IEC 60332-1-2

Edition 2.0 2025-06
COMMENTED VERSION

INTERNATIONAL STANDARD

**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**

ICS 13.220.40; 29.020; 29.060.20

ISBN 978-2-8327-0502-5

CONTENTS

FOREWORD 3
1 Scope 5
2 Normative references 5
3 Terms and definitions 6
4 Test apparatus 6
5 Procedure 6
5.1 Sample 6
5.2 Conditioning 6
5.3 Positioning of test piece 7
5.4 Flame application 7
5.4.1 Safety warning 7
5.4.2 Positioning of flame 7
5.4.3 Test duration 8
6 Evaluation of test results 8
7 Performance requirements 8
Annex A(~~informative~~normative) ~~Recommended~~ Performance requirements 12
Bibliography 13
List of comments 14

Figure 1 – Arrangement of test piece in test apparatus 9
Figure 2 – Application of flame to test piece 11

Table 1 – Time for flame application 8
Table A.1 – Performance requirements 12

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

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

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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

This commented version (CMV) of the official standard IEC 60332-1-2:2025 edition 2.0 allows the user to identify the changes made to the previous IEC 60332-1-2:2004+ AMD1:2015 CSV edition 1.1. Furthermore, comments from IEC TC 20 experts are provided to explain the reasons of the most relevant changes, or to clarify any part of the content.

A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text. Experts' comments are identified by a blue-background number. Mouse over a number to display a pop-up note with the comment.

This publication contains the CMV and the official standard. The full list of comments is available at the end of the CMV.

IEC 60332-1-2 has been prepared by IEC technical committee 20: Electric cables. It is an International Standard.

This second edition cancels and replaces the first edition published in 2004 and Amendment 1:2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) modification in positioning of test pieces, which move out of the flame (5.3);

b) addition of performance requirements (Annex A).

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

Draft	Report on voting
20/2232/FDIS	20/2244/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

A list of all parts in the IEC 60332 series, published under the general title *Tests on electric and optical fibre cables under fire conditions*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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

1 Scope

This part of IEC 60332 specifies the procedure for testing the resistance to vertical flame propagation for a single vertical electric~~al~~ insulated conductor or cable, or optical fibre cable, under fire conditions using a 1 kW pre-mixed flame **1**. The apparatus is described in IEC 60332-1-1.

NOTE 1 Testing to IEC 60332-1-2 ~~may~~ can be performed simultaneously with that to IEC 60332-1-3, if required.

~~Recommended requirements for performance are given in Annex A.~~

~~IEC 60332-1-2 specifies the use of a 1 kW pre-mixed flame and is for general use, except that the procedure specified may not be suitable for the testing of small single insulated conductors or cables of less than 0,5 mm² total cross-section because the conductor melts before the test is completed, or for the testing of small optical fibre cables because the cable is broken before the test is completed. In these cases, the procedure given in IEC 60332-2-2 is recommended.~~ **2**

This group safety publication focusing on test method(s) is primarily intended to be used as a product safety standard for the products mentioned in the scope, but is also intended to be used by technical committees in the preparation of standards for products similar to those mentioned in the scope of this group safety publication, in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

NOTE 2 ~~Since the use of insulated conductor or cable which retards flame propagation and complies with the recommended requirements of this standard is not sufficient by itself to prevent propagation of fire under all conditions of installation, it is recommended that wherever the risk of propagation is high, for example in long vertical runs of bunches of cables, special installation precautions should also be taken. It cannot be assumed that because the sample of cable complies with the performance requirements recommended in this standard, that a bunch of cables will behave in a similar manner. (See IEC 60332-3 series.)~~ The performing of this test method on a single insulated conductor or cable or optical fibre cable does not provide compliance with fire propagation requirements in relevant standards in the case that the single insulated conductor or cable or optical fibre cable is installed with or amongst other cables as a group. (See the IEC 60332-3 series). **3**

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications and/or group safety publications in the preparation of its publications.

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

~~IEC 60695-4, *Fire hazard testing – Part 4: Terminology concerning fire tests*~~

IEC 60811-203, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 203: General tests – Measurement of overall dimensions*

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

IEC 60332-1-2

Edition 2.0 2025-06

INTERNATIONAL STANDARD

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

ICS 13.220.40; 29.020; 29.060.20

ISBN 978-2-8327-0430-1

CONTENTS

FOREWORD 3
1 Scope 5
2 Normative references 5
3 Terms and definitions 5
4 Test apparatus 6
5 Procedure 6
5.1 Sample 6
5.2 Conditioning 6
5.3 Positioning of test piece 6
5.4 Flame application 7
5.4.1 Safety warning 7
5.4.2 Positioning of flame 7
5.4.3 Test duration 7
6 Evaluation of test results 8
7 Performance requirements 8
Annex A (normative) Performance requirements 11
Bibliography 12

Figure 1 – Arrangement of test piece in test apparatus 9
Figure 2 – Application of flame to test piece 10

Table 1 – Time for flame application 8
Table A.1 – Performance requirements 11

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

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

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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 60332-1-2 has been prepared by IEC technical committee 20: Electric cables. It is an International Standard.

This second edition cancels and replaces the first edition published in 2004 and Amendment 1:2015. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) modification in positioning of test pieces, which move out of the flame (5.3);
b) addition of performance requirements (Annex A).

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

Draft	Report on voting
20/2232/FDIS	20/2244/RVD

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

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

A list of all parts in the IEC 60332 series, published under the general title *Tests on electric and optical fibre cables under fire conditions*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

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

1 Scope

This part of IEC 60332 specifies the procedure for testing the resistance to vertical flame propagation for a single vertical electric insulated conductor or cable, or optical fibre cable, under fire conditions using a 1 kW pre-mixed flame. The apparatus is described in IEC 60332-1-1.

NOTE 1 Testing to IEC 60332-1-2 can be performed simultaneously with that to IEC 60332-1-3, if required.

This group safety publication focusing on test method(s) is primarily intended to be used as a product safety standard for the products mentioned in the scope, but is also intended to be used by technical committees in the preparation of standards for products similar to those mentioned in the scope of this group safety publication, in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

NOTE 2 The performing of this test method on a single insulated conductor or cable or optical fibre cable does not provide compliance with fire propagation requirements in relevant standards in the case that the single insulated conductor or cable or optical fibre cable is installed with or amongst other cables as a group. (See the IEC 60332-3 series).

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications and/or group safety publications in the preparation of its publications.

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

IEC 60811-203, *Electric and optical fibre cables – Test methods for non-metallic materials – Part 203: General tests – Measurement of overall dimensions*