Australian/New Zealand Standard™

Tests on electric and optical fibre cables under fire conditions

Part 3.22: Test for vertical flame spread of vertically-mounted bunched wires or cables—Category A

AS/NZS IEC 60332.3.22:2017

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee EL-003, Electric Wires And Cables. It was approved on behalf of the Council of Standards Australia on 30 April 2017 and by the New Zealand Standards Approval Board on 7 June 2017.

This Standard was published on 30 June 2017.

The following are represented on Committee EL-003:

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
Queensland University of Technology
Worksafe New Zealand

This Standard was issued in draft form for comment as DR AS/NZS IEC 60332.3.22:2017.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

www.standards.org.au

www.standards.govt.nz

www.saiglobal.com (sales and distribution)

ISBN 978 1 76035 829 7

Australian/New Zealand Standard™

Tests on electric and optical fibre cables under fire conditions

Part 3.22: Test for vertical flame spread of vertically-mounted bunched wires or cables—Category A

Originated in Australia as SAA Int 88001—1988.
Jointly revised and designated as AS/NZS 1660.5.1:1998.
Third edition 2005.
AS/NZS 1660.5.1:2005 revised and redesignated, in part, as
AS/NZS IEC 60332.3.22:2017.

Jointly published by SAI Global Limited under licence from Standards Australia Limited, GPO Box 476, Sydney, NSW 2001 and by Standards New Zealand, PO Box 1473, Wellington 6140.

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 methods 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 Category A and relates to cables installed on the test ladder to achieve a nominal total volume of non-metallic material of 7 l/m of test sample. This category is intended for general use where high volumes of non-metallic material are required to be evaluated.

This Standard is identical with, and has been reproduced from IEC 60332-3-22:2000+AMD1:2008 CSV (ED. 1.1), Tests on electric and optical fibre cables under fire conditions, Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables—Category A.

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

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

TESTS ON ELECTRIC AND OPTICAL FIBRE CABLES UNDER FIRE CONDITIONS –

Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A

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 provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with an IEC Publication.
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) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60332-3-22 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 60332-3-22 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 60332-3-22 consists of the first edition (2000) [documents 20/404/FDIS and 20/428/RVD] and its amendment 1 (2008) [documents 20/934/CDV and 20/983A/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.

Annex A forms an integral part of this standard.

Annex B is 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 cable or wire 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 the 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 mm² are tested in a spaced configuration, whereas cables of conductor cross-sectional area of 35 mm^2 or smaller and optical cables 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 as 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 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A

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.

The test is intended for type approval testing. The requirements for the selection of cables for testing are given in annex A. The flame spread is measured as the extent of damage of the cable sample. This procedure may be used to demonstrate the cable's ability to limit flame spread.

This part of IEC 60332 covers category A and relates to cables installed on the test ladder to achieve a nominal total volume of non-metallic material of 7 l/m of test sample. The flame application time is 40 min. The method of mounting uses the front of the ladder, a standard or wide ladder being used for cables having a conductor cross-section greater than 35 mm² according to the number of test pieces required, and a standard ladder for conductor cross-sections 35 mm² and smaller. The category is intended for general use where high volumes of non-metallic material are required to be evaluated.

A recommended performance requirement is given in annex B.

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 60332-3-10,*Tests on electric cables under fire conditions – Part 3-10: Test for vertical flame spread of vertically-mounted bunched wires or cables – Apparatus*

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

IEC 60811-1-3, *Insulating and sheathing materials of electric cables – Common test methods Part 1: General application – Section 3: Methods for determining the density – Water absorption tests – Shrinkage test*

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