



ThinFilm OPX - Material Safety Data Sheet

Revision Date 6/9/14

This MSDS adheres to the standards and regulatory requirements of the United States and may meet the regulatory requirements in other countries.

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT: ThinFilm OPX

MANUFACTURER: Thin Film Partners, LLC

ADDRESS: Thin Film Partners LLC, 2976 E. State Street #120-32, Eagle, Idaho, 83616

PHONE: (206) 257-9787

SECTION 2: HAZARDS IDENTIFICATION

OSHA HAZARDS

Not classified as hazardous according to OSHA Hazard Communication, 29 CFR 1910.1200.

Signal words: Not Applicable

Symbols: Not Applicable

Pictograms: Not Applicable

Hazards not otherwise classified: None

SECTION 3: COMPOSITION OF INGREDIENTS

INGREDIENT	Wt%	C.A.S. NUMBER
Ethyl Nonafluoroisobutyl Ether	20-80	163702-06-5
Ethyl Nonafluorobutyl Ether	20-80	163702-05-4
Perfluoropolyether Methoxysilane	0.1-20	211931-77-0

SECTION 4: FIRST AID MEASURES

FIRST AID PROCEDURES

The following first aid recommendations are based on an assumption that appropriate personal and industrial hygiene practices are followed.

Eye Contact: Flush eyes with large amounts of water. If signs/symptoms persist, get medical attention.

Skin Contact: Wash affected area with soap and water. If signs/symptoms develop, get medical attention.

Inhalation: If signs/symptoms develop, remove person to fresh air. If signs/symptoms persist, get medical attention.

If Swallowed: If signs/symptoms develop, get medical attention. No need for first aid is anticipated.



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SECTION 5: FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES: Non-Flammable

EXTINGUISHING MEDIA

In case of fire: use a fire fighting agent suitable for ordinary combustible materials such as water or foam to extinguish.

PROTECTION OF FIRE FIGHTERS.

Fire Fighting Procedures: Exposure to extreme heat can give rise to thermal decomposition. Wear full protective equipment and a self-contained breathing apparatus.

Fire and Explosion Hazards: No unusual fire or explosion hazards are anticipated. Avoid breathing the products and substances that may result from the thermal decomposition of the product or the other substances in the fire zone. Decomposition products include carbon monoxide, carbon dioxide and hydrogen fluoride. Keep containers cool with water spray when exposed to fire to avoid rupture.

Special protective action for fire fighters: When fire-fighting conditions are severe wear and thermal decomposition of product is possible, wear full protective clothing, including helmet, self-contained positive pressure breathing apparatus, bunker coat and pants, bands around arms, waist and legs, face mask and protective covering for exposed areas of the head.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Accidental Release Measures: Observe precautions from other sections.

PERSONAL PRECAUTIONS.

Evacuate unprotected and untrained personnel from hazard area. The spill should be cleaned up by qualified personnel. Ventilate the area with fresh air.

SPILL CLEAN-UP.

Contain spill. Working from around the edges of the spill inward, cover with bentonite, vermiculite, or commercially available inorganic absorbent material. Clean up residue with an appropriate organic solvent.

ENVIRONMENTAL PRECAUTIONS.

Place in a metal container approved for transportation by appropriate authorities. Seal the container. Dispose of collected material as soon as possible.

SECTION 7: HANDLING AND STORAGE

HANDLING.

For industrial or professional use only. Use with adequate ventilation. Product evolves flammable methyl alcohol when exposed to water or humid air. Provide ventilation during use to control exposure or use air-supplied or self-contained breathing apparatus. Avoid contact with eyes. Contents may be under pressure, open carefully. Store work clothes separately from other clothing, food and tobacco products. No smoking: Smoking while using this product can result in the formation of the hazardous decomposition products. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below Occupational Exposure Limits. If ventilation is not adequate, use respiratory protection equipment. Avoid continuous exposure of the material to heat above 200°C.

STORAGE.

Keep container tightly closed. Keep container in well-ventilated area. Store away from heat. Store away from strong bases or alkali metals.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS.



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Use with appropriate local exhaust ventilation. Provide local exhaust ventilation at transfer points. Provide appropriate local exhaust when product is heated.

PERSONAL PROTECTIVE EQUIPMENT.

Eye/Face Protection

Avoid eye contact. Use Safety Glasses with side shields.

Skin Protection

Avoid skin contact with hot material. Wear polymer laminate gloves when handling this material to prevent thermal burns.

Respiratory Protection

CAS # 211931-77-0, PFPEmethoxysilane, produces methyl alcohol when contacted with water or humid air. Use ventilation during use or provide air-supplied self-contained personnel respiratory protection. If thermal degradation products are expected, use full face supplied air respirator.

Prevention of Swallowing

Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water.

EXPOSURE GUIDELINES.

Methyl Alcohol TWA 200 ppm

Ethyl Nonafluorobutyl Ether TWA 200 ppm

Ethyl Nonafluoroisobutyl Ether TWA 200 ppm

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Specific Physical Form: liquid

Odor, Color, Grade: clear, colorless, with faint odor.

General Physical Form: Liquid

Autoignition temperature 405 °C [ASTM E659-94]

Flash Point *Not Applicable*

Flammable Limits - LEL 210 g/m³ [ASTM E681-94]

Flammable Limits - UEL 1070 g/m³ [ASTM E681-94]

Boiling point 76 °C @ 760 mmHg

Density 1.4-1.5 g/ml

Vapor Density: 9.1

Vapor Pressure: 109 mmHg @ 25 °C

Specific Gravity: 1.4-1.5

pH *Not Applicable*

Melting point: -138 °C

Solubility in Water : insoluble

Viscosity: 0.61

Evaporation rate: 33 [BUOAC=1]

Volatile Organic Compounds: Exempt

Percent volatile: 100 %

VOC Less H₂O & Exempt Solvents: Exempt

SECTION 10: STABILITY AND REACTIVITY

Reactivity: This material is considered to be non-reactive under normal use conditions.

Stability: Stable.



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Materials and Conditions to Avoid: Strong bases and alkali metals. Water, moisture of humid air can cause hazardous vapors, methanol, to form as described in Section 8.

Hazardous Polymerization: Hazardous polymerization will not occur.

Hazardous Thermal Decomposition Products: Hydrogen Fluoride, Perfluoroisobutylene (PFIB) at elevated temperatures.

Hazardous Decomposition: Hydrogen fluoride has an ACGIH Threshold Limit Value of 3 parts per million (as fluoride) as a Ceiling Limit and an OSHA PEL of 3 ppm of fluoride as an eight hour Time-Weighted Average and 6 ppm of fluoride as a Short Term Exposure Limit. The odor threshold for HF is 0.04 ppm, providing good warning properties for exposure. Decomposition of this product at temperatures above 350 degrees C can form perfluoroisobutylene (PFIB), but PFIB will only accumulate with continuous exposure to excessive heat in a sealed vessel. The formation rate for PFIB is about 1000 times less than the rate for primary thermal decomposition products such as HF. During normal use conditions, no health hazard is associated with the use of this material due to PFIB exposure.

SECTION 11: TOXICOLOGICAL INFORMATION

Information below may not be consistent with the material classification in Section 2 if specific ingredient classifications are mandated by a competent authority. In addition, toxicological data on ingredients may not be reflected in the material classification and/or the signs and symptoms of exposure, because an ingredient may be present below the threshold for labeling, an ingredient may not be available for exposure, or the data may not be relevant to the material as a whole.

Signs and Symptoms of Exposure

Based on test data and/or information on the components, CAS # 163702-06-05 and 163702-05-04, this material may produce the following health effects:

Inhalation:

Vapors from heated material may cause irritation of the respiratory system. Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Skin Contact:

Contact with the skin during product use is not expected to result in significant irritation.

Eye Contact:

Vapors from heated material may cause eye irritation. Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Ingestion:

May be harmful if swallowed.

Toxicological Data

If a component is disclosed in section 3 but does not appear in a table below, either no data are available for that endpoint or the data are not sufficient for classification.

Acute Toxicity

CAS #	Route	Species	Value
163702-06-5	Inhalation (vapor 4 hrs.)	Rat	LC50>989 mg/l
163702-06-5	Ingestion	Rat	LD50>2000 mg/kg
163702-05-4	Inhalation (vapor 4 hrs.)	Rat	LC50>989 mg/l



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163702-05-4	Ingestion	Rat	LD50.2000 mg/kg
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Skin Corrosion/Irritation

CAS #	Species	Value
163702-06-5	Rabbit	No significant irritation
163702-05-4	Rabbit	No significant irritation

Serious Eye Damage/Irritation

CAS #	Species	Value
163702-06-5	Rabbit	No significant irritation
163702-05-4	Rabbit	No significant irritation

Skin Sensitization

CAS #	Species	Value
163702-06-5	Guinea Pig	Not sensitizing
163702-05-4	Guinea Pig	Not sensitizing

Reproductive and Development Effects

CAS #	Route	Value	Species	Test Results	Exposure Duration
1637-06-05	Not toxic female reproduction Ingestion	Not toxic female reproduction	Rat	NOAEL 1000mg/kg/d	28 days
1637-06-05	Inhalation	Not toxic female reproduction	Rat	NOAEL 260.1mg/l	During gestation
1637-06-05	Ingestion	Not toxic male reproduction	Rat	NOAEL 1000mg/kg/d	28 days
1637-06-05	Inhalation	Not toxic	Rat	NOAEL 263.4mg/l	4 weeks
1637-06-05	Inhalation	Some positive development data exist, but not sufficient for classification	Rat	NOAEL 260 mg/l	During gestation
1637-05-04	Ingestion	Not toxic female reproduction	Rat	NOAEL 1000 mg/kg/d	28 days
1637-05-04	Inhalation	Not toxic	Rat	NOAEL 260.1	During



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		female reproduction		mg/l	gestation
1637-05-04	Ingestion	Not toxic male reproduction	Rat	NOAEL 1000 mg/kg/d	28 days
1637-05-04	Inhalation	Not toxic male reproduction	Rat	NOAEL 263.4 mg/l	4 weeks
1637-05-04	Inhalation	Some positive developmental data exists but the data are not sufficient for classification	Rat	NOAEL 260 mg/l	During gestation

Target Organ.

For CAS # 1637-05-04 and 1637-06-05, both ingestion and inhalation some positive data exist for cardiac sensitization, liver, kidney bladder and respiratory system, but the data are insufficient for classification.

Toxicity Data is not available for CAS # 211931-77-0.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION: CAS 163702-05-04 and 163702-06-05.

Test Organism Test Type Result

Fathead Minnow, Pimephales promelas 96 hours Lethal Concentration 50% >2.75 mg/l

Green algae, Selenastrum capricornutum 96 hours Inhibitory Concentration 50% >2.32 mg/l

Water flea, Daphnia magna 48 hours Effect Concentration 50% >2.55 mg/l

Ecological data is not available for CAS # 211931-77-0

SECTION 13: DISPOSAL CONSIDERATIONS

Dispose of contents in accordance with the local/regional/national/international regulations.

Waste Disposal Method: Reclaim if feasible. As a disposal alternative, incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF.

EPA Hazardous Waste Number: Not regulated.

SECTION 14: TRANSPORT INFORMATION

Not regulated by DOT.

Not subject to IMDG code.

Not subject to IATA regulations.



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SECTION 15: REGULATORY INFORMATION

302 Extremely Hazardous Substances: None

304 CERCLA (40 CFR 302): None

311/312 Hazard Categories:

Fire Hazard - No

Pressure Hazard - No

Reactivity Hazard - No

Immediate Hazard - Yes

Delayed Hazard – No

313 Toxic Chemicals: None

CHEMICAL INVENTORIES.

The components of this product are in compliance with the chemical notification requirements of TSCA. All applicable chemical ingredients in this material are listed on the European Inventory of Existing Chemical Substances (EINECS), or are exempt polymers whose monomers are listed on EINECS. Contact Thin Film Partners, LLC for more information.

TSCA Status. Low Volume Exemption (LVE). This product contains a component that is not TSCA listed. Permission to import or manufacture the component is limited to the LVE submitter. Thin Film Partners, LLC is required to notify customers of any LVE restrictions on activities regulated by TSCA.

TSCA clearance for manufacture, import, processing, or use of this product is based on a low volume exemption from the inventory listing requirements of TSCA (40 CFR 723.50© (1)). For activities regulated by TSCA, the following conditions apply: The product may only be used as an antifouling coating. The low volume exemption specifies that the processor and industrial users of this product will conduct both preparation and coating application steps with local ventilation and will utilize PPE including gloves and will incinerate all wastes.

If Thin Film Partners, LLC learns that a customer is processing or using this product in violation of the use restrictions or without utilizing the exposure or release controls, Thin Film Partners, LLC must cease distribution to the customer and report the situation to the EPA.

Contents of this SDS comply with OSHA Hazard Communication Standard 29 CFR 1910.1200.

SECTION 16: OTHER INFORMATION

NFPA HAZARD CLASSIFICATION

Health: 3 Flammability: 1 Instability: 0 Special Hazards: None

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a



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material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

HMIS HAZARD CLASSIFICATION

Health: 1 Flammability: 1 Physical Hazard: 0 Personal Protection: X - See PPE section.

Hazardous Material Identification System (HMIS® III) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use and are not intended for use in emergency situations. HMIS® III ratings are to be used with a fully implemented HMIS® III program. HMIS® is a registered mark of the American Coatings Association (ACA).

DISCLAIMER: The information in this Safety Data Sheet (SDS) is believed to be correct as of the date issued. Judgments as to the suitability of information herein for the purchaser's purposes are necessarily the purchaser's responsibility. Although reasonable care has been taken in the preparation of such information, Thin Film Partners, extends no warranties, makes no representations, and assumes no responsibility as to the accuracy or suitability of such information for application to the purchaser's intended purpose or for consequences of its use.