NFPA 395
Standard for the Storage of Flammable and Combustible Liquids at Farms and Isolated Sites

1993 Edition

National Fire Protection Association, 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101
An International Codes and Standards Organization

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Standard for the

Storage of Flammable and Combustible Liquids at Farms and Isolated Sites

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This edition of NFPA 395, *Standard for the Storage of Flammable and Combustible Liquids at Farms and Isolated Sites*, was prepared by the Technical Committee on Flammable and Combustible Liquids, released by the Correlating Committee on Flammable Liquids, and acted on by the National Fire Protection Association, Inc. at its Annual Meeting held May 24-27, 1993, in Orlando, FL. It was issued by the Standards Council on July 23, 1993, with an effective date of August 20, 1993, and supersedes all previous editions.

The 1993 edition of this document has been approved by the American National Standards Institute.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

Origin and Development of NFPA 395

This standard was first adopted by the Association in 1947 as the *Standard for Farm Storage of Flammable Liquids*. It was developed to provide guidance for safe storage of flammable liquids in rural locations where exposures were minimal and compliance with the more restrictive requirements of NFPA 30, *Flammable and Combustible Liquids Code*, was not justified. The 1947 edition of NFPA 395 was reconfirmed in 1952. In 1959, the scope of NFPA 395 was expanded to include isolated construction projects, and further amendments were adopted in 1965, 1972, 1977, 1980, 1984, and 1988.

In 1991, the Technical Committee on Flammable and Combustible Liquids completely revised NFPA 395, primarily to comply with NFPA's *Manual of Style*. In addition, the Committee again expanded the scope of NFPA 395 so that it could be applied to any isolated site, not just construction projects, subject to the approval of the authority having jurisdiction.

Other changes to the 1988 edition include:

- Incorporation of statements of equivalency and retroactivity, in accordance with the NFPA *Manual of Style* and with NFPA policy.
- Addition of A-2-3.3 to explain the derivation of the required vent sizes given in Subsection 2-3.3.
- Addition of A-2-4.2 to caution the user that separation might be necessary from combustible storage or combustible structures other than buildings.

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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 criteria for safeguarding against fire and explosion hazards associated with the general storage, handling, and use of flammable and combustible liquids; and also for documents presenting criteria for the storage of flammable and combustible liquids on farms and isolated construction projects.

Contents

NFPA 395

Standard for the Storage of

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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 Appendix A.

Information on referenced publications can be found in Chapter 3 and Appendix B

Chapter 1 General

1-1 Scope.

1-1.1* This standard shall apply to the storage of Class I flammable liquids and Class II and Class IIIA combustible liquids, as herein defined, in containers or tanks that do not exceed 1,100 gal (4,164 L) individual capacity:

(a) On farms and in rural areas;

(b) At isolated construction sites and isolated earth-moving projects, including gravel pits, quarries, and borrow pits, where, in the opinion of the authority having jurisdiction, it is not necessary to comply with the more restrictive requirements of NFPA 30, *Flammable and Combustible Liquids Code*; and

(c) At any private site where isolation or separation from other structures or where temporary use makes it unnecessary, in the opinion of the authority having jurisdiction, to comply with the more restrictive requirements of NFPA 30, *Flammable and Combustible Liquids Code*.

1-1.2 This standard shall not apply to:

(a) The storage, handling, and use of fuel tanks and containers that are installed or used in accordance with NFPA 31, *Standard for the Installation of Oil-Burning Equipment*; NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines*; and NFPA 30A, *Automotive and Marine Service Station Code*, and

(b) The storage of 25 gal (95 L) or less of Class I flammable liquid and Class II and Class III combustible liquids in containers that do not exceed a capacity of 5 gal (19 L).

1-2 Purpose. The purpose of this standard shall be to provide reasonable requirements for the storage of Class I flammable and Class II and Class IIIA combustible liquids that are less restrictive than the requirements of NFPA 30, *Flammable and Combustible Liquids Code*, for use in the specific situations set forth in 1-1.1.

1-3 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, or safety over those prescribed by this standard, provided technical documentation is submitted to the authority having jurisdiction to demonstrate equivalency and the system, method, or device is approved for the purpose.

1-4 Retroactivity. The provisions of this standard are considered necessary to provide a reasonable level of protection from loss of life and property from fire or explosion. They reflect situations and the state-of-the-art prevalence at the time the standard was issued. Unless otherwise indicated, it is not intended that the provisions of this standard be applied to facilities, equipment, structures, or installations that were existing or approved for construction or installation prior to the effective date of this standard, except in those cases where it is determined that the existing situation involves a distinct hazard to life or adjacent property.

1-5 Definitions. For the purposes of this standard, the following terms shall be defined as shown below.

Approved. Acceptable to the "authority having jurisdiction."

NOTE: The National Fire Protection Association does not approve, inspect or certify any installations, procedures, equipment, or materials nor does it approve or evaluate testing laboratories. In determining the acceptability of installations or procedures, equipment or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization concerned with product evaluations which is in a position to determine compliance with appropriate standards for the current production of listed items.

Authority Having Jurisdiction. The "authority having jurisdiction" is the organization, office, or individual responsible for "approving" equipment, an installation, or a procedure.

NOTE: The phrase "authority having jurisdiction" is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

Liquid. For the purpose of this code, any material that has a fluidity greater than that of 300 penetration asphalt when tested in accordance with ASTM D 5, *Test for Penetration for Bituminous Materials*. When not otherwise identified, the term liquid shall mean both flammable and combustible liquids.

(a) *Combustible Liquid.* A liquid having a closed-cup flash point at or above 100°F (37.8°C), as determined by appropriate methods of test. Combustible liquids shall be subdivided as follows:

1. Class II liquids shall include those having a closed-cup flash point at or above 100°F (37.8°C) and below 140°F (60°C).

2. Class IIIA liquids shall include any liquid that has a closed-cup flash point at or above 140°F (60°C), but below 200°F (93.4°C).

(b) *Flammable Liquid.* A liquid that has a closed-cup flash point below 100°F (37.8°C), as determined by appropriate methods of test. Flammable liquids shall be classified as follows:

1. Class IA liquids shall include any liquid that has a closed-cup flash point below 73°F (22.8°C) and having a boiling point below 100°F (37.8°C).

2. Class IB liquids shall include any liquid that has a closed-cup flash point below 73°F (22.8°C) and a boiling point at or above 100°F (37.8°C).

3. Class IC liquids shall include any liquid that has a closed-cup flash point at or above 73°F (22.8°C), but below 100°F (37.8°C).

Chapter 2 Specific Requirements

2-1 Types of Approved Storage.

2-1.1 Storage of Class I, Class II, and Class IIIA liquids, as covered by this standard, shall be permitted in any of the following:

(a) In aboveground or underground tanks that meet the requirements of Section 2-2 and Chapter 3 of NFPA 30, *Flammable and Combustible Liquids Code*;

(b) In containers that meet the requirements of Section 4-2 of NFPA 30, *Flammable and Combustible Liquids Code*;

(c) In containers that do not exceed 60 gal (227 L), in accordance with Section 2-2 of this standard; and

(d) In tanks of more than 60 gal (227 L) but not more than 1,100 gal (4,164 L) capacity, in accordance with Section 2-3 of this standard.

2-2 Individual Containers Not Exceeding 60 Gallons Capacity.

2-2.1 Storage of liquids shall be in containers approved by the U.S. Department of Transportation or in other approved containers.

2-2.2 Capacity of containers shall not exceed 60 gal (227 L).

2-2.3 Dispensing or transfer devices that require the container to be pressurized shall be prohibited.

2-2.4 Pumping devices and faucets shall be well maintained to prevent leakage.

2-2.5 Individual containers shall not be interconnected or manifolded and shall be kept tightly closed when not in use.

2-2.6 Containers used for the storage of Class I liquids shall be kept outside and at least 10 ft (3 m) from any building.

Exception: As allowed in 2-2.7.

2-2.7 Containers shall be permitted to be stored inside any building that is used exclusively for the storage of Class I, Class II, and Class IIIA liquids and is located at least 10 ft (3 m) from any other building.

2-2.7.1 The building shall be provided with cross ventilation using at least 2 vents, each having a net open area of 64 in.^{2} (413 cm^2) and each placed at floor level. The vents shall be located opposite from each other.

2-3 Tanks of 60 to 1,100 Gallons Capacity.

2-3.1 Tanks shall be of single-compartment design and constructed in accordance with good engineering practice. Joints shall be riveted and caulked, riveted and welded, or welded. Tank heads that are greater than 6 ft (2 m) in diameter shall be dished, stayed, braced, or reinforced.

2-3.1.1 Tanks shall meet the following minimum plate thickness:

Capacity		Minimum Steel Thickness
Gallons	Liters	Mfrs. Standard Gauge No.
60 to 560	230 to 2,120	14
561 to 1,100	2,120 to 4,165	12

2-3.2 Each tank shall be provided with a fill opening that is equipped with a closure that is designed to be locked. The fill opening shall be separate from the vent opening.

2-3.3* Each tank shall be provided with a free-opening vent that shall relieve either the vacuum or the pressure that might develop during normal operation or fire exposure. The vent shall have the following nominal pipe size:

Capacity		Vent Diameter	
Gallons	Liters	Inches	Millimeters
Up to 275	1,040	$1^1/_2$	38
276 - 660	1,040 - 2,500	2	51
661 - 900	2,500 - 3,410	$2^1/_2$	64
900 - 1,100	3,410 - 4,165	3	76

2-3.4 Vents shall be arranged to discharge so as to prevent localized overheating of or direct flame impingement on any part of the tank in the event that vapors from the vent are ignited.

2-3.5 Tanks shall be located outside and at least 40 ft (12 m) from any building. They shall also be located so that any vehicle, equipment, or container that is filled directly from the tanks is at least 40 ft (12 m) from any building.

2-3.6 Tanks provided for in this section shall be permitted to have top openings only or shall be permitted to be elevated for gravity discharge.

2-3.6.1 Tanks that have top openings only shall be mounted and equipped as follows:

(a) Stationary tanks shall be mounted on timbers or blocks 6 in. (150 mm) in height so as to protect the bottom of the tank from corrosion due to contact with the ground and to maintain the tank in a stable position.

(b) Movable tanks shall be equipped with attached metal legs that rest on shoes or runners designed so that the tank is supported in a stable position and so that the tank and its supports can be moved as a single unit.

(c) Tanks shall be equipped with a tightly and permanently attached approved pumping device having an approved hose of sufficient length for filling the vehicles, equipment, or containers to be served by the tank.

(d) The dispenser nozzle and hose shall be equipped so that it can be padlocked to its hanger to prevent tampering.

(e) The pump discharge shall be equipped with an effective antisiphoning device, or the discharge hose shall be equipped with a self-closing nozzle.

(f) Siphons or internal pressure discharge devices shall be prohibited.

2-3.6.2 Tanks elevated for gravity discharge shall be mounted and equipped as follows:

(a) Tanks shall be supported on steel or wood supports having adequate strength and design to provide stability. Alternately, tanks shall be permitted to be placed on a pile of earth or near the edge of a cut bank to provide the necessary elevation and shall be supported on timbers or blocks for stability and to prevent corrosion from contact with the ground.

(b) Discharge connections shall be made to the bottom or to the end of the tank.

(c) The discharge connection shall be equipped with a valve that shall automatically close in the event of a fire by means of operation of an effective heat-actuated device. This valve shall be located adjacent to the tank shell. If this valve cannot be operated manually, an additional valve that can be manually operated shall be provided.

(d) The discharge connection shall be provided with an approved hose of sufficient length for filling vehicles, equipment, and containers to be served by the tank. The hose shall be provided with a self-closing nozzle at the discharge end.

(e) The hose shall be equipped so that it can be padlocked to its hanger to prevent tampering.

2-4 Marking of Tanks and Containers.

2-4.1 Tanks and containers shall be conspicuously marked with the name of the product contained and with the following marking: "FLAMMABLE — KEEP FIRE AND FLAME AWAY."

2-4.2* Tanks shall also bear the following marking: "KEEP 40 FT FROM BUILDINGS."

2-5 Fire Prevention and Control.

2-5.1 Storage areas shall be kept free of weeds and other extraneous combustible materials.

2-5.2 Open flames and smoking materials shall not be permitted in areas where Class I liquids are stored.

Chapter 3 Referenced Publications

3-1 The following documents or portions thereof are referenced within this standard and shall be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

3-1.1 NFPA Publication. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 30, *Flammable and Combustible Liquids Code*, 1993 edition.

3-1.2 ASTM Publication. American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM D5-1986, *Test for Penetration for Bituminous Materials.*

Appendix A Explanatory Material

This appendix is not a part of the requirements of this NFPA document but is included for informational purposes only.

A-1-1.1 On isolated construction and earth-moving projects and on other similarly isolated sites, it is customary for the property owner or the contractor to obtain fuel in bulk and to dispense the fuel under his or her direct control.

A-2-3.3 Vent sizes are based on limiting the internal pressure of the tank to 3.0 psig (20.7 kPa) [120 percent of 2.5 psig (17.2 kPa), the maximum internal pressure allowed for an atmospheric storage tank], using an orifice coefficient of 0.8 and an environmental factor of 0.5. The 0.5 environmental factor recognizes the limited time that a small tank will be exposed to fire, loss of fuel by absorption into the soil, and drainage of liquid away from the tank. Calculations are based on 2-3.5 of NFPA 30, *Flammable and Combustible Liquids Code.*

A-2-4.2 This 40-ft (12.2-m) clearance distance should also apply to other combustible structures, haystacks, etc.

Appendix B Referenced Publications

B-1 The following documents or portions thereof are referenced within this standard for informational purposes only and thus are not considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

B-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 30, *Flammable and Combustible Liquids Code*, 1993 edition.

NFPA 30A, *Automotive and Marine Service Station Code*, 1993 edition.

NFPA 31, *Standard for the Installation of Oil-Burning Equipment*, 1992 edition.

NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines*, 1990 edition.