 specifies the test apparatus and procedure and gives the performance requirements, including recommended flame application times, for low-voltage power cables of rated voltage up to and including 0,6/1,0 kV, and control cables with a rated voltage which are required to maintain circuit integrity when tested in a metal enclosure and when subject to fire and mechanical shock under specified conditions.~~

~~This standard describes the means of sample preparation, the continuity checking arrangements, the electrical testing procedure, the method of burning the cables and the method of shock production and gives requirements for evaluating test results.~~

~~NOTE All cables assessed by this method should first have been assessed against the test of IEC 60331-1 or IEC 60331-2. Such performance may be recognized by the marking according to Clause 11 of IEC 60331-1 or Clause 11 of IEC 60331-2.~~

This part of IEC 60331 specifies the test method for cables which are required to maintain circuit integrity when tested in a metal enclosure and when subject to fire and mechanical shock under specified conditions.

This document is applicable to cables of rated voltage not exceeding 600 V/1 000 V, including those of rated voltage below 80 V, metallic data and telecom cables and optical fibre cables.

It is intended for use when testing cables not greater than 20 mm overall diameter.

This document includes details for the specific point of failure, continuity checking arrangement, test sample, test procedure and test report relevant to electric power and control cables with rated voltage up to and including 600 V/1 000 V. Details for the specific point of failure, continuity checking arrangement, test sample, test procedure and test report relevant to metallic data and telecom cables and optical fibre cables are not given by IEC 60331-3.

Although the scope is restricted to cables with rated voltage up to and including 0,6/1,0 kV, the procedure can be used, with the agreement of the manufacturer and the purchaser, for cables with rated voltage up to and including 1,8/3 (3,3) kV, provided that suitable fuses are used.

It is not assumed that cables successfully assessed by this method, will also pass requirements for either IEC 60331-1 or IEC 60331-2. Testing to either of these two standards is to be carried out separately. Such additional performance can be recognised by the marking in accordance with IEC 60331-1:2018 Clause 11 or IEC 60331-2:2018 Clause 11.

Annex A provides the method of verification of the burner and control system used for the test.

CAUTION – The test given in this standard may involve the use of dangerous voltages and temperatures. Suitable precautions should be taken against the risk of shock,

burning, fire and explosion that may be involved, and against any noxious fumes that may be produced.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60269-3, *Low-voltage fuses – Part 3: Supplementary requirements for fuses for use by unskilled persons (fuses mainly for household and similar applications) – Examples of standardized systems of fuses A to F*

IEC 60331-1:2018, *Test for electric cables under fire conditions – Circuit integrity – Part 1: Test ~~method~~ for circuit integrity under conditions of fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0kV and with an overall diameter exceeding 20 mm*

IEC 60331-2:2018, *Test for electric cables under fire conditions – Circuit integrity – Part 2: Test ~~method~~ for circuit integrity under conditions of fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0kV and with an overall diameter not exceeding 20 mm*

IEC 60584-1, *Thermocouples – Part 1: ~~Reference tables~~ EMF specifications and tolerances*

~~IEC Guide 104, *The preparation of safety publications and the use of basic safety publications and group safety publications*~~

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INTERNATIONAL STANDARD

GROUP SAFETY PUBLICATION

Tests for electric cables under fire conditions – Circuit integrity – Part 3: Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV tested in a metal enclosure



IEC 60331-3:2018-03(en)

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A bilingual version of this publication may be issued at a later date.

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Part 3: *Test method for fire with shock at a temperature of at least 830 °C for cables of rated voltage up to and including 0,6/1,0 kV tested in a metal enclosure*

Part 11: *Apparatus – Fire alone at a flame temperature of at least 750 °C*

Part 21: *Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV*

Part 23: *Procedures and requirements – Electric data cables*

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Annex A provides the method of verification of the burner and control system used for the test.

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IEC 60584-1, *Thermocouples – Part 1: EMF specifications and tolerances*