

MATERIAL SAFETY DATA SHEET

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Product: Unidym™ Transparent Conductive Film (PET)

Product Use: This Material Safety Data Sheet (MSDS) is provided as a courtesy in response to a customer request. This product is classified as an article, and, therefore, not regulated under the OSHA Hazard Communication Standard (29 CFR 1910.1200), and is excluded from these requirements. A MSDS is not required for this product. When this product is used as recommended or under ordinary conditions, it should not present a health and safety hazard. However, use or processing of the product not in accordance with the product's recommendations or not under ordinary conditions may affect the performance of the product and may present potential health and safety hazards.

Section 1 Product Identification

Chemical Name: Coated polyester film

Formula: Coated polyethylene terephthalate film

Chemical Family: Coated polyester film with a carbon nanotube conductive inner coating and polymer top coating

Synonyms: Coated PET film

CAS Number: 25038-59-9 (Polyethylene terephthalate) for base film

Section 2 Composition and Information on Ingredients

Proprietary coated polyester film comprising a transparent oriented polyester base film with an inner carbon nanotube conductive coating and an outer polymeric top coating.

Section 3 Hazards Identification

Emergency Overview

Appearance: Solid transparent or translucent film, generally 2-mil to 10-mil thick

Odor: Odorless

No known health hazards at ambient temperature.

Read the entire MSDS for a more thorough evaluation of the hazards

Potential Health Effects

High temperature operations using polyester films can produce fumes or vapors of decomposition products of polyethylene terephthalate polymer. The type and quantity of the fumes or vapors will vary based on temperature, time and other variables. These fumes or vapors may cause eye, nose, throat or respiratory irritation, or other effects such as headache.

Molten polymer can cause severe thermal burns.

Exposure to fillers in the polyester film or the inner conductive carbon nanotube layer is not likely as these are either encapsulated in the polymer film itself or encased between polymer film layers.

Section 4 First Aid Measures

Inhalation: No specific intervention is indicated as the product is not likely to be hazardous by inhalation.

However, if exposed to fumes from overheating or combustion, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician if necessary.

Skin Contact: The film is not likely to be hazardous by skin contact but cleansing the skin after use is advisable.

If molten material gets on the skin, cool rapidly with cold water. Do not attempt to remove material from skin. Obtain medical treatment for thermal burns.

Eye Contact: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.

Ingestion: Ingestion is not an expected route of exposure during normal use of the product. If ingested, call a physician immediately.

Notes to Physicians

Prolonged eye irritation may occur from pieces of debris sticking to the eyeball or eyelids.

Section 5 Fire Fighting Measures

Flammable Properties: Film can be combusted only by remaining in contact with flame. If flame source is stationary, film will shrink away and self-extinguish. Film remaining in contact with flame can continue to burn slowly, dropping flaming liquid which can spread the fire.

Hazardous gases/vapors produced in fire are carbon dioxide, carbon monoxide, organic acids, aldehydes, alcohols.

During processing, film may pick up a strong static charge. Avoid discharge into dust or solvent laden air as a flash fire or explosion may result.

Extinguishing Media: Water, foam, dry chemical, carbon dioxide. Water is the best extinguishing medium. Carbon dioxide and dry chemical are not generally recommended because their lack of cooling capacity and may permit re-ignition.

Fire Fighting: Keep personnel removed and upwind of fire. Wear self-contained breathing apparatus. Wear full protective equipment.

Section 6 Accidental Release Measures

Safeguards: Review FIRE FIGHTING MEASURES and HANDLING Sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Spill Clean Up: Sweep up to avoid a slipping hazard. Place in proper container for disposal or recovery.

Section 7 Handling and Storage

Handling: Avoid skin contact with sharp film edges.

If the film is in a roll, roll of film may telescope. Use caution when handling.

Film may pick up static charge.

Storage: Store away from heat and sources of ignition. Do not store in direct sunlight. Avoid prolonged storage in high or low temperatures. Recommended storage temperatures are 20 °F (-7 °C) to 100 °F (38 °C).

Section 8 Exposure Controls and Personal Protection

Engineering Controls: General exhaust is acceptable except where overheating can occur during processing. High temperature operations may require use of local exhaust ventilation to keep employee exposure below recommended limits.

Movement of film over metal or rollers will produce a surface static charge on the film. Consider processing design and procedures that will reduce or dissipate this discharge, and eliminate the possibility of unwanted electrical discharge to people, equipment and materials.

Personal Protective Equipment:

Eye/Face Protection: Wear safety glasses.

Respiratory Protection: Respirators are not needed for normal use.

Where airborne concentrations are expected to exceed exposure limits, a NIOSH approved respirator should be selected based on the form and concentration of the contaminant in the air and in accordance with OSHA Respiratory Protection Standard CFR 1910.134.

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

If there is potential for contact with hot/molten material, wear heat resistant impervious clothing and footwear.

Exposure Guidelines:

Applicable Exposure Limits:

Polyethylene Terephthalate

PEL (OSHA): None Established

TLV (ACGIH): None Established

Section 9 Physical and Chemical Properties

Form: Transparent or translucent film

Color: Colorless to slightly grey

Odor: Negligible

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| Melting Point: | ~ 260 °C (~500 °F) (PET base film – Coatings may melt at lower temperatures) This product does not exhibit a sharp melting point, but softens gradually over a wide temperature range. |
| Solubility in Water: | Insoluble |
| Specific Gravity: | 1.2 – 1.4 |
| Vapor Pressure (mm Hg): | Negligible @ 20 °C (68 °F) |

Section 10 Stability and Reactivity

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| Stability: | Stable at normal temperatures and storage conditions. |
| Incompatibility with Other Materials: | Strong acids and bases may hydrolyze the film. Avoid contact with strong oxidizing agents. |
| Decomposition: | Combustion can produce carbon oxides and hydrocarbon oxidation products, including organic acids, aldehydes, alcohols, ketones and acrolein. |
| Polymerization: | Polymerization will not occur. |

Section 11 Toxicological Information

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| Toxicological Information: | No information is available for this product. Polyethylene Terephthalate (Base film) Oral ALD: > 10,000 mg/kg in rats Not a skin irritant, but is a mild eye irritant. |
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Section 12 Environmental Information

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| Ecological Information: | No information is available for this product. Aquatic toxicity is expected to be low based on insolubility with water. |
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Section 13 Disposal Considerations

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| Disposal: | Dispose of this material in accordance with local, state, and federal regulations. Preferred options for disposal are incineration with energy recovery and landfill. |
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Section 14 Transportation Information

Shipping Information:

DOT Proper Shipping Name: Not regulated.

Section 15 Regulatory Information

This film contains at least one component not listed on the US Toxic Substances Control Act (TSCA).

Section 16 Other Information

Caution: Not for medical applications.

Disclaimer: Unidym, Inc. provides the information contained herein in good faith and makes no representation as to its comprehensiveness or accuracy. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Individuals receiving the information must exercise their independent judgment in determining its appropriateness for a particular purpose. Unidym, Inc. makes no representations or warranties, either express or implied, regarding the suitability of the material for any purpose or the accuracy of the information contained within this document. Accordingly, Unidym, Inc. will not be responsible for damages resulting from use of or reliance upon this information.

Preparation Date: September 19, 2007

Revision Dates: December 3, 2007, May 1, 2008

Current Revision: August 29, 2009