

Australian Standard™

**Fire hazard testing**

**Part 7.1: Toxicity of fire effluent—  
General guidance**

**STANDARDS**  
Australia



This Australian Standard® was prepared by Committee EL-053, Fire hazard testing—  
Electrotechnical equipment. It was approved on behalf of the Council of Standards Australia  
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The following are represented on Committee EL-053:

- Australian Electrical and Electronic Manufacturers Association
  - Australian Information Industry Association
  - Electrical Compliance Testing Association
  - Electrical Regulatory Authorities Council
  - Energy Networks Association
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contributed to the development of this Standard through their representation on the  
Committee and through public comment period.

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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 60695-7-1, Ed 2.0 (2004), *Fire hazard testing - Part 7-1: Toxicity of fire effluent - General guidance*.

As this Standard is reproduced from an International Standard, the following applies:

- (a) Its number does not appear on each page of text and its identity is shown only on the cover and title page.
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## INTRODUCTION

Electrotechnical products sometimes become involved in fires. However, except for certain specific cases (for example, 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.

The IEC 60695-7 series of publications is subject to the ongoing evolution of fire safety philosophy within ISO/TC 92.

The guidance in this International Standard 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, Part 1 to 6. General guidance for the assessment of the fire hazard of electrotechnical products is provided in IEC 60695-1-1. Guidance on the estimation of escape times from fires is provided in ISO/TS 13571. The determination of the lethal toxic potency of fire effluent is described in ISO 13344.

The following is a summary of the views expressed in ISO/TR 9122-1.

"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 4.6.1). 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 such as the effects of heat, radiant energy, depletion of oxygen and smoke obscuration, all of which are discussed in ISO/TS 13571. General guidance on the effects of smoke obscuration is provided 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.

## STANDARDS AUSTRALIA

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**Australian Standard****Fire hazard testing**  
**Part 7.1: Toxicity of fire effluent—General guidance**

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**1 Scope**

This part of IEC 60695 provides guidance on the factors which affect the toxic hazard from fires involving electrotechnical products, and provides information on the methodologies recommended by ISO TC 92 (SC 3) for estimating and reducing toxic hazard from fires, as expressed in ISO/TR 9122 (Parts 1 to 6), ISO 13344 and ISO/TS 13571.

There is no single test to realistically assess toxic hazard in fires. Small-scale toxic potency tests are not capable on their own of assessing fire hazard. Current toxicity tests attempt to measure the toxic potency of a laboratory generated fire effluent. Toxic potency should not be confused with toxic hazard.

One of the responsibilities of a technical committee is, wherever applicable, to make use of basic safety publications in the preparation of its 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 60695-7-2:2002, *Fire hazard testing – Part 7-2: Toxicity of fire effluent – Summary and relevance of test methods*

IEC 60695-7-3:2004, *Fire hazard testing – Part 7-3: Toxicity of fire effluent – Use and interpretation of test results*

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

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

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 terms and definitions, some of which have been taken from ISO/IEC 13943, apply.