

Australian/New Zealand Standard™

**Tests on electric and optical fibre cables  
under fire conditions**

**Part 3.10: Test for vertical flame spread  
of vertically-mounted bunched wires or  
cables—Apparatus**



AS/NZS IEC 60332.3.10:2017

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- Australian Cablemakers Association
- Australian Industry Group
- Electrical Compliance Testing Association
- Electrical Contractors Association of New Zealand
- Electrical Regulatory Authorities Council
- Institute of Electrical Inspectors
- National Electrical and Communications Association
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## Preface

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee,

EL-003 Electric Wires and Cables, to supersede in part, AS/NZS 1660.5.1:2005, Test methods for electric cables, cords and conductors, Method 5.1: Fire tests—Test for vertical flame spread of vertically-mounted bunched wires or cables.

The objective of this Standard is to specify method of test for the assessment of vertical flame spread of vertically-mounted bunched wires or cables, electrical or optical, under defined conditions. This Standard specifies the apparatus and its arrangement and calibration.

This Standard is identical with, and has been reproduced from IEC 60332-3-10:2000+AMD1:2008 CSV (ED. 1.1), Tests on electric and optical fibre cables under fire conditions, Part 3-10: Test for vertical flame spread of vertically-mounted bunched wires or cables—Apparatus.

As this Standard is reproduced from an International Standard, the following applies:

- (a) In the source text 'this part of IEC 60332' should read 'this Australian/New Zealand Standard'.
- (b) A full point substitutes for a comma when referring to a decimal marker.

None of the normative references in the source document have been adopted as Australian or Australian/New Zealand Standards.

## NOTES

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**TESTS ON ELECTRIC AND OPTICAL FIBRE CABLES  
UNDER FIRE CONDITIONS –****Part 3-10: Test for vertical flame spread of vertically-mounted bunched  
wires or cables – Apparatus**

## FOREWORD

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International Standard IEC 60332-3-10 has been prepared by IEC technical committee 20: Electric cables.

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

IEC 60332-3-10 forms one of a series of publications dealing with tests on electric cables under fire conditions; the series supersedes IEC 60332-3 published in 1992. The parts of the series are described in the introduction.

All pre-existing categories of test are retained and updated. A new category (category D) has been added to cater for testing at very low non-metallic volumes.

This consolidated version of IEC 60332-3-10 consists of the first edition (2000) [documents 20/402/FDIS and 20/426/RVD] and its amendment 1 (2008) [documents 20/933/CDV and 20/982A/RVC].

The technical content is therefore identical to the base edition and its amendment and has been prepared for user convenience.

It bears the edition number 1.1.

A vertical line in the margin shows where the base publication has been modified by amendment 1.

Annexes A and B are for information only.

The committee has decided that the contents of the base publication and its amendments 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.

## INTRODUCTION

Parts 1 and 2 of IEC 60332 specify methods of test for flame spread characteristics for a single vertical insulated wire or cable. It cannot be assumed that, because a wire or cable meets the requirements of parts 1 and 2, a vertical bunch of similar cables or wires will behave in a similar manner. This is because flame spread along a vertical bunch of cables depends on a number of features, such as

- a) the volume of combustible material exposed to the fire and to any flame which may be produced by the combustion of the cables;
- b) the geometrical configuration of the cables and their relationship to an enclosure;
- c) the temperature at which it is possible to ignite the gases emitted from the cables;
- d) the quantity of combustible gas released from the cables for a given temperature rise;
- e) the volume of air passing through the cable installation;
- f) the construction of the cable, for example armoured or unarmoured, multi- or single-core.

All of the foregoing assume that the cables are able to be ignited when involved in an external fire.

Part 3 of IEC 60332 gives details of a test where a number of cables are bunched together to form various test sample installations. For easier use and differentiation of various test categories, the parts are designated as follows:

Part 3-10: Apparatus

Part 3-21: Category A F/R

Part 3-22: Category A

Part 3-23: Category B

Part 3-24: Category C

Part 3-25: Category D

Parts from 3-21 onwards define the various categories and the relevant procedures. The categories are distinguished by test duration, the volume of non-metallic material of the test sample and the method of mounting the sample for the test. In all categories, cables having at least one conductor of cross-sectional area greater than 35 mm<sup>2</sup> are tested in a spaced configuration, whereas cables of conductor cross-sectional area of 35 mm<sup>2</sup> or smaller are tested in a touching configuration.

The categories are not necessarily related to different safety levels in actual cable installations. The actual installed configuration of the cables may be a major determinant in the level of flame spread occurring in an actual fire.

The method of mounting described in category A F/R (part 3-21) is intended for special cable designs used in particular installations.

Categories A, B, C and D (parts 3-22 to 3-25 respectively) are for general use where different non-metallic volumes are applicable.

## TESTS ON ELECTRIC AND OPTICAL FIBRE CABLES UNDER FIRE CONDITIONS –

### Part 3-10: Test for vertical flame spread of vertically-mounted bunched wires or cables – Apparatus

#### 1 Scope

The series of International Standards covered by Parts 3-10, 3-21, 3-22, 3-23, 3-24 and 3-25 of IEC 60332 specifies methods of test for the assessment of vertical flame spread of vertically-mounted bunched wires or cables, electrical or optical, under defined conditions.

NOTE For the purpose of this standard the term “electric wire or cable” covers all insulated metallic conductor cables used for the conveyance of energy or signals.

This part of IEC 60332 details the apparatus and its arrangement and calibration.

#### 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.

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

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

#### 3 Definitions

For the purpose of this part of IEC 60332 the following definition applies. The definition is taken from IEC 60695-4.

##### 3.1

##### **ignition source**

source of energy that initiates combustion

#### 4 Test environment

The test shall not be carried out if the external wind speed, measured by an anemometer fitted on the top of the test rig, is greater than 8 m/s and shall not be carried out if the temperature of the inside walls is below 5 °C or above 40 °C measured at a point approximately 1 500 mm above floor level, 50 mm from a side wall, and 1 000 mm from the door. The enclosure door shall be closed throughout the test.