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TECHNICAL REPORT

Fire performance of communication cables installed in buildings

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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FIRE PERFORMANCE OF COMMUNICATION CABLES INSTALLED IN BUILDINGS

FOREWORD

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IEC TR 62222 has been prepared by subcommittee 46C: Wires and symmetric cables, of IEC technical committee 46: Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories. It is a Technical Report.

This third edition cancels and replaces the second edition published in 2012. This edition constitutes a technical revision.

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

a) Scope rewritten to clarify and bring into line current understanding from other technical sources;
b) Normative References updated to be in line with the most recent technical definitions and new additions;
c) new additional terms and definitions added to Annex F since these are not used in the document;
d) new inclusions to the list of abbreviated terms, some corrections;
e) project reports are now in Annex E, for information only;

f) Subclause 4.2 Mitigation of fire hazards, about fire protection, updated with clearer information on standards plus updates where new standards have been published or amended;

g) test methods, test methods conclusions and fire performance updated.

The text of this Technical Report is based on the following documents:

DTR	Report on voting
46C/1151/DTR	46C/1156/RVDTR

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 Technical Report 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/standardsdev/publications.

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

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- withdrawn,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

INTRODUCTION

IEC TR 62222:2005 was the first attempt in understanding the potential fire hazards concerning new installations where large quantities of data cable are involved. Although it is important to remember that data cables will probably not spontaneously combust and offices are still filled with other highly flammable products, the increase of "flood wiring" should be a building design concern. IEC TR 62222:2012 attempted to align all the installation guides found and further improve safety with fire and its possible transmission.

FIRE PERFORMANCE OF COMMUNICATION CABLES INSTALLED IN BUILDINGS

1 Scope

This document describes the test methods for various parameters relating to the reaction to fire properties of metallic and optical fibre communications cables. The parameters have particular importance for cables intended to be installed within buildings and other structures.

This document also maps the test methods and associated limits applied to the fire hazards created by particular installation conditions and which can be referenced by other international, regional and national standards. For example, it is important that compliance with the requirements and recommendations for installation methods in ISO/IEC 14763-2 taking into consideration this document improve safety concerning fire.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms, definitions and abbreviated terms apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at http://www.electropedia.org/
- ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Terms and definitions

3.1.1
asphyxiant
toxicant that causes hypoxia, which can result in central nervous system depression or cardiovascular effects

[SOURCE: ISO 13943:2017, 3.23, modified – The note to entry has been removed.]

3.1.2
cabling
system of telecommunication cables, cords and connecting hardware that supports the connection of information technology equipment

[SOURCE: ISO/IEC 11801-1:2017, 3.1.21]

3.1.3
chimney effect
upward movement of hot fire effluent caused by convection currents confined within an essentially vertical enclosure

[SOURCE: ISO 13943:2017, 3.50, modified – The note to entry has been removed.]

3.1.4
combustible
capable of being ignited and burned

[SOURCE: ISO 13943:2017, 3.52]

3.1.5
combustion
exothermic reaction of a substance with an oxidizing agent

Note 1 to entry: Combustion generally emits fire effluent accompanied by flames and/or glowing.

[SOURCE: ISO 13943:2017, 3.55]

3.1.6
communication cable
assembly of suitably insulated coaxial conductors, twisted pairs of insulated conductors or optical fibres fabricated to meet transmission, mechanical and environmental requirements, and sufficient to allow conveyance of information between two points with the minimum of radiation

3.1.7
compartment
discrete fire zone designed to contain a fire within that zone

Note 1 to entry: Compartments are also known as "fire compartments".

3.1.8
compartmentation
division of premises into compartments in order to provide protection for the rest of the premises

3.1.9
convection
transfer of heat by movement of a fluid

[SOURCE: ISO 13943:2017, 3.66]

3.1.10
contribution to fire
energy released by a product influencing the fire growth

3.1.11
corrosion damage
physical and/or chemical damage or impaired function caused by chemical action

[SOURCE: ISO 13943:2017, 3.69]

3.1.12
damaged length
maximum extent in a specified direction of damaged area

3.1.13
enclosure
<built environment> volume defined by bounding surfaces, which may have one or more openings

[SOURCE: ISO 13943:2017, 3.92]

3.1.14
fire
<general> process of combustion characterized by the emission of heat and fire effluent and usually accompanied by smoke, flame or glowing or a combination thereof

Note 1 to entry: In the English language, the term "fire" is used to designate three concepts, two of which relate to specific types of self-supporting combustion with different meanings. Of these three, two of them are designated using two different terms in both French and German.

[SOURCE: ISO 13943:2017, 3.114]

3.1.15
fire attack
thermal attack by fire test burner

3.1.16
fire compartment
enclosed space, which may be subdivided, separated from adjoining spaces by fire barriers

[SOURCE: ISO 13943:2017, 3.120]

3.1.17
fire danger
concept including both fire hazard and fire risk

[SOURCE: ISO 13943:2017, 3.121, modified – The note to entry has been removed.]

3.1.18
fire effluent
totality of gases and aerosols, including suspended particles, created by combustion or pyrolysis in a fire

[SOURCE: ISO 13943:2017, 3.123, modified – The definition has been rephrased.]

3.1.19
fire growth
stage of fire development during which the heat release rate and the temperature of the fire are increasing

[SOURCE: ISO 13943:2017, 3.129]

3.1.20
fire growth rate index
FIGRA index
highest value of the quotient between heat release rate (HRR) and time

Note 1 to entry: In this report FIGRA is expressed in W/s.

3.1.21
fire hazard
potential for harm associated with fire

Note 1 to entry: Alternatively, fire hazard can be a physical object or condition with a potential for an undesirable consequence from fire.

[SOURCE: ISO 13943:2017, 3.131]

3.1.22
fire load
quantity of heat which could be released by the complete combustion of all the combustible materials in a volume, including the facings and bounding surfaces

Note 1 to entry: Fire load may be based on effective heat of combustion, gross heat of combustion, or net heat of combustion as required by the specifier.

[SOURCE: ISO 13943:2017, 3.134, modified – Note 2 to entry and Note 3 to entry have been removed.]

3.1.23
fire performance
response of a material, product or assembly in a fire

[SOURCE: ISO 13943:2017, 3.137, modified – The notes to entry have been removed.]

3.1.24
fire propagation
combination of flame spread and spread of fire effluent

[SOURCE: ISO 13943:2017, 3.140]

3.1.25
fire resistance
ability of a test specimen to withstand fire or give protection from it for a period of time

Note 1 to entry: Typical criteria used to asses fire resistance in a standard fire test are fire integrity, fire stability and thermal insulation.

[SOURCE: ISO 13943:2017, 3.141, modified – Note 2 to entry has been removed.]

3.1.26
fire risk
estimation of expected fire loss that combines the potential for harm in various fire scenarios that can occur with the probabilities of occurrence of those scenarios

Note 1 to entry: An alternate definition of fire risk is, "combination of the probability of a fire and a quantified measure of its consequence".

Note 2 to entry: Fire risk is often calculated as the product of probability and consequence.

[SOURCE: ISO 13943:2017, 3.145]

3.1.27
fire scenario
qualitative description of the course of a fire with respect to time, identifying key events that characterize the studied fire and differentiate it from other possible fires

[SOURCE: ISO 13943:2017, 3.152, modified – The note to entry has been removed.]

3.1.28
fire severity
capacity of a fire to cause damage

[SOURCE: ISO 13943:2017, 3.155, modified – The note to entry has been removed.]

3.1.29
fire test
test that measures fire behaviour or exposes an item to the effects of a fire or reaction to fire of the test specimen

Note 1 to entry: The results of a fire test can be used to quantify fire severity or determine the fire resistance or reaction to fire of the test specimen.

[SOURCE: ISO 13943:2017, 3.157, modified – The words "or reaction to the fire of the test specimen" have been added to the definition.]

3.1.30
fire stability
fire resistance ability of a building element to resist collapse for a stated period of time in a standard fire resistance test

Note 1 to entry: The building element may or may not be load-bearing.

3.1.31
fire safety objective
desired outcome with respect to the probability of an unwanted fire, relative to essential aspects of the built environment

Note 1 to entry: The essential aspects typically relate to the issues of life safety, conservation of property, continuity of operations, protection of the environment and preservation of heritage.

[SOURCE: ISO 13943:2017, 3.151]

3.1.32
flame, noun
rapid, self-sustaining, sub-sonic propagation of combustion in a gaseous medium, usually with the emission of light

[SOURCE: ISO 13943:2017, 3.159]

3.1.33
flame, verb
produce flame

[SOURCE: ISO 13943:2017, 3.160]

3.1.34
flame retarded
treated with a flame retardant

[SOURCE: ISO 13943:2017, 3.167, modified – The note to entry has been removed.]

3.1.35
flame application time
period of time for which a burner flame is applied to a test specimen

[SOURCE: ISO 13943:2017, 3.161]

3.1.36
flame retardant
substance which suppresses or delays the appearance of a flame and/or reduces the flame spread rate

3.1.37
flame retardance
property of a material whereby flaming combustion is slowed, terminated or prevented

Note 1 to entry: Flame retardance can be an inherent property of the basic material or it may be imparted by specific treatment.

Note 2 to entry: The degree of the flame retardance exhibited by a material during testing can vary with the test conditions.

3.1.38
flame spread
propagation of a flame front

[SOURCE: ISO 13943:2017, 3.168]

3.1.39
flame spread rate
DEPRECATED: burning rate
DEPRECATED: rate of burning
distance travelled by a flame front during its propagation, divided by the time of travel, under specified conditions

[SOURCE: ISO 13943:2017, 3.169, modified – The note to entry has been removed.]

3.1.40
flaming
continuation of the presence of a flame after its first appearance

[SOURCE: ISO 13943:2017, 3.174]

3.1.41
flaming droplets
flaming molten or flaming liquefied drops which fall from the test specimen during the fire test and continue to burn on the floor

[SOURCE: ISO 13943:2017, 3.177]

3.1.42
flammability
ability of a material or product to burn with a flame under specified conditions

[SOURCE: ISO 13943:2017, 3.178]

3.1.43
flammable
capable of flaming combustion under specified conditions

[SOURCE: ISO 13943:2017, 3.180]

3.1.44
flashover
<stage of fire> transition state of total surface involvement in a fire of combustible materials within an enclosure

[SOURCE: ISO 13943:2017, 3.184]

3.1.45
fuel
substance which can react exothermically with an oxidizing agent

[SOURCE: ISO 13943:2017, 3.189]

3.1.46
gross heat of combustion
heat of combustion of a substance when the combustion is complete and any produced water is entirely condensed under specified conditions

[SOURCE: ISO 13943:2017, 3.198, modified – The notes to entry have been removed.]

3.1.47
halogen free
free from halogen according to IEC 60754-2

Note 1 to entry: When added to abbreviations, "halogen free, HF" can be added to mean that the material also should be low smoke and have some resistance to ignitability, e.g. HF = halogen free, LS=low smoke, HFFR = halogen free flame retardant, HFFR LS = halogen free, flame retardant and low smoke!

3.1.48
heat of combustion
DEPRECATED: calorific potential
DEPRECATED: calorific value
thermal energy produced by combustion of unit mass of a given substance

Note 1 to entry: The typical unit is kilojoule per gram ($kJ \cdot g^{-1}$).

[SOURCE: ISO 13943:2017, 3.203, modified – Note 1 to entry has been removed.]

3.1.49
heat release
thermal energy produced by combustion

[SOURCE: ISO 13943:2017, 3.205, modified – The note to entry has been removed.]

3.1.50
heat release rate
HRR
DEPRECATED: burning rate
DEPRECATED: rate of burning
rate of thermal energy production generated by combustion

[SOURCE: ISO 13943:2017, 3.206, modified – The abbreviated term "HRR" has been added, and the note to entry has been removed.]

3.1.51
ignitability
measure of the ease with which a test specimen can be ignited, under specified conditions

[SOURCE: ISO 13943:2017, 3.212, modified – The synonym "ease of ignition" and the notes to entry have been removed.]