

Standard System for the Identification of the Hazards of Materials for Emergency Response





# IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® STANDARDS

NFPA<sup>®</sup> codes, standards, recommended practices, and guides ("NFPA Standards"), of which the document contained herein is one, are developed through a consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on fire and other safety issues. While the NFPA administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in NFPA Standards.

The NFPA disclaims liability for any personal injury, property, or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on NFPA Standards. The NFPA also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

In issuing and making NFPA Standards available, the NFPA is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the NFPA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The NFPA has no power, nor does it undertake, to police or enforce compliance with the contents of NFPA Standards. Nor does the NFPA list, certify, test, or inspect products, designs, or installations for compliance with this document. Any certification or other statement of compliance with the requirements of this document shall not be attributable to the NFPA and is solely the responsibility of the certifier or maker of the statement.

# **REVISION SYMBOLS IDENTIFYING CHANGES FROM THE PREVIOUS EDITION**

Text revisions are shaded. A  $\triangle$  before a section number indicates that words within that section were deleted and a  $\triangle$  to the left of a table or figure number indicates a revision to an existing table or figure. When a chapter was heavily revised, the entire chapter is marked throughout with the  $\triangle$  symbol. Where one or more sections were deleted, a • is placed between the remaining sections. Chapters, annexes, sections, figures, and tables that are new are indicated with an **N**.

Note that these indicators are a guide. Rearrangement of sections may not be captured in the markup, but users can view complete revision details in the First and Second Draft Reports located in the archived revision information section of each code at www.nfpa.org/docinfo. Any subsequent changes from the NFPA Technical Meeting, Tentative Interim Amendments, and Errata are also located there.

# **REMINDER: UPDATING OF NFPA STANDARDS**

Users of NFPA codes, standards, recommended practices, and guides ("NFPA Standards") should be aware that these documents may be superseded at any time by the issuance of a new edition, may be amended with the issuance of Tentative Interim Amendments (TIAs), or be corrected by Errata. It is intended that through regular revisions and amendments, participants in the NFPA standards development process consider the then-current and available information on incidents, materials, technologies, innovations, and methods as these develop over time and that NFPA Standards reflect this consideration. Therefore, any previous edition of this document no longer represents the current NFPA Standard on the subject matter addressed. NFPA encourages the use of the most current edition of any NFPA Standard [as it may be amended by TIA(s) or Errata] to take advantage of current experience and understanding. An official NFPA Standard at any point in time consists of the current edition of the document, including any issued TIAs and Errata then in effect.

To determine whether an NFPA Standard has been amended through the issuance of TIAs or corrected by Errata, visit the "Codes & Standards" section at www.nfpa.org.

# ADDITIONAL IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® STANDARDS

## Updating of NFPA Standards

Users of NFPA codes, standards, recommended practices, and guides ("NFPA Standards") should be aware that these documents may be superseded at any time by the issuance of a new edition, may be amended with the issuance of Tentative Interim Amendments (TIAs), or be corrected by Errata. It is intended that through regular revisions and amendments, participants in the NFPA standards development process consider the then-current and available information on incidents, materials, technologies, innovations, and methods as these develop over time and that NFPA Standards reflect this consideration. Therefore, any previous edition of this document no longer represents the current NFPA Standard on the subject matter addressed. NFPA encourages the use of the most current edition of any NFPA Standard [as it may be amended by TIA(s) or Errata] to take advantage of current experience and understanding. An official NFPA Standard at any point in time consists of the current edition of the document, including any issued TIAs and Errata then in effect.

To determine whether an NFPA Standard has been amended through the issuance of TIAs or corrected by Errata, visit the "Codes & Standards" section at www.nfpa.org.

### **Interpretations of NFPA Standards**

A statement, written or oral, that is not processed in accordance with Section 6 of the Regulations Governing the Development of NFPA Standards shall not be considered the official position of NFPA or any of its Committees and shall not be considered to be, nor be relied upon as, a Formal Interpretation.

## Patents

The NFPA does not take any position with respect to the validity of any patent rights referenced in, related to, or asserted in connection with an NFPA Standard. The users of NFPA Standards bear the sole responsibility for determining the validity of any such patent rights, as well as the risk of infringement of such rights, and the NFPA disclaims liability for the infringement of any patent resulting from the use of or reliance on NFPA Standards.

NFPA adheres to the policy of the American National Standards Institute (ANSI) regarding the inclusion of patents in American National Standards ("the ANSI Patent Policy"), and hereby gives the following notice pursuant to that policy:

NOTICE: The user's attention is called to the possibility that compliance with an NFPA Standard may require use of an invention covered by patent rights. NFPA takes no position as to the validity of any such patent rights or as to whether such patent rights constitute or include essential patent claims under the ANSI Patent Policy. If, in connection with the ANSI Patent Policy, a patent holder has filed a statement of willingness to grant licenses under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, copies of such filed statements can be obtained, on request, from NFPA. For further information, contact the NFPA at the address listed below.

### Law and Regulations

Users of NFPA Standards should consult applicable federal, state, and local laws and regulations. NFPA does not, by the publication of its codes, standards, recommended practices, and guides, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

## Copyrights

NFPA Standards are copyrighted. They are made available for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of safe practices and methods. By making these documents available for use and adoption by public authorities and private users, the NFPA does not waive any rights in copyright to these documents.

Use of NFPA Standards for regulatory purposes should be accomplished through adoption by reference. The term "adoption by reference" means the citing of title, edition, and publishing information only. Any deletions, additions, and changes desired by the adopting authority should be noted separately in the adopting instrument. In order to assist NFPA in following the uses made of its documents, adopting authorities are requested to notify the NFPA (Attention: Secretary, Standards Council) in writing of such use. For technical assistance and questions concerning adoption of NFPA Standards, contact NFPA at the address below.

### **For Further Information**

All questions or other communications relating to NFPA Standards and all requests for information on NFPA procedures governing its codes and standards development process, including information on the procedures for requesting Formal Interpretations, for proposing Tentative Interim Amendments, and for proposing revisions to NFPA standards during regular revision cycles, should be sent to NFPA headquarters, addressed to the attention of the Secretary, Standards Council, NFPA, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101; email: stds\_admin@nfpa.org.

For more information about NFPA, visit the NFPA website at www.nfpa.org. All NFPA codes and standards can be viewed at no cost at www.nfpa.org/docinfo.

Copyright © 2020 National Fire Protection Association®. All Rights Reserved.

## **NFPA® 704**

### Standard System for the

## Identification of the Hazards of Materials for Emergency Response

### 2022 Edition

This edition of NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, was prepared by the Technical Committee on Classification and Properties of Hazardous Chemical Data. It was issued by the Standards Council on October 14, 2020, with an effective date of November 3, 2020, and supersedes all previous editions.

This edition of NFPA 704 was approved as an American National Standard on November 3, 2020.

### **Origin and Development of NFPA 704**

Work on this standard originated in 1957. A great deal of the development work had been done by the NFPA Sectional Committee on Classification, Labeling, and Properties of Flammable Liquids starting in 1952. Background data were published by the association in its quarterly magazine in 1954, 1956, and 1958. The material in its present form was first tentatively adopted in 1960. Official adoption was secured in 1961, and revisions were adopted in 1964, 1966, 1969, 1975, 1980, and 1985. In the 1987 and 1990 editions, the Committee on Fire Hazards of Materials introduced quantitative guidelines for assigning the Health Hazard and Reactivity Hazard Ratings. The 1996 edition introduced additional quantitative guidelines and an amended definition for *instability hazard rating*, formerly *reactivity hazard rating*.

The 2001 edition clarified numerous topics, including the following: rating of mixtures; three options of how to rate areas with multiple chemical storage and use; location of signs; more quantitative criteria for flammability ratings for solids; and quantitative criteria for a flammability rating of zero, including introduction of a new test method. Guidance material was added for quantifying the degree of water reactivity. An annex was added to cover water reactivity and identification criteria, as well as additional information on flash point test methods.

The 2007 edition clarified topics including the special hazards quadrant and placement and hierarchy of symbols. The new simple asphyxiant (SA) designation and other optional symbols, as well as requirements for the classification of flammability rating for dusts, were added.

The 2012 edition included reinstatement of the differential scanning calorimetry (DSC) hazard criterion to Table 7.2 as well as new guidance on the flammability hazard classification for aerosol products. The 2012 edition also included new text in Table 6.2 that emphasized the use of Annex D to classify the flammability hazard of a finely divided solid.

In 2017 information related to differential scanning calorimetry (DSC) exotherm onset temperature criteria was removed from Table 7.2. Chapter 8 was modified to require the use of the SA symbol for liquefied carbon dioxide vapor withdrawal systems and where large quantities of dry ice are used in confined areas. Annex G was added to explain key differences between the OSHA HazCom 2012 and NFPA 704. Annex H was added to provide sample placards that can be extracted into emergency response publications and training materials.

The 2022 edition of the standard includes revisions to Figures 9.1(b) and 9.1(c) that provide guidance on NFPA 704 placard and numeral dimension and size requirements.

## Technical Committee on Classification and Properties of Hazardous Chemical Data

Ron A. Kirsch, *Chair* OHS Associates, Inc., TN [SE]

**Robert A. Michaels**, *Secretary* RAM TRAC Corporation, NY [SE]

Christopher Allen, Montgomery County Government, MD [E] Jason Beam, CCB, Inc., ME [U] David L. Bowman, Bowman Global Enterprise Group, FL [SE] Laurence G. Britton, Process Safety Consultant, WV [SE] Laura Draelos, Sandia National Laboratories, NM [U] Nelson C. Dunston, Laboratory Corporation of America, NC [RT] David W. Hollinger, Drexel University, PA [U] Caroline Miller, UL LLC/ChemADVISOR, Inc., NY [SE] Robert A. Nocco, Chevron, CA [U] Brian Ott, Exponent, CA [SE] Nissan Patel, Jefferson Parish Fire Services, LA [E] David T. Phelan, Township of North Bergen - NJ, NJ [E] Christopher M. Platz, Abington Township, PA [E] Brian Primeau, MIT Lincoln Labs, MA [RT] Mark L. Robin, Chemours, DE [M] William J. Satterfield, III, Hydrogen Safety, LLC/Rode & Associates, LLC, RI [I] Stephen Sides, American Coatings Association, DC [M] James O. Vigerust, Jr., CB&I, NM [SE] David B. Wechsler, Consultant, TX [U] Rep. American Chemistry Council Cynthia J. Wernet, The Boeing Company, CA [U] Rep. NFPA Industrial Fire Protection Section Ryan Wyse, Hebron Fire Department, OH [E]

#### Alternates

Karl Leipold, AIG Energy & Engineered Risk, MD [I] (Voting Alt.) Brenda Prine, Elora, ON, Canada [SE] (Alt. to Laurence G. Britton)

Nonvoting

Jennifer H. Lawless, US Department of Labor, DC [E]

Lawrence Russell, NFPA Staff Liaison

This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

**Committee Scope:** This Committee shall have primary responsibility for documents on the classification of the relative hazards of all chemical solids, liquids and gases and to compile data on the hazard properties of these hazardous chemicals.

704-2

# Contents

Chapter	1 Administration	<b>704</b> – 4	7.2 1
1.1	Scope	<b>704–</b> 4	
1.2	Purpose	<b>704–</b> 4	Chapter 8
1.3	Application.	<b>704–</b> 4	8.1 0
1.4	Retroactivity.	<b>704–</b> 4	8.2 5
1.5	Equivalency.	<b>704–</b> 4	Chapter 9
Chapter	2 Referenced Publications	<b>704–</b> 4	
2.1	General	<b>704–</b> 4	9.1 5
2.2	NFPA Publications.	<b>704–</b> 5	Annor A
2.3	Other Publications.	<b>704–</b> 5	Annex A
2.4	References for Extracts in Mandatory		Annex B
	Sections.	<b>704–</b> 5	Think D
			Annex C
Chapter	3 Definitions	<b>704–</b> 5	
3.1	General	<b>704–</b> 5	Annex D
3.2	NFPA Official Definitions.	<b>704–</b> 5	
3.3	General Definitions.	<b>704–</b> 5	Annex E
Chapter	4 General	<b>704–</b> 5	
4.1	Description.	<b>704–</b> 5	Annex F
4.2	Assignment of Ratings.	<b>704–</b> 6	Amman C
4.3	Location of Signs.	<b>704–</b> 6	Annex G
	5		
Chapter	5 Health Hazards	<b>704–</b> 6	
5.1	General	<b>704–</b> 6	Anney H
5.2	Degrees of Hazard	<b>704–</b> 6	
Chapter	6 Flammability Hazards	<b>704–</b> 9	Anney I
6.1	General	<b>704–</b> 9	
6.2	Degrees of Hazard.	<b>704–</b> 9	Index
6.3	Aerosols.	<b>704</b> – 10	
<b>C1</b>	H T . 1991. TT 1	<b>FO</b> ( 10 N	
Chapter	7 Instability Hazards	704-10	
7.1	General	704-10	

7.2	Deg	rees of Hazard	<b>704–</b> 10
<b>Chapter</b> 8.1 8.2	<b>8</b> Gen Sym	<b>Special Hazards</b> eral bols	<b>704–</b> 11 <b>704–</b> 11 <b>704–</b> 11
Chapter	9	Identification of Materials by Hazard	<b>E</b> 04 11
9.1	Sym	Bol Arrangement	704–11 704–11
Annex A	<b>A</b>	Explanatory Material	<b>704–</b> 13
Annex I	3	Health Hazard Rating	<b>704–</b> 16
Annex (	3	Flammability	<b>704–</b> 18
Annex I	D	Combustible Dusts	<b>704–</b> 18
Annex I	Ξ	Instability, Thermal Hazard Evaluation Techniques	<b>704–</b> 19
Annex I	7	Water Reactivity Identification Criteria	<b>704–</b> 21
Annex (	G	Comparison of NFPA 704 Numerical Hazard Rating with OSHA's Hazard Classification System	<b>704–</b> 23
Annex I	H	Sample NFPA 704 Placard Information for Use in Safety Publications	<b>704–</b> 23
Annex I	Ī	Informational References	<b>704–</b> 27
Index			<b>704</b> – 29

#### NFPA 704

## Standard System for the

# Identification of the Hazards of Materials for Emergency Response

### 2022 Edition

IMPORTANT NOTE: This NFPA document is made available for use subject to important notices and legal disclaimers. These notices and disclaimers appear in all publications containing this document and may be found under the heading "Important Notices and Disclaimers Concerning NFPA Standards." They can also be viewed at www.nfpa.org/disclaimers or obtained on request from NFPA.

UPDATES, ALERTS, AND FUTURE EDITIONS: New editions of NFPA codes, standards, recommended practices, and guides (i.e., NFPA Standards) are released on scheduled revision cycles. This edition may be superseded by a later one, or it may be amended outside of its scheduled revision cycle through the issuance of Tentative Interim Amendments (TIAs). An official NFPA Standard at any point in time consists of the current edition of the document, together with all TIAs and Errata in effect. To verify that this document is the current edition or to determine if it has been amended by TIAs or Errata, please consult the National Fire Codes<sup>®</sup> Subscription Service or the "List of NFPA Codes & Standards" at www.nfpa.org/docinfo. In addition to TIAs and Errata, the document information pages also include the option to sign up for alerts for individual documents and to be involved in the development of the next edition.

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

A reference in brackets [] following a section or paragraph indicates material that has been extracted from another NFPA document. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

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

#### Chapter 1 Administration

**1.1 Scope.** This standard shall address the health, flammability, instability, and related hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies.

1.2 Purpose.

**1.2.1** This standard shall provide a simple, readily recognized, and easily understood system of markings that provides a general idea of the hazards of a material and the severity of these hazards as they relate to emergency response.

**1.2.2** The objectives of the system shall be as follows:

- (1) To provide an appropriate signal or alert and on-the-spot information to safeguard the lives of both public and private emergency response personnel
- (2) To assist in planning for effective fire and emergency control operations, including cleanup
- (3) To assist all designated personnel, engineers, and plant and safety personnel in evaluating hazards

**1.2.3** This system shall provide basic information to fire-fighting, emergency, and other personnel, enabling them to easily decide whether to evacuate the area or to commence emergency control procedures.

**1.2.4** This system also shall provide those personnel with information to assist in selecting fire-fighting tactics and emergency procedures.

**1.2.5** Local conditions can have a bearing on evaluation of hazards; therefore, discussion shall be kept in general terms.

#### 1.3 Application.

**1.3.1** This standard shall apply to industrial, commercial, and institutional facilities that manufacture, process, use, or store hazardous materials.

**1.3.2\*** This standard shall not apply to transportation or use by the general public and is not intended to address the following:

- (1) Occupational exposure
- (2) Explosive and blasting agents, including commercial explosive material as defined in NFPA 495
- (3) Chemicals whose only hazard is one of chronic health hazards
- (4) Teratogens, mutagens, oncogens, etiologic agents, and other similar hazards

**1.4 Retroactivity.** The provisions of this standard reflect a consensus of what is necessary to provide an acceptable degree of protection from the hazards addressed in this standard at the time the standard was issued.

**1.4.1** Unless otherwise specified, the provisions of this standard shall not apply to facilities, equipment, structures, or installations that existed or were approved for construction or installation prior to the effective date of the standard. Where specified, the provisions of this standard shall be retroactive.

**1.4.2** In those cases where the authority having jurisdiction determines that the existing situation presents an unacceptable degree of risk, the authority having jurisdiction shall be permitted to apply retroactively any portions of this standard deemed appropriate.

**1.4.3** The retroactive requirements of this standard shall be permitted to be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction and only where it is clearly evident that a reasonable degree of safety is provided.

**1.5 Equivalency.** Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard.

**1.5.1** Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

**1.5.2** The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

#### **Chapter 2** Referenced Publications

**2.1 General.** The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.