1 Chemical Product and Company Identification

The Lubrizol Corporation
29400 Lakeland Boulevard
Wickliffe, Ohio 44092
Tel: (440) 943-4200

2 Hazards Identification

Appearance Natural pellets.
Odor Faint
Principal Hazards

- This material has no known health hazards.

See Section 11 for complete health hazard information.

3 Composition/Information on Ingredients

Hazardous Ingredients This material has no known hazards under applicable laws.

4 First Aid Measures

Eyes If hot, melted material should splash into the eyes, flush eyes immediately with water for 15 minutes while holding the eyelids open. See a physician for treatment. If hot melted material should splash into the eyes, flush eyes immediately with water for 15 minutes while holding the eyelids open. See a physician for treatment.
Skin Wash with soap and water. Get medical attention if irritation develops. For contact with molten product, do not remove contaminated clothing. Flush skin immediately with large amounts of cold water. If possible submerge area in cold water. Pack with ice. DO NOT attempt to peel polymer from skin. Seek medical attention immediately.
Inhalation Remove exposed person to fresh air if adverse effects are observed.
Oral Treat symptomatically. Get medical attention.
Additional Information Note to physician: Treat symptomatically.

5 Fire Fighting Measures

Flash Point > 400 °C, 752 °F ASTM D-1929 (Minimum)
Extinguishing Media Water spray, dry chemical, foam. CO2 may be ineffective on large fires.
Firefighting Procedures Recommend wearing self-contained breathing apparatus. Water may cause splattering.
Unusual Fire & Explosion Hazards Solid does not readily release flammable vapors. Thermoplastic polymers can burn. Protect product from flames; maintain proper clearance when using heat devices, etc. Irritating or toxic substances will be emitted upon burning, combustion or decomposition. Large masses of molten polymer held at elevated temperatures for extended periods of time may auto-ignite. Run-off water from fire fighting may have corrosive effects. See section 10 for additional information.

6 Accidental Release Measures

Spill Procedures Pick up free solid for recycle and/or disposal.
Pumping Temperature

Not applicable.

Maximum Handling Temperature

Not determined.

Handling Procedures

Loading and unloading operations may cause nuisance dust to form. Refer to Processing Guide and/or contact your local Technical Service representative for melt processing temperature range. For most thermoplastic polyurethanes, melt processing is in the range of 177 - 232 deg. C (350 - 450 deg. F), however, some products may process at different temperatures. Heating above 232 deg. C (450 deg. F) can generate hazardous decomposition products (see Section 10). Conduct any operations emitting flames or vapors (including thermo-forming, heat joining, cutting and or sealing of articles and clean up) under well-ventilated conditions. Avoid breathing process vapors. Do not hold product for extended periods of time at elevated temperatures or allow thick masses of hot polymer to accumulate because they can decompose emitting hazardous gasses. Do not taste, swallow, or chew products. Wash thoroughly after processing. Do not store or consume food in processing areas. Fume condensates may include hazardous contaminants from additives. Condensate may be combustible and should be periodically removed from exhaust hoods, ductwork, and other surfaces. Impervious gloves should be worn during cleanup operations to prevent skin contact. Post thermal processing activities necessary to produce molded articles (such as cutting, sanding, sawing, grinding, drilling, or regrinding) may create dust or “fines.” Powders, dust, and/or fines may pose a dust explosion hazard. Do not steam sterilize articles made with Estane TPU resins. Methylene diamineline can be formed under these conditions. Electrostatic buildup may occur when pouring or transferring this product from its container. The spark produced may be sufficient to ignite vapors of flammable liquids. Always transfer product by means which avoid static buildup. Avoid pouring product directly from its container into combustible or flammable solvent. The major off-gasses from normal melt processing are expected to be water vapor and carbon dioxide. Other trace volatile organic components may also be emitted. Wash thoroughly after handling. Dispose of packaging or containers in accordance with local, regional, national and international regulations.

Maximum Storage Temperature

Not determined.

Storage Procedures

Use good housekeeping measures to prevent dust accumulations. Store in well ventilated place. Avoid excessive heat. Do not store near flammable agents.

Loading Temperature

Not determined.

8

Exposure Limits

None established

Other Exposure Limits

None known.

Engineering Controls

Prevent inhalation by providing effective general and, when necessary, local exhaust ventilation to draw spray, aerosol, fume, mist, or vapor away from workers.

Gloves Procedures

To avoid burns from contact with molten product, use thermal insulating gloves.

Eye Protection

Safety Glasses.

Respiratory Protection

Under normal use conditions, respirator is not usually required. Use appropriate NIOSH/MSHA respiratory protection if exposure to dust particles, mist or vapors is likely. Cutting operations may create small particles from this product. If inhalation of particulates cannot be avoided, wear a dust respirator. Consult with an industrial hygienist to determine the appropriate respiratory protection for your specific use of this material. A respiratory protection program compliant with all applicable regulations must be followed whenever workplace conditions require the use of a respirator.

Clothing Recommendation

Long sleeve shirt is recommended.

9

Physical and Chemical Properties

Flash Point

> 400 °C. 752 °F ASTM D-1929 (Minimum)

Upper Flammable Limit

Not determined.

Lower Flammable Limit

Not determined.

Autoignition Point

> 407 °C, > 764.6 °F

Explosion Data

Dust can form explosive mixtures in the air.

Vapor Pressure

Not determined.

pH

Not determined.

Specific Gravity

1.1 (20 °C)

Bulk Density

Not determined.

Water Solubility

Insoluble.

Percent Solid

Not determined.

Percent Volatile

Not determined.

Volatile Organic Compound

Not determined.

Vapor Density

Not determined.

Evaporation Rate

Not determined.

Odor

Faint

Appearance

Natural pellets.

Viscosity

Not determined.

Odor Threshold

Not determined.

Boiling Point

Not determined.

Pour Point Temperature

Not determined.

Melting / Freezing Point

Not determined.
The above data are typical values and do not constitute a specification. Vapor pressure data are calculated unless otherwise noted.

### Stability and Reactivity

<table>
<thead>
<tr>
<th>Property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability</td>
<td>Material is normally stable at moderately elevated temperatures and pressures.</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>Not determined.</td>
</tr>
<tr>
<td>Incompatibility</td>
<td>None known, avoid contact with reactive chemicals.</td>
</tr>
<tr>
<td>Polymerization</td>
<td>Will not occur.</td>
</tr>
<tr>
<td>Thermal Decomposition</td>
<td>Smoke, carbon monoxide, carbon dioxide, aldehydes and other products of incomplete combustion. Under combustion conditions, oxides of the following elements will be formed: nitrogen. May also include isocyanates and small amounts of hydrogen cyanide.</td>
</tr>
<tr>
<td>Conditions to Avoid</td>
<td>Overheating.</td>
</tr>
</tbody>
</table>

### Toxicological Information

--- **ACUTE EXPOSURE** ---

- **Eye Irritation**: Not expected to cause eye irritation. Based on data from components or similar materials. Particulates may cause mechanical irritation. At processing or combustion temperatures this product may emit fumes and vapors that cause irritation, possibly severe, to the eyes.
- **Skin Irritation**: Not expected to be a primary skin irritant. Based on data from components or similar materials. Contact with heated polymer may cause thermal burns and adhesion of solidified product to the skin.
- **Respiratory Irritation**: At processing or combustion temperatures this product may emit fumes and vapors that cause irritation, possibly severe, to the respiratory tract, eyes, or skin.
- **Dermal Toxicity**: The LD50 in rabbits is > 2000 mg/Kg. Based on data from components or similar materials.
- **Inhalation Toxicity**: Overexposure to vapors or mist may cause dizziness, headache, nausea, and/or flu-like symptoms. Avoid the inhalation of dust, mists, or vapors.
- **Oral Toxicity**: The LD50 in rats is > 2000 mg/Kg. Based on data from components or similar materials.
- **Dermal Sensitization**: No data available to indicate product or components may be a skin sensitizer.
- **Inhalation Sensitization**: No data available to indicate product or components may be respiratory sensitzers.

--- **CHRONIC EXPOSURE** ---

- **Chronic Toxicity**: No data available to indicate product or components present at greater than 1% are chronic health hazards.
- **Carcinogenicity**: No data available to indicate any components present at greater than 0.1% may present a carcinogenic hazard.
- **Mutagenicity**: No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
- **Reproductive Toxicity**: No data available to indicate either product or components present at greater than 0.1% that may cause reproductive toxicity.
- **Teratogenicity**: No data available to indicate product or any components contained at greater than 0.1% may cause birth defects.

--- **ADDITIONAL INFORMATION** ---

**Other**: Under decomposition conditions, isocyanates may be generated from this product. Isocyanates can cause skin sensitization and/or respiratory sensitization. Pre-existing skin conditions may be aggravated by prolonged or repeated exposure. Persons with sensitive airways (e.g., asthmatics) may react to vapors.

### Ecological Information

--- **ENVIRONMENTAL TOXICITY** ---

- **Freshwater Fish Toxicity**: Not determined.
- **Freshwater Invertebrates Toxicity**: Not determined.
- **Algal Inhibition**: Not determined.
- **Saltwater Fish Toxicity**: Not determined.
- **Saltwater Invertebrates Toxicity**: Not determined.
- **Bacteria Toxicity**: Not determined.
- ** Miscellaneous Toxicity**: Not determined.

--- **ENVIRONMENTAL FATE** ---

- **Biodegradation**: Adequate data is not available to estimate the biodegradation potential of this material.
- **Bioaccumulation**: There is no data available to evaluate this material for bioconcentration.
- **Soil Mobility**: Not determined.

### Disposal Considerations

**Waste Disposal**: This material, if discarded, is not a hazardous waste under RCRA Regulation 40 CFR 261. Treatment, storage, transportation, and disposal must be in accordance with applicable Federal, State/Provincial, and Local regulations.
### Transport Information

<table>
<thead>
<tr>
<th>ICAO/IATA I</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ICAO/IATA II</td>
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</tr>
<tr>
<td>IMDG</td>
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</tr>
<tr>
<td>IMDG EMS Fire</td>
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</tr>
<tr>
<td>IMDG EMS Spill</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>IMDG MFAG</td>
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<tr>
<td>MARPOL Annex II</td>
<td>Not determined.</td>
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<tr>
<td>USCG Compatibility</td>
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</tr>
<tr>
<td>U.S. DOT Bulk</td>
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</tr>
<tr>
<td>DOT NAERG</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>U.S. DOT Intermediate NAERG</td>
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</tr>
<tr>
<td>U.S. DOT Non-Bulk</td>
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<tr>
<td>U.S. DOT Non-Bulk NAERG</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Canada</td>
<td>Not regulated.</td>
</tr>
<tr>
<td>Mexico</td>
<td>Not regulated.</td>
</tr>
<tr>
<td>Bulk Quantity</td>
<td>85000 KG, 187391 lbs.</td>
</tr>
<tr>
<td>Intermediate Quantity</td>
<td>11000 KG, 24251 lbs.</td>
</tr>
<tr>
<td>Non-Bulk Quantity</td>
<td>400 KG, 882 lbs.</td>
</tr>
</tbody>
</table>

*Review classification requirements before shipping materials at elevated temperatures.*

### Regulatory Information

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**Global Chemical Inventories**

USA

All components of this material are on the US TSCA Inventory or are exempt.

Other TSCA Reg.

None known.

EU

All components are in compliance with the EC Seventh amendment Directive 92/32/EEC.

Japan

All components are in compliance with the Chemical Substances Control Law of Japan.

Australia

All components are in compliance with chemical notification requirements in Australia.

New Zealand

All components are in compliance with chemical notification requirements in New Zealand.

Canada

All components are in compliance with the Canadian Environmental Protection Act and are present on the Domestic Substances List.

Switzerland

All components are in compliance with the Environmentally Hazardous Substances Ordinance in Switzerland.

Korea

All components are in compliance in Korea.

Philippines

All components are in compliance with the Philippines Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990 (R.A. 6969).

China

All components of this product are listed on the Inventory of Existing Chemical Substances in China.

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**Other U.S. Federal Regulations**


This product does not contain greater than 1.0% of any chemical substance on the SARA Extremely Hazardous Substances list.

SARA Section 313

This product does not contain greater than 1.0% (greater than 0.1% for carcinogenic substance) of any chemical substances listed under SARA Section 313.

SARA 311 Classifications

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Acute Hazard</td>
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<tr>
<td>Chronic Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Fire Hazard</td>
<td>No</td>
</tr>
<tr>
<td>Reactivity Hazard</td>
<td>No</td>
</tr>
</tbody>
</table>

CERCLA Hazardous Substances

None known.

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**State Regulations**

Cal. Prop. 65

This product does not intentionally contain any chemicals known by the State of California to cause cancer and/or birth defects. Moreover, we do not routinely analyze its products for impurities which may be such chemicals.

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**Product Registrations**

U.S. Fuel Registration

Not applicable.

Finnish Registration Number

Not Registered.

Swedish Registration Number

Not Registered.

Norwegian Registration Number

Not Registered.

Danish Registration Number

Not Registered.
Swiss Registration Number Not Registered
Italian Registration Number Not Registered

Miscellaneous Regulatory Information Not determined.

<table>
<thead>
<tr>
<th>16</th>
<th>Other Information</th>
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</table>

US NFPA Codes

<table>
<thead>
<tr>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
<th>Special</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
<td>N/E</td>
</tr>
</tbody>
</table>

(N/E) - None established

HMIS Codes

<table>
<thead>
<tr>
<th>Health</th>
<th>Fire</th>
<th>Reactivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0</td>
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</tbody>
</table>

Precautionary Labels

- This material has no known health hazards.

Revision Indicators

Section: 15 EU EINECS. Changed: 2 December 2010

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