

NFPA®

2

**Hydrogen Technologies
Code**

2020



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NFPA® 2

Hydrogen Technologies Code**2020 Edition**

This edition of NFPA 2, *Hydrogen Technologies Code*, was prepared by the Technical Committee on Hydrogen Technology. It was issued by the Standards Council on June 10, 2019, with an effective date of June 30, 2019, and supersedes all previous editions.

This edition of NFPA 2 was approved as an American National Standard on June 30, 2019.

Origin and Development of NFPA 2

With the increased interest in hydrogen being used as a fuel source, the National Fire Protection Association was petitioned to develop an all-encompassing document that establishes the necessary requirements for hydrogen technologies. In 2006, the Technical Committee on Hydrogen Technology was formed and tasked to develop a document that addresses all aspects of hydrogen storage, use, and handling; that draws from existing NFPA codes and standards; and that identifies and fills technical gaps for a complete functional set of requirements for code users and enforcers. This document is also structured so that it works seamlessly with building and fire codes.

This code is largely extracted from other NFPA codes and standards (e.g., NFPA 52, NFPA 55, and NFPA 853) and is organized in a fashion that is specific for hydrogen. Paragraphs that have been extracted from other documents are shown with the extract reference brackets at the end of the paragraph. In some cases, modifications have been made to the extracted text to use terminology appropriate for this code, such as the terms GH_2 instead of *compressed gas* and LH_2 instead of *cryogenic fluid*. In those instances, brackets encase the modifying words. Similarly, where language was deleted to adhere to requirements based exclusively on hydrogen and no other changes were made to the paragraph, brackets that encompass a hyphen [-] are inserted into the paragraph to denote a change to the original material while retaining the extract to the source document. In short, added or modified text is shown with brackets around the differing language and pure deletions of text are shown with [-].

The 2016 edition of NFPA 2 was more closely aligned with the requirements in NFPA 55 for gaseous and liquefied hydrogen systems. Both documents were in the same revision cycle, which allowed the technical committees to work more closely together on revisions to the joint content. The requirements for hydrogen generation systems in NFPA 2 (Chapter 13) were no longer extracted from NFPA 55, and the requirements for hydrogen fueling systems (Chapters 10 and 11) were no longer extracted from NFPA 52. The Technical Committee on Hydrogen Technology had primary responsibility for those requirements.

The 2016 edition had the following changes:

- (1) Significant revisions to Chapter 10, Gaseous Vehicle Fueling Facilities, that reflected significant efforts by the technical committee in improving this chapter
- (2) Clarification and organization of the requirements for gaseous hydrogen systems into three tiers based on the quantity of hydrogen stored: less than or equal to the maximum allowable quantity (MAQ), greater than the MAQ but less than the bulk quantity, and bulk systems
- (3) Changes to the requirements in Chapter 7 for emergency isolation consistent with the changes made to NFPA 55
- (4) New requirements for hydrogen equipment enclosures to address the growing use of these systems in a variety of field applications
- (5) New chapters for parking garages and repair garages for hydrogen fuel cell vehicles

For the 2020 edition of NFPA 2, several updates have been made to both Chapter 10, GH₂ Vehicle Fueling Facilities, and Chapter 18, Repair Garage. Changes made to Chapter 10 focus on addressing fueling protocols, authorized fueling, signage, and vehicle to station communication protocols. With the inclusion of these updates, Chapter 10 has been restructured to maintain clarity for the user. With this new edition of NFPA 2, Chapter 18 has been limited to only apply to LH₂ applications. The changes made to Chapter 18 enhance the ease of repair garages to accept hydrogen as an alternative motor fuel while properly addressing the additional hazards the repair and servicing of these vehicles can present without reducing the level of protection currently required.

Technical Committee on Hydrogen Technology

Carl H. Rivkin, *Chair*

National Renewable Energy Laboratory, CO [U]

Robert Avery, Proton OnSite, CT [M]
Nick Barilo, Pacific Northwest National Laboratory, WA [U]
Robert W. Boyd, Boyd Hydrogen LLC, CA [SE]
Tim Brown, FirstElement Fuel, Inc., CA [IM]
Michael Ciotti, Linde North America, Inc., NJ [M]
Larry M. Danner, GE Power & Water, SC [M]
Steven Anthony Delmonaco, Plug Power, NY [IM]
Joseph D. DiGiacomo, Flynn Burner Corporation, OH [M]
Rob Early, Compressed Gas Association, NY [M]
David J. Farese, Air Products and Chemicals, Inc., PA [IM]
Tom Ferraro, Billerica Fire Department, MA [E]
Stephen Goyette, Nuvera Fuel Cells, Inc., MA [M]
Martin T. Gresho, FP2Fire, Inc., CO [SE]
Jennifer Hamilton, BKi, CA [SE]
Aaron Harris, Air Liquide, TX [M]
Thomas Joseph, Bethlehem Hydrogen Inc., PA [M]
Y. John Khalil, United Technologies Research Center (UTRC), CT [SE]
Brian Ladds, Calgary Fire Department, Canada [E]

Chris LaFleur, Sandia National Laboratories, NM [U]
James C. Martin, Shell Alternative Energies, CA [M]
Sara Marxen, Canadian Standards Association (CSA Group), OH [RT]
Lawrence C. Moulthrop, Jr., H2@LMDesk, CT [SE]
Narendra Pal, United Hydrogen Group, PA [IM]
Joseph Plati, Code Consultants, Inc., NY [SE]
Karen I. Quackenbush, Fuel Cell & Hydrogen Energy Association, DC [M]
Spencer Quong, Toyota/Quong & Associates Inc., CA [M]
Alfred J. Unione, AECOM/URS Washington Division, PA [SE]
Nathan Weyandt, Southwest Research Institute, TX [RT]
Steven Wheaton, Intertek Testing Services, Canada [RT]
 Rep. Intertek Testing Services
Robert P. Wichert, Robert P. Wichert Professional Engineering Inc., CA [SE]
Edgar Wolff-Klammer, UL LLC, IL [RT]
Jiann C. Yang, National Institute of Standards & Technology (NIST), MD [RT]

Alternates

Jacquelyn Birdsall, Toyota Engineering & Manufacturing North America, Inc., CA [M]
 (Alt. to Spencer Quong)
Elizabeth Kate Carcone, Code Consultants, Inc., NY [SE]
 (Alt. to Joseph Plati)
Richard A. Craig, Compressed Gas Association, VA [M]
 (Alt. to Rob Early)
Brian Ehrhart, Sandia National Laboratories, NM [U]
 (Alt. to Chris LaFleur)
Laurie B. Florence, UL LLC, IL [RT]
 (Alt. to Edgar Wolff-Klammer)
Scott M. Heyworth, FP2Fire, Inc., FL [SE]
 (Alt. to Martin T. Gresho)
Scott Jennings, Air Liquide, TX [M]
 (Alt. to Aaron Harris)

Heath Dehn, NFPA Staff Liaison

Alexandra Joyce, Southwest Research Institute, TX [RT]
 (Alt. to Nathan Weyandt)
Kuldeep Prasad, National Institute of Standards & Technology (NIST), MD [RT]
 (Alt. to Jiann C. Yang)
Mason B. Root, Plug Power Inc., NY [IM]
 (Alt. to Steven Anthony Delmonaco)
R. Jeff Tanner, Michigan Department of Environmental Quality, MI [E]
 (Voting Alt.)
Crystal Xie, Crystalloggy Consulting, Inc., CA [U]
 (Alt. to Carl H. Rivkin)

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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 storage, transfer, production, and use of hydrogen. The use of hydrogen would include stationary, portable, and vehicular applications.

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Hydrogen Technologies Code

2020 Edition

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

Chapter 1 Administration

1.1 Scope. (Reserved)

1.2 Purpose. The purpose of this code shall be to provide fundamental safeguards for the generation, installation, storage, piping, use, and handling of hydrogen in compressed gas (GH₂) form or cryogenic liquid (LH₂) form.

1.3* Application.

1.3.1 This code shall apply to the production, storage, transfer, and use of hydrogen in all occupancies and on all premises.

1.3.2 The use of hydrogen shall include stationary, portable, and vehicular infrastructure applications.

Δ **1.3.3** The fundamental requirements of Chapters 1 and 4 through 8 shall apply in addition to the use-specific requirements provided in Chapters 9 through 18, as applicable.

1.3.4 Exemptions. This code shall not apply to the following:

- (1) Onboard vehicle or mobile equipment components or systems, including the onboard GH₂ or LH₂ fuel supply

- (2) Mixtures of GH₂ and other gases with a hydrogen concentration of less than 95 percent by volume when in accordance with NFPA 55
- (3) The storage, handling, use, or processing of metal hydride materials outside of metal hydride storage systems defined in Chapter 3

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

1.4.1 Unless otherwise specified, the provisions of this code 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 code. Where specified, the provisions of this code shall be retroactive.

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

Δ **1.4.3** The retroactive requirements of this code shall be permitted to be modified if their application would be impractical in the judgment of the AHJ, and only where it is evident that a reasonable degree of safety is provided.

1.5 Equivalency.

1.5.1 Nothing in this code 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 code.

1.5.2 Technical documentation shall be submitted to the AHJ to demonstrate equivalency.

1.5.3 The system, method, or device shall be approved for the intended purpose by the AHJ.

1.6 Units and Formulas.

1.6.1 The units of measure in this code are presented first in U.S. customary units (inch-pound units). International System (SI) of Units follow the inch-pound units in parentheses.

1.6.2 Either system of units shall be acceptable for satisfying the requirements in the code.

1.6.3 Users of this code shall apply one system of units consistently and shall not alternate between units.

1.6.4 The values presented for measurements in this code are expressed with a degree of precision appropriate for practical application and enforcement. It is not intended that the application or enforcement of these values be more precise than the precision expressed.

1.6.5 Where extracted text contains values expressed in only one system of units, the values in the extracted text have been retained without conversion to preserve the values established by the responsible technical committee in the source document.

1.6.6 If a value for measurement given in this standard is followed by an equivalent value in other units, the first stated shall be regarded as the requirement. The given equivalent value shall be considered to be approximate.

1.6.7 All pressures in this document are gauge pressures, unless otherwise indicated.

1.7 Enforcement.

1.7.1* This code shall be administered and enforced by the **AHJ** designated by the governing authority under the administrative provisions of the adopted building or fire prevention code. (See Annex C for sample wording for enabling legislation.)

1.7.2 The administrative provisions of Annex B shall be allowed to be used **where** specifically adopted.

Chapter 2 Referenced Publications

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

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 10, *Standard for Portable Fire Extinguishers*, 2018 edition.

NFPA 11, *Standard for Low-, Medium-, and High-Expansion Foam*, 2016 edition.

NFPA 12, *Standard on Carbon Dioxide Extinguishing Systems*, 2018 edition.

NFPA 12A, *Standard on Halon 1301 Fire Extinguishing Systems*, 2018 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2019 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, 2016 edition.

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*, 2017 edition.

NFPA 17, *Standard for Dry Chemical Extinguishing Systems*, 2017 edition.

NFPA 17A, *Standard for Wet Chemical Extinguishing Systems*, 2017 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, 2017 edition.

NFPA 30, *Flammable and Combustible Liquids Code*, 2018 edition.

NFPA 30A, *Code for Motor Fuel Dispensing Facilities and Repair Garages*, 2018 edition.

NFPA 31, *Standard for the Installation of Oil-Burning Equipment*, 2016 edition.

NFPA 45, *Standard on Fire Protection for Laboratories Using Chemicals*, 2018 edition.

NFPA 54, *National Fuel Gas Code*, 2018 edition.

NFPA 55, *Compressed Gases and Cryogenic Fluids Code*, 2020 edition.

NFPA 58, *Liquefied Petroleum Gas Code*, 2017 edition.

NFPA 68, *Standard on Explosion Protection by Deflagration Venting*, 2018 edition.

NFPA 69, *Standard on Explosion Prevention Systems*, 2019 edition.

NFPA 70®, *National Electrical Code®*, 2017 edition.

NFPA 72®, *National Fire Alarm and Signaling Code*, 2019 edition.

NFPA 79, *Electrical Standard for Industrial Machinery*, 2018 edition.

NFPA 80, *Standard for Fire Doors and Other Opening Protectives*, 2019 edition.

NFPA 86, *Standard for Ovens and Furnaces*, 2019 edition.

NFPA 88A, *Standard for Parking Structures*, 2019 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2018 edition.

NFPA 91, *Standard for Exhaust Systems for Air Conveying of Vapors, Gases, Mists, and Particulate Solids*, 2015 edition.

NFPA 101®, *Life Safety Code®*, 2018 edition.

NFPA 110, *Standard for Emergency and Standby Power Systems*, 2019 edition.

NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems*, 2019 edition.

NFPA 259, *Standard Test Method for Potential Heat of Building Materials*, 2018 edition.

NFPA 400, *Hazardous Materials Code*, 2019 edition.

NFPA 496, *Standard for Purged and Pressurized Enclosures for Electrical Equipment*, 2017 edition.

NFPA 505, *Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operations*, 2018 edition.

NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, 2017 edition.

NFPA 750, *Standard on Water Mist Fire Protection Systems*, 2019 edition.

NFPA 853, *Standard for the Installation of Stationary Fuel Cell Power Systems*, 2015 edition.

NFPA 2001, *Standard on Clean Agent Fire Extinguishing Systems*, 2018 edition.

2.3 Other Publications.

2.3.1 AIHA Publications. American Industrial Hygiene Association, 3141 Fairview Park Dr., Suite 777, Falls Church, VA 22042.

ANSI/AIHA Z9.5, *Laboratory Ventilation*, 2012.

2.3.2 ANSI Publications. American National Standards Institute, Inc., 25 West 43rd Street, 4th Floor, New York, NY 10036.

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