SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier
REILLEX® HP Polymer

Synonyms:
Poly-4-Vinylpyridine, crosslinked with divinylbenzene

Chemical Abstracts Registry No: 9017-40-7

REACH Registration Number: 4-Vinylpyridine monomer: 01-2119970566-26-0000; Divinylbenzene: Not yet registered

1.2. Relevant identified uses of the substance or mixture and uses advised against
acid scavenger; metals recovery

1.3. Details of the supplier of the safety data sheet
Vertellus LLC
201 North Illinois Street, Suite 1800,
Indianapolis, IN 46204
800-223-0453

e-mail Address: sds@vertellus.com

1.4. Emergency telephone number
Vertellus: 1-800-223-0453
CHEMTREC (USA): 1-800-424-9300 (collect calls accepted)
CHEMTREC (International): 1-703-527-3887 (collect calls accepted)
NRCC (China): +86 532 83889090

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Not classified as hazardous under this directive.
Symbol: Not classified as hazardous under this directive.
Risk Phrases: Not classified as hazardous under this directive.
Safety Phrases: Not classified as hazardous under this directive.

2.2. Label elements

Signal Word: Non-Hazardous

Hazard Precautions: Not classified as hazardous under this directive.

Prevention Precautionary Statements:

Note: These precautionary statements are not prescribed by directive 1272/2008 as this product is not classified as hazardous under this directive. Wash hands thoroughly after handling with soap and water. Wear protective gloves, protective clothing, eye protection and face protection. If swallowed, in eyes, on skin or inhaled call a poison center or doctor/physician if you feel unwell. If inhaled, remove victim to fresh air and keep at rest in a comfortable position for breathing. Take off contaminated clothing before reuse. Store in a well-ventilated place. Keep container tightly closed.

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SECTION 3: Composition/information on ingredients

3.1. Substances or 3.2. Mixtures

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>CAS Number</th>
<th>Concentration (weight %)</th>
<th>EC Number</th>
<th>CLP Inventory/Annex VI</th>
<th>EU DSD Classification (67/548/EEC)</th>
<th>EU CLP Classification (1272/2008)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poly-4-Vinylpyridine, crosslinked with divinylbenzene</td>
<td>9017-40-7</td>
<td>~ 100 (may be water wet)</td>
<td>Polymer</td>
<td>Not applicable.</td>
<td>Not applicable.</td>
<td>Non-Hazardous</td>
</tr>
</tbody>
</table>

NOTE: See Section 8 for exposure limit data for these ingredients. See Section 15 for trade secret information (where applicable). See Section 16 for the full text of the R-phrases above.

SECTION 4: First aid measures

4.1. Description of first aid measures

Skin Contact: Wash exposed area twice with soap and water. The exposed area should be examined by medical personnel if irritation or pain persists after the area has been washed.

Eye Contact: Rinse eyes immediately with large amounts of water for at least 15 minutes, occasionally lifting the eyelids. Seek medical advice if symptoms persist.

Inhalation: Remove from exposure area to fresh air immediately. If breathing has stopped, give artificial respiration. Seek medical advice if symptoms persist.

Ingestion: If swallowed, contact physician or poison control center immediately. Give oxygen if respiration is shallow. If irritation or discomfort occurs, obtain medical advice.

4.2 Most important symptoms and effects, both acute and delayed

Acute: Cross-linked Poly-4-Vinylpyridine polymers are not expected to cause irritation to skin or eyes, based on laboratory test results. Overexposure to dusty material may cause respiratory tract irritation in sensitive individuals. No skin sensitization was observed in laboratory tests. Although it has been observed that the health effects related to this compound are minimal, as with any chemical, use appropriate precautions during handling.

Delayed Effects: None known.

4.3. Indication of any immediate medical attention and special treatment needed

Note to Physician: No specific indications. Treatment should be based on the judgment of the physician in response to the reactions of the patient.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Appropriate Extinguishing Media: Water spray, water fog, alcohol-resistant foam, carbon dioxide, dry chemical.
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5.2. Special hazards arising from the substance or mixture

Hazardous Products of
Combustion: Toxic vapors may be released upon thermal decomposition (cyanides, nitrogen oxides, carbon monoxide).
Potential for Dust Explosion: No data available -- handle in a manner that prevents generation of potentially explosive dust.

5.3. Advice for firefighters

Basic Fire Fighting Guidance: Wear self-contained breathing apparatus and full protective clothing (i.e., Bunker gear). Skin and eye contact should be avoided. Normal fire fighting procedures may be used.

5.4. Reference to other sections

Refer to section 8 for information on selecting personal protective equipment. Refer to section 13 for information on spilled product, absorbent and clean up material disposal instructions.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuation Procedures: Isolate the hazard area and deny entry to unnecessary and unprotected personnel.
Special Instructions: See Section 8 for personal protective equipment recommendations. Remove all contaminated clothing to prevent further absorption. Decontaminate affected personnel using the first aid procedures in Section 4. Leather shoes that have been saturated must be discarded.

6.2. Environmental precautions

Prevent releases to soils, drains, sewers and waterways.

6.3. Methods and material for containment and cleaning up

Remove all ignition sources. Ventilate the area of spill or leak. Wear protective equipment during clean-up. Material can then be collected for later disposal. After collection of material, flush area with water. Dispose of the material in accordance with standard practice for disposal of potentially hazardous materials as required by applicable federal, state or local laws.

6.4. Reference to other sections

Refer to section 8 for information on selecting personal protective equipment. Refer to section 13 for information on spilled product, absorbent and clean up material disposal instructions.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Practices to Minimize Risk: Wear appropriate protective equipment when performing maintenance on contaminated equipment. Wash hands thoroughly before eating or smoking after handling this material. Do not eat, drink or smoke in work areas. Prevent contact with incompatible materials. Avoid spills and keep away from drains. Handle in a manner to prevent generation of aerosols, vapors or dust clouds.

Special Handling Equipment: Not applicable.

7.2. Conditions for safe storage, including any incompatibilities

Storage Precautions & Recommendations: This product should be stored at ambient temperature in a dry, well-ventilated location. Keep container closed to prevent drying out
Dangerous Incompatibility Reactions: Strong oxidizing agents

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Incompatibilities with Materials of Construction: None known

7.3. Specific end use(s)
If a chemical safety assessment has been completed an exposure scenario is attached as an annex to this Safety Data Sheet. Refer to this annex for the specific exposure scenario control parameters for uses identified in subsection 1.2.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational Exposure Limit</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Air Monitoring Method</td>
<td>No data available.</td>
</tr>
</tbody>
</table>

8.2. Exposure controls
Also see the annex to this SDS (if applicable) for specific exposure scenario controls.

<table>
<thead>
<tr>
<th>Control parameter</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Engineering Controls</td>
<td>All operations should be conducted in well-ventilated conditions. Local exhaust ventilation should be provided.</td>
</tr>
<tr>
<td>Personal Protective Equipment</td>
<td>Where overexposures are a concern, use NIOSH-approved dust/mist respirator as necessary. Latex rubber gloves are recommended where contact is likely.</td>
</tr>
<tr>
<td>Thermal Hazards</td>
<td>Not applicable.</td>
</tr>
<tr>
<td>Environmental Exposure Controls</td>
<td>The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.</td>
</tr>
</tbody>
</table>

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance, State &amp; Odor (ambient temperature)</td>
<td>White to off-white small beads with no odor.</td>
</tr>
<tr>
<td>Molecular Formula</td>
<td>((C_{10}H_{10}(C_7H_7N))_n)</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>No data available.</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>No data available.</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>No data available.</td>
</tr>
<tr>
<td>Specific Gravity or Density</td>
<td>0.35 g/mL (dry)</td>
</tr>
<tr>
<td>Vapor Density (air = 1)</td>
<td>No data available.</td>
</tr>
<tr>
<td>Boiling Point</td>
<td>No data available.</td>
</tr>
<tr>
<td>Freezing / Melting Point</td>
<td>No data available.</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>Insoluble</td>
</tr>
<tr>
<td>Octanol / Water Coefficient</td>
<td>No data available.</td>
</tr>
<tr>
<td>pH</td>
<td>No data available.</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No data available.</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No data available.</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>No data available.</td>
</tr>
</tbody>
</table>

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Flash Point and Method: > 300°F (> 148°C) Tag Open Cup
Flammability (solid, gas): No data available.
 Explosive Properties: Not explosive.

Flammable Limits: No data available.
Decomposition Temperature: No data available.
Oxidizing Properties: Not an oxidizer.

SECTION 10: Stability and reactivity

10.1. Reactivity
Not classified as dangerously reactive.

10.2. Chemical stability
Stable

10.3. Possibility of hazardous reactions
Polymerization is not expected to occur

10.4. Conditions to avoid
No data available.

10.5. Incompatible materials
Strong oxidizing agents

10.6. Hazardous decomposition products
Toxic vapors may be released upon thermal decomposition (cyanides, nitrogen oxides, carbon monoxide).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute Oral LD₅₀: > 5000 mg/kg (rat) Poly-4-Vinylpyridine, crosslinked with divinylbenzene
Acute Dermal LD₅₀: > 2000 mg/kg (rabbit) Poly-4-Vinylpyridine, crosslinked with divinylbenzene
Acute Inhalation LC₅₀: No data available.
Skin Irritation: Non-irritating to skin.
Eye Irritation: Non-irritating to eyes.
Skin Sensitization: Negative for sensitizing effects in guinea pig maximization test.
Mutagenicity: No data available.
Reproductive / Developmental Toxicity: No data available.
Carcinogenicity: This material is not listed by IARC, NTP or OSHA as a carcinogen. No test data is available that indicates this material is a carcinogen.
Target Organs: No data available.
Aspiration Hazard: Based on physical properties, not likely to be an aspiration hazard.
Primary Route(s) of Exposure: Skin contact and absorption, eye contact, and inhalation. Ingestion is not likely to be a primary route of exposure.

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Most important symptoms and effects, both acute and delayed
Cross-linked Poly-4-Vinylpyridine polymers are not expected to cause irritation to skin or eyes, based on laboratory test results. Overexposure to dusty material may cause respiratory tract irritation in sensitive individuals. No skin sensitization was observed in laboratory tests. Although it has been observed that the health effects related to this compound are minimal, as with any chemical, use appropriate precautions during handling. Delayed Effects: None known.

Additive or Synergistic effects:
None known.

SECTION 12: Ecological information

12.1. Toxicity
No data available.

12.2. Persistence and degradability
Does not biodegrade readily.

12.3. Bioaccumulative potential
Bioconcentration is not expected to occur.

12.4. Mobility in soil
No data available.

12.5. Results of PBT and vPvB assessment
This substance is not a PBT or vPvB.

SECTION 13: Disposal considerations

13.1. Waste treatment methods
US EPA Waste Number: Non-Hazardous
Waste Classification: (per US regulations) The waste may be classified as “special” or hazardous per State regulations.
Waste Disposal:
NOTE: Generator is responsible for proper waste characterization. State hazardous waste regulations may differ substantially from federal regulations. Dispose of this material responsibly, and in accordance with standard practice for disposal of potentially hazardous materials as required by applicable international, national, regional, state or local laws, and environmental protection duty of care principles. Do NOT dump into any sewers, on the ground, or into any body of water. For disposal within the EC, the appropriate classification code according to the European Community List of Wastes should be used. Note that disposal regulations may also apply to empty containers and equipment rinsates.

SECTION 14: Transport information

The following information applies to all shipping modes (DOT/IATA/ICAO/IMDG/ADR/RID/ADN), unless otherwise indicated:

14.1. UN number
Non-Hazardous
14.2. UN proper shipping name
Chemicals, n.o.s. (Poly-4-Vinylpyridine, crosslinked with divinylbenzene)

14.3. Transport hazard class(es)
Not applicable.
14.4. Packing group
Not applicable.

14.5. Environmental hazards
Not applicable.

14.6. Special precautions for user
Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Not applicable.

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SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Chemical Inventory Lists:  Status:
USA TSCA:  Listed  EINECS:  Polymer, monomers listed
Canada(DSL/NDSL):  Listed (DSL)  Japan:  Listed (6-1463)
Korea:  Listed (KE-13322)  Australia:  Not listed.
Taiwan:  Listed  New Zealand:  Not listed.

WHMIS Classification:  This product is not classified as a controlled product under Canadian Controlled Products Regulations.

German Water Hazard Classification:  WGK 1 (self-classification)

SARA 313:  Not applicable.
Reportable Quantities:  Not applicable.
State Regulations:  Not applicable.

HMIS:  
HEALTH 0  NFPA:
FLAMMABILITY 1  
REACTIVITY 0

15.2. Chemical safety assessment

Not applicable.

SECTION 16: Other information

Full text of R phrases in Section 3:  Non-Hazardous
Classification Method:  On basis of test data

Legend of Abbreviations:

ACGIH = American Conference on Governmental Industrial Hygienists.
CAS = Chemical Abstracts Service.
DSL/NDSL = Domestic Substances List/Non-Domestic Substances List.
EC = European Community.
EINECS = European Inventory of Existing Commercial Chemical Substances.
ELINCS = European List of Notified Chemical Substances.
EU = European Union.
GHS = Globally Harmonized System.
LC = Lethal Concentration.
LD = Lethal Dose.
NIOSH = National Institute of Occupational Safety and Health.
NTP = National Toxicology Program.
OSHA = Occupational Safety and Health Administration.
PEL = Permissible Exposure Limit.
RQ = Reportable Quantity.
TLV = Threshold Limit Value.
WHMIS = Workplace Hazardous Materials Information System.

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Issued by: Regulatory Management Department
Revision Details: Revised Section 12 and 15.

Original Date of Issue: 12 June 1985
Email: SDS@Vertellus.com