

ARTICLE INFORMATION SHEET



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1. PRODUCT NAME AND COMPANY IDENTIFICATION

1.1 Product Name: KODAK Cellulose Nitrate Films (discontinued 1952)
EASTMAN KODAK COMPANY, Rochester, New York 14650

2. PRODUCT TYPE

Photographic films (cellulose nitrate film base)
Motion picture films
Other films

3. COMPOSITION

Weight % Component

80-95 Cellulose nitrate film base (11-12% nitrogen, 1.9-2.2 degree of substitution)
3-10 Photographic gelatin
1-8 Silver halides
< 1 Miscellaneous additives

4. HEALTH AND SAFETY

4.1 General: Cellulose nitrate films are highly flammable. Decomposition of the film also can present safety concerns during its storage, handling, transportation, and destruction. Do not handle the films unless you have expertise in determining the characteristics of nitrate films in various stages of decomposition. The deterioration of cellulose nitrate films can be divided into five stages:

Table with 2 columns: Stage, Description. Rows describe five stages of cellulose nitrate film deterioration from amber discoloration to shock sensitive powder.

Because of the potential fire hazards, the projection of cellulose nitrate films is not a common practice. Project cellulose nitrate films only in specially designed enclosures using projectors with air cooling systems. Refer to design specifications in the National Fire Protection Association (NFPA), Standard for the Storage and Handling of Cellulose Nitrate Film (NFPA 40), Chapter 6.

4.2 Health Aspects: Vapors from decomposing film may be irritating to the eyes, nose, and throat. Use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne concentrations below recommended exposure limits.

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Avoid contact with skin and eyes. Wear impervious gloves, such as rubber or neoprene, and eye protection when handling decomposing cellulose nitrate film.

4.3 Fire Hazard and Extinguishing Media:

Extinguishing Media: Water spray, carbon dioxide (CO2), dry chemical.

Special Fire-fighting procedures: Fire or excessive heat may produce hazardous decomposition products. Wear self-contained breathing apparatus and protective clothing. Risk of explosion by shock, friction, fire or other sources of ignition. Water mist may be used to cool closed containers. Fight fire from protected location.

Hazardous combustion products: carbon oxides, nitrogen oxides (NOx), sulfur oxides

Unusual Fire and Explosion Hazards: Highly flammable. Elevated temperatures accelerate film deterioration and may cause explosive decomposition. Stage 5 deteriorated film and powder residues are shock sensitive.

Prevention of Fire and Explosion: Keep away from heat. Keep away from sources of ignition. Use with adequate ventilation. Comply with all national, state, and local codes pertaining to the storage, handling, and disposal of cellulose nitrate films.

5. WASTE DISPOSAL

Place waste cellulose nitrate films in a steel or plastic drum that meets United States Department of Transport (USDOT) specifications, and cover the films with water (the water must be more than 25 percent by weight of the total weight of the films, including the weight of any film reels). Send to an authorized waste-treatment facility for incineration as soon as possible. All waste cellulose nitrate films are classified as hazardous wastes under RCRA.

Stages of Deterioration	RCRA Hazardous Waste Codes
1 + 2	D001 + D003
3, 4 + 5	D001, D003 + D011

6. TRANSPORT AND LABELLING REGULATIONS

6.1 General: See KODAK Environmental Services, *Safe Handling, Storage, and Destruction of Nitrate-Based Motion Picture Films*, H-182 (<http://www.kodak.com/global/en/corp/environment/kes/pubs/pdfs/H182.pdf>) for details on how to package and ship cellulose nitrate-based films.

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6.2 Shipment for Storage, Projection, Duplication or Repair:

US DOT:	UN Number:	UN 1324
	Proper Shipping Name:	Film, nitrocellulose base
	Hazard Class:	4.1
	Packing Group:	III
IMDG:	UN Number:	UN 1324
	Proper Shipping Name:	Film, nitrocellulose base
	Hazard Class:	4.1
	Packing Group:	III
IATA:	UN Number:	UN 1324
	Proper Shipping Name:	Film, nitrocellulose base
	Hazard Class:	4.1
	Packing Group:	III

6.3 Shipment As Waste:

US DOT:	UN Number:	UN 2555
	Proper Shipping Name:	Waste nitrocellulose with water, D001, D003*
	Hazard Class:	4.1
	Packing Group:	II
IMDG:	UN Number:	UN 2555
	Proper Shipping Name:	Waste nitrocellulose with water, D001, D003*
	Hazard Class:	4.1
	Packing Group:	II
IATA:	UN Number:	UN 2555
	Proper Shipping Name:	Waste nitrocellulose with water, D001, D003*
	Hazard Class:	4.1
	Packing Group:	II

*add D011 if film is in the last three stages of decomposition

For other transportation information, call the Kodak Worldwide Transportation Hazmat Hot Line: (585) 722-2400 between 8 a.m. and 5 p.m. (Eastern Standard Time), Monday through Friday.

7. HANDLING & STORAGE

7.1 Storage: Cellulose nitrate films can be preserved or duplicated until the third stage of deterioration. Cellulose nitrate films that have reached the third stage of deterioration, or that have no historical value, should be destroyed at an authorized facility.

Use approved film cabinets for short-term storage of up to 750 pounds of film (equal to 150 1000-foot rolls). Use vaults for long-term storage of any amount of film and storage of amounts greater than 750 pounds. All cabinets and vaults must allow for venting of decomposition gases. Refer to the design specifications found in NFPA40 and your local regulations for additional cellulose nitrate film storage requirements.

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Segregate cellulose nitrate films from other film storage areas. Store deteriorated cellulose nitrate films separate from other cellulose nitrate films.

Do not exceed 70° F inside the storage vault, and maintain the relative humidity below 50 percent. For long-term storage requirements, store the film at 35° F at 20- to 30-percent relative humidity.

Placement of Molecular Sieves inside the film storage container will promote extended keeping and preservation of cellulose nitrate films.

Exposure to temperatures in excess of 185° F accelerates decomposition of these films. Store cellulose nitrate films in painted or tin-plated metal cans with loose lids to avoid spontaneous combustion from the buildup of contained gases and heat. Do not tape the lids or use tight-fitting lids unless Molecular Sieves are used.

See KODAK Environmental Services, *Safe Handling, Storage, and Destruction of Nitrate-Based Motion Picture Films*, H-182 (<http://www.kodak.com/global/en/corp/environment/kes/pubs/pdfs/H182.pdf>) for further storage details.

- 7.2 Stability: Varies depending on condition of film. Film becomes unstable and sensitive to heat and shock.

Decomposition products: Nitrogen oxides (NO_x), sulfur oxides as deterioration progresses.

8. OTHER INFORMATION

References:

Charles Selwitz, *Cellulose Nitrate in Conservation*, 1988 (<http://www.getty.edu/conservation/resources/nitrate.pdf>)

KODAK Environmental Services, *Safe Handling, Storage, and Destruction of Nitrate-Based Motion Picture Films*, H-182 (<http://www.kodak.com/global/en/corp/environment/kes/pubs/pdfs/H182.pdf>)

National Fire Protection Association (NFPA), *Standard for the Storage and Handling of Cellulose Nitrate Film* (NFPA 40)

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