SAFETY DATA SHEET

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

1.1. Product identifier
   
   Product name: Ingeo™ biopolymer
   Product code: 3D870

1.2. Relevant identified uses of the substance or mixture and uses advised against
   
   Product Use: A biopolymer to be used in 3D printing applications.

1.3. Details of the supplier of the safety data sheet
   
   Supplier: NatureWorks LLC, 15305 Minnetonka Blvd, Minnetonka, MN 55345 USA
   Customer Information Center: 800-664-6436
   sdsinquiry@natureworksllc.com
   952-562-3450

1.4. Emergency telephone number
   
   Emergency telephone numbers (24 hours a day):
   (Medical Information) +1-(651)-632-9273
   (Transportation Information) CHEMTREC: +1-(800)-424-9300 (in the United States)
   (Transportation Information) CHEMTREC: +1-(703)-527-3887 (outside the United States)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture
   
   This product is NOT classified as hazardous according to Regulation EU 1272/2008 or with Directive 67/548/EC or 1999/45/EC as amended.

2.2. Label elements
   
   Signal word: None
   Hazard Statements: None required
   Precautionary Statements: None required

2.3. Other hazards
   
   No information available

SECTION 3: Composition/information on ingredients

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Chemical name and CAS | Weight %
--- | ---
Polylactide resin | 9051-89-2 | >85

**Other standards:** This material can generate Particulates Not Otherwise Classifiable (PNOC). The Occupational Safety and Health Administration (OSHA) PEL/TWA for PNOC is 15 mg/m$^3$ for total dust and 5 mg/m$^3$ for the respirable fraction. The American Conference of Governmental Industrial Hygienists (ACGIH) TLV/TWA for PNOC is 10 mg/m$^3$ for inhalable particulates and 3 mg/m$^3$ for respirable particulates.

**SECTION 4: First aid measures**

**Emergency telephone numbers (24 hours a day):**
- (Medical Information) +1-(651)-632-9273
- (Transportation Information) CHEMTREC: +1-(800)-424-9300 (in the United States)
- (Transportation Information) CHEMTREC: +1-(703)-527-3887 (outside the United States)

**4.1. Description of first aid measures**

**Eye contact:** Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician immediately.

**Skin contact:** Rinse immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician. Cool skin rapidly with cold water after contact with hot polymer. Do not peel polymer from the skin. Consult a physician.

**Inhalation:** Move to fresh air. Call a physician immediately.

**Ingestion:** Drink water as a precaution. Never give anything by mouth to an unconscious person. Do not induce vomiting without medical advice. Call a physician immediately.

**Notes to physician:** Treat symptomatically.

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

No information available.

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

No information available.

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SECTION 5: Firefighting measures

Flammability:
Not determined

Flammability Limits in Air:
- Flammable limits in air - lower (%): Not applicable
- Flammable limits in air - upper (%): Not applicable

5.1. Extinguishing media

Suitable extinguishing media: Foam. Water. Carbon dioxide (CO2). Dry chemical. Alcohol resistant foams are preferred if available. General-purpose synthetic foams (including AFFF) or protein foams may function, but much less effectively.

Unsuitable extinguishing media: None

5.2. Special hazards arising from the substance or mixture

Burning produces obnoxious and toxic fumes Aldehydes, Carbon monoxide (CO), carbon dioxide (CO2) Nitrogen oxides (NOx)

5.3. Advice for firefighters

Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

Under fire conditions: Cool containers / tanks with water spray Water mist may be used to cool closed containers Fine dust dispersed in air may ignite. Risks of ignition followed by flame propagation or secondary explosions shall be prevented by avoiding accumulation of dust, e.g. on floors and ledges.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

6.1.2. For emergency responders

6.2. Environmental precautions

- Do not flush into surface water or sanitary sewer system
- Do not allow material to contaminate ground water system.

6.3. Methods and material for containment and cleaning up

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• Shovel into suitable container for disposal.

6.4. Reference to other sections
• No information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

• Avoid contact with skin and eyes
• Workers should be protected from the possibility of contact with molten material during fabrication
• Use personal protective equipment as required
• See Section 8
• If small particles are generated during further processing, handling, or by other means, combustible dust concentrations in air may form
• Low hazard for usual industrial or commercial handling

7.2. Conditions for safe storage, including any incompatibilities
• Store in a cool place.
• Keep at temperatures below 122°F (50°C).
• No special restrictions on storage with other products.

7.3. Specific end use(s)

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure limits:
• None established.
• This material can generate Particulates Not Otherwise Classifiable (PNOC). The Occupational Safety and Health Administration (OSHA) PEL/TWA for PNOC is 15 mg/m³ for total dust and 5 mg/m³ for the respirable fraction. The American Conference of Governmental Industrial Hygienists (ACGIH) TLV/TWA for PNOC is 10 mg/m³ for inhalable particulates and 3 mg/m³ for respirable particulates.

Engineering measures:
• Where reasonably practicable this should be achieved by the use of local exhaust ventilation and good general extraction.
• Provide appropriate exhaust ventilation at places where dust is formed.

8.2. Exposure controls

Eye protection: Safety glasses with side-shields. Goggles

Skin and body Impervious clothing

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Respiratory protection: Respirator must be worn if exposed to dust. Wear respirator with dust filter. Respiratory protection is needed if any of the exposure limits listed in the control parameters are exceeded. Consult an industrial hygiene professional prior to respirator selection and use. Use a positive-pressure air supplied respirator if there is any potential for an uncontrolled release, exposure levels are not known, or any other circumstances where air-purifying respirators may not provide adequate protection. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres.

Hand protection: Preventive skin protection.

Hygiene measures: Avoid contact with skin, eyes and clothing.

Special hazard: Workers should be protected from the possibility of contact with molten material during fabrication.

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>Solid, Pellet</td>
</tr>
<tr>
<td>Appearance</td>
<td>Opaque, pellets</td>
</tr>
<tr>
<td>Color</td>
<td>Opaque Light brown Beige</td>
</tr>
<tr>
<td>Odor</td>
<td>Sweet</td>
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<tr>
<td>pH</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>Not determined</td>
</tr>
<tr>
<td>Vapor density</td>
<td>Not determined</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>Not determined</td>
</tr>
<tr>
<td>Density</td>
<td>Not determined</td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>Not determined</td>
</tr>
<tr>
<td>Flammability</td>
<td>Fine dust dispersed in air may ignite</td>
</tr>
<tr>
<td>Flammability Limits in Air</td>
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<tr>
<td>Water solubility</td>
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<tr>
<td>Solubility in other solvents</td>
<td>None known</td>
</tr>
<tr>
<td>Solubility</td>
<td>Not determined</td>
</tr>
</tbody>
</table>

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9.2. Other information

SECTION 10: Stability and reactivity

10.1. Reactivity
None expected under conditions of normal use.

10.2. Chemical stability

10.3. Possibility of hazardous reactions
None expected under conditions of normal use

10.4. Conditions to avoid
Temperatures above 446°F (230 °C).

10.5. Incompatible materials
Oxidizing agents
Strong bases

10.6. Hazardous decomposition products
Burning produces obnoxious and toxic fumes
Aldehydes, Carbon monoxide (CO), carbon dioxide (CO2)
Nitrogen oxides (NOx)

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Principle routes of exposure: Eye contact Skin contact Inhalation Ingestion

Acute toxicity: Not determined

Local effects: May cause eye/skin irritation. Product dust may be irritating to eyes, skin and respiratory system Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea

Specific effects: May cause skin irritation and/or dermatitis Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea Inhalation of dust may cause shortness of breath, tightness of the chest, a sore throat and cough Burning

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produces irritant fumes.

Mutagenic effects: No data is available on the product itself.

Reproductive toxicity: No data is available on the product itself.

Carcinogenic effects: No data is available on the product itself.

Target organ effects: Not determined

Ingestion: No data is available on the product itself

Further information: No information available

SECTION 12: Ecological information

12.1. Toxicity
No data available

12.2. Persistence and degradability
No data available

12.3. Bioaccumulative potential
No data available

12.4. Mobility in soil
No data available

12.5. Results of PBT and vPvB assessment

12.6. Other adverse effects
No information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

In compliance with the requirements of Directive 2008/98/EC

Waste from residues / unused products: In accordance with local and national regulations Do not contaminate ponds, waterways or ditches with chemical or used container. Contact manufacturer.
Contaminated packaging: Empty remaining contents Do not re-use empty containers. Empty containers should be transported/delivered using a registered waste carrier to local recyclers for disposal.

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SECTION 14: Transport information

14.4. Packaging group

SECTION 15: Regulatory information

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

• No information available

15.2. Chemical safety assessment

Regulatory Information:

(not meant to be all inclusive - selective regulations represented)

Regulatory requirements are subject to change and may differ between locations. It is the User's responsibility to ensure that all activities comply with all federal, state or provincial and local laws and regulations. The following specific information is made for the purpose of complying with numerous national, federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

U.S. REGULATIONS

Sara 313 title III: Not Listed

TSCA Inventory List: Listed

STATE REGULATIONS

INTERNATIONAL INVENTORIES

Canada DSL Inventory List: Listed
Japanese inventory (ENCS): Listed
Australia (AICS): Listed
Korean chemical inventory: Listed
Taiwan Chemical Substance inventory (TCSI): Listed
China inventory of existing chemical substances list: Listed

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SECTION 16: Other information

Label information: Ingeo™ biopolymer
Product code: 3D870
Reason for revision: Updating of information
Revision Number: 4
Revision date: 06/19/2019
Print date: 06/19/2019
Prepared by: NatureWorks LLC Health and Safety

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