

**NFPA®**

**269**

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Standard Test Method for  
Developing Toxic Potency Data  
for Use in Fire Hazard Modeling

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**2022**



# NFPA<sup>®</sup> 269

## Standard Test Method for Developing Toxic Potency Data for Use in Fire Hazard Modeling

2022 Edition



NFPA, 1 Batterymarch Park, Quincy, MA 02269-9101  
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**NFPA® 269**

**Standard Test Method for**

**Developing Toxic Potency Data for Use in Fire Hazard Modeling**

**2022 Edition**

This edition of NFPA 269, *Standard Test Method for Developing Toxic Potency Data for Use in Fire Hazard Modeling*, was prepared by the Technical Committee on Fire Tests. It was issued by the Standards Council on October 2, 2021, with an effective date of October 22, 2021, and supersedes all previous editions.

This edition of NFPA 269 was approved as an American National Standard on October 22, 2021.

**Origin and Development of NFPA 269**

The first edition of NFPA 269 was published in 1996. It was desirable to establish a standard test method for the development of data for use in toxic hazard modeling. The basis of this standard was derived from work completed by the National Institute of Standards and Technology (NIST). The 2000 edition was a reconfirmation of the earlier edition. The 2007 edition was a complete revision for compliance with the *Manual of Style for NFPA Technical Committee Documents*.

The 2012 edition was revised to contain new scope statements for testing lethal toxic potency values and new requirements for testing reports.

The 2017 edition included revisions to the reporting section, clarifying the use of animal check tests, as revised in a TIA. Revisions were also made to the power supply for the spark ignition figure in Chapter 5.

The 2022 edition is a reconfirmation of the 2017 edition. Minor changes have been made to update annex information.

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## NFPA 269

## Standard Test Method for

## Developing Toxic Potency Data for Use in Fire Hazard Modeling

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**NOTICE:** An asterisk (\*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

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Information on referenced and extracted publications can be found in Chapter 2 and Annex D.

## Chapter 1 Administration

## 1.1\* Scope.

**1.1.1\*** This test method is intended to provide a means for assessing the lethal toxic potency of combustion products produced from a material or product ignited when exposed to a radiant flux.

**1.1.2** This test method has been designed to generate toxic potency data on materials and products (including composites) for use in fire hazard analysis. It is also permitted to be used to assist in the research and development of materials and products.

## 1.1.3 Lethal Toxic Potency Values.

**1.1.3.1** Lethal toxic potency values associated with 30-minute exposures are predicted using calculations that employ combustion atmospheric analytical data for carbon monoxide, carbon dioxide, oxygen (vitiation), and, if present, hydrogen cyanide, hydrogen chloride, and hydrogen bromide.

**1.1.3.2** These predictive equations are therefore limited to those materials and products whose smoke toxicity can be attributed to these toxicants.

**1.1.3.3** The confirmation of the predicted lethal toxic potency values by means of an animal check will serve to determine the extent to which additional toxicants contribute to the lethal toxic potency of the smoke.

**1.1.3.4** Where an animal check test result does not confirm the predicted lethal toxic potency values, the presence of one or more additional toxicants or toxicological antagonists is indicated by the degree of disagreement between the two results, and indicates the importance of the unmeasured factors.

**1.1.4** Specimens are exposed to a radiant heating flux with an electric spark ignition.

**1.1.5** Specimens tested are representative of finished products, including composite and combination systems.

**1.1.6** This standard is not intended to address all safety issues associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations (especially with regard to the institutional care and use of experimental test animals) prior to use. (For specific hazard requirements, see Section 6.1.)

## 1.2 Purpose.

**1.2.1** This test method is intended to provide data for the mathematical modeling of fire hazard as a means for the evaluation of materials and products.

**1.2.2** This test method shall be used to predict, and subsequently confirm, the lethal toxic potency of smoke produced upon exposure of a material or product to specific fire test conditions. Confirmation determines whether certain major gaseous toxicants account for the observed toxic effects as well as the lethal toxic potency. If a predicted lethal toxic potency value is not adequately confirmed, indicating the potential for unusual or unexplained toxicity due to other components, the lethal toxic potency shall be investigated using other methodology, such as conducting an experimental determination of the  $LC_{50}$  using the apparatus described. (See B.3.1 and B.3.2.)

**1.2.3** This test method produces lethal toxic potency data that shall be considered appropriate for use in modeling the hazard of both preflashover and postflashover fires. Most fire deaths due to smoke inhalation in the United States occur in areas other than the room of fire origin and are caused by fires that have proceeded beyond the room of fire origin. It is assumed that these fires typically are flashover fires. Therefore, the principal emphasis is placed on evaluating toxic hazard under these conditions. In postflashover fires, large concentrations of carbon monoxide result from a reduced air supply to the fire plume. Because bench-scale tests do not have the capability to simulate this phenomenon, the lethal toxic potencies determined in this test method shall require adjustment for use in modeling the hazard from postflashover conditions (see 11.2.3). For preflashover conditions, the  $LC_{50}$  values derived from this method shall be permitted to be used as toxic potency data without adjustment.