1. PRODUCT AND COMPANY INFORMATION

Product Name: Poly(tetrafluoroethylene)
Catalog Number: 203
Company: Scientific Polymer Products, Inc.
Address: 6265 Dean Parkway
          Ontario, NY 14519
Telephone: 585/265-0413
Fax: 585/265-1390
Website: www.scientificpolymer.com
Emergency Phone Number: 800-255-3924 (CHEM TEL)

2. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS Number</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poly(tetrafluoroethylene)</td>
<td>9002-84-0</td>
<td>100</td>
</tr>
</tbody>
</table>

Heated above 750°F can evolve as degradation products:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS Number</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogen fluoride</td>
<td>7664-39-3</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Carbonyl fluoride</td>
<td>353-50-4</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

3. HAZARDS IDENTIFICATION

Emergency Overview: Material is not known to contain Toxic Chemicals under Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372. The primary hazard associated with this polymer is the inhalation of fumes from overheating or burning, which may cause “polymer fume fever”.

HMIS Classification:
Health Hazard: 2  Flammability: 1  Reactivity: 0  Protective Equipment: B

Potential Health Effects:
Inhalation of this materials dust may cause generalized irritation of the nose, throat and lungs with cough, difficulty breathing or shortness of breath.
Heating above 300°C may liberate a fine particulate fume. Inhalation may produce polymer fume fever, a temporary flu-like condition with fever, chills, nausea, shortness of breath, chest tightness, muscle or joint ache, and sometimes cough delayed 4 to 24 hours after exposure. These signs are generally temporary, lasting 24-48 hours and resolve without further complications. However, some individuals with repeated episodes of polymer fume fever have reported persistent pulmonary effects. Protection against polymer fume fever should also provide protection against any potential chronic effects.

Exposure to decomposition products from this material heated above 400°C may cause pulmonary inflammation, hemorrhage or edema. These more serious consequences of exposure may occur from extreme thermal decomposition of this material which can liberate fume particles, and toxic gases (carbonyl fluoride, hydrogen fluoride, and other fluorinated gases) especially under conditions of poor ventilation and/or confined spaces. These decomposition products may initially produce chest tightness or pain, chills, fever, nausea, with shortness of breath, cough, wheezing and progression into pulmonary edema. Edema may be delayed in onset and requires medical treatment. In severe cases, if medical intervention is delayed pulmonary edema may become life threatening. Recovery is generally complete within a few days; in some rare cases, persistent lung function abnormalities have been reported.

Compared to non-smokers, polymer fume fever symptoms appear to be more prevalent and serious in smokers. Smokers must avoid contamination of tobacco with residual polymer from their hands or from fumes, and should wash their hands before smoking.

Significant skin permeation, and systemic toxicity, after contact with the dust appears unlikely. There are no reports of human sensitization from contact with the dust.

If dust contacts the eye, mechanical irritation with tearing, pain or blurred vision may result.

Individuals with pre-existing diseases of the lungs or cardiovascular system may have increased susceptibility to the reduction in blood oxygen that may develop after excessive exposure to thermal decomposition products.

CARCINOGENICITY INFORMATION: None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, OSHA or ACGIH as a carcinogen.

4. FIRST AID MEASURES

Inhalation: No specific intervention is indicated as the compound is not likely to be hazardous by inhalation. Consult a physician if necessary. If exposed to fumes from overheating or combustion, move to fresh air. Consult a physician if symptoms persist.

Skin: The compound is not likely to be hazardous by skin contact, but cleansing the skin after use is advisable. If molten polymer gets on skin, cool rapidly with cold water. Do NOT attempt to peel polymer from skin. Obtain medical treatment for thermal burns.
5. FIRE FIGHTING MEASURES

Flammable Properties:
- **Flash Point:** 986-1,022°F (ASTM D1929)
- **Ignition Temperature:** 968-1,040°F (ASTM 1929)

Suitable extinguishing: Water, foam, dry chemical, CO2

Fire Fighting Procedures: Wear self-contained breathing apparatus. Wear full protective equipment.

Unusual Fire and Explosion Hazards: Difficult to ignite, and flames goes out when initiating source is removed. Limited flame spread and low smoke generation. Complies with NFPA definition of “limited combustible” material. High self-ignition and auto-ignition temperatures (ASTM D1929). Hydrogen fluoride fumes emitted during a fire can react with water to form hydrofluoric acid. Wear neoprene gloves when handling refuse from fire.

Hazardous Combustion Products: Hazardous gases/vapors produced in fire are hydrogen fluoride (HF), carbon monoxide, potentially toxic fluorinated compounds.

6. ACCIDENTAL RELEASE MEASURES

Spilled material is a slipping hazard. Recover undamaged and minimally contaminated material for reuse and reclamation. Shovel or sweep up.

7. HANDLING AND STORAGE

Handling: Avoid breathing dust. Avoid contamination of cigarettes or tobacco with dust from this material. Do not use a torch to clean this material from equipment without local exhaust ventilation and respirator.

Storage: Keep container closed to prevent contamination.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limits:
- Poly(tetrafluoroethylene):
  - PEL (OSHA) – Particulates Not Otherwise Regulated: 15 mg/m3, 8 Hr. TWA, total dust; 5 mg/m3, 8 Hr. TWA, respirable dust.
  - Hydrogen Fluoride: PEL (OSHA): 3 ppm, 8 Hr. TWA, as F; TLV (ACGIH): 0.5 ppm, 8 Hr. TWA as F; Ceiling 2 ppm, as F
Carbonyl Fluoride:
TLV (ACGIH): 2 ppm, 5.4 mg/m^3, 8 Hr. TWA; STEL 5 ppm, 13 mg/m^3

PERSONAL PROTECTIVE EQUIPMENT:
RESPIRATORY: A respirator is not required if local exhaust ventilation is adequate. At processing temperatures less than 400°C a NIOSH/MSHA approved air purifying respirator with dust/mist cartridge or canister may provide protection from airborne particulates which cause polymer fume fever. At higher processing temperatures if ventilation is inadequate to maintain hydrogen fluoride and carbonyl fluoride concentrations below exposure limits, use a positive pressure air supplied respirator. Air purifying respirators may not provide adequate protection.

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

EYES: Wear safety glasses. Wear coverall chemical splash goggles and face shield when possibility exists for eye and face contact due to splashing or spraying of molten materials.

Engineering Controls: Use local exhaust to completely remove vapors and fumes liberated during hot processing from the work area.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Appearance:</td>
<td>Powder</td>
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<tr>
<td>Odor:</td>
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<tr>
<td>Melting Point:</td>
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<tr>
<td>Specific Gravity:</td>
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<tr>
<td>Tg:</td>
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<tr>
<td>Solubility in Water:</td>
<td>Insoluble</td>
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<tr>
<td>Refractive Index:</td>
<td>n_D 1.35</td>
</tr>
<tr>
<td>Solubility Parameter:</td>
<td>6.21</td>
</tr>
</tbody>
</table>

10. STABILITY AND REACTIVITY

Stability: Stable at normal temperatures and storage conditions

Hazardous polymerization: Will not occur

Materials to avoid: Incompatible or can react with finely divided metal powders (e.g., aluminum and magnesium) and potent oxidizers like fluorine (F2) and related compounds (e.g., chlorine trifluoride, C1F3). Contact with incompatibles can cause fire and explosion.

Conditions to avoid: Contact with incompatibles.

Decomposition: Heating above 300°C, may cause evolution of particulate matter, which can cause polymer fume fever. Trace amounts of hydrogen fluoride and carbonyl fluoride may be evolved at about 400°C, with larger amounts at higher temperatures.
11. TOXICOLOGICAL INFORMATION

ANIMAL DATA:
Animal testing indicates that this material is not a skin irritant.

Repeated exposure to this material by ingestion caused no significant toxicological effects. Possible effects on white blood cell counts were found in rats red 25% of this material in the diet for 90 days, however any changes were within normal variability and were considered to be of no toxicological significance.

In rats, single exposure to dusts of undegraded material by inhalation caused irritation of the lungs. Exposure to thermal decomposition products of this material caused lung injury whose severity depends upon the temperature and exposure conditions. Birds appear to be especially susceptible to the toxic effects of fluoropolymer decomposition products. In rats, exposure to freshly formed low molecular weight polymer fragments (fume) produced by continuous heating of the polymer above 400°C may produce acute pulmonary inflammation. When the concentration of fluoropolymer fragment fumes increases, deaths may occur from pulmonary edema and hemorrhage. Exposure to fume aged for several minutes, markedly reduces the toxicity. At higher temperatures involving gross thermal decomposition of the polymer, deaths occurred due to pulmonary edema from lethal concentrations of fluoropolymer fume and/or fluorinated gas decomposition products.

No adequate animal data are available to define the carcinogenicity or developmental hazards of this material. No adequate reports of genetic testing were found. No animal data are available to define the reproductive toxicity of this material.

12. ECOLOGICAL INFORMATION

No information available. Toxicity is expected to be low based on insolubility in water.

13. DISPOSAL CONSIDERATIONS

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. SP2 HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION DESCRIBED IN SECTION 2.

14. TRANSPORT INFORMATION

DOT/IATA INFORMATION:

<table>
<thead>
<tr>
<th>Proper Shipping Name</th>
<th>Not regulated</th>
<th>Hazard Class</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Packing Group</td>
<td>N/A</td>
<td>UN#:</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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15. REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS:
TSCA Inventory: In compliance with TSCA inventory requirements for commercial purposes.

STATE REGULATIONS (U.S.):
No substances on the state hazardous substances list, for the states indicated below, are used in the manufacture of products on this MSDS, with the exception indicated.

Substances on the Pennsylvania Hazardous Substances List Present at a Concentration of 1% or More (0.01% for special hazardous substances): Poly(tetrafluoroethylene) is listed, but we believe it was listed in error and have petitioned to have it delisted.

WARNING: Substances known to the State of California to cause cancer, birth defects or other reproductive harm:
Tetrafluoroethylene

Substances on the New Jersey workplace hazardous substances List present at a concentration of 1% or more (0.1% for substance identified as carcinogens, mutagens ot teratogens): NONE known

16. OTHER INFORMATION

This material is intended for laboratory use only. It is not sold or intended for drug, household or other uses. The information represents the most accurate and complete data currently available to us. However, we make no warranty, express or implied, with respect to such information, and we assure no liability resulting from its use.

MEDICAL USE: CAUTION: Do NOT use in medical applications involving permanent implantation in the human body.