SAFETY DATA SHEET

1. Identification

Covestro LLC
1 Covestro Circle
Pittsburgh, PA 15205
USA

TRANSPORTATION EMERGENCY

CALL CHEMTREC:	(800) 424-9300
INTERNATIONAL:	(703) 527-3887

NON-TRANSPORTATION

Emergency Phone:	Call Chemtrec
Information Phone:	(844) 646-0545

Product Name:	MAKROFOL ID234 6-4 010207
Material Number:	60229447
Chemical Family:	Polycarbonate film
Use:	Film for the production of plastic articles

2. Hazards Identification

GHS Classification
This product is not hazardous in the form in which it is shipped by the manufacturer.

GHS Label Elements

Signal word:	Warning
Hazard statements:	If fine particles are generated during further processing, handling or by other means, product may form combustible dust concentrations in air.

3. Composition/Information on Ingredients

Hazardous Components

The following potentially hazardous ingredient(s) are used to formulate this product. As supplied, the ingredient(s) are bound in the polymer matrix. Because they are bound in the matrix, they are not expected to create any unusual hazards when handled and processed according to good manufacturing and industrial hygiene practices and the guidelines provided in this SDS.

Concentration	Components	CAS-No.
5 - 10%	Titanium dioxide (Rutile)	13463-67-7

The specific chemical identity and/or exact percentage of component(s) have been withheld as a trade

secret.

4. First Aid Measures

Most Important Symptom(s)/Effect(s)

Acute: Contact with heated material can cause thermal burns., Vapors released from thermal decomposition may cause irritation with symptoms of burning and tearing., Gases and fumes evolved during the thermal processing or decomposition of this material may irritate the eyes, skin or respiratory tract.

Eye Contact
In case of contact, flush eyes with plenty of lukewarm water.

Skin Contact
Cool melted product on skin with plenty of water. Do not remove solidified product. Get medical attention if thermal burn occurs.

Inhalation
Move to fresh air in case of accidental inhalation of dust or fumes from overheating or combustion.

Ingestion
Get medical attention.

5. Firefighting Measures

Suitable Extinguishing Media: Water fog, Dry chemical, Carbon dioxide (CO2), Foam

Unsuitable Extinguishing Media: High Pressure Water Streams

Fire Fighting Procedure
Firefighters should be equipped with self-contained breathing apparatus to protect against potentially toxic and irritating fumes.

Hazardous Decomposition Products
By Fire and Thermal Decomposition: Phenol Carbon oxides, Hazardous decomposition products due to incomplete combustion

Unusual Fire/Explosion Hazards
Toxic and irritating gases/fumes may be given off during burning or thermal decomposition. Avoid generating dust: fine dust dispersed in air in sufficient concentrations and in the presence of an ignition source is a potential dust explosion hazard.

6. Accidental Release Measures

Spill and Leak Procedures
If molten, allow material to cool and place into an appropriate marked container for disposal. Sweep up and shovel into suitable containers for disposal. Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture as they are released into the atmosphere in sufficient concentrations. Avoid dispersal of dust in the air (e.g., cleaning dust from surfaces with compressed air).

7. Handling and Storage

Handling/Storage Precautions
Handle in accordance with good industrial hygiene and safety practices. Wash thoroughly after handling. Minimize dust generation and accumulation. Routine housekeeping should be instituted to ensure that dust does not accumulate on surfaces. Solid particulate can generate electrical charging during operations such as unloading from containers and pneumatic transfer. Provide adequate precautions, such as electrical grounding and bonding, where conductive equipment is involved.

Storage Period:
None.

Storage Temperature
Maximum: 49 °C (120.2 °F)

Storage Conditions
Containers should be tightly closed to prevent contamination with foreign materials and moisture.

Substances to Avoid
None known.

8. Exposure Controls/Personal Protection

The recommendations in this section should not be a substitute for a personal protective equipment (PPE) assessment performed by the employer as required by 29 CFR 1910 Subpart I.

Exposure Limits

Titanium dioxide (Rutile) (13463-67-7**)**

US. ACGIH Threshold Limit Values, as amended
Time weighted average 10 mg/m3

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000), as amended
Permissible exposure limit 15 mg/m3 (Total dust.)

US. ACGIH Threshold Limit Values, as amended
Hazard Designation: Group A4 Not classifiable as a human carcinogen.

Any component which is listed in section 3 and is not listed in this section does not have a known ACGIH TLV, OSHA PEL or supplier recommended occupational exposure limit.

Industrial Hygiene/Ventilation Measures
General dilution and local exhaust as necessary to control airborne vapors, mists, dusts and thermal decomposition products below appropriate airborne concentration standards/guidelines, especially during cutting, grinding and high heat operations.

Respiratory Protection
Although no exposure limit has been established for this product, the OSHA PEL for Particulates Not Otherwise Regulated (PNOR) of 15 mg/m3 - total dust, 5 mg/m3 - respirable fraction is recommended. In addition, the ACGIH recommends 3 mg/m3 - respirable particles and 10 mg/m3 - inhalable particles for Particles (insoluble or poorly soluble) Not Otherwise Specified (PNOS).

Hand Protection

Ensure gloves remain in good condition during use and replace if any deterioration is observed.
Wear heat resistant gloves when handling molten material.

Eye Protection
Safety glasses with side-shields

Skin Protection
No special skin protection requirements during normal handling and use.

Additional Protective Measures
Employees should wash their hands and face before eating, drinking, or using tobacco products. Educate and train employees in the safe use and handling of this product. Purgings should be collected as small flat thin shapes or thin strands to allow for rapid cooling.

9. Physical and Chemical Properties

Physical state:	solid
Appearance:	film
Color:	White, Opaque
Odor:	Odorless
Odor Threshold:	No Data Available
pH:	not applicable
Melting Point:	220 - 230 °C (428 - 446 °F)
Boiling Point:	No Data Available
Flash Point:	No Data Available
Evaporation Rate:	No Data Available
Flammability:	No Data Available
Lower explosion limit:	No Data Available
Upper Explosion Limit:	No Data Available
Vapor Pressure:	No Data Available
Vapor Density:	No Data Available
Density:	ca. 1.29 g/cm³ @ 20 °C (68 °F) (DIN 53479)
Relative Vapor Density:	No Data Available
Specific Gravity:	No Data Available
Solubility in Water:	insoluble
Partition Coefficient: n-octanol/water:	No Data Available
Auto-ignition Temperature:	> 450 °C (842 °F)
Decomposition Temperature:	>= 380 °C (716 °F) Fumes evolved by overheating during improperly processing or by burning may be injurious to health.
Unblocking Temperature:	No Data Available
Softening point:	150 - 160 °C (302 - 320 °F)
Dynamic Viscosity:	not applicable
Kinematic Viscosity:	No Data Available
Bulk Density:	No Data Available
Molecular Weight:	No Data Available
Particle characteristics:	No Data Available

10. Stability and Reactivity

Hazardous Reactions

Hazardous polymerisation does not occur.

Stability
Stable

Materials to Avoid
None known.

Conditions to Avoid
Generation of dust clouds.

Hazardous Decomposition Products
By Fire and Thermal Decomposition: Phenol; Carbon oxides, Hazardous decomposition products due to incomplete combustion

11. Toxicological Information

Likely Routes of Exposure: Inhalation
Skin Contact
Eye Contact

Health Effects and Symptoms

Acute: Contact with heated material can cause thermal burns., Vapors released from thermal decomposition may cause irritation with symptoms of burning and tearing., Gases and fumes evolved during the thermal processing or decomposition of this material may irritate the eyes, skin or respiratory tract.

Toxicity Data for: MAKROFOL ID234 6-4 010207

No data available for this product.

Toxicity Data for: Titanium dioxide (Rutile)

Acute Oral Toxicity
LD50: > 5,000 mg/kg (rat, female) (OECD Test Guideline 425)

Acute Inhalation Toxicity
LC50: > 6.82 mg/l, 4 h, dust/mist (rat, male)

Acute Dermal Toxicity
LD50: > 10,000 mg/kg (rabbit)

Skin Irritation
rabbit, OECD Test Guideline 404, Exposure Time: 24 h, Non-irritating

rabbit, Exposure Time: 24 h, Non-irritating

Eye Irritation
rabbit, OECD Test Guideline 405, Non-irritating

rabbit, Draize, Non-irritating

Sensitization
dermal: non-sensitizer (Guinea pig, Maximization Test)

dermal: non-sensitizer (Human, Patch Test)

Skin sensitization (local lymph node assay (LLNA)):: negative (Mouse, OECD Test Guideline 429)

dermal: non-sensitizer (Guinea pig, Maximization Test)

dermal: non-sensitizer (Human, Patch Test)

Repeated Dose Toxicity
28 Days, inhalation: NOAEL: 35 mg/m3, (Rat)

29 days, Oral: NOAEL: 24,000 mg/kg, (rat, male, daily)

up to 2 years, inhalation: NOAEL: 0.01 mg/l, (Rat, male/female, 6 hrs/day 5 days/week)

28 Days, inhalation: NOAEL: 35 mg/m3, (Rat)

Mutagenicity
Genetic Toxicity in Vitro:
Ames: negative (Salmonella typhimurium, Metabolic Activation: with/without)
Mammalian cell - gene mutation assay: negative (Mouse lymphoma cells (L5178Y/TK), Metabolic Activation: with/without)
Chromosome aberration test: negative (Chinese hamster ovary (CHO) cells, Metabolic Activation: with/without)
Ames: negative (Salmonella typhimurium, Metabolic Activation: with/without)

Genetic Toxicity in Vivo:
Drosophila SLRL test: negative (Drosophila melanogaster)
negative

Cytogenetic assay: negative (Mouse, male, intraperitoneal)
negative

Drosophila SLRL test: negative (Drosophila melanogaster)
negative

Carcinogenicity
Rat, Male/Female, inhalationAccording to IARC, several rat inhalation and intratracheal installation studies using titanium dioxide have shown increases in benign and malignant lung tumors. Reviewed human exposure data did not suggest an association between occupational exposure to titanium dioxide and risk for cancer. Additionally, the IARC working group determined that, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium dioxide is bound to other material, such as in paints."Rat, Male/Female, inhalationAccording to IARC, several rat inhalation and intratracheal installation studies using titanium dioxide have shown increases in benign and malignant lung tumors. Reviewed human exposure data did not suggest an association between occupational exposure to titanium dioxide and risk for cancer. Additionally, the IARC working group determined that, "No significant exposure to titanium dioxide is thought to occur during the use of products in which titanium dioxide is bound to other material, such as in paints."

Other Relevant Toxicity Information
May cause irritation of respiratory tract.

Carcinogenicity:
Titanium dioxide (Rutile) **IARC** - Overall evaluation: 2B Possibly carcinogenic to humans.

12. Ecological Information

Ecological Data for: MAKROFOL ID234 6-4 010207

No data available for this product.

Ecological Data for Titanium dioxide (Rutile)
Acute and Prolonged Toxicity to Fish
LC0: > 1,000 mg/l (Golden orfe (Leuciscus idus), 48 h)

Acute Toxicity to Aquatic Invertebrates
EC0: > 3 mg/l (Water flea (Daphnia magna))

Toxicity to Microorganisms
EC0: > 10,000 mg/l, (Pseudomonas fluorescens, 24 h)

13. Disposal Considerations

Waste Disposal Method
Waste disposal should be in accordance with existing federal, state and local environmental control laws.

14. Transportation Information

Land transport (DOT)
Non-Regulated

Sea transport (IMDG)
Non-Regulated

Air transport (ICAO/IATA)
Non-Regulated

15. Regulatory Information

United States Federal Regulations
US. Toxic Substances Control Act: Excluded: Article.

SNUR Components
No substances are subject to Section 5 Significant New Use Rule (SNUR) requirements.

Section 6 Risk Management Components:
No substances are subject to Section 6 Risk Management rule requirement.

Section 12b Components:
No substances are subject to TSCA 12(b) export notification requirements.

Section 4 Test Order/Rule Components:
No substances are subject to Section 4 Final Test Orders or Rules.

Consent Order:
No substances are subject to Section 5 Consent Order requirements.

US. EPA CERCLA Hazardous Substances (40 CFR 302.4) Components:
None

SARA Section 311/312 Hazard Categories:
Refer to hazard classification information in Section 2.

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A) Components:
None
None

US. EPA Emergency Planning and Community Right-To-Know Act (EPCRA) SARA Title III Section 313 Toxic Chemicals (40 CFR 372.65) - Supplier Notification Required Components:

Concentration	Components	CAS-No.
<1 ppm	Lead	7439-92-1
<1 ppb	Mercury	7439-97-6

US. EPA Resource Conservation and Recovery Act (RCRA) Composite List of Hazardous Wastes and Appendix VIII Hazardous Constituents (40 CFR 261):
Under RCRA, it is the responsibility of the person who generates a solid waste, as defined in 40 CFR 261.2, to determine if that waste is a hazardous waste.

State Right-To-Know Information
The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the SDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

The concentrations reported below in units of parts per million (ppm) or parts per billion (ppb) are maximum values.

Massachusetts, New Jersey or Pennsylvania Right to Know Substance Lists:

Concentration	Components	CAS-No.
>=1%	Bisphenol A Polycarbonate	25971-63-5
5 - 10%	Titanium dioxide (Rutile)	13463-67-7
>=1%	Bisphenol A Polycarbonate	CAS# is a trade secret
>=1%	Bisphenol A Polycarbonate	CAS# is a trade secret

Massachusetts Right to Know Extraordinarily Hazardous Substance List:

Concentration	Components	CAS-No.
<=3 ppm	Methylene Chloride	75-09-2

California Proposition 65 List:

Concentration	Components	CAS-No.
5 - 10%	Titanium dioxide (Rutile)	13463-67-7
Trace element	Bisphenol A	80-05-7
<=3 ppm	Methylene Chloride	75-09-2
<1 ppm	Lead	7439-92-1
<1 ppb	Arsenic	7440-38-2
<1 ppb	Mercury	7439-97-6
<1 ppb	Nickel (Ni)	7440-02-0

<1 ppb	Cadmium	7440-43-9

CFATS (Chemical Facility Anti-Terrorism Standards) Chemicals
To the best of our knowledge, this product does not contain Appendix A Chemicals of Interest (COI), at or above the Screening Threshold Quantity (STQ), as defined by the Department of Homeland Security Chemical Facility Anti-terrorism Standard (CFATS, 6 CFR Part 27).

Based on information provided by our suppliers, this product is considered "DRC Conflict Free" as defined by the SEC Conflict Minerals Final Rule (Release No. 34-67716; File No. S7-40-10; Date: 2012-08-22).

16. Other Information

The method of hazard communication for Covestro LLC is comprised of product labels and safety data sheets. Safety data sheets for all of our products and general product declarations are available for download at www.productsafetyfirst.covestro.com.

Contact:	Product Safety Department
Telephone:	(412) 413-2835
Version Date:	10/31/2025
SDS Version:	2.8

Changes since the last version are highlighted in the margin. This version replaces all previous versions.