SECTION 1: Identification

1.1. Identification

Product name: POLY(1,1-PERHYDROSILAZANE) telomer 10wt% in heptanes
Product code: PSN-2H01.2
Product form: Mixture
Physical state: Liquid
Synonyms: POLY(IMINOSILYLENE); AMINE CURE SILICON RESIN
Chemical family: SILICONE RESIN

1.2. Recommended use and restrictions on use

Recommended use: Chemical intermediate

1.3. Supplier

GELEST, INC.
11 East Steel Road
Morrisville, PA 19067
USA
T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST
info@gelest.com - www.gelest.com

1.4. Emergency telephone number

Emergency number: CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Flammable liquids Category 2 - H225 - Highly flammable liquid and vapor
Skin corrosion/irritation Category 2 - H315 - Causes skin irritation
Serious eye damage/eye irritation Category 2A - H319 - Causes serious eye irritation
Specific target organ toxicity (single exposure) Category 3 - H336 - May cause drowsiness or dizziness
Hazardous to the aquatic environment - Acute Hazard Category 1 - H400 - Very toxic to aquatic life
Hazardous to the aquatic environment - Chronic Hazard Category 1 - H410 - Very toxic to aquatic life with long lasting effects

Full text of H statements: see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US):

Signal word (GHS US): Danger

Hazard statements (GHS US):

- H225 - Highly flammable liquid and vapor
- H315 - Causes skin irritation
- H319 - Causes serious eye irritation
- H336 - May cause drowsiness or dizziness
- H400 - Very toxic to aquatic life
- H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements (GHS US):

- P280 - Wear protective gloves/protective clothing/eye protection/face protection.
- P280 - Wear protective gloves/protective clothing/eye protection/face protection.
- P210 - Keep away from heat, open flames, sparks. - No smoking.
- P240 - Ground/Bond container and receiving equipment
- P241 - Use explosion-proof electrical equipment
- P242 - Use only non-sparking tools.
- P243 - Take precautionary measures against static discharge.
- P261 - Avoid breathing vapors.
- P264 - Wash hands thoroughly after handling.
- P271 - Use only outdoors or in a well-ventilated area.
- P273 - Avoid release to the environment.
- P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
- P303+P361+P353 - If on skin (or hair): take off immediately all contaminated clothing. Rinse skin with water/shower
- P332+P313 - If skin irritation occurs: Get medical advice/attention.
- P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
POLY(1,1-PERHYDROSILAZANE) telomer 10wt% in heptanes

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2.3. Hazards not otherwise classified (HNOC)
No additional information available

2.4. Unknown acute toxicity (GHS US)
Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances
Not applicable

3.2. Mixtures

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Heptane</td>
<td>(CAS-No.) 142-82-5</td>
<td>89 - 91</td>
<td>Flam. Liq. 2, H225, Skin Irrit. 2, H315, STOT SE 3, H336, Asp. Tox. 1, H304, Aquatic Acute 1, H400, Aquatic Chronic 1, H410</td>
</tr>
<tr>
<td>Poly(1,1-perhydrosilazane) telomer</td>
<td>(CAS-No.) 176948-80-4/149013-47-8</td>
<td>9 - 11</td>
<td>Eye Irrit. 2A, H319</td>
</tr>
</tbody>
</table>

Full text of hazard classes and H-statements : see section 16

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available show packaging or label.

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact : Wash with plenty of soap and water. Get medical advice/attention.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

First-aid measures after ingestion : Never give anything by mouth to an unconscious person. Get medical advice/attention.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation : May cause drowsiness or dizziness. May cause irritation to the respiratory tract. Heptane can cause vertigo, incoordination and stupor at 5000ppm. Vapor inhalation of heptane may lead to impairment of coodination mental alertness, and reaction times, leading to accident proneness.

Symptoms/effects after skin contact : Causes skin irritation.

Symptoms/effects after eye contact : Causes serious eye irritation.

Symptoms/effects after ingestion : May be harmful if swallowed.

4.3. Immediate medical attention and special treatment, if necessary
No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media


Unsuitable extinguishing media : Do not use straight streams.

5.2. Specific hazards arising from the chemical

Fire hazard : Highly flammable liquid and vapor. Irritating fumes of hydrochloric acid and organic acid vapors may develop when material is exposed to water or open flame.

Explosion hazard : May form flammable/explosive vapor-air mixture.

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Exercise caution when fighting any chemical fire. Use water spray to cool exposed surfaces.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection. Avoid all eye and skin contact and do not breathe vapor and mist.
POLY(1,1-PERHYDROSILAZANE) telomer 10wt% in heptanes
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SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Eliminate every possible source of ignition. Use special care to avoid static electric charges.

6.1.1. For non-emergency personnel
Protective equipment : Wear protective equipment as described in Section 8.
Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders
Protective equipment : For further information refer to section 8: "Exposure controls/personal protection". Equip cleanup crew with proper protection. Do not attempt to take action without suitable protective equipment.

6.2. Environmental precautions
Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up
For containment : Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.
Methods for cleaning up : Clean up any spills as soon as possible, using an absorbent material to collect it. Sweep or shovel spills into appropriate container for disposal. Collect spillage. Use only non-sparking tools.

6.4. Reference to other sections
See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Additional hazards when processed : Handle empty containers with care because residual vapors are flammable. Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Precautions for safe handling : Avoid all eye and skin contact and do not breathe vapor and mist. Ground/bond container and receiving equipment. Take precautionary measures against static discharge. Use only outdoors or in a well-ventilated area. Use only non-sparking tools.
Hygiene measures : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities
Technical measures : Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof electrical equipment.
Storage conditions : Keep container tightly closed. Keep in a cool place. Store locked up. Store < 5°C.
Storage area : Store in a well-ventilated place. Store away from heat.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>n-Heptane (142-82-5)</td>
<td></td>
</tr>
<tr>
<td>ACGIH TWA (ppm)</td>
<td>400 ppm</td>
</tr>
<tr>
<td>ACGIH STEL (ppm)</td>
<td>500 ppm</td>
</tr>
<tr>
<td>OSHA PEL (TWA) (mg/m³)</td>
<td>2000 mg/m³</td>
</tr>
<tr>
<td>OSHA PEL (TWA) (ppm)</td>
<td>500 ppm</td>
</tr>
<tr>
<td>US IDLH (ppm)</td>
<td>750 ppm</td>
</tr>
<tr>
<td>NIOSH REL (TWA) (mg/m³)</td>
<td>350 mg/m³</td>
</tr>
<tr>
<td>NIOSH REL (TWA) (ppm)</td>
<td>85 ppm</td>
</tr>
<tr>
<td>NIOSH REL (ceiling) (mg/m³)</td>
<td>1800 mg/m³</td>
</tr>
<tr>
<td>NIOSH REL (ceiling) (ppm)</td>
<td>440 ppm</td>
</tr>
</tbody>
</table>

8.2. Appropriate engineering controls
Appropriate engineering controls : Provide local exhaust or general room ventilation.
8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:
Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

Hand protection:
Neoprene or nitrile rubber gloves

Eye protection:
Chemical goggles. Contact lenses should not be worn

Skin and body protection:
Wear suitable protective clothing

Respiratory protection:
Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. NIOSH-certified combination organic vapor - amine gas (brown cartridge) respirator.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Liquid. Forms cross-linked solid after evaporation of solvent.</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>500 - 2500 g/mol</td>
</tr>
<tr>
<td>Color</td>
<td>No data available</td>
</tr>
<tr>
<td>Odor</td>
<td>Ammoniacal</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>Refractive index</td>
<td>No data available</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (butyl acetate=1)</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
<td>No data available</td>
</tr>
<tr>
<td>Freezing point</td>
<td>&lt; -20 °C</td>
</tr>
<tr>
<td>Boiling point</td>
<td>98 °C initial (heptane)</td>
</tr>
<tr>
<td>Flash point</td>
<td>0 °C</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>204 °C (heptane)</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Highly flammable liquid and vapor</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>40 mm Hg @ 22°C (heptane)</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>3.45 (heptane)</td>
</tr>
<tr>
<td>Relative density</td>
<td>0.728</td>
</tr>
<tr>
<td>% Volatiles</td>
<td>&gt; 60 %</td>
</tr>
<tr>
<td>Solubility</td>
<td>Insoluble in water. Reacts with water.</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Log Kow</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>1 - 6.7 vol % (lower; upper: heptane)</td>
</tr>
</tbody>
</table>

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable in sealed containers stored under a dry inert atmosphere at less than 5°C. Gels on exposure to air.

10.3. Possibility of hazardous reactions

No additional information available
POLY(1,1-PERHYDROSILAZANE) telomer 10wt% in heptanes
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10.4. Conditions to avoid
Heat. Open flame. Sparks.

10.5. Incompatible materials

10.6. Hazardous decomposition products
Ammonia vapors. Silicon dioxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity: Not classified

<table>
<thead>
<tr>
<th>n-Heptane (142-82-5)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 oral mouse</td>
<td>5000 mg/kg</td>
</tr>
<tr>
<td>LD50 dermal rabbit</td>
<td>3000 mg/kg</td>
</tr>
<tr>
<td>LC50 inhalation rat (mg/l)</td>
<td>103 g/m³ (Exposure time: 4 h)</td>
</tr>
<tr>
<td>ATE US (dermal)</td>
<td>3000 mg/kg body weight</td>
</tr>
<tr>
<td>ATE US (vapors)</td>
<td>103 mg/l/4h</td>
</tr>
<tr>
<td>ATE US (dust, mist)</td>
<td>103 mg/l/4h</td>
</tr>
<tr>
<td>Toxicity information</td>
<td>1000 ppm Inhalation (heptane)-human, TCL0</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation: Causes skin irritation.
Serious eye damage/irritation: Causes serious eye irritation.
Respiratory or skin sensitization: Not classified
Germ cell mutagenicity: Not classified
Carcinogenicity: Not classified
Reproductive toxicity: Not classified
Specific target organ toxicity – single exposure: May cause drowsiness or dizziness.
Specific target organ toxicity – repeated exposure: Not classified
Aspiration hazard: Not classified
Symptoms/effects after inhalation: May cause drowsiness or dizziness. May cause irritation to the respiratory tract. Heptane can cause vertigo, incoordination and stupor at 5000ppm. Vapor inhalation of heptane may lead to impairment of coordination mental alertness, and reaction times, leading to accident proneness.
Symptoms/effects after skin contact: Causes skin irritation.
Symptoms/effects after eye contact: Causes serious eye irritation.
Symptoms/effects after ingestion: May be harmful if swallowed.
Reason for classification: Expert judgment

SECTION 12: Ecological information

12.1. Toxicity
Ecology - general: Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

<table>
<thead>
<tr>
<th>n-Heptane (142-82-5)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LC50 fish 1</td>
<td>375 mg/l (Exposure time: 96 h - Species: Cichlid fish)</td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential

<table>
<thead>
<tr>
<th>n-Heptane (142-82-5)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Log Pow</td>
<td>4.66</td>
</tr>
</tbody>
</table>

12.4. Mobility in soil
No additional information available

12.5. Other adverse effects
Effect on the ozone layer: No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods
Sewage disposal recommendations: Do not dispose of waste into sewer.
POLY(1,1-PERHYDROSILAZANE) telomer 10wt% in heptanes

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Product/Packaging disposal recommendations: May be incinerated. Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.

Additional information: Handle empty containers with care because residual vapors are flammable.

Ecology - waste materials: Avoid release to the environment.

SECTION 14: Transport information

14.1. UN number

UN-No.(DOT) : 1139
DOT NA no. : UN1139

14.2. UN proper shipping name

Transport document description: UN1139 Coating solution (POLY(1,1-PERHYDROSILAZANE) telomer 10wt% in heptanes), 3, II
Proper Shipping Name (DOT): Coating solution (POLY(1,1-PERHYDROSILAZANE) telomer 10wt% in heptanes)
Class (DOT) : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120
Packing group (DOT): II - Medium Danger
Hazard labels (DOT) : 3 - Flammable liquid

Dangerous for the environment : Yes
Marine pollutant : Yes

DOT Packaging Non Bulk (49 CFR 173.xxx) : 202
DOT Packaging Bulk (49 CFR 173.xxx) : 242
DOT Packaging Exceptions (49 CFR 173.xxx) : 150

14.3. Additional information

Emergency Response Guide (ERG) Number : 127
Other information : No supplementary information available.

Transport by sea

DOT Vessel Stowage Location : B - (i) The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) “On deck only” on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.

Air transport

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : 5 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 60 L

SECTION 15: Regulatory information

15.1. US Federal regulations

POLY(1,1-PERHYDROSILAZANE) telomer 10wt% in heptanes

CAUTION: This material is supplied for research and development purposes subject to the R&D exemption under TSCA, 40 CFR 720.36, and must meet the requirements of the exemption, including supervision by a "technically qualified individual" as defined by 40 CFR 720.3(ee). The use of this material for "commercial purposes" as defined by 40 CFR 720.3(r) is not permitted in the United States.

TSCA Exemption/Exclusion

Poly(1,1-perhydrosilazane) telomer (176948-80-4/149013-47-8)
Not listed on the United States TSCA (Toxic Substances Control Act) inventory
POLY(1,1-PERHYDROSILAZANE) telomer 10wt% in heptanes

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**15.2. International regulations**

**CANADA**
No additional information available

**n-Heptane (142-82-5)**
Listed on the Canadian DSL (Domestic Substances List)

<table>
<thead>
<tr>
<th>WHMIS Classification</th>
<th>Class B Division 2 - Flammable Liquid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class D Division 2 Subdivision B - Toxic material causing other toxic effects</td>
</tr>
</tbody>
</table>

**EU-Regulations**
No additional information available

**n-Heptane (142-82-5)**
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

**National regulations**

**n-Heptane (142-82-5)**
Listed on the AICS (Australian Inventory of Chemical Substances)  
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)  
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory  
Listed on the Korean ECL (Existing Chemicals List)  
Listed on NZIoC (New Zealand Inventory of Chemicals)  
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)  
Listed on the Canadian IDL (Ingredient Disclosure List)  
Listed on INSQ (Mexican National Inventory of Chemical Substances)  
Listed on CICR (Turkish Inventory and Control of Chemicals)

**15.3. US State regulations**
California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

**n-Heptane (142-82-5)**
U.S. - Massachusetts - Right To Know List  
U.S. - New Jersey - Right to Know Hazardous Substance List  
U.S. - Pennsylvania - RTK (Right to Know) List

**SECTION 16: Other information**

Full text of H-phrases::

- **H225**: Highly flammable liquid and vapor
- **H304**: May be fatal if swallowed and enters airways
- **H315**: Causes skin irritation
- **H319**: Causes serious eye irritation
- **H336**: May cause drowsiness or dizziness
- **H400**: Very toxic to aquatic life
- **H410**: Very toxic to aquatic life with long lasting effects

**Abbreviations and acronyms**

Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemical Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor.

**Hazard Rating**

**Health**

- **2 Moderate Hazard - Temporary or minor injury may occur**

**Flammability**

- **4 Severe Hazard - Flammable gases, or very volatile flammable liquids with flash points below 73 F, and boiling points below 100 F. Materials may ignite spontaneously with air. (Class IA)**

**Physical**

- **1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors.**
POLY(1,1-PERHYDROSILAZANE) telomer 10wt% in heptanes

Safety Data Sheet

Prepared by safety and environmental affairs.

Date of issue: 10/12/2015       Revision date: 03/05/2019       Version: 1.1

SDS US (GHS HazCom 2012) - Custom

According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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