Material Safety Data Sheet

1 - Product and company information

Product name  ESTANE* 58212 NAT 050 THERMOPLASTIC POLYURETHANE
Product number  58212000050
Effective date  05/10/2007

Company identification  Lubrizol Advanced Materials, Inc. 9911 Brecksville Rd. Cleveland, OH 44141-3247
Company  Lubrizol Advanced Materials Canada, 100 Regina Street South
Canadian Address  Suite 360
Waterloo, Ontario, N2J 4P9
Canada

Telephone  (216) 447-5000
Telephone  (800) 424-9300
Chemtrec (24 Hour)  CANUTEC  (519) 888-3330
Telephone  (613) 996-6666

Preparer  Health, Safety, and Environmental Department
Product description  Thermoplastic Polyurethane Compound CAS-Proprietary

2 - Composition / information on ingredients

No Hazardous Components found under OSHA 29 CFR 1910.1200

Amounts specified are typical and do not represent a specification. Remaining components are proprietary, non-hazardous, and/or present at amounts below reportable limits.

Notes:  All additives are physically bound (encapsulated) in the compound. This product is not expected to create any hazard when it is used, handled, and processed.

3 - Hazards identification

Emergency overview
Smoke from burning compound will be very irritating. Extinguishing media include water, ABC dry chemical, alcohol foam, and protein type air foams. Carbon dioxide is not recommended due to a lack of cooling capacity. Wear positive pressure self-contained breathing apparatus (SCBA) and approved protective clothing.

Acute health effects
Molten product causes skin burns. At elevated temperatures (e.g., at melt processing temperature or combustion temperature), this product may emit fumes and vapors that cause irritation (possibly severe) to the respiratory tract, eyes and/or skin. At ambient temperature, there are no known or expected health effects.

Chronic health effects
None known.

Signs/Symptoms of exposure
Irritation
Routes of exposure/entry
Contact with molten polymer, Inhalation of process vapors

Target organs
Eyes, Respiratory tract, Skin

Medical conditions aggravated by exposure
Individuals with bronchial asthma and/or other types of chronic obstructive respiratory diseases may develop bronchospasm if exposure to processing fumes or vapors is prolonged.

Carcinogenic status
The substance(s) below is/are encapsulated within the compound, and therefore, not available for direct exposure.

Reproductive effects
None Expected

4 - First aid measures

If irritation or other symptoms (as noted above) occur or persist from any route of exposure, remove the affected individual from the area: see a physician/get medical attention.

Eye contact
Treat as any foreign particulate matter.

Skin contact
Wash the affected area thoroughly with plenty of water and soap. If molten polymer contacts the skin, cool the skin rapidly with water or ice. See a physician for removal of any adhering material and for treatment of the burn.

Inhalation
If any processing vapors, decomposition products or particulates are inhaled, remove individual(s) to fresh air. Provide protection before allowing reentry. Get medical attention immediately.

Ingestion
No ingestion effects known.

Notes to physician
No additional information.

5 - Fire fighting measures

NFPA flammability class: A

Flash point: (Estimated) 752 °F (400 °C)
ASTM D-1929

Explosive range: LEL Not Applicable
UEL Not Applicable

Notes: Self-Ignition Temperature > 765 °F (407 °C)
ASTM D-1929. Expected.

Fire and explosive properties
This product is not known to present any fire hazard.

Extinguishing media
NFPA Class A (Ordinary Combustibles): Use water, dry chemical, alcohol foam or protein type foam. CO2 is not recommended on Class A fires, as a lack of cooling capacity may result in reignition.

Fire fighting instructions
Wear self-contained breathing apparatus (SCBA) equipped with a full facepiece and operated in a pressure-demand mode (or other positive pressure mode) and protective clothing.

Unusual fire/explosion hazards
Thermoplastic polymers can burn. Protect product from flames of any kind; 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 firefighting may have corrosive effects.

6 - Accidental release measures

Containment techniques
No specific requirements known.

Clean-up techniques
Sweep up carefully and place into container for reuse or disposal. Do not sweep or flush product into sewers or waterways.

Evacuation instructions
Not Applicable

7 - Handling and storage

Handling
Melt Processing and Pre/Post Processing:
Conduct any operations emitting fumes or vapors (including 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 gases. Do not taste, swallow, or chew products. Wash thoroughly after processing. Do not store or consume food in processing areas. Do not use processing equipment to heat food.

Processing Fume Condensates:
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:
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.

Electrostatic Buildup:
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.

Storage
Avoid excessive heat. Do not store near flammable agents.

8 - Exposure controls / personal protection

No additional exposure notes
**Notes:** No Additional Information

**Engineering controls**
Always provide effective general and, when necessary, local exhaust ventilation to draw spray, aerosol, fume, mist and vapor away from workers to prevent routine inhalation. (Ventilation guidelines/techniques may be found in publications such as Industrial Ventilation: American Conference of Governmental Industrial Hygienists, 1330 Kemper Meadow Drive, Cincinnati, OH, 45240-1634, USA.)

**Eye/face protection**
Safety glasses or goggles required.

**Skin protection**
Protective gloves required to handle hot material during processing.

**Respiratory protection**
Wear an approved respirator (e.g., an organic vapor respirator, a full face air purifying respirator for organic vapors, or a self-contained breathing apparatus) whenever exposure to aerosol, mist, spray, fume or vapor exceed the exposure limit(s) of any chemical substance listed in this MSDS. Cutting operations may create small particles from this product. If inhalation of particulates cannot be avoided, wear a dust respirator.

**General protection**
No additional information available.

### 9 - Physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Solid</td>
</tr>
<tr>
<td>pH</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Appearance</td>
<td>Natural</td>
</tr>
<tr>
<td>% Volatile by weight</td>
<td>Negligible</td>
</tr>
<tr>
<td>Odor</td>
<td>Slight</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>&gt;1.00</td>
</tr>
<tr>
<td>Solubility in water</td>
<td>Insoluble</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Boiling point °F</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Boiling point °C</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Melting point</td>
<td>See note below.</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Partition coefficient</td>
<td>Not Applicable</td>
</tr>
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</table>

**Notes:** 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 350 - 450 °F (177 - 232 °C), however, some products may process at different temperatures.

### 10 - Stability and reactivity

**Stability**
This product is stable.

**Hazardous polymerization**
Hazardous polymerization will not occur.
Notes:
No Additional Information

Conditions to avoid
Overheating.

Incompatibility with other materials
Hydrated halogen is a potential combustion product. These substances have a corrosive effect on many metals. Affected surfaces should be washed with a water based detergent solution to remove corrosive deposits.

Hazardous decomposition products
Volatile may be evolved during overheating, combustion, or decomposition. These potential decomposition gases have not been fully determined but may include CO, CO2, and small amounts of hydrogen cyanide, oxides of nitrogen, hydrocarbons, isocyanates, water vapor and/or combinations of the previous, and smoke. Substances listed under Thermal Processing Emissions may also be present.

Additional reactivity / stability information
NOTE: Hydrogen chloride is detectable by its sharp pungent odor in concentrations as low as 1-5 ppm. Low concentrations (below 50 ppm) are not harmful in short-term exposures but do provide excellent warning properties by causing coughing or irritation. Because the protective response is so strong, humans rarely submit to damaging concentrations -- instead, there is an unmistakable urge to leave the area. Repeated or prolonged exposure to high concentrations can cause eye and respiratory damage.

Thermal processing emissions
Volatile from melt processing is expected to be the primary hazard in an occupational setting. Well-ventilated conditions are necessary to control exposure to fumes and vapors. The major off-gases from normal melt processing are expected to be water vapor and carbon dioxide. Other trace volatile organic components may also be emitted as off-gas.

11 - Toxicological information
Caution must be exercised through the prudent use of protective equipment and handling procedures to minimize exposure.

No toxicity information available for this product.

No toxicity studies have been conducted on this product.
Under decomposition conditions, isocyanates may be generated from this product. Isocyanates can cause skin sensitization and/or respiratory sensitization.

12 - Ecological information
Ecotoxicity / Environmental Fate: None known or expected from this product as furnished. This product has not been tested.

Notes: No Additional Information

13 - Disposal information
For waste disposal purposes, this product is not known to be defined or designated as hazardous by current provisions of

US RQ
Not Applicable

14 - Transportation information

<table>
<thead>
<tr>
<th>UN/NA Number:</th>
<th>N/A</th>
<th>Hazard Class:</th>
<th>N/A</th>
<th>IMDG Class:</th>
<th>N/A</th>
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<tbody>
<tr>
<td>Packing Group:</td>
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<td>ICAO/IATA Class:</td>
<td>N/A</td>
<td>TDG Class:</td>
<td>N/A</td>
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</table>

Name of Material: Not regulated

Notes: No Additional Information

15 - Regulatory information

This MSDS has been prepared in accordance with the hazard criteria of the OSHA Hazard Communication Standard, 29 CFR 1910.1200

U.S. Toxic Substances Control Act:

All components of this product are either listed on the U.S. Toxic Substances Control Act (TSCA) inventory of chemicals or are otherwise compliant with TSCA regulations.

U.S. CERCLA – SARA:

SARA Title III Section 312 Hazard Category (40 CFR 311/312):

Not Hazardous

SARA Section 313: This product contains the following toxic chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986 and 40 CFR 372:

None Known

California Proposition 65:

Warning: The following ingredients present in the product are known to the state of California to cause Cancer:

None known to be present or none in reportable amounts for occupational exposure as per OSHA’s approval of the California Hazard Communication Standard, Federal Register, page 31159 ff, 6 June 1997.

Warning: The following ingredients present in the product are known to the state of California to cause birth defects, or other reproductive hazards:

None known to be present or none in reportable amounts for occupational exposure as per OSHA’s approval of the
The chemical identity of some or all components present is confidential business information (trade secret) and is being withheld as permitted by 29CFR1910.1200 (i).

**Canadian Domestic Substances List (DSL):**

All components in this product are on the Canadian Domestic Substances List (DSL) or are exempt from listing.

**Canadian Ingredient Disclosure List:**
The following components are on the Canadian Ingredient Disclosure List (WHMIS):

None Listed

**Canadian WHMIS Class:**

Not controlled

**Notes:** No Additional Information

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

### 16 - Other information

**Notes:** No Additional Information

<table>
<thead>
<tr>
<th>HMIS Rating</th>
<th>NFPA Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Health:</strong></td>
<td><strong>Health:</strong></td>
</tr>
<tr>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td><strong>Flammability:</strong></td>
<td><strong>Flammability:</strong></td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Reactivity:</strong></td>
<td><strong>Reactivity:</strong></td>
</tr>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Personal Protection:</strong></td>
<td>X</td>
</tr>
</tbody>
</table>

Key: 0=Insignificant; 1=Slight; 2=Moderate; 3=High; 4=Extreme

Hazardous Materials Identification System (HMIS), National Paint and Coating Assn. rating applies to product "as packaged" (i.e., ambient temperature). Ratings are based upon HMIS® Rating Manual 1984. Values do not reflect HMIS® III.

National Fire Protection Association (NFPA) rating identifies the severity of hazards of material during a fire emergency (i.e., "on fire").

**Legend:**

* : Trademark owned by The Lubrizol Corporation.
ACGIH: American Conference of Governmental Industrial Hygienists
A1: Confirmed human carcinogen
A2: Suspected human carcinogen
A3: Animal carcinogen
CAS No: Chemical Abstract Service Registry Number
IARC: International Agency for Research on Cancer
Group 1: Carcinogenic to humans
Group 2A: Probably carcinogenic to humans
Group 2B: Possibly carcinogenic to humans
Group 3: Unclassified as a carcinogen to humans
Users responsibility/disclaimer of liability
As the conditions or methods of use are beyond our control, we do not assume any responsibility and expressly disclaim any liability for any use of this product. Information contained herein is believed to be true and accurate but all statements or suggestions are made without warranty, expressed or implied, regarding accuracy of the information, the hazards connected with the use of the material or the results to be obtained from the use thereof. Compliance with all applicable federal, state, and local laws and local regulations remains the responsibility of the user.

This bulletin cannot cover all possible situations which the user may experience during processing. Each aspect of your operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained in this bulletin should be provided to your employees or customers. It is your responsibility to develop appropriate work practice guidelines and employee instructional programs for your operation.