

ESSENTIUM PA

Thank you for your interest in Essentium's products. We are providing this safety data sheet [SDS] as a courtesy to your request. We certainly expect you to read the entire SDS and to call us with any required points of clarification. Please follow all precautions identified in this document.

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SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

| | |
|---|--|
| Product Name: | Essentium PA |
| Supplier: | Essentium Inc. |
| Address: | 19025 N. Heatherwilde Blvd. Suite 100 Pflugerville, TX 78660 |
| Manufacturer: | Essentium Inc. |
| Address: | 19025 N. Heatherwilde Blvd. Suite 100 Pflugerville, TX 78660 |
| Supplier Emergency Contacts & Phone: | Essentium Inc. Email: Sales@Essentium.com Website: Essentium.com |
| Revision Date | 08/21/2019 |

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

This product does not contain any components classified as hazardous under 29 CFR Part 1910.1200.

SECTION 3: HAZARDS IDENTIFICATION

Hazard statement: Molten polymer will cause thermal burns. Please take all precautions necessary to avoid burns by the molten polymer. Use with local exhaust ventilation.

Precautionary statement: None

Signal word: None

Potential health effects: See section 11 for more information

Environmental precautions: See section 12 for more information

Other hazards: If small particles are generated during further processing, handling, or by other means, combustible dust concentrations in air may form. See sections 7 and 8 for additional information.

SECTION 4: FIRST AID MEASURES

The following first aid recommendations are based on an assumption that appropriate personal and industrial best practices are followed. Precautions should be taken to avoid inhalation and eye contact.

General Advice: Remove contaminated clothing. Burns caused by molten material may require hospital treatment.

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

Skin contact: Adverse effects are not expected from accidental skin contact following occupational exposure. After contact with skin, wash with soap and water. If skin irritation persists, call a physician. Cool skin rapidly with cold water after contact with hot polymer. DO NOT attempt to remove hot polymer from skin or contaminated clothing as skin may be easily damaged. 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.

Inhalation: Move to fresh air, keep person calm. Assist in breathing if necessary. Call a physician immediately.

SECTION 5: FIRE-FIGHTING MEASURES

Suitable extinguishing media: Carbon dioxide, water spray, dry powder, and foam.

Unsuitable extinguishing media: None known

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.

Special hazards arising from substance: Hazards during fire-fighting: carbon monoxide, hydrogen cyanide, can be emitted at > 300 C. Under special fire conditions traces of other toxic substances are possible. Formation of further decomposition and oxidation products depends upon the fire conditions.

Further information: Dispose of fire debris and contaminated extinguishing water in accordance with official regulations.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions: No special precautions necessary.

Environmental precautions: No special precautions necessary.

Methods for cleaning up: Spills should be contained and placed in suitable containers for disposal.

SECTION 7: HANDLING AND STORAGE

Safe handling advice: Use personal protective equipment. Avoid contact with skin and eyes. Low hazard for usual industrial or commercial handling. Workers should be protected from the possibility of contact with molten material during fabrication. Avoid dust formation. If small particles are generated during further processing, handling, or by other means, combustible dust concentrations in air may form. Protect from moisture and impurities. Keep the floor clear. Provide suitable exhaust for ventilation during the drying process.

Storage: Protect against moisture

Suitable materials for containers: Stainless steel 1.4301 (V2), stainless steel 1.4404, aluminum, HDPE

Precautions: No special precautions required

Dangerous reaction: No dangerous reactions are known

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure control:

Engineering measures: Provide local exhaust ventilation to control dust

Engineering Guidelines:

| Component | ACHGIH TLV | OSHA PEL |
|-------------|---|--|
| Caprolactam | TWA: 5 mg/m ³ Inhalable fraction and vapor | TW value 5 ppm 20 mg/m ³ vapor, TWA value 1 mg/m ³ dust; STEL value 10 ppm 40 mg/m ³ vapor; STEL value 3 mg/m ³ dust |

Personal protective equipment:

Eye protection: Safety glasses or goggles with side-shields to protect from hot molten substance/product

Skin and body protection: Body protection is not required

Respiratory protection: Wear respiratory protection if ventilation is inadequate. Wear a NIOSH certified (or equivalent) particulate respirator. Wear a NIOSH certified (or equivalent) organic vapor/particulate respirator.

Hand protection: Preventive skin protection, gloves

Hygiene measures: Wear protective clothing to prevent contact during mechanical processing and or hot melt conditions. Avoid inhalation of dust. When using, do not eat, drink, or smoke. Hands and/or face should be washed before breaks and at the end of the shift. At the end of the shift the skin should be cleaned and skin care agents applied.

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

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

| | | | |
|--------------------------|-------------------------------|---------------------------------------|-----------------------------|
| Physical State: | Solid filament | Bulk Density: | 690 – 790 kg/m ³ |
| Appearance: | White, translucent | Decomposition Temperature: | > 300°C |
| Color: | White | Boiling Point / Boiling Range: | Not available |
| Odor: | No apparent odor | Melting Point / Melting Range: | 191 – 197°C |
| pH: | Not applicable | Flash Point: | Not available |
| Vapor Pressure: | Not determined | Autoignition Temperature: | > 400°C |
| Vapor Density: | Not determined | Water Solubility: | Insoluble |
| Evaporation Rate: | Not applicable | Solubility in Other Solvents: | Not determined |
| Relative Density: | 1.12 – 1.15 g/cm ³ | | |

SECTION 10: STABILITY AND REACTIVITY

Corrosive effect on metals: No corrosive effect

Oxidizing properties: Not fire propagating

Reactivity: None expected under conditions of normal use

Chemical stability: Stable under recommended storage conditions

Hazardous decomposition products: Carbon monoxide, carbon dioxide, hydrogen cyanide, caprolactam

SECTION 11: TOXICOLOGICAL INFORMATION

Inhalation: Low hazard for usual industrial handling

Eyes: Molten material will cause thermal burns

Skin: Molten material will cause thermal burns

Ingestion: Expected to be a low ingestion hazard

Other:

- No specific target organ toxicity (STOT)
- No sensitizing effect
- No aspiration hazard
- No known chronic effects
- Chemical structure does not suggest a specific alert to genetic toxicity
- Chemical structure does not suggest a specific alert to carcinogenicity
- Chemical structure does not suggest a specific alert to reproductive toxicity
- Chemical structure does not suggest a specific alert to teratogenicity

SECTION 12: ECOLOGICAL INFORMATION

Aquatic Toxicity: There is a high probability that the product is not acutely harmful to aquatic organisms

Biodegradable: Inert and non-degradable.

Mobility: No data available

Other: This product contains no organically-bound halogens

SECTION 13: DISPOSAL CONSIDERATIONS

Waste from residues / unused products: In accordance with local, state and national regulations. Should not be released into the environment. Do not contaminate ponds, waterways or ditches with chemical or used container. Incinerate or dispose in a licensed facility.

Contaminated packaging: Dispose of in accordance with national, state, and local regulations.

THE COMPANY 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.

SECTION 14: TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION | PROPER SHIPPING NAME: Not regulated for transportation

WATER TRANSPORTATION | PROPER SHIPPING NAME: Not regulated for transportation

AIR TRANSPORTATION | PROPER SHIPPING NAME: Not regulated for transportation

SECTION 15: REGULATORY INFORMATION

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 | | |
| NFPA Hazard Codes: | Health: 1 | Fire: 1 | Reactivity: 0 |
| HMIS III Rating: | Health: 1 | Flammability: 1 | Physical hazard: 0 |

INTERNATIONAL REGULATIONS: Contact Essentium Inc. for more information.

Not meant to be all inclusive - selective regulations represented.

SECTION 16: OTHER INFORMATION

DISCLAIMER:

Essentium Inc. nor any of its subsidiaries assumes any liability whatsoever for transporting/handling the product. It is the buyer's/user's/ licensee's responsibility to ensure that its activities comply with all federal, state, provincial, or local laws and import/export requirements. We assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Essentium Inc. makes no warranties, expressed or implied, including but not limited to, any implied warranty of merchantability or fitness for a particular purpose or course of performance or usage of trade. Final determination of suitability of any material is the sole responsibility of the user.