

## Safety Data Sheet

Printing date 04/24/2019

Reviewed on 04/24/2019

### 1 Identification

- **Product identifier**
- **Trade name:** **PENTALYN® H**
- **Product Description** synthetic resin
- **Article number:** 108736, 105420, 105723
- **Application of the substance / the mixture**  
*Tackifier in pressure-sensitive adhesives needing heat, light, oxidation, and moisture resistance*  
*Readily formulated into solvent and hot-melt type adhesives*  
*Tackifier for natural rubber, neoprene and SBR latex based adhesives*
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**  
*Pinova Incorporated*  
*2801 Cook Street*  
*Brunswick, Georgia 31520*  
*msds@pinovasolutions.com*
- **Information department:**  
*Pinova, Inc. - Regulatory Affairs Department*  
*msds@pinovasolutions.com*
- **Emergency telephone number:**  
*Within USA and Canada: 1-800-CHEMTREC (424-9300)*  
*Outside the USA and Canada: 1-703-527-3887*

### 2 Hazard(s) identification

- **Classification of the substance or mixture**  
*Combustible Dust May form combustible dust concentrations in air.*
- **Label elements**
- **GHS label elements**  
*The substance is classified and labeled according to the Globally Harmonized System (GHS).*
- **Hazard pictograms** Void
- **Signal word** Warning
- **Hazard statements**  
*May form combustible dust concentrations in air.*
- **Precautionary statements**  

P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P234	Keep only in original container.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/fume/gas/mist/vapors/spray
P262	Do not get in eyes, on skin, or on clothing.
P264	Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves / eye protection.
P301+P312	If swallowed: Call a doctor if you feel unwell.
P301+P330+P331	If swallowed: Rinse mouth. Do NOT induce vomiting.
P302+P352	If on skin: Wash with plenty of soap and water.

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- P304+P312 *IF INHALED: Call a doctor if you feel unwell.*
- P304+P341 *If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.*
- P305+P351+P338 *If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.*
- P314 *Get medical advice/attention if you feel unwell.*
- P333+P313 *If skin irritation or rash occurs: Get medical advice/attention.*
- P363 *Wash contaminated clothing before reuse.*
- P402+P404 *Store in a dry place. Store in a closed container.*
- P403+P233 *Store in a well-ventilated place. Keep container tightly closed.*
- P501 *Dispose of contents/container in accordance with local/regional/national/international regulations.*

• **Information pertaining to particular dangers for man and environment:**

**DANGER!**

*HOT MOLTEN product: Burns may cause irreversible eye injury and blindness. Causes skin burns. Inhalation of smoke or fumes may cause throat discomfort, coughing, or breathing difficulty. Product may burn if ignited.*

*POTENTIAL HEALTH EFFECTS - May cause eye irritation by mechanical abrasion. May cause skin irritation by mechanical abrasion. Inhalation may cause respiratory irritation with throat discomfort, coughing, or breathing difficulty. Repeated exposure may lead to respiratory sensitization (asthma) in susceptible individuals.*

*GENERAL HYGENIC PRACTICES - Avoid contact with eyes, skin and clothing. Avoid breathing dust or fumes. Handle in areas with adequate ventilation.*

**WARNING!**

*Solid product at ambient temperature. Static charges generated by emptying package in or near flammable vapors may cause a flash fire. May form flammable dust-air mixtures.*

*Refer to SDS Section 8, Exposure Controls/Personal Protection, for further information. Refer to Section 5 for Hazardous Combustion Products and Section 10 for Hazardous Decomposition/Hazardous Polymerization Products.*

• **Classification system:**

• **NFPA ratings (scale 0 - 4)**



• **HMIS-ratings (scale 0 - 4)**



• **Other hazards** None known.

• **Results of PBT and vPvB assessment**

• **PBT:** Not a PBT.

• **vPvB:** Not a vPvB.

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### 3 Composition/information on ingredients

- **Chemical characterization: Substances**

- **CAS No.:** 64365-17-9

- **CAS No. Description**

Resin acids and Rosin acids, hydrogenated, esters with pentaerythritol

- **Additional information:**

This product is shipped and delivered as an ambient temperature SOLID or HOT MOLTEN liquid. THE HMIS HEALTH HAZARD RATING FOR THE HOT MOLTEN OR HOT LIQUID PRODUCT IS 3 SERIOUS. See SDS Section 2 for the HMIS health hazard rating for the product at ambient temperature.

When shipped at elevated temperatures and delivered in HOT MOLTEN or HOT LIQUID form, refer to SDS Sections 2, 4, 5, 7 and 8 for additional hazard information.

When shipped and delivered in solid form, this product is considered hazardous according to the OSHA Hazard Communication Standard 29CFR1910.1200 due to flammable dust potential.

If this product is heated or used at temperatures sufficient to produce smoke or fumes, refer to SDS Section 8, Exposure Controls/Personal Protection

As Pinova, Inc interprets the Workplace Hazardous Materials Information System (WHMIS) 2015, this product should be considered a hazardous material due to the potential presence of combustible dust.

If dispersed in air, the fine particles may catch fire if ignited. This SDS contains valuable information important to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users/handlers of this product.

### 4 First-aid measures

- **Description of first aid measures**

- **After inhalation:**

Remove to fresh air. Get medical attention if nasal, throat or lung irritation develops.

See Note to Physician.

- **After skin contact:**

HOT MOLTEN product: Immediately cool skin burns with water and cold packs for at least 15 minutes. Do NOT put ice directly on the skin. Do NOT attempt to remove solidified resin from the skin as severe tissue damage may result.

See Note to Physician.

SOLID product at ambient temperature: Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists. Thoroughly wash clothing before reuse.

See Note to Physician.

- **After eye contact:**

HOT MOLTEN product: Cool burns with plenty of low-pressure water. Get immediate medical attention.

SOLID product at ambient temperature: Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get medical attention if irritation persists.

- **After swallowing:**

Not an ingestion hazard under anticipated conditions of use.

For accidental ingestion: Do NOT induce vomiting. Get immediate medical attention.

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**Information for doctor:**

For HOT MOLTEN or HOT LIQUID product: Material should not be forcibly removed from the skin. Mineral oil may be used to loosen and soften the material.

This product contains rosin or a rosin derivative. Rosin and some of its derivatives have been reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged skin contact. Smoke or fumes generated by heating product may lead to respiratory sensitization (asthma) in susceptible individuals.

For HOT MOLTEN or HOT LIQUID product: Material should not be forcibly removed from the skin. Mineral oil may be used to loosen and soften the material.

**Most important symptoms and effects, both acute and delayed**

No further relevant information available.

**Indication of any immediate medical attention and special treatment needed**

No further relevant information available.

### 5 Fire-fighting measures

**Extinguishing media****Suitable extinguishing agents:**

Water spray, dry chemical, foam, carbon dioxide or clean extinguishing agents may be used on fires involving this product.

**Special hazards arising from the substance or mixture**

If heated to combustion, the following substances may be formed:

Carbon monoxide (CO)

Carbon Dioxide (CO<sub>2</sub>)

Aldehydes

Carboxylic acids

Smoke

Formaldehyde

**Advice for firefighters****Protective equipment:**

Wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH approved (or equivalent) and full protective gear when fighting fires involving this product.

Apply water to HOT MOLTEN or HOT LIQUID resin fires from a safe, protected location to avoid body contact with hot resin.

**Additional information** Cool containers with water to prevent rupture.

### 6 Accidental release measures

**Personal precautions, protective equipment and emergency procedures**

For HOT MOLTEN or HOT LIQUID product: Wear protective equipment as required (see SDS Section 8). Contain spilled material and allow it to cool and solidify. Do NOT apply water. After solidification, clean up and place in suitable containers for use or disposal.

For SOLID product: Ventilate area. Avoid dust formation. If product is not contaminated, scoop into clean containers for use. If product is contaminated, scoop into containers, and dispose appropriately. In case of accidental spills or release, refer to Section 8, Personal Protective Equipment and General Hygiene Practices.

**Environmental precautions:** Damp down dust with water spray.

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- **Methods and material for containment and cleaning up:** Allow to solidify. Pick up mechanically.
- **Reference to other sections**
  - See Section 7 for information on safe handling.
  - See Section 8 for information on personal protection equipment.
  - See Section 13 for disposal information.
- **Protective Action Criteria for Chemicals**
  - **PAC-1:** Substance is not listed.
  - **PAC-2:** Substance is not listed.
  - **PAC-3:** Substance is not listed.

### 7 Handling and storage

- **Handling:**
- **Precautions for safe handling**
  - For **HOT MOLTEN** or **HOT LIQUID** product: Use personal protective equipment as indicated in Section 8: Exposure Controls/Personal Protection.
  - For **SOLID** product:
    - Ground all equipment.
    - Blanket vessel with inert gas when emptying bags where flammable vapors may be present.
    - Ground operator and pour material slowly into conductive, grounded chute.
    - For large bags (1000 lbs or greater) a ground cable **MUST** be attached to the bag ground connection.
- **Information about protection against explosions and fires:**
  - Avoid conditions that generate dust; product may form flammable dust-air mixtures.
  - Avoid emptying package in or near flammable vapors; static charges may cause flash fire.
  - Keep away from heat, flame, sparks and other ignition sources.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
  - Store in a cool, dry, well-ventilated area.
  - Keep container closed when not in use.
  - Control inventory.
  - Rotate stock periodically.
  - Check old product for deterioration regularly.
  - Use oldest material first.
  - Refer to technical literature for additional handling and storage measures.
- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:**
  - Water contact with **HOT MOLTEN** resin may result in foaming or spattering, which can cause eye or skin burns.
- **Specific end use(s)** No further relevant information available.

### 8 Exposure controls/personal protection

- **Additional information about design of technical systems:**
  - Eyewash fountains and safety showers should be easily accessible.
  - If user operations generates vapor, fumes or mist: Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
  - Discharge from the ventilation system should comply with applicable air pollution control regulations.

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*Eliminate ignition sources and prevent build-up of static electrical charges.*

*Completely isolate and thoroughly clean all equipment, piping, or vessels before beginning maintenance or repairs.*

• **Control parameters**

• **Components with limit values that require monitoring at the workplace:** Not required.

• **Additional Occupational Exposure Limit Values for possible hazards during processing:**

*This product may present an inhalation health hazard if used under conditions that could generate fumes.*

*PARTICULATES (INSOLUBLE) NOT OTHERWISE SPECIFIED (PNOS): If used under conditions that generate particulates, the ACGIH TLV-TWA of 3 mg/m<sup>3</sup> respirable fraction (10mg/m<sup>3</sup> total) should be observed.*

*ROSIN PYROLYSIS FUMES: If this product is heated to temperatures sufficient to produce smoke or fumes, maintain exposure to resin acids to the lowest achievable concentration using recommended engineering controls and personal protective equipment.*

• **Exposure controls**

• **Personal protective equipment:**

• **General protective and hygienic measures:**

*Avoid contact with eyes, skin, and clothing.*

*Avoid breathing dust or fumes.*

*Handle in areas with adequate ventilation.*

*Avoid contamination of food, beverages, or smoking materials.*

*Wash thoroughly after handling, and before eating, drinking or smoking.*

*Remove contaminated clothing promptly and clean thoroughly before reuse.*

• **Breathing equipment:**

*Appropriate respiratory protection is required when exposure to airborne contaminants may exceed acceptable limits. Respirators should be selected and used in accordance with OSHA, Subpart I (29 CFR 1910.134) and manufacturers recommendations.*

• **Protection of hands:**

*Impervious gloves*

*The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.*

*Selection of the glove material should be made based on consideration of the penetration times, rates of diffusion and the degradation*

• **Material of gloves**

*The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.*

• **Penetration time of glove material**

*The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.*

• **Eye protection:** Safety glasses

• **Body protection:**

*Appropriate protective clothing*

*Personnel exposed to HOT MOLTEN or HOT LIQUID material should wear protective clothing that provides protection against thermal burns. Required Protective Equipment: a) Longsleeved protective shirt, long pants and work shoes; b) Hard hat and face shield; c) Long-cuff gloves (Gauntlet type-extending beyond wrist); d) Lined rain suit with protective hood or shoulder shroud or e) Full aluminized or thermal suit with hood.*

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### 9 Physical and chemical properties

· **Information on basic physical and chemical properties**

· **General Information**

· **Appearance:**

**Form:** Hot molten liquid, solid or flake

**Color:** straw to amber

· **Odor:** Typical rosin odour

· **Specific Gravity** 1.07 @ 25°C

· **Change in condition**

**Softening Point** 94-102 °C (201.2-215.6 °F) (Ring & Ball)

· **Flash point:** 232 - 237 °C (449.6-458.6 °F)

· **Explosive properties:** Product is not explosive. However, formation of explosive air/dust mixtures are possible.

· **Explosion limits:**

**Oxidizing properties** The substance does not contain any chemical groups associated with oxidizing properties.

· **Density:** 1.07 (kg/m<sup>3</sup>)

· **Bulk density:** Not determined

· **Solubility in / Miscibility with Water at 20 °C (68 °F):** negligibl g/l

· **Partition coefficient (n-octanol/water):** > 4

· **Other information** No further relevant information available.

### 10 Stability and reactivity

· **Reactivity** No further relevant information available.

· **Chemical stability**

· **Thermal decomposition / conditions to be avoided:**

None known. If this product is used at elevated temperatures, it may generate combustion products. Refer to SDS Section 5, Hazardous Combustion Products.

· **Possibility of hazardous reactions**

HAZARDOUS POLYMERIZATION - Not anticipated under normal or recommended handling and storage conditions.

· **Conditions to avoid** No further relevant information available.

· **Incompatible materials:** None known.

· **Hazardous decomposition products:**

No dangerous decomposition products known.

If this product is used at elevated temperatures, it may generate combustion products. Refer to SDS Section 5, Hazardous Combustion Products.

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### 11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity:**
- **LD/LC50 values that are relevant for classification:**  
PRODUCT/SIMILAR PRODUCT -  
Not toxic by OSHA/ANSI criteria based on acute animal peroral testing of this or a similar product (LD50 >5000 mg/kg). Feeding studies of this or similar products indicate no evidence of risk at anticipated workplace exposure levels. Mild reversible respiratory irritation from single and repeated inhalation exposure to heated vapors of this or a similar material.
- **Primary irritant effect:**
- **Skin corrosion/irritation:**  
PRODUCT/SIMILAR PRODUCT - Rosin and some derivatives: Reported to cause an allergic skin reaction (sensitization) in susceptible individuals after repeated or prolonged contact. Smoke or fumes generated by heating may lead to respiratory sensitization (asthma) in susceptible individuals. Due to the physical nature of this material, may cause eye, skin and respiratory irritation.
- **Serious eye damage/irritation:**  
The fine particles and powder should be regarded as an inert, nuisance dust.
- **Skin Sensitization:**  
Inhalation: Noxious and irritating fumes may be released on overheating this product. The thermal decomposition of these vapours at about 400 °C may give rise to products which, if not ventilated adequately, could cause asthmatic attacks in a small percentage of exposed workers.
- **Additional toxicological information:** The substance is not subject to classification.
- **Carcinogenic categories**
- **IARC (International Agency for Research on Cancer)** Substance is not listed.
- **NTP (National Toxicology Program)** Substance is not listed.
- **OSHA-Ca (Occupational Safety & Health Administration)** Substance is not listed.

### 12 Ecological information

- **Toxicity**
- **Aquatic toxicity:**  
Aquatic 48-hour static LC50 value falls within the relatively harmless range of >1000 mg/L, according to U.S. Fish and Wildlife documentation. As a screening test for chemical pollutants of natural waters, the Bacterial Multiplication Inhibition Test was performed using *Pseudomonas putida*. Due to insolubility of the product, bacteriotoxicity threshold (EC10) of 3363 mg/L was determined on a homogeneous suspension.
- **Persistence and degradability**  
Based upon data from this or similar materials, this product cannot be regarded as readily biodegradable; however, it may be slowly biodegradable.
- **Behavior in environmental systems:**
- **Bioaccumulative potential** No further relevant information available.
- **Mobility in soil** No further relevant information available.
- **Results of PBT and vPvB assessment**
- **PBT:** Not a PBT.
- **vPvB:** Not vPvB.

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· **Other adverse effects** No further relevant information available.

### 13 Disposal considerations

· **Waste treatment methods**

· **Recommendation:**

For SOLID and HOT MOLTEN product that has been cooled and solidified: Landfilling in a permitted solid or hazardous waste facility is recommended. Handling, transportation, and disposal of material should be conducted in a manner to prevent a nuisance dust hazard. Fully containerize the material before handling, and protect from exposure to the outdoors. Ensure there are no restrictions on disposing of bulk or semi-bulk quantities of waste material. Disposal should be in accordance with all Federal, State and local regulations.

· **Uncleaned packagings:**

· **Recommendation:** Disposal must be made according to official regulations.

### 14 Transport information

· **UN-Number**

· DOT, ADR, ADN, IMDG, IATA                      Void

· **UN proper shipping name**

· DOT, ADN, IMDG, IATA                      Void  
 · ADR    Void

· **Transport hazard class(es)**

· DOT, ADR, ADN, IMDG, IATA                      Void  
 · Class

· **Packing group**

· DOT, ADR, IMDG, IATA                      Void

· **Environmental hazards:**

· **Marine pollutant:**                                      No

· **Special precautions for user**

Not applicable.

· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

Not applicable.

· **Transport/Additional information:**

· DOT

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- |                                 |  |
|---------------------------------|--|
| <b>· Remarks:</b>               | <p><i>HOT MOLTEN or HOT LIQUID product: This product is subject to the hazardous materials regulations. For specific information regarding transportation of this product, please contact the Pinova representative at 912-265-3550 x3200.</i></p> <p><i>SOLID at ambient temperature: This product is NOT subject to DOT regulations.</i></p> |
| <b>· UN "Model Regulation":</b> | Void   |

### 15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
  - **Sara**
  - **Section 355 (extremely hazardous substances):** Substance is not listed.
  - **Section 313 (Specific toxic chemical listings):**  
*This product does not contain any chemicals subject to reporting under Section 313 of Title III of the Superfund Amendments and Reauthorization Act and 40CFR372.*
- Substance is not listed.*
- **SECTIONS 302/304**  
*This product is not an Extremely Hazardous Substance subject to reporting under 40CFR355.*
  - **SECTION 311 AND 312**  
*Physical Hazard:  
 Combustible Dust*
  - **CERCLA**  
*This product does not contain any chemicals subject to reporting as a CERCLA Hazardous Substance under 40CFR302.4.*
  - **RCRA**  
*This product is not a hazardous waste as listed in 40CFR261.33. It does not exhibit any of the hazardous characteristics listed in 40CFR261, Subpart C.*
  - **TSCA (Toxic Substances Control Act):** Substance is listed.
  - **Proposition 65**
  - **Chemicals known to cause cancer:** Substance is not listed.
  - **Chemicals known to cause reproductive toxicity for females:** Substance is not listed.
  - **Chemicals known to cause reproductive toxicity for males:** Substance is not listed.
  - **Chemicals known to cause developmental toxicity:** Substance is not listed.
  - **New Jersey Right-to-Know List:** Substance is not listed.
  - **New Jersey Special Hazardous Substance List:** Substance is not listed.
  - **Pennsylvania Right-to-Know List:** Substance is not listed.
  - **Pennsylvania Special Hazardous Substance List:** Substance is not listed.
  - **Carcinogenic categories**
  - **EPA (Environmental Protection Agency)** Substance is not listed.
  - **TLV (Threshold Limit Value established by ACGIH)** Substance is not listed.
  - **NIOSH-Ca (National Institute for Occupational Safety and Health)** Substance is not listed.
  - **Canadian substance listings:**
  - **Canadian Domestic Substances List (DSL)** Substance is listed.

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- **Canadian Non-Domestic Substances List (NDSL)** Substance is not listed.
- **GHS label elements**  
The substance is classified and labeled according to the Globally Harmonized System (GHS).
- **Hazard pictograms** Void
- **Signal word** Warning
- **Hazard statements**  
May form combustible dust concentrations in air.
- **Precautionary statements**  
This product has been classified in accordance with the hazard criteria of the HPR and the SDS contains all the information required by the HPR.  
Observe the general safety regulations when handling chemicals.  
P202 Do not handle until all safety precautions have been read and understood.  
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.  
P234 Keep only in original container.  
P243 Take precautionary measures against static discharge.  
P261 Avoid breathing dust/fume/gas/mist/vapors/spray  
P262 Do not get in eyes, on skin, or on clothing.  
P264 Wash thoroughly after handling.  
P270 Do not eat, drink or smoke when using this product.  
P280 Wear protective gloves / eye protection.  
P301+P312 If swallowed: Call a doctor if you feel unwell.  
P301+P330+P331 If swallowed: Rinse mouth. Do NOT induce vomiting.  
P302+P352 If on skin: Wash with plenty of soap and water.  
P304+P312 IF INHALED: Call a doctor if you feel unwell.  
P304+P341 If inhaled: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.  
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P314 Get medical advice/attention if you feel unwell.  
P333+P313 If skin irritation or rash occurs: Get medical advice/attention.  
P363 Wash contaminated clothing before reuse.  
P402+P404 Store in a dry place. Store in a closed container.  
P403+P233 Store in a well-ventilated place. Keep container tightly closed.  
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
- **National regulations:**
- **Information about limitation of use:**  
FOR USES INVOLVING COSMETIC OR SKIN-CONTACT APPLICATIONS:  
Pursuant to U.S. FDA Regulation 21 CFR 740.10:  
"WARNING: - The safety of this product has not been determined."

### 16 Other information

**DISCLAIMER:** The information and recommendations contained in this Safety Data Sheet have been compiled from sources believed to be reliable and to represent the most reasonable current opinion on the subject when the SDS was prepared. No warranty, guaranty or representation is made as to the correctness or sufficiency of the information. The user of this product must decide what safety measures are necessary to safely use this product, either alone or in combination with other products, and determine its environmental regulatory compliance obligations under any applicable federal or

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state laws.

- **Department issuing SDS:** Regulatory Affairs Department
- **Contact:** MSDS@pinovasolutions.com
- **Date of preparation / last revision** 04/24/2019 / 1.0

· **Abbreviations and acronyms:**

ICAO: International Civil Aviation Organisation

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

ACGIH: American Conference of Governmental Industrial Hygienists

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

- **Sources** Literature and company data
- \* **Data compared to the previous version altered.**

Section 15 -

SARA 311/312 physical and health hazard warnings updated to match OSHA Hazard Communications Standard 2012 Final Rule Technical Amendment effective January 1st, 2018.