

# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

BASIC SAFETY PUBLICATION

PUBLICATION FONDAMENTALE DE SÉCURITÉ

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**Fire hazard testing –  
Part 8-1: Heat release – General guidance**

**Essais relatifs aux risques du feu –  
Partie 8-1: Dégagement de chaleur – Guide général**





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INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

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## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references .....	7
3 Terms and definitions .....	7
4 Principles of determining heat release .....	11
4.1 Complete combustion measured by the oxygen bomb calorimeter .....	11
4.2 Incomplete combustion .....	12
4.2.1 Measurement techniques.....	12
4.2.2 Heat release by oxygen consumption.....	12
4.2.3 Heat release by carbon dioxide generation .....	13
4.2.4 Heat release by increase of gas temperature .....	13
5 Parameters used to report heat release data .....	15
5.1 Heat of combustion (gross and net) .....	15
5.2 Heat release rate (HRR) .....	15
5.3 Heat release (HR).....	16
5.4 Heat release rate per unit area (HRR*) .....	16
5.5 Total heat release .....	17
5.6 Peak heat release rate.....	17
5.7 Time to peak heat release rate.....	17
5.8 Effective heat of combustion .....	17
5.8.1 Measurement and calculation .....	17
5.8.2 Examples.....	18
5.9 FIGRA index .....	19
5.10 ARHE and MARHE .....	20
6 Considerations for the selection of test methods.....	22
6.1 Ignition sources .....	22
6.2 Type of test specimen.....	22
6.3 Choice of conditions .....	22
6.4 Test apparatus.....	22
6.4.1 General .....	22
6.4.2 Small-scale fire test apparatus.....	22
6.4.3 Intermediate and large-scale fire test apparatus .....	23
6.4.4 Comparison between small-scale and intermediate/large-scale fire test methods .....	23
6.5 Choice of fire tests.....	23
7 Relevance of heat release data .....	23
7.1 Contribution to fire hazard.....	23
7.2 Secondary ignition and flame spread .....	23
7.3 Determination of self-propagating fire thresholds .....	24
7.4 Probability of reaching flash-over.....	24
7.5 Smoke and toxic gas production .....	24
7.6 The role of heat release testing in research and development.....	24
Bibliography.....	25

Figure 1 – Heat release rate (HRR) curve .....	16
Figure 2 – Heat release (HR) curve.....	16
Figure 3 – Heat release rate per unit area (HRR*) curve .....	17
Figure 4 – Mass loss curve .....	18
Figure 5 – FIGRA curve derived from Figure 1 .....	19
Figure 6 – Illustrative HRR curve .....	20
Figure 7 – FIGRA curve derived from Figure 6 .....	20
Figure 8 – ARHE curve derived from Figure 1 .....	21
Figure 9 – ARHE curve derived from Figure 6 .....	21
Table 1 – Relationship between heat of combustion expressed in units of $\text{kJ}\cdot\text{g}^{-1}$ of fuel burned and $\text{kJ}\cdot\text{g}^{-1}$ of oxygen consumed for a variety of fuels .....	14
Table 2 – Relationship between heat of combustion expressed in units of $\text{kJ}\cdot\text{g}^{-1}$ of fuel burned and $\text{kJ}\cdot\text{g}^{-1}$ of oxygen consumed for a variety of insulating liquids .....	15

# INTERNATIONAL ELECTROTECHNICAL COMMISSION

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## FIRE HAZARD TESTING –

### Part 8-1: Heat release – General guidance

#### 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.
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International Standard IEC 60695-8-1 has been prepared by IEC technical committee 89: Fire hazard testing.

This third edition cancels and replaces the second edition published in 2008. This edition constitutes a technical revision.

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

- a) a modified Introduction;
- b) reference to IEC 60695-1-12;
- c) updated normative references;
- d) revised terms and definitions;
- e) new text in 4.2.2, 4.2.3, 6.1 and 6.4, including several mandatory statements;
- f) mandatory statements in a new Subclause 6.5.

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

FDIS	Report on voting
89/1342/FDIS	89/1348/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.

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

This standard is to be used in conjunction with IEC 60695-8-2.

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

IEC 60695-8 consists of the following parts:

Part 8-1: *Heat release – General guidance*

Part 8-2: *Heat release – Summary of test methods*

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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

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 the risk of fire to a tolerable level even in the event of reasonably foreseeable (mis)use, malfunction or failure. IEC 60695-1-10 [1]<sup>1</sup> provides guidance on how this is to be accomplished.

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

The aim of the IEC 60695 series of standards is to save lives and property by reducing the number of fires or reducing the consequences of the fire. This can be accomplished by:

- trying to prevent ignition caused by an electrically energised component part and, in the event of ignition, to confine any resulting fire within the bounds of the enclosure of the electrotechnical product;
- trying to minimise flame spread beyond the product's enclosure and to minimise the harmful effects of fire effluents including heat, smoke, and toxic or corrosive combustion products.

Fires are responsible for creating hazards to life and property as a result of the generation of heat (thermal hazard), toxic and/or corrosive compounds and obscuration of vision due to smoke. Fire risk increases as the heat released increases, possibly leading to a flash-over fire.

One of the most important measurements in fire testing is the measurement of heat release, and it is used as an important factor in the determination of fire hazard; it is also used as one of the parameters in fire safety engineering calculations.

The measurement and use of heat release data, together with other fire test data, can be used to reduce the likelihood of (or the effects of) fire, even in the event of reasonably foreseeable (mis)use, malfunction or failure of electrotechnical products.

When a material is heated by some external source, fire effluent can be generated and can form a mixture with air, which can ignite and initiate a fire. The heat released in the process is carried away by the fire effluent-air mixture, radiatively lost or transferred back to the solid material, to generate further pyrolysis products, thus continuing the process.

Heat may also be transferred to other nearby products, which may burn, and then release additional heat and fire effluent.

The rate at which thermal energy is released in a fire is defined as the heat release rate. Heat release rate is important because of its influence on flame spread and on the initiation of secondary fires. Other characteristics are also important, such as ignitability, flame spread and the side-effects of the fire (see the IEC 60695 series of standards).

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<sup>1</sup> Numbers in square brackets refer to the Bibliography.



## FIRE HAZARD TESTING –

### Part 8-1: Heat release – General guidance

#### 1 Scope

This part of IEC 60695-8 provides guidance on the measurement and interpretation of heat release from electrotechnical products and materials from which they are constructed.

Heat release data can be used as part of fire hazard assessment and in fire safety engineering, as described in IEC 60695-1-11 [2] and IEC 60695-1-12 [3].

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 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.

IEC 60695-4:2012, *Fire hazard testing – Part 4: Terminology concerning fire tests for electrotechnical products*

IEC 60695-8-2, *Fire hazard testing – Part 8-2: Heat release – Summary and relevance of test methods*

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*

#### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13943:2008 and IEC 60695-4:2012 (some of which are reproduced below), as well as the following, apply.

##### 3.1

##### **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.