

Fire hazard testing —

Part 8-3: Heat release — Heat release of insulating liquids used in electrotechnical products

ICS 13.220.40; 29.020

National foreword

This Draft for Development is the UK implementation of IEC/TS 60695-8-3:2008.

This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature. It should be applied on this provisional basis, so that information and experience of its practical application can be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the international organization responsible for its conversion to an international standard. A review of this publication will be initiated not later than three years after its publication by the international organization so that a decision can be taken on its status. Notification of the start of the review period will be made in an announcement in the appropriate issue of *Update Standards*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into an international Standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent to the Secretary of the responsible BSI Technical Committee at British Standards House, 389 Chiswick High Road, London W4 4AL.

The UK participation in its preparation was entrusted to Technical Committee GEL/89, Fire hazard testing.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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TECHNICAL SPECIFICATION

**Fire hazard testing –
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electrotechnical products**

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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 [1]¹, together with its companion, the future IEC 60695-1-1 [2], provide guidance on how this is to be accomplished.

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 the overall risk assessment.

Fires are responsible for creating hazards to life and property as a result of the generation of heat (thermal hazard), the production of toxic and/or corrosive compounds, and the 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 foreseeable abnormal 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. Some of the heat released in the process is carried away by the fire effluent-air mixture, some is radiatively lost, and some is transferred back to the 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).

This technical specification, is based on the use of the cone calorimeter which is an instrument which measures heat release rate as well as other useful fire hazard parameters such as smoke production, ignition time and mass loss.

The need for heat release data from the combustion of insulating liquids is mentioned in IEC 60695-1-40 [3]. This technical specification provides a method for measuring the heat release from such materials and is also applicable to other combustible liquids. Guidance on the use of the cone calorimeter is given in ISO 5660-3 [4] and in IEC 60695-8-2 [5].

¹ Figures in square brackets refer to the bibliography.