

POSITION STATEMENT

LIQUEFIED HYDROGEN SUPPLY SYSTEM SEPARATION DISTANCES

Question

How can liquefied hydrogen supply systems and equipment be located in accordance with the new separation distances that have been approved by the NFPA 2, *Hydrogen Technologies Code*, and recognized by the NFPA 55, *Compressed Gases and Cryogenic Fluids Code* technical committees but not yet issued [1, 2]?

Answer

Installers of new liquefied hydrogen supply systems can use the NFPA equivalency clause to obtain a variance to locate equipment in accordance with the revised distances and associated controls until NFPA 2 has been updated. The NFPA equivalency clause, copied from NFPA 2, is as follows [1]: ¹

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.*

The revised liquefied hydrogen supply system separation distances have been approved by the NFPA 2 technical committee and are anticipated to be published as part of NFPA 2:2024 in August 2023.

The revised distances and the explanation for the revisions is in the NFPA 2 public comments report ([NFPA 2 public comments](#)); the NFPA 2 second draft report ([NFPA 2 second revisions](#)); and the NFPA 2 final ballot ([NFPA 2 final ballot](#)). The material is in the public domain as part of NFPA's open revision process.

Until NFPA 2:2024 is issued and adopted by jurisdictions, users may choose to request a variance from the existing separation distances and use the revised distances and associated controls located on the NFPA web site. Requests for a variance to the current distances should cite the NFPA equivalency clause and attach a copy of the following justification material:

- (1) The revised table of minimum distances from bulk liquefied hydrogen distances to exposures in table 8.3.2.3.1.6(A) and the statement of reasons for second revision (SR) 34-NFPA 2-2022, found in the second draft report at [NFPA 2 second revisions](#), pages 119-121 and 130-139.
- (2) The detailed descriptions of the calculation methodology, risk assumptions, and harm criteria for the updated liquefied supply system separation distances in public comment (PC) 49-NFPA 2-2022 section of the public comments report at [NFPA 2 public comments](#) pages 222-233.

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Background

Requirements for hydrogen supply systems, including gaseous and liquefied hydrogen storage, historically have been within NFPA 55 and extracted (copied and pasted) into NFPA 2 in accordance with the NFPA extraction work process. Extensive work by an NFPA hydrogen storage task group has developed revised liquefied hydrogen supply system separation distances and associated controls (such as retention valves at hydrogen fueling stations).

The basis for the original liquefied hydrogen supply system separation distances in NFPA 2 section 8.3.2.3.1.6 is not well-documented. The task group developed and documented a risk-informed approach for liquefied hydrogen supply system separation distances similar to the approach used for gaseous hydrogen supply system separation distances in NFPA 2:2011. Separation distances based on consequences of a hydrogen leak led to a revised table of minimum separation distances as a function of exposure type, maximum supply system pipe size, and maximum operating pressures, utilizing associated controls, instead of storage volume.

More details on the rationale for the revised distances can be found in the references previously listed in the “answer” section.

Changes to the scope statements of these two codes have started the process of moving hydrogen requirements from NFPA 55 into NFPA 2. That movement has affected the location of the revised liquefied hydrogen supply system separation distances. The updated distances facilitate the safe siting of liquefied hydrogen supply systems, particularly those located at near-consumer locations for vehicle fueling.

The latest edition of NFPA 55 was released in July 2022 as NFPA 55:2023. It retains the liquefied hydrogen distances from previous editions because the revised distances were not finalized before the release of NFPA 55:2023. However, NFPA 55:2023 gives the user the option to follow either the existing historical distances or the distances in NFPA 2, copied from NFPA 55 as follows [2]:²

11.3.2.2*

The minimum distance from outdoor bulk liquefied hydrogen systems of the indicated capacity shall be in accordance with one of the following:

(1) Table 11.3.2.2

(2) Chapter 8 of NFPA 2

The current NFPA 2:2020 distances are the historical distances that match those in NFPA 55. The revised distances will be published in the next edition of NFPA 2, which will be released in August 2023 as NFPA 2:2024.

Before the August 2023 release of NFPA 2:2024, users are not able to find language in NFPA 2 or NFPA 55 for the revised distances that provide improved ease of siting of liquefied hydrogen supply systems. To resolve this issue, users can use the NFPA equivalency clause to request a variance and use the technical reasons as substantiation for the revised separation distances that are available from NFPA’s web site.

References

Unless otherwise specified, the latest edition shall apply.

[1] NFPA 2, *Hydrogen Technologies Code*, National Fire Protection Association, www.nfpa.org

[2] NFPA 55, *Compressed Gases and Cryogenic Fluids Code*, National Fire Protection Association, www.nfpa.org

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