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BASIC SAFETY PUBLICATION

PUBLICATION FONDAMENTALE DE SÉCURITÉ

Fire hazard testing –
Part 1-30: Guidance for assessing the fire hazard of electrotechnical products – Preselection testing process – General guidelines

Essais relatifs aux risques du feu –
Partie 1-30: Lignes directrices pour l'évaluation des risques du feu des produits électrotechniques – Processus d'essai de présélection – Lignes directrices générales

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IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
Web: www.iec.ch

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

FIRE HAZARD TESTING –

Part 1-30: Guidance for assessing the fire hazard of electrotechnical products – Preselection testing process – General guidelines

FOREWORD

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International Standard IEC 60695-1-30 has been prepared by IEC technical committee 89: Fire hazard testing.

This second edition cancels and replaces the first edition of IEC 60695-1-30, published in 2002, and constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

– Further explanation given in the introduction and scope.
– Clause 3: changes to the definitions.
– Clause 4: clarifications of the principles of product design considering preselection.
– Clause 5: clarifications of the advantages and limitations of preselection.
– Clause 6: clarifications of the aspects of preselection relative to hazard assessment.

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– Annex A: changes in the references for examples of test methods which may be relevant to preselection.

– Annex B: changes in the illustrative example of the flowchart of the use of preselection tests for resistance to fire hazards of a specific product type.

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
89/865/FDIS	89/869/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.

This publication is to be used in conjunction with the future IEC 60695-1-10[1] and IEC 60695-1-11[1].

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

Part 1 consists of the following sub-parts:

Part 1-10[1]: *Guidance for assessing the fire hazard of electrotechnical products – General guidelines*

Part 1-11[1]: *Guidance for assessing the fire hazard of electrotechnical products – Fire hazard assessment*

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

Part 1-21: *Guidance for assessing the fire hazard of electrotechnical products – Ignitability – Summary and relevance of test methods*

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*

The committee has decided that the contents of this publication 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.

[1] Under consideration.

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INTRODUCTION

In the design of any electrotechnical product, the risk of fire and the potential hazards associated with fire need to be considered. In this respect the objective of component, circuit and equipment design as well as the choice of materials is to reduce to acceptable levels the potential risks of fire even in the event of foreseeable abnormal use, malfunction or failure. The future IEC 60695-1-10[2] and IEC 60695-1-11[2] provide guidance on how this is to be accomplished using quantitative and qualitative fire tests.

The information gained from properly designed small-scale tests can be used as an aid for the preselection of proper materials, parts, components or sub-assemblies with regard to the fire hazard evaluation of the final end-product. The best method for testing electrotechnical products with regard to fire hazard is to duplicate exactly the conditions occurring in practice by conducting real-scale fire tests. Where this is not practicable, fire hazard testing should be conducted by simulating as closely as possible, the actual conditions of use and of the situation to which a sub-assembly, component, part or material may be exposed in such use. As an outcome of conducting a fire hazard assessment, an appropriate series of preselection flammability and ignition tests may enable reduced end-product testing.

Preselection is the procedure for assessing and choosing materials, components or sub-assemblies for parts of end-products. Preselection has been used for many years to assist the designer in the selection of candidate materials in the design stage of the end-product.

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FIRE HAZARD TESTING –

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1 Scope

This part of IEC 60695 provides guidance for assessing and choosing candidate materials, components or sub-assemblies for making an end-product based upon preselection testing.

It describes how preselection provides comparative fire hazard test methods to evaluate the performance of a test specimen and how preselection can be used in the selection of materials, parts, components and sub-assemblies during the design stage of an end-product. It further describes how standardized test methods may be used as one part in the decision making processes directed to minimize the fire hazards from electrotechnical equipment. It states that one should take into account the desired reaction to fire properties of the end-product, and that one should consider the possible effects of environmental conditions on the behaviour of the end-product.

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 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 60695-4:2005, *Fire hazard testing – Part 4: Terminology concerning fire tests for electrotechnical products*

IEC Guide 104:1997, *The preparation of safety publications and the use of basic safety publications and group safety publications*

ISO/IEC Guide 51:1999, *Safety aspects – Guidelines for their inclusion in standards*

ISO/IEC 13943:2000, *Fire safety – Vocabulary*

3 Terms and definitions

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

3.1
end-product fire test
fire test that is described in a relevant product specification and that is carried out on an assembled product which is ready for use

NOTE End-product fire tests may be small-scale, intermediate-scale, large-scale or real-scale.

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3.2
preselection
process of assessing and choosing candidate materials, components or sub-assemblies for making an end-product

4 Principles of product design considering preselection

One objective of equipment design is to choose individual materials, parts, components and sub-assemblies that reduce the likelihood of fire. The preselection procedure, as well as end-product testing, should take into account all possible ignition sources, even those that may have an influence in the event of foreseeable abnormal use, malfunction or failure.

The properties required by individual materials, parts, components and sub-assemblies are determined by their function and related requirements as part of the final end-product. The selection and magnitude of these properties will be dependent upon the details of reasonable foreseeable use, abuse and environmental exposure.

An integral element of preselection is the acquisition of relevant information regarding a material's characteristics. This knowledge can be acquired from an analysis of data obtained from standardized test methods conducted on specified test specimens. Examples of tests which may be relevant to preselection are contained in Annex A.

The preselection process should describe how standardized test methods may be used in decision-making processes to minimize the fire hazards from electrotechnical equipment. The preselection process should take into account the relevant features of the end-product, since the actual performance of the material may be affected by various factors and constructional characteristics.

The fire performance of materials, parts, components and sub-assemblies is affected by a number of factors, some of which are listed in Table 1.

Consequently, a preselection procedure to assess the adequate performance of a final end-product requires test data on materials, parts, components and sub-assemblies and should take into account all of the relevant features (for example, the environmental conditions, association with other items, and possible ignition sources).

A decision analysis flow chart (see Figure B.1) is shown in Annex B for an illustrative example of the use of preselection.

Table 1 – Some of the factors which can affect fire performance in preselection tests

Item	Factor
a)	Thickness and size of the test specimen
b)	Shape, homogeneity and volume of the test specimen
c)	Combination and interaction of materials, parts, components and sub-assemblies
d)	Position and orientation of the test specimen
e)	Composition of materials
f)	Presence of fire-retardant covers, barriers and/or coatings
g)	Effects of environmental influence and contamination, e.g. effects of temperature, ageing and ventilation
h)	Effects of manufacturing processes
i)	Type and power of the ignition source
j)	Location of application of the ignition source
k)	Time of application of the ignition source
l)	Presence of any heat sinks, and heat transfer effects

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