



Smithsonian  
Institution

SMITHSONIAN DIRECTIVE 502,  
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## MANAGEMENT OF CELLULOSE NITRATE STILL PICTURE AND MOTION PICTURE FILM

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### 1. PURPOSE

The purpose of this directive is to inform and guide Smithsonian staff in understanding and complying with applicable laws, relevant industry guidelines, and Smithsonian requirements for managing still or motion picture cellulose nitrate film. As new collections are received, and because nitrate film may be newly identified within extant holdings as associated collections assets of permanent value, a vigilant Smithsonian policy for the management of nitrate film is necessary.

### 2. BACKGROUND

Cellulose nitrate film is found in both collections, as defined by [SD 600, Collections Management Policy](#), and related records excluded from Unit Collections Management Policy requirements (e.g., associated collection assets such as medical or spectrographic records; field research photography and film; provenance records; object documentation files; and more). See SD 501, Archives and Records of the Smithsonian Institution, and the [Smithsonian-wide Records Disposition Schedule](#) for guidance on archives and records.

The storage of all cellulose nitrate still and motion picture film is guided by National Fire Protection Association (NFPA) 40 — [Standard for the Storage and Handling of Cellulose Nitrate Film](#). Up-to-date editions of NFPA code books are subscribed to and are available from the Smithsonian Facilities' Office of Safety, Health and Environmental Management, Fire Protection (OSHEM-FPD) main office. To consult the current edition, contact OSHEM-FPD; alternately, the codes can be accessed in read-only mode on the Web for free after registering via the NFPA's online portal.

## 2. BACKGROUND (continued)

Familiarity with NFPA 40 is an essential component of collections management of cellulose nitrate film. Supplementary knowledge is found in NFPA 909 — [Code for the Protection of Cultural Resource Properties — Museums, Libraries, and Places of Worship](#).

In addition, transportation and disposal of cellulose nitrate film are regulated by the *Code of Federal Regulations* (CFR); specifically, the Department of Transportation (DOT) 49 CFR Hazardous Materials Regulations; and the Environmental Protection Agency's (EPA) Resource Conservation and Recovery Act (RCRA), at 40 CFR §260–265.

Under normal museum storage (non-specialized environment) conditions, cellulose nitrate film (nitrate) decomposes and may deteriorate to the point of being unstable. As it deteriorates, it emits acidic gases that can damage nearby materials. Because of its unique chemical nature as a flammable solid and oxidizer, improperly managed nitrate film can dramatically increase damage to surrounding collections and contribute to the severity of a fire due to the difficulty it poses for fire suppression.

The Smithsonian Libraries and Archives (SLA) has and continues to identify and recommend segregation of cellulose nitrate film since this directive was first issued in 1982.

## 3. APPLICABILITY

This policy applies to all Units holding photographic records from the nitrate film era (circa 1890s–1950s). This includes research and provenance materials such as archival documentation, original documentation, and collections as defined in SD 600.

This policy does not apply to management of dimensional objects cast or formed with cellulose nitrate, such as art and design objects, nor does it apply to historic coatings (lacquers derived from cellulose nitrate formulations such as airplane dope, or as used in historic conservation treatments). Lastly, this policy does not govern the use or disposal of cellulose acetate films, objects, or lacquer formulations.

## 4. DEFINITIONS

**Collections-Based Hazard:** See [Smithsonian Institution \(SI\) Safety Manual, Chapter 24 — Collections-Based Hazards](#).

**Collections Steward:** Any Smithsonian employee having direct oversight of and/or management of SD 600 collection or non-collection-associated research records. This includes but is not limited to archivists, conservators, collection managers, curators, museum specialists, registrars, and others.

## 4. DEFINITIONS (continued)

### NFPA 40 Definitions

The terms found below are selected official and specific definitions used in NFPA 40 (2022), reproduced here to maintain comprehension, consistency and compliance with interpretation of that document. Units' own nomenclature such as "collections storage" or "collection vault" are not interchangeable with NFPA code definitions and are not used in this document or subdocuments.

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

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

**Labeled:** Equipment or materials with an attached label, symbol, or other identifying mark of an organization that is acceptable to the authority having jurisdiction of and that is 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.

**Permanent 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).

**Permanent Storage Cabinet:** A specially constructed and equipped enclosure that is used for the permanent storage of cellulose nitrate motion picture film.

**Permanent Storage Film:** Film of value for record purposes that will be kept in permanent storage.

**Permanent Storage Vault:** A specially constructed and equipped storage room with both a four-hour fire rating and an inside volume that does not exceed 28 m<sup>3</sup> (1,000 ft<sup>3</sup>).

**Vault:** A specially constructed and equipped storage room with both a four-hour fire rating and an inside volume that does not exceed 21 m<sup>3</sup> (750 ft<sup>3</sup>).

## 5. POLICY

For the safety of workers, including employees and affiliated persons, emergency responders, and visitors, and the security of Smithsonian collections and buildings, it is imperative for risk management in collections stewardship to appropriately identify, account for, and properly

## 5. POLICY (continued)

manage cellulose nitrate film. As such, Smithsonian policy requires prompt segregation of all positively identified or strongly suspected still and motion picture nitrate film from the collections, and removal of the nitrate film to storage that conforms with the provisions of the most current editions of NFPA 40 and NFPA 909 as interpreted by OSHEM. SLA, together with NCP and OSHEM, will work with Units to identify potential storage arrangements for film that meet SI and NFPA code, per the mass of material identified, and access needs. All storage shall comply with the *SI Safety Manual*, Chapter 24 — [Collections Based Hazards](#), and Chapter 36 — [Fire Protection](#), and NFPA 40 (current edition), to include hazard warnings for flammable solids. Per *SI Safety Manual, Chapter 24*, “Storage of cellulose nitrate...film...materials shall be reported to OSHEM and the SI Archives [now Smithsonian Libraries and Archives] prior to commencement of storage.” [Smithsonian Institution \(SI\) Safety Manual, Chapter 24 — Collections Based Hazards \(E.4\)](#)

SLA is the liaison for SI collections held under a custodial agreement at the [Library of Congress' National Audio Visual Collections Center \(NAVCC\)](#), an off-site nitrate film storage facility that conforms to NFPA 40 structural and engineering requirements.

Smithsonian museums, research centers, and offices that currently store and need access to their nitrate film at NAVCC must arrange for transportation, storage, and inventory control of the film with SLA. An inventory should be reviewed for accuracy on a periodic basis; existing agreements shall be renewed between SLA and the Unit per the SD 600 Shared Space Agreement Framework.

Space in this remote secure storage facility is considered full as of the date of publication for this directive; no newly identified film collections may be added to this space. Units that have known or newly identified nitrate film collection items outside of NAVCC, or that are considering acquisition of nitrate film, may provide alternate on-site compartmentalized arrangements for permanent storage, per NFPA 40.

Nitrate film collections may not be offered for transfer or stored in any leased facility without following SI policies and procedures and applicable NFPA, and RCRA/DOT code requirements and consulting OSHEM. To request advisory support services from the Archives, write to [osiaref@si.edu](mailto:osiaref@si.edu) with the subject line: Nitrate inquiry.

## 6. RESPONSIBILITIES

**Unit Directors** are responsible for ensuring the safe management and storage of all cellulose nitrate film materials that are in their Unit's possession, subject to this directive, to include:

- tasking collections stewards and Unit safety coordinators and other safety personnel to promote proper stewardship, as appropriate to the Unit's scale and diversity of holdings;

## 6. RESPONSIBILITIES (continued)

- providing resources to support recommendations from collections stewards for the accurate inventory, collections space survey, and improvements, such as equipment and training, needed to ensure safe work practices that comply with this directive.

**Unit Collections Stewards and Supervisors** are responsible for establishing and implementing procedures for handling hazardous collections, which include pursuing education and/or training in identification, hazard communication, removal, copying, storage, or disposal of nitrate film. This includes coordination with their Unit Safety Coordinator, the Collections Space Survey Unit Coordinator, and SLA to:

- monitor for physical changes consistent with deterioration (NFPA 40 C.1).
- document location of nitrate film in the collections management database and/or facility maps.
- label nitrate collections at their outermost packaging and/or the film cabinet level.
- estimate mass of nitrate in collections to facilitate
  - compliance with NFPA 40
  - assessment of quantitative data regarding specialized collections space (e.g., Permanent Storage Vault) needs to Unit, NCP, Smithsonian Facilities (SF), and SLA.
- understand that all transportation of nitrate film is regulated by DOT CFR 49. Nitrate film is considered a class 4.1 flammable solid.
- understand the difference between hazardous collection material and hazardous waste offered for deaccession and disposal.
- assign and maintain staff points of contact for communication for collection items on deposit with SLA.
- assess and advocate priorities for storage and access, including for specialized environments for permanent storage and/or preservation reformatting. Consult with SLA to obtain draft SD 502 *Handbook* with resources and best practices.
- communicate the findings annually to the Collections Space Committee, co-chaired by SF and NCP, in addition to OSHEM and SLA.

**Unit Safety Coordinators'** responsibilities include collaborating with the Collections Steward(s) to:

## 6. RESPONSIBILITIES (continued)

- ensure that appropriate hazardous communication training and protocols are in place (such as properly labeling cabinets and/or workrooms and making Job Hazard Analyses accessible to workers, inspectors, and responders).
- facilitate compliance with all applicable laws and procedures specific to their Unit locations (e.g., different Units and buildings [including leased facilities] may have different requirements for hazardous waste accumulation and disposal). For leased facilities, communication must involve SF's representative to the lessor.
- provide adequate training to staff and affiliated persons to explain the difference between identification and management of Collections-Based Hazards versus the declaration and management of hazardous waste.

**Smithsonian Facilities and OSHM** are responsible for:

- training of Unit Safety Coordinators and Supervisors in safe work procedures and the use of proper personal protective equipment (PPE), including fulfilling requests regarding Job Hazard Analysis and recommending appropriate engineering controls for working with Collections-Based Hazards;
- conducting inspections and providing guidance in purchasing, installation, or building containment strategies for Collections-Based Hazards, for building and property protection, and for public safety;
- maintaining the subscription and access to the current edition of the NFPA Code (40 and 909) for stakeholders; and
- working with NCP to co-chair the Collections Space Committee and developing and maintaining systems for tracking data pertaining to nitrate volume, storage locations, conditions, and needs.

**Smithsonian Libraries and Archives'** responsibilities include:

- responding to Unit requests for identification and management of nitrate collections in an advisory capacity, in cooperation with Unit collections stewards, safety coordinators, and OSHM;
- maintenance and communication with Library of Congress' staff regarding the custodial agreement at the NAVCC, and arranging access for inventory, processing, condition checks, and withdrawals;

## 6. RESPONSIBILITIES (continued)

- custodial responsibility for Units' collections that are on deposit with SLA at the Library of Congress NAVCC or other permanent storage locations, as well as communicating with points of contact for each Unit;
- maintaining this directive as well as associated procedural guidance; and
- advising SF and NCP on the management of nitrate film via the Collections Space Committee.

**National Collections Program** responsibilities include:

- supporting Units with long-term strategies, priorities, policies, and plans to address Institution-wide collections needs, per SD 600, as applicable to management of cellulose nitrate film;
- working with SF to co-chair the Collections Space Committee and developing and maintaining systems for tracking data pertaining to nitrate volume, storage locations, and conditions and needs; and
- addressing challenges and identified deficiencies in collections management and improving the allocation of limited central collections care resources.

## 7. REFERENCES

Further guidance on Risk Management, Deaccession, Disposal, Health and Safety, Reformatting, Storage, and Transportation responsibilities is available in the following related documents:

National Collections Program [SD 600 — Collections Management](#)

SF-OSHEM SD 419 — Smithsonian Institution Safety and Health Program

- [Smithsonian Institution Safety Manual](#)
  - [Chapter 24 — Collections Based Hazards](#)
  - [Chapter 29 — Hazardous Waste Management](#)
  - [Chapter 36 — Fire Protection](#)
  - [Chapter 38 — Fire Prevention](#)

SLA SD 501 — Archives and Records of the Smithsonian Institution

- [Smithsonian-wide Records Disposition Schedule](#)

## 7. REFERENCES (continued)

National Fire Protection Association. 2022. “NFPA 40: Standard for the Storage and Handling of Cellulose Nitrate Film.” <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=40>.

———. National Fire Protection Association. 2021. “NFPA 909: Code for the Protection of Cultural Resource Properties — Museums, Libraries, and Places of Worship.” <https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=909>.

Electronic *Code of Federal Regulations* (e-CFR). CFR 40 (Protection of Environment) and CFR 49 (Transportation). <https://gov.ecfr.io/cgi-bin/ECFR>

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**SUPERSEDES:** SD 502 issued on April 7, 2009.

**INQUIRIES:** Smithsonian Libraries and Archives (SLA)

**RETENTION:** Indefinite. Subject to review for currency 36 months from date of issue.

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