The MSDS format adheres to the standards and regulatory requirements of the United States and may not meet regulatory requirements in other countries.

"KAPTON" POLYIMIDE FILM, FLUOROCARBON-COATED, FILLED TYPES
KAP00003 Revised 12-MAR-1999

CHEMICAL PRODUCT/COMPANY IDENTIFICATION

Material Identification

Kapton is a registered trademark of DuPont.

Corporate MSDS Number : DU005416

Tradenames and Synonyms

"KAPTON" FNY
"KAPTON" XPY
"KAPTON" ZNY
"KAPTON" XZY
"KAPTON" FCR

Company Identification

MANUFACTURER/DISTRIBUTOR
DuPont
"Kapton"/"Teflon" Customer Service
P.O. Box 89
Circleville, OH 43113

PHONE NUMBERS
Product Information : 1-800-237-4357
Transport Emergency : 1-800-424-9300
Medical Emergency : 1-800-441-3637

COMPOSITION/INFORMATION ON INGREDIENTS

Components

Material	CAS Number	%
INERT POLYIMIDE FILM		100
Filled types contain:		
TITANIUM DIOXIDE	13463-67-7	0-6
or		
ALUMINA	1344-28-1	0-35
Coated or laminated with:		
POLYFLUOROCARBON	25067-11-2	
or		
POLYFLUOROCARBON	26655-00-5	
or		
POLYFLUOROCARBON	68258-85-5	
Exposure limits for the following may apply:		
DIMETHYL ACETAMIDE (residual in film)	127-19-5	<1

(COMPOSITION/INFORMATION ON INGREDIENTS - Continued)

POLYIMIDE POLYMER (as nuisance dust) 25038-81-7

Components (Remarks)

All reportable ingredients are listed in the TSCA Chemical Substance Inventory.

HAZARDS IDENTIFICATION

Potential Health Effects

Before using "Kapton" Polyimide Films, read the bulletin on safe handling and use.

POTENTIAL HEALTH EFFECTS

INHALATION: Not a probable route of exposure for film. Exposure to titanium dioxide or alumina encapsulated in the polymer is not likely.

For the polymer from which the film is made, DuPont recommends treating polymer dust as a nuisance particulate.

Vapors and fumes from heating "Kapton" fluorocarbon coatings above 275 deg C, or from smoking tobacco or cigarettes contaminated with fluorocarbon coatings may cause polymer fume fever, a temporary, flu-like illness of approximately 24 hours duration with fever, chills and sometimes cough.

SKIN CONTACT: No irritation is expected from handling film. Less than 1 ppm dimethyl acetamide was extracted from film by distilled water at 40 deg C for 4 hours.

EYE CONTACT: Not a probable route of exposure for film.

INGESTION: Not a probable route of exposure for film.

Though "Kapton" is not heated to degradation temperatures during normal use, heating "Kapton" fluorocarbon coatings to temperatures above 350 deg C can produce trace amounts of toxic and irritating gases/vapors of hydrogen fluoride, carbonyl fluoride, and possibly perfluoroisobutylene. These compounds can cause severe eye, skin and respiratory tract irritation. Inhalation can cause shortness of breath and other respiratory effects and symptoms may be delayed.

Carcinogenicity Information

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

FIRST AID MEASURES

First Aid

INHALATION

If exposed to fumes form overheating or combustion, move to fresh air. Consult a physician if symptoms persist.

SKIN CONTACT

Wash with soap and water after handling. If skin irritation develops, consult a physician.

EYE CONTACT

Flush eyes with plenty of water. Consult a physician if symptoms persist.

INGESTION

Not a probable route of exposure for films.

FIRE FIGHTING MEASURES

Flammable Properties

Not a fire or explosion hazard.

The flammability characteristic of polyimide film is reported as "self-extinguishing".

"Kapton" chars but does not burn in air. Coated types of "Kapton" will burn in an atmosphere of 95% oxygen when an ignition source is present. Combustion products include carbon monoxide, hydrogen fluoride, carbonyl fluoride and possibly perfluoroisobutylene.

The processing of "Kapton" polyimide films can cause the generation of static charge. Precautions for static charges should also be taken when removing plastic films used as protective packaging for "Kapton".

Extinguishing Media

Water, Foam, Dry Chemical, CO_2.

Fire Fighting Instructions

Wear self-contained breathing apparatus and clothing to protect from hydrogen fluoride fumes which react with water to form hydrofluoric acid. Wear Neoprene gloves when handling refuse from a fire involving fluorocarbon resins.

ACCIDENTAL RELEASE MEASURES

Safeguards (Personnel)

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Accidental Release Measures

Pick up to prevent slipping hazard.

HANDLING AND STORAGE

Handling (Personnel)

Wash thoroughly after handling.

Avoid contamination of tobacco products.

Storage

Store away from flammable materials.

EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

Safe handling of "Kapton" polyimide films at high temperatures (above 200 deg C) requires adequate ventilation If small quantities of "Kapton" are involved, normal air circulation may be all that is needed in case of overheating. Whether or not existing ventilation is adequate at higher temperatures will depend on the combined factors of film quantity, temperature and exposure time.

Personal Protective Equipment

Safety glasses are recommended as good industrial practice.

Respirators are not needed for normal use.

Special protective clothing is not needed for normal use. Gloves are recommended as good industrial practice.

 # Exposure Guidelines

Applicable Exposure Limits

TITANIUM DIOXIDE

PEL	(OSHA)	: 15 mg/m3, total dust, 8 Hr. TWA
TLV	(ACGIH)	: 10 mg/m3, total dust, 8 Hr. TWA, A4
AEL *	(DuPont)	: 10 mg/m3, total dust, 8 Hr. TWA 5 mg/m3, respirable dust, 8 Hr. TWA

ALUMINA

PEL	(OSHA)	: 15 mg/m3, total dust, 8 Hr. TWA 5 mg/m3, respirable dust, 8 Hr. TWA
TLV	(ACGIH)	: 10 mg/m3, total dust, 8 Hr. TWA, A4
AEL *	(DuPont)	: None Established

POLYFLUOROCARBON

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: None Established
AEL *	(DuPont)	: 10 mg/m3, 8 & 12 Hr. TWA, total dust 5 mg/m3, 8 & 12 Hr. TWA, respirable dust

DIMETHYL ACETAMIDE (residual in film)

PEL	(OSHA)	: 10 ppm, 35 mg/m3, 8 Hr. TWA, Skin
TLV	(ACGIH)	: 10 ppm, 36 mg/m3, 8 Hr. TWA, Skin, A4
AEL *	(DuPont)	: 10 ppm, 8 & 12 Hr. TWA, Skin

POLYIMIDE POLYMER (as nuisance dust)

PEL	(OSHA)	: None Established
TLV	(ACGIH)	: None Established
AEL *	(DuPont)	: 10 mg/m3, 8 Hr. TWA, total dust 5 mg/m3, 8 Hr. TWA, respirable dust

*** AEL is DuPont’s Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.**

PHYSICAL AND CHEMICAL PROPERTIES

Physical Data

Melting Point	: None
% Volatiles	: 1% max
Solubility in Water	: Insoluble
Odor	: No odor
Form	: Opaque film
Color	: Yellow
Specific Gravity	: >1.4

STABILITY AND REACTIVITY

Chemical Stability

Stable at normal temperatures and storage conditions.

Fluorocarbon coatings react with finely divided metal powders and fluorine and related compounds (e.g. chlorine trifluoride).

Decomposition

"Kapton" fluorocarbon coatings may degrade at temperatures >350 deg C producing hydrogen fluoride and carbonyl fluorides.

ECOLOGICAL INFORMATION

Ecotoxicological Information

Aquatic Toxicity

Insoluble.

DISPOSAL CONSIDERATIONS

Waste Disposal

Landfill or incinerate in compliance with federal, state, and local regulations. Incinerator should be equipped with scrubber to remove acidic hydrogen fluoride from off-gases.

TRANSPORTATION INFORMATION

Shipping Information

DOT
Proper Shipping Name : NOT APPLICABLE
Hazard Class : NOT REGULATED

REGULATORY INFORMATION

State Regulations (U.S.)

STATE RIGHT-TO-KNOW

No substances on the state hazardous substances list, for the states indicated below, are used in the manufacture of products on this Material Safety Data Sheet, with the exceptions indicated.

(REGULATORY INFORMATION - Continued)

SUBSTANCES ON THE PENNSYLVANIA HAZARDOUS SUBSTANCES LIST PRESENT AT A CONCENTRATION OF 1% OR MORE (0.01% FOR SPECIAL HAZARDOUS SUBSTANCES)- Dimethyl acetamide (1% maximum); Some types contain titanium dioxide (6% maximum); Some types contain alumina (35% maximum).

WARNING: SUBSTANCES KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER, BIRTH DEFECTS OR OTHER REPRODUCTIVE HARM- None known.

SUBSTANCES ON THE NEW JERSEY WORKPLACE HAZARDOUS SUBSTANCE LIST PRESENT AT A CONCENTRATION OF 1% OR MORE (0.1% FOR SUBSTANCES IDENTIFIED AS CARCINOGENS, MUTAGENS OR TERATOGENS)- Dimethyl acetamide (1% maximum); Some types contain titanium dioxide (6% maximum); Some types contain alumina (35% maximum).

OTHER INFORMATION

Additional Information

MEDICAL USE: CAUTION: Do not use in medical applications involving permanent implantation in the human body. For other medical applications see DuPont CAUTION Bulletin No. H-50102.

The data in this Material Safety Data Sheet relates only to the specific material designated herein and does not relate to use in combination with any other material or in any process.

Responsibility for MSDS : "Kapton" Customer Service
Address : DuPont
Circleville, OH
Telephone : 800-237-4357

# Indicates updated section.

This information is based upon technical information believed to be reliable. It is subject to revision as additional knowledge and experience is gained.

End of MSDS