

Fire hazard testing —

Part 7-3: Toxicity of fire effluent — Use and interpretation of test results

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Cross-references

The British Standards which implement international publications referred to in this document may be found in the BSI Standards Catalogue under the section entitled “International Standards Correspondence Index”, or by using the “Find” facility of the BSI Standards Electronic Catalogue.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the IEC title page, page ii, pages 1 to 14 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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Part 7-3:

Toxicity of fire effluent –

Use and interpretation of test results



Commission Electrotechnique Internationale
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Introduction

The guidance in this technical report is consistent with principles of fire safety developed by ISO TC 92 SC 3 on toxic hazards in fire [1–6]¹⁾. The recommended systems approach is believed to be a major advance to fire standards development.

This technical report follows directly from IEC 60695-7-1. Small-scale toxicity tests as we know them today are not valid as directly applied standards for electrotechnical materials and products. Toxic potency data, such as provided by small-scale test methods, should be used only as one of the input parameters for toxic hazard assessment.

Toxic hazard assessment is that part of fire hazard assessment in which the toxic effects of fire effluent are evaluated. General guidance is reviewed in IEC 60695-7-1. It is the intention of IEC TC 89 to publish a summary and relevance of test methods in the near future. This technical report provides guidance on the use and interpretation of results from toxic potency tests in assessing toxic hazard, a part of total fire hazard.

In interpreting the data generated by toxic potency test methods, it is important to recognize that, in order to produce concentrations of fire effluent sufficient to measure their incapacitating or lethal effects, test specimens are forced to decompose. Any advantages in thermal stability or combustibility possessed by a specimen are overridden by the test, either by testing under very severe exposure conditions or by continuously increasing temperature during the test. Thus, laboratory test conditions are necessarily artificial and are not intended to substitute for real fire situations.

Any test for assessing potency which is to be useful for toxic hazard assessment, needs to provide a way of knowing the concentration of fire effluent in the test apparatus and relating it to the mass loss of the test specimen. In real fires, the concentration of the fire effluent is determined by fire dynamics and the combustibility characteristics of the burning products. In toxic potency testing, the concentration is set by the experimenter. These procedures are necessary to the toxicologist in order to get quantified testable concentrations of fire effluents, but they also inherently define limitations on use of data. This is why toxic potency alone cannot be used for any type of decision in fire safety, and should only be used as data input for hazard assessments which also incorporate relevant and necessary combustibility information, the amount of product burning and the environment in which the fire takes place.

1 Scope

This technical report provides guidance on the use and interpretation of results obtained from laboratory tests. It discusses currently available approaches to toxic hazard assessment consistent with the approach of ISO TC 92 SC 3, as set out in ISO/TR 9122-6 [6]. It also provides guidance on the use of toxic potency data in hazard assessment and on principles which underlie the use of combustibility and toxicological information in hazard assessment.

The detailed methodology described in this technical report is directly applicable to data produced by tests measuring the *lethal effects* of fire effluents. The general principles, but not all of the details, are applicable when interpreting data produced by tests which measure the *incapacitating effects* of fire effluents.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this technical report. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this technical report are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60695-1-1:1995, *Fire hazard testing — Part 1-1: Guidance assessing fire hazard of electrotechnical products — General guidance*.

IEC 60695-4:1993, *Fire hazard testing — Part 4: Terminology concerning fire tests*. Amendment (1995)

IEC 60695-7-1:1993, *Fire hazard testing — Part 7-1: Guidance on the minimization of toxic hazards due to fires involving electrotechnical products — General*.

¹⁾ Figures in square brackets refer to the bibliography.