

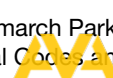
NFPA[®] 40

Standard for the Storage and Handling of Cellulose Nitrate Film

2016 Edition



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NFPA®40

Standard for the

Storage and Handling of Cellulose Nitrate Film

2016 Edition

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 May 26, 2015, with an effective date of June 15, 2015, and supersedes all previous editions.

This edition of NFPA 40 was approved as an American National Standard on June 15, 2015.

Origin and Development of NFPA 40

NFPA 40, *Standard for the Storage and Handling of Cellulose Nitrate Film*, was developed by the National Board of Fire Underwriters Committee of Consulting Engineers and was first adopted by NFPA in 1910, under the title *Standard for the Storage and Handling of Cellulose Nitrate Motion Picture Film*. Amendments were adopted in 1915, 1919, 1922, and 1926. A complete revision was adopted in 1931, with further amendments in 1936, 1939, 1946, and 1947. Extensive revisions were also made in 1953. The technical requirements of the 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 as long as archive collections are being maintained. (The Library of Congress, the Smithsonian Institution, the U.S. military services, and others have great quantities of such film, which is slowly being reprinted onto safety film.) An updated edition was adopted in 1982 and reconfirmed in 1988.

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. Those 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 Technical Committee on Hazardous Chemicals. 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 1986 edition of the *Manual of Style*.

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 revision, NFPA 42, *Code for the Storage of Pyroxylin Plastic*, had covered flat film storage, but the requirements did not adequately address it. Several changes were made to the storage chapter of NFPA 40 to reflect the safety concerns with flat film. Restructuring changes also were made to make the document conform to the

2000 edition of the *Manual of Style for NFPA Technical Committee Documents*, including eliminating several exceptions, changing the chapter order, and moving nonmandatory material to the annexes. In addition, the title of the standard was changed to *Standard for the Storage and Handling of Cellulose Nitrate Film*.

The 2007 edition was essentially a reconfirmation of the 2001 edition of the document.

The 2011 edition included amendments to the requirements for applying the standard to new and existing facilities so that the equivalency provision applied correctly. Research by FM Global that was concluded in 2000 was incorporated in revisions to film vault fire protection. The committee provided an annex item that provided information on converting sheets of flat film to roll film equivalencies, since storage requirements in the standard are based on roll film quantities. The Committee also revised the standard to comply with the 2004 edition of the *Manual of Style for NFPA Technical Committee Documents*.

The 2016 edition clarifies how the storage requirements in NFPA 40 apply to both motion picture film and flat film. Explanatory material expands upon the flat film-to-roll film equivalencies developed in the 2011 edition to include mass, volume, and number of rolls or sheets of film. The committee has also revised recommendations for the inspection, reformatting, and disposal of unstable nitrate film to accurately reflect the variable nature of nitrate decay.

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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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NFPA 40

Standard for the

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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.

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 10, *Standard for Portable Fire Extinguishers*, 2013 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, 2016 edition.

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*, 2012 edition.

NFPA 70®, *National Electrical Code®*, 2014 edition.

NFPA 72®, *National Fire Alarm and Signaling Code*, 2016 edition.

NFPA 80, *Standard for Fire Doors and Other Opening Protectives*, 2016 edition.

NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilating Systems*, 2015 edition.

NFPA 101®, *Life Safety Code®*, 2015 edition.

NFPA 220, *Standard on Types of Building Construction*, 2015 edition.

NFPA 221, *Standard for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls*, 2015 edition.

2.3 Other Publications.

2.3.1 ASTM Publications. ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.

ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, 2014 edition.

2.3.2 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

ANSI/UL 723, *Standard for Test for Surface Burning Characteristics of Building Materials*, 2008, revised 2010.

2.3.3 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.

3.2.7 Standard. An NFPA Standard, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and that is in a form generally suitable

for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase "standards development process" or "standards development activities," the term "standards" includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

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 (1⅜ 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 decomposition or from incomplete combustion 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.

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