

Australian Standard™

Fire hazard testing

**Part 7.3: Toxicity of fire effluent—Use
and interpretation of test results**

STANDARDS
Australia



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Australian Electrical and Electronic Manufacturers Association
Australian Information Industry Association
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Energy Networks Association

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**Part 7.3: Toxicity of fire effluent—Use
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PREFACE

This Standard was prepared by the Standards Australia Committee EL-053, Fire hazard testing—Electrotechnical equipment.

The objective of this series of standards is to provide the electrotechnology industry and standards writing committees with a series of standards which give guidance on assessing the fire hazard of electrotechnical products.

This Standard is identical with, and has been reproduced from IEC/TR 60695-7-3, Ed 2.0 (2004), *Fire hazard testing - Part 7-3: Toxicity of fire effluent - Use and interpretation of test results*.

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INTRODUCTION

Electrotechnical products sometimes become involved in fires. However, except for certain specific cases (e.g. power generating stations, mass transit tunnels, computer suites), electrotechnical products are not normally present in sufficient quantities to form the major source of toxic hazard. For example, in domestic dwellings and places of public assembly, electrotechnical products are usually a very minor source of fire effluent compared with, for example, furnishings.

It should be noted that the IEC 60695-7 series is subject to the ongoing evolution of fire safety philosophy within ISO/TC 92.

The guidance in this technical specification is consistent with the principles of fire safety developed by ISO TC 92 SC 3 on toxic hazards in fire, as described in ISO/TR 9122-1 to 9122-6. General guidance for the assessment of the fire hazard of electrotechnical products is given in IEC 60695-1-1. Guidance on the estimation of escape times from fires is given in ISO/TS 13571. The determination of the lethal toxic potency of fire effluents is described in ISO 13344.

The following is a summary of the views expressed in ISO/TR 9122-1 (*Toxicity testing of fire effluents – Part 1: General*).

"Small-scale toxic potency tests as we know them today are inappropriate for regulatory purposes. They cannot provide rank orderings of materials with respect to their propensity to produce toxic atmospheres in fires. All currently available tests are limited because of their inability to replicate the dynamics of fire growth which determine the time/concentration profiles of the effluent in full-scale fires, and the response of electrotechnical products, not just materials. This is a crucial limitation because the toxic effects of combustion effluent are now known to depend much more on the rates and conditions of combustion than on the chemical constitution of the burning materials."

Because of these limitations IEC TC 89 has developed IEC 60695-7-50. This is a practical small-scale test for toxic potency which, by virtue of its ability to model defined stages of a fire, will yield toxic potency data suitable for use in a full hazard assessment. The test method follows the guidance of ISO TC 92 SC 3 in terms of the fire models used, and in methods of measurement of effluent. IEC 60695-7-51 covers the calculation and interpretation of test results, again following the guidance of ISO TC 92 SC 3.

The evidence from fires and fire casualties, when taken with data from experimental fire and combustion toxicity studies, suggests that chemical species with unusually high toxicity are not important (see Clause 7). Carbon monoxide is by far the most significant agent contributing to toxic hazard. Other agents of major significance are hydrogen cyanide, carbon dioxide and irritants. There are also other important, non-toxic, threats to life. These are the effects of heat and radiant energy, the effects of depletion of oxygen, and the effects of smoke obscuration, which are all discussed in ISO/TS 13571. General guidance on the effects of smoke obscuration is given in IEC 60695-6-1.

ISO/TR 9122-1 recognizes that effective mitigation of toxic hazard is best accomplished by tests and regulations leading to improved resistance to ignition and to reduced rates of fire growth, thus limiting the level of exposure to fire effluent.

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STANDARDS AUSTRALIA

Australian Standard**Fire hazard testing****Part 7.3: Toxicity of fire effluent—Use and interpretation of test results**

1 Scope

This technical specification concerns laboratory tests used to measure the toxic components of the fire effluent from either electrotechnical products or materials used in electrotechnical products. It provides guidance on the use and interpretation of results from such 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 9122-1 to 9122-6, ISO 13344 and ISO/TS 13571. 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 methods described are applicable to data concerning both the incapacitating effects and the lethal effects of fire effluents.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications in the preparation of its publications (see IEC Guide 104).

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 60695-1-1:1999, *Fire hazard testing – Part 1-1: Guidance for assessing the fire hazard of electrotechnical products – General guidelines*

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

ISO/TR 9122 (all parts), *Toxicity testing of fire effluents*

ISO 13344:1996, *Determination of the lethal toxic potency of fire effluents*

ISO/TS 13571:2002, *Life-threatening components of fire – Guidelines for the estimation of time available for escape using fire data*

3 Terms and definitions

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

3.1**acute toxicity**

ability of a substance to produce rapidly occurring adverse effects upon a living organism