

STN	Skúšanie požiarneho nebezpečenstva Časť 1-12: Návod na posudzovanie požiarneho nebezpečenstva elektrotechnických výrobkov Požiarne inžinierstvo	STN EN IEC 60695-1-12 34 5630
------------	--	---

Fire hazard testing - Part 1-12: Guidance for assessing the fire hazard of electrotechnical products - Fire safety engineering

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 08/20

Obsahuje: EN IEC 60695-1-12:2020, IEC 60695-1-12:2015

131341

EUROPEAN STANDARD

EN IEC 60695-1-12

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2020

ICS 13.220.40; 29.020

English Version

Fire hazard testing - Part 1-12: Guidance for assessing the fire hazard of electrotechnical products - Fire safety engineering (IEC 60695-1-12:2015)

Essais relatifs aux risques du feu - Partie 1-12: Lignes directrices pour l'évaluation des risques du feu des produits électrotechniques - Ingénierie de la sécurité incendie (IEC 60695-1-12:2015)

Prüfungen zur Beurteilung der Brandgefahr - Teil 1-12: Anleitung zur Beurteilung der Brandgefahr von elektrotechnischen Erzeugnissen - Brandschutzingenieurwesen (IEC 60695-1-12:2015)

This European Standard was approved by CENELEC on 2020-05-11. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN IEC 60695-1-12:2020 (E)**European foreword**

This document (EN IEC 60695-1-12:2020) consists of the text of IEC 60695-1-12:2015 prepared by IEC/TC 89 "Fire hazard testing".

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2021-05-11
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2023-05-11

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

Endorsement notice

The text of the International Standard IEC 60695-1-12:2015 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

ISO 9239-1 NOTE Harmonized as EN ISO 9239-1

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60695-1-10	-	Fire hazard testing -- Part 1-10: Guidance for assessing the fire hazard of electrotechnical products - General guidelines	-	-
IEC 60695-1-11	-	Fire hazard testing - Part 1-11: Guidance for assessing the fire hazard of electrotechnical products - Fire hazard assessment	EN 60695-1-11	-
IEC 60695-4	-	Fire hazard testing - Part 4: Terminology concerning fire tests for electrotechnical products	EN 60695-4	-
IEC Guide 104	-	The preparation of safety publications and the use of basic safety publications and group safety publications	-	-
ISO/IEC Guide 51	-	Safety aspects - Guidelines for their inclusion in standards	-	-
ISO 13943	2008	Fire safety - Vocabulary	-	-
ISO/TR 13387-2	-	Fire safety engineering – Part 2: Design fire scenarios and design fires	-	-
ISO/TR 13387-8	-	Fire safety engineering - Part 8: Life safety - Occupant behaviour, location and condition	-	-
ISO/TS 16733	-	Fire safety engineering - Selection of design fire scenarios and design fires	-	-
ISO/TR 16738	-	Fire-safety engineering - Technical information on methods for evaluating behaviour and movement of people	-	-
ISO/TR 17252	2008	Fire tests - Applicability of reaction to fire tests to fire modelling and fire safety engineering	-	-
ISO 23932	2009	Fire safety engineering - General principles	-	-



IEC 60695-1-12

Edition 1.0 2015-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

BASIC SAFETY PUBLICATION

PUBLICATION FONDAMENTALE DE SÉCURITÉ

Fire hazard testing –

**Part 1-12: Guidance for assessing the fire hazard of electrotechnical products –
Fire safety engineering**

Essais relatifs aux risques du feu –

**Partie 1-12: Lignes directrices pour l'évaluation des risques du feu des produits
électrotechniques – Ingénierie de la sécurité incendie**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2015 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

More than 60 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

Plus de 60 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.



IEC 60695-1-12

Edition 1.0 2015-01

INTERNATIONAL STANDARD

NORME INTERNATIONALE

BASIC SAFETY PUBLICATION

PUBLICATION FONDAMENTALE DE SÉCURITÉ

**Fire hazard testing –
Part 1-12: Guidance for assessing the fire hazard of electrotechnical products –
Fire safety engineering**

**Essais relatifs aux risques du feu –
Partie 1-12: Lignes directrices pour l'évaluation des risques du feu des produits
électrotechniques – Ingénierie de la sécurité incendie**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 13.220.40; 29.020

ISBN 978-2-8322-1960-7

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative References.....	7
3 Terms and Definitions.....	8
4 The fire safety engineering process.....	14
4.1 General.....	14
4.2 Fire safety engineering calculations.....	15
4.3 Validity of methods.....	15
5 Benefits of fire safety engineering.....	16
6 Objectives, requirements and performance.....	17
6.1 Fire safety engineering objectives.....	17
6.1.1 General.....	17
6.1.2 Safety of life.....	17
6.1.3 Conservation of property.....	17
6.1.4 Continuity of operations.....	17
6.1.5 Protection of the natural environment.....	18
6.1.6 Preservation of heritage.....	18
6.2 Functional requirements.....	18
6.3 Performance criteria.....	18
6.3.1 General.....	18
6.3.2 Explicit performance criteria.....	18
6.3.3 Implicit performance criteria.....	19
7 Design fire scenarios and design fires.....	19
7.1 Design fire scenarios.....	19
7.2 Design fires.....	20
8 Data for fire safety engineering.....	20
9 Tests on electrotechnical products.....	21
9.1 General.....	21
9.2 Conditions for evaluation in fire tests.....	21
9.3 Electrotechnical product evaluations.....	21
9.3.1 As the source of ignition of a fire.....	21
9.3.2 As the victim of a fire.....	22
9.4 Test selection and/or development.....	22
Annex A (informative) A probabilistic fire risk assessment.....	24
A.1 The assessment of a fire risk in accordance with the Russian national standard GOST 12.1.004-91 [38].....	24
A.1.1 Introduction.....	24
A.1.2 Probability Q_{fc}	24
A.1.3 Probability Q_{fv}	25
A.1.4 Probability Q_{pf}	25
A.1.5 Probability Q_{ign}	25
A.2 Example.....	26
A.2.1 General.....	26
A.2.2 Test data.....	27

A.2.3 Calculation	27
Bibliography.....	29
Figure 1 – Flowchart illustrating an example of the fire safety engineering process as applied to a major project in the built environment	16
Table 1 – Examples of design fire scenarios	19
Table 2 – Common ignition phenomena encountered in electrotechnical products.....	23
Table A.1 – Long start-up mode: enclosure (shell) temperatures in the most heated up-point	27
Table A.2 – The enclosure temperature at the most heated point when working under abnormal conditions	28
Table A.3 – Failure data for abnormal operation	28

INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIRE HAZARD TESTING –**Part 1-12: Guidance for assessing
the fire hazard of electrotechnical products –
Fire safety engineering**

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) 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 60695-1-12 Ed 1.0 has been prepared by IEC technical committee 89: Fire hazard testing.

It has the status of a basic safety publication in accordance with IEC Guide 104 and ISO/IEC Guide 51.

The text of this standard is based on the following documents:

FDIS	Report on voting
89/1237A/FDIS	89/1242/RVD

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

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

A list of all the parts in the 60695 series, under the general title *Fire hazard testing*, can be found on the IEC web site.

IEC 60695-1 consists of the following parts:

- Part 1-10: Guidance for assessing the fire hazard of electrotechnical products – General guidelines
- Part 1-11: Guidance for assessing the fire hazard of electrotechnical products – Fire hazard assessment
- Part 1-12: Guidance for assessing the fire hazard of electrotechnical products – Fire safety engineering
- Part 1-30: Guidance for assessing the fire hazard of electrotechnical products – Preselection testing process – General guidelines
- Part 1-40: Guidance for assessing the fire hazard of electrotechnical products – Insulating liquids.

This standard is to be used in conjunction with IEC 60695-1-10 and IEC 60695-1-11.

The committee has decided that the contents of this publication will remain unchanged until the stability 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

Fire safety engineering

Fire safety engineering concerns the application of engineering methods based on scientific principles to the development or assessment of designs in the built environment through the analysis of specific fire scenarios or through the quantification of risk for a group of fire scenarios. This is in order to achieve fire safety engineering objectives, which typically are:

- a) to protect life safety,
- b) to protect property,
- c) to maintain the continuity of operations,
- d) to protect the natural environment, and
- e) to preserve heritage.

The analysis is based on calculations that use input data obtained principally from quantitative fire tests.

Fire safety engineering (FSE) is a discipline increasingly being used in support of performance-based national fire safety regulations in many countries and regional jurisdictions throughout the world. The eight parts of ISO/TR 13387 (see Clause 2 and [1] to [6]) and ISO 23932 outline the fundamental methodologies and uses of FSE. Further detailed aspects of FSE are covered in ISO 16730 [7], ISO/TS 16732 [8], ISO/TS 16733, ISO 16734 [9], ISO 16735 [10], ISO 16736 [11], ISO 16737 [12] and ISO/TR 16738.

In addition to purely performance-based regulations, many countries are also using FSE to supplement prescriptive regulations by applying FSE principles to specific design aspects, where reduced costs, alternative practices, improved performance and improved safety are the objectives.

The International Maritime Organization (IMO) is using FSE and the ISO standards mentioned above to develop fire safety designs for ships. These are considered to be an improvement on designs based on prescriptive fire safety requirements.

Qualitative and quantitative fire tests

Many standardised fire test methods give information on the performance of a material or end product as measured in the test, which may or may not be related to a real fire scenario or real installation practices. These qualitative fire test methods result in a “pass” or “fail” and/or a product or material ranking. They play an important role in prescriptive regulations, and the results of a qualitative test can be used indirectly in fire hazard assessment of electrotechnical products, but they are not suitable for directly supporting performance-based design.

Most standardized test methods developed by the IEC for electrotechnical products are of the qualitative type. It is agreed within ISO and the IEC that this type of fire test will continue to be maintained and, where necessary, developed. It is recognised that, even if the use of these standards is in prescriptive codes, product data from many of these standards may be potentially adaptable for fire safety engineering purposes.

In contrast, quantitative fire tests are increasingly being used and developed, and these do provide data that can be input to fire safety engineering calculations.

Various quantitative fire tests have been developed by ISO, some of which can be used to assess the performance of electrotechnical products (see 9.4).

FIRE HAZARD TESTING –

Part 1-12: Guidance for assessing the fire hazard of electrotechnical products – Fire safety engineering

1 Scope

This part of IEC 60695 is intended as a general guideline for IEC Product Committees and provides:

- an explanation of the principles and uses of fire safety engineering;
- guidance on the use of fire safety engineering in the design of electrotechnical products;
- fire safety engineering terminology, and concepts;
- an indication of properties, data and tests needed for input into fire safety engineering assessments;
- informative references.

This international standard is not intended to be a detailed technical design guide, but is intended to provide guidance for product committees on fire safety engineering methods and performance based test information needs for use in performance based designs and fire hazard assessments of electrotechnical materials, assemblies, products and systems. More detailed information on fire safety engineering is contained in the ISO/TR 13387 series of documents (see Clause 2 and [1] to [6]) and in ISO 23932.

NOTE Further detailed aspects of FSE are covered in ISO 16730 [7], ISO/TS 16732 [8], ISO/TS 16733, ISO 16734 [9], ISO 16735 [10], ISO 16736 [11], ISO 16737 [12] and ISO/TR 16738.

This basic safety publication is intended for use by technical committees in the preparation of standards in accordance with the principles laid down in IEC Guide 104 and ISO/IEC Guide 51.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications in the preparation of its publications. The requirements, test methods or test conditions of this basic safety publication will not apply unless specifically referred to or included in the relevant publications.

2 Normative References

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60695-1-10, *Fire hazard testing – Part 1-10: Guidance for assessing the fire hazard of electrotechnical products – General guidelines*

IEC 60695-1-11, *Fire hazard testing – Part 1-11: Guidance for assessing the fire hazard of electrotechnical products – Fire hazard assessment*

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

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

ISO/IEC Guide 51, *Safety aspects – Guidelines for inclusion in standards*

ISO 13943:2008, *Fire safety – Vocabulary*

ISO/TR 13387-2: *Fire safety engineering – Part 2: Design fire scenarios and design fires*

ISO/TR 13387-8, *Fire safety engineering – Part 8: Life safety: Occupant behaviour, location and condition*

ISO/TS 16733, *Fire safety engineering – Selection of design fire scenarios and design fires*

ISO/TR 16738, *Fire safety engineering – Technical information on methods for evaluating behaviour and movement of people*

ISO/TR 17252:2008, *Fire tests – Applicability of reaction to fire tests to fire modelling and fire safety engineering*

ISO 23932:2009, *Fire safety engineering – General principles*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN