

NFPA 40

Standard for the Storage and Handling of Cellulose Nitrate Film

2007 Edition



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NFPA 40
Standard for the
Storage and Handling of Cellulose Nitrate Film
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This edition of NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Film*, was prepared by the Technical Committee on Hazardous Chemicals. It was issued by the Standards Council on July 28, 2006, with an effective date of August 17, 2006, and supersedes all previous editions.

This edition of NFPA 40 was approved as an American National Standard on August 17, 2006.

Origin and Development of NFPA 40

NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film*, was developed by the Committee on Hazardous Chemicals and Explosives and was first adopted by NFPA in 1919. Amendments were adopted in 1921 and 1926. A complete revision was adopted in 1931, with further amendments in 1939, 1946, and 1947. Extensive revisions were also made in 1953. The technical requirements of these early editions of NFPA 40 were based on extensive fire tests conducted by motion picture film manufacturers.

With the reorganization of the committee in 1960, the Technical Committee on Explosives was given responsibility for NFPA 40. However, in 1970, responsibility was transferred to the Technical Committee on Storage, Handling, and Transportation of Hazardous Chemicals. The 1953 edition of NFPA 40 was reconfirmed in 1962. Amendments were adopted in 1967, and the 1967 edition was reconfirmed in 1974.

In 1979, the Technical Committee on Storage, Handling, and Transportation of Hazardous Chemicals debated whether to withdraw the document since cellulose nitrate motion picture film had not been manufactured for more than 20 years. However, due to the large quantities of cellulose nitrate motion picture film in various archives, the Committee decided to revise NFPA 40 and to maintain it as an active NFPA standard until the archive collections are reprinted onto safety film or destroyed. (The Library of Congress, the Smithsonian Institution, the U.S. military services, and others have great quantities of such film that is slowly being reprinted.)

The 1994 edition of NFPA 40 reflected a partial revision of the standard to improve its usability, adoptability, and enforceability and to update old terminology. In addition, the Technical Committee on Hazardous Chemicals clarified the requirements relating to protection of film cabinets and vaults with automatic sprinkler protection, as well as clarifying the requirements for decomposition vents.

For the 1997 edition, the terminology and provisions relating to long-term storage of cellulose nitrate motion picture film were updated to be consistent with the terminology used in the film storage industry. This was done in response to new storage facilities for cellulose nitrate films that were being built, and clarification was needed for consistency between the standard's provisions for vault construction and various building code requirements. These changes were reflected throughout the standard. Provisions for handling cellulose nitrate motion picture films also were updated within the safety limits previously established by the Hazardous Chemicals Committee. However, the Committee reduced the number of rolls of cellulose nitrate motion picture film allowed to be present in a shipping room, to reduce the potential hazard to persons working in the area. Other changes were editorial in nature to bring the document into conformance with the NFPA *Manual of Style*, 1986 edition.

The 2001 edition expanded the scope of the document to include flat film, making NFPA 40 the single document that addressed cellulose nitrate film storage. Prior to that change, flat film storage had been covered by NFPA 42, *Standard for the Storage of Pyroxylin Plastic*. Additionally, the requirements located in NFPA 42 did not adequately address flat cellulose nitrate film storage. Several changes were made to the storage chapter to reflect the safety concerns with flat film. Restructuring changes also were made to make the document conform to the *Manual of Style for NFPA Technical Committee Documents*, 2000 edition, including eliminating several exceptions, changing the chapter order, and moving nonmandatory material to annexes.

The 2007 edition of NFPA 40 is essentially a reconfirmation of the 2001 edition of the document.

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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, and maintain current codes for, classes of hazardous chemicals and codes for specific chemicals where these are warranted by virtue of widespread distribution or special hazards.



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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.

Changes other than editorial are indicated by a vertical rule beside the paragraph, table, or figure in which the change occurred. These rules are included as an aid to the user in identifying changes from the previous edition. Where one or more complete paragraphs have been deleted, the deletion is indicated by a bullet (•) between the paragraphs that remain.

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

Chapter 1 Administration

1.1* Scope.

1.1.1* This standard shall apply to all facilities that are involved with the storage and handling of cellulose nitrate-based film.

1.1.2 This standard shall not apply to the storage and handling of film having a base other than cellulose nitrate.

1.2 Purpose. Based on minimum requirements for safety to life and property from fire, this standard shall provide for the storage and handling of cellulose nitrate film.

1.3 Application.

1.3.1 This standard gives general provisions regarding the storage and handling of cellulose nitrate film and special provisions for such occupancies as motion picture projection booths, nitrate film vaults, and laboratories handling nitrate film. These special provisions shall apply in addition to any and all general provisions that are applicable.

1.3.2* The grouping of the special provisions under the heading of special occupancies is merely for convenience in the application of this standard. Any particular process or operation in any type of occupancy shall be governed by the provisions that are given for that process or operation, whether under the heading of that occupancy or any other heading, unless otherwise specifically provided herein.

1.4 Retroactivity. Because nitrate film deteriorates with age, the provisions of this standard shall be retroactive. Where improvements have been made over previous editions of this standard, the incorporation of these changes in existing facilities shall be required particularly where cellulose nitrate film storage will continue.

1.5 Equivalency.

1.5.1 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 in this standard, provided that technical documentation is submitted to the authority having jurisdiction to demonstrate equivalency and that the system, method, or device is approved for the intended purpose.

1.5.2 The specific requirements of this standard for existing buildings shall be permitted to be modified by the authority having jurisdiction to allow alternative arrangements that will secure, as nearly as practical, equivalent safety to life and protection of film collections from fire. However, in no case shall the modification afford less safety to life than compliance with the corresponding provisions contained in this standard for existing buildings. (See also 1.5.1.)

1.6 Approval of Plans. Before any building is constructed for use as a cellulose nitrate film occupancy, any nitrate film vault is built, any enclosure for motion picture projection is installed, or any screening room is installed, complete plans for the proposed construction or installation shall be submitted for approval to the authority having jurisdiction. These plans shall show in detail all proposed construction and structural changes, means of protection to be provided, the heating system and its protection, electrical equipment, and the character and location of exposures. The plans also shall indicate the maximum amount and types of film to be handled or stored in each area.

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.

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

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2007 edition.

NFPA 70, *National Electrical Code*®, 2005 edition.

NFPA 80, *Standard for Fire Doors and Other Opening Protectives*, 2007 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2002 edition.

NFPA 101®, *Life Safety Code*®, 2006 edition.

NFPA 220, *Standard on Types of Building Construction*, 2006 edition.

NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls*, 2006 edition.

2.3 Other Publications. Merriam-Webster's *Collegiate Dictionary*, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections. (Reserved)

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall



be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Labeled. Equipment or materials to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

3.2.4* Listed. Equipment, materials, or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material, or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

3.2.5 Shall. Indicates a mandatory requirement.

3.2.6 Should. Indicates a recommendation or that which is advised but not required.

3.3 General Definitions.

3.3.1* Cellulose Nitrate Film. Motion picture sound recording, still, or flat film that is coated on a support or base consisting essentially of cellulose nitrate.

3.3.2* Extended Term Storage. Storage having an indefinite duration (i.e., for the functional life of the film element and intended to protect and conserve the useful life of the film as long as possible).

3.3.3 Extended Term Storage Cabinet. A specially constructed and equipped enclosure that is used for the extended term storage of cellulose nitrate motion picture film.

3.3.4 Extended Term Storage Film. Film of value for record purposes that will be kept in permanent storage.

3.3.5* Extended Term Storage Rack. A rack that is intended for use in extended term storage of high value or permanent record film.

3.3.6* Extended Term Storage Vault. A specially constructed and equipped storage room with both a 4-hour fire rating and an inside volume that does not exceed 28 m³ (1000 ft³).

3.3.7 Film Cabinet. A specially constructed and equipped enclosure for the storage of up to 170 kg (375 lb) of cellulose nitrate motion picture film.

3.3.8* Standard Roll. A roll of film that is 35 mm (1 3/8 in.) wide, 305 m (1000 ft) long, and approximately 2.3 kg (5 lb) in weight.

3.3.9* Vault. A specially constructed and equipped storage room with both a 4-hour fire rating and an inside volume that does not exceed 21 m³ (750 ft³).

3.3.10 Vent.

3.3.10.1 Decomposition Vent. A vent to permit the escape of gases resulting from partial burning or decomposition of nitrate film.

3.3.10.2 Explosion Vent. A vent to relieve explosion pressures resulting from ignition of a mixture of decomposition gases and air.

Chapter 4 Construction Requirements and Arrangements of Buildings

4.1 Construction.

4.1.1* Nitrate film shall be stored or handled only in buildings of Type I construction as defined in NFPA 220, *Standard on Types of Building Construction*.

4.1.1.1 Decomposition vents and explosion vents shall be of noncombustible construction.

4.1.2 All rooms where nitrate film is stored or handled shall be separated from each other and from all other parts of the building by partitions having a fire resistance rating of at least 1 hour.

4.1.2.1 The partitions shall be constructed in accordance with NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls*.

Exception: Film vaults shall meet the requirements of Section 6.3 or Section 6.5.

4.1.2.2 Partitions shall be continuous from floor to ceiling and shall be anchored securely to walls, floors, and ceilings.

4.1.3 Openings in partitions shall be protected by approved fire doors having a 1-hour fire resistance rating and installed according to NFPA 80, *Standard for Fire Doors and Other Opening Protectives*.

4.2 Exits.

4.2.1 All new rooms where nitrate film is handled, except film vaults, shall be provided with aisles having a minimum width of 910 mm (36 in.).

4.2.1.1 For existing rooms, the minimum aisle width shall be 760 mm (30 in.).

4.2.1.2 The minimum aisle width for film vaults shall be 760 mm (30 in.).

4.2.2 Rooms where nitrate film is handled shall have two or more exits that are remote from each other.

Exception: Film vaults shall not be required to comply with this provision.

4.2.3* Doors shall swing in the direction of exit travel. Where not clearly identifiable, exits shall be marked by an "EXIT" sign meeting the requirements of NFPA 101, *Life Safety Code*.

4.3 Explosion Venting.

4.3.1* Explosion venting shall be provided in new construction for rooms or vaults that are used for the storing and handling of nitrate film.

Exception: Rooms where the total quantity of film not stored in vented cabinets is less than 20 standard rolls or 6100 m (20,000 ft).