

Fire hazard testing - Part 1-20: Guidance for assessing  
the fire hazard of electrotechnical products - Ignitability  
- General guidance

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

See Eesti standard EVS-EN 60695-1-20:2016 sisaldab Euroopa standardi EN 60695-1-20:2016 ingliskeelset teksti.	This Estonian standard EVS-EN 60695-1-20:2016 consists of the English text of the European standard EN 60695-1-20:2016.
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English Version

Fire hazard testing -  
Part 1-20: Guidance for assessing the fire hazard of  
electrotechnical products - Ignitability - General guidance  
(IEC 60695-1-20:2016)

Essais relatifs aux risques du feu -  
Partie 1-20: Lignes directrices pour l'évaluation des risques  
du feu des produits électrotechniques - Allumabilité - Lignes  
directrices générales  
(IEC 60695-1-20:2016)

Prüfungen zur Beurteilung der Brandgefahr -  
Teil 1-20: Anleitung zur Beurteilung der Brandgefahr von  
elektrotechnischen Erzeugnissen - Entzündbarkeit -  
Allgemeiner Leitfaden  
(IEC 60695-1-20:2016)

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Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

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## European foreword

The text of document 89/1296/FDIS, future edition 1 of IEC 60695-1-20:2016, prepared by IEC/TC 89 "Fire hazard testing" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60695-1-20:2016.

The following dates are fixed:

- latest date by which the document has to be (dop) 2016-12-02  
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standard or by endorsement
- latest date by which the national (dow) 2019-03-02  
standards conflicting with the  
document have to be withdrawn

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In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC/TS 62441	NOTE	Harmonized as CLC/TS 62441.
IEC 60112	NOTE	Harmonized as EN 60112.
IEC 60587	NOTE	Harmonized as EN 60587.
IEC 60099-4	NOTE	Harmonized as EN 60099-4.

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE 1 When 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](http://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	EN 60695-1-10	-
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 60695-1-12	-	Fire hazard testing - Part 1-12: Guidance for assessing the fire hazard of electrotechnical products - Fire safety engineering	EN 60695-1-12	-
IEC/TR 60695-1-21	-	Fire hazard testing - Part 1-21: Guidance for assessing the fire hazard of electrotechnical products - Ignitability - Summary and relevance of test methods	-	-
IEC 60695-2-11	-	Fire hazard testing - Part 2-11: Glowing/hot-wire based test methods - Glow-wire flammability test method for end-products (GWEPT)	EN 60695-2-11	-
IEC 60695-2-12	-	Fire hazard testing - Part 2-12: Glowing/hot-wire based test methods - Glow-wire flammability index (GWFI) test method for materials	EN 60695-2-12	-
IEC 60695-2-13	-	Fire hazard testing - Part 2-13: Glowing/hot-wire based test methods - Glow-wire ignition temperature (GWIT) test method for materials	EN 60695-2-13	-
IEC 60695-4	2012	Fire hazard testing - Part 4: Terminology concerning fire tests for electrotechnical products	EN 60695-4	2012
IEC 60695-11-5	-	Fire hazard testing - Part 11-5: Test flames - Needle-flame test method - Apparatus, confirmatory test arrangement and guidance	EN 60695-11-5	-

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60695-11-10	-	Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods	EN 60695-11-10	-
IEC/TS 60695-11-11	-	Fire hazard testing - Part 11-11: Test flames - Determination of the characteristic heat flux for ignition from a non-contacting flame source	-	-
IEC 60695-11-20	-	Fire hazard testing - Part 11-20: Test flames - 500 W flame test methods	EN 60695-11-20	-
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	-	Fire safety - Vocabulary	EN ISO 13943	-
ISO 871	2006	Plastics - Determination of ignition temperature using a hot-air furnace	-	-
ISO 2592	-	Determination of flash and fire points - Cleveland open cup method	EN ISO 2592	-
ISO 2719	-	Determination of flash point - Pensky- Martens closed cup method	EN ISO 2719	-
ISO 5657	-	Reaction to fire tests - Ignitability of building products using a radiant heat source	-	-
ISO 5660-1	-	Reaction-to-fire tests - Heat release, smoke production and mass loss rate - Part-1: Heat release rate (cone calorimeter method) and smoke production rate (dynamic measurement)	-	-
ISO 10840	-	Plastics - Guidance for the use of standard - fire tests	-	-

## CONTENTS

FOREWORD.....	3
INTRODUCTION.....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions .....	7
4 Principles of ignitability .....	12
4.1 Gases.....	12
4.1.1 Overview .....	12
4.1.2 Flammability limits .....	12
4.1.3 Arc fires.....	12
4.2 Liquids.....	13
4.2.1 Overview .....	13
4.2.2 Ignition parameters .....	13
4.2.3 Insulating liquids.....	13
4.3 Solids .....	13
4.3.1 Overview .....	13
4.3.2 Parameters affecting ignition .....	14
4.3.3 Metals .....	14
4.3.4 Carbon (graphite) and carbonaceous char .....	15
4.3.5 Reactive substances .....	15
4.3.6 Dust clouds.....	15
5 Consideration for the selection of test methods .....	15
5.1 General.....	15
5.2 Fire scenario .....	16
5.3 Ignition sources.....	16
5.3.1 General .....	16
5.3.2 Internal ignition sources .....	16
5.3.3 External ignition sources .....	17
5.3.4 Arc ignition of materials.....	18
5.4 Types of test specimen.....	19
5.5 Test procedure and apparatus .....	20
6 Use and interpretation of results .....	20
Annex A (informative) Examples of accidents due to arc fires in underground hydroelectric power plants or urban substations .....	21
A.1 General.....	21
A.2 Examples which are generally available (non-exhaustive list) .....	21
A.2.1 Underground hydroelectric power plants .....	21
A.2.2 Urban substations (non-exhaustive list) .....	21
Bibliography .....	22

## INTRODUCTION

Fires are responsible for creating hazards to life and property as a result of the generation of heat (thermal hazard), and also as a result of the production of toxic effluent, corrosive effluent and smoke (non-thermal hazard). Fires start with ignition and then can grow, leading in some cases to flash-over and a fully developed fire. Ignition resistance is therefore one of the most important parameters of a material to be considered in the assessment of fire hazard. If there is no ignition, there is no fire.

For most materials (other than metals and some other elements), ignition occurs in the gas phase. Ignition occurs when combustible vapour, mixed with air, reaches a high enough temperature for exothermic oxidation reactions to rapidly propagate. The ease of ignition is a function of the chemical nature of the vapour, the fuel/air ratio and the temperature.

In the case of liquids, the combustible vapour is produced by vaporization of the liquid, and the vaporization process is dependent on the temperature and chemical composition of the liquid.

In the case of solids, the combustible vapour is produced by pyrolysis when the temperature of the solid is sufficiently high. The vaporization process is dependent on the temperature and chemical composition of the solid, and also on the thickness, density, specific heat, and thermal conductivity of the solid.

The ease of ignition of a test specimen depends on many variables. Factors to be considered for the assessment of ignitability are:

- a) the geometry of the test specimen, including thickness and the presence of edges, corners or joints;
- b) the surface orientation;
- c) the rate and direction of air flow;
- d) the nature and position of the ignition source;
- e) the magnitude and position of any external heat flux; and
- f) whether the combustible material is a solid or a liquid.

The primary aims are to prevent ignition caused by an electrically energized component part, and in the event of ignition, to confine any resulting fire within the bounds of the enclosure of the electrotechnical product.

Secondary aims include the minimization of any flame spread beyond the product's enclosure and the minimization of harmful effects of fire effluents including heat, smoke, and toxic or corrosive combustion products.

Fires involving electrotechnical products can also be initiated from external non-electrical sources. Considerations of this nature are dealt with in an overall fire hazard assessment.

This international standard gives an overview of ignitability and its relevance to the fire hazard of electrotechnical products.