



SAFETY DATA SHEET

Section 1 Product and Company Identification

Chemical Product or Sample Name: MSDS information is applicable to the following products:

- Luna XPN1 Part B
- Luna XPN3 Part B
- Luna XPC1 Part B

CAS Number: Mixture

Synonyms: Epoxy curing agent

Recommended Use(s): Research sample

Company Information: Luna Innovations Incorporated

706 Forest Street Suite A
Charlottesville, VA 22903

e-mail: solutions@lunainnovations.com

Web: www.lunainnovations.com

Telephone: (434) 972-9950 (M-W; 8:00 a.m. – 5:00 p.m. EDT)

Fax: (434) 972-9956

Section 2 Hazards Identification

EMERGENCY OVERVIEW

OSHA /HCS Status: This material is considered to be hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

GHS Classification:



Hazard Class	<u>Hazard Category</u>
Acute Toxicity Dermal	4
Skin Corrosion	1B
Serious Eye Damage	1
Skin Sensitization	1
Health Hazard Signal	DANGER
Words / Route of Entry:	Causes eye, skin and respiratory tract burns. May cause allergic skin and respiratory reaction. May be harmful if absorbed through skin.
Other Hazards / Comments:	None



SAFETY DATA SHEET

POTENTIAL HEALTH EFFECTS

Potential routes of entry: Inhalation, skin, eyes.

Inhalation: Vapors and mists will irritate the respiratory tract and nasal passages. May cause allergic respiratory reaction. This product contains an ingredient that may be carcinogenic in its respirable form. However, since the ingredient is completely encapsulated by the epoxy resin, only if the cured product is dry sanded, ground, or abraded, might the carcinogenic material be released. In that case, wear a NIOSH approved respirator to protect against the potential release.

Skin Contact: Possible burns to skin. Repeated or prolonged skin contact may result in allergic sensitization.

Eye Contact: Severe eye irritation. Possible burns to eyes. May cause corneal injury. May cause permanent visual impairment.

Ingestion: Not expected under normal conditions of use. May cause burns of mouth and throat if swallowed. May cause an aspiration hazard if swallowed.

Existing conditions aggravated by exposure: Eye, skin and respiratory disorders.

See Section 11 for additional toxicological information

POTENTIAL ENVIRONMENTAL EFFECTS

Unknown

Section 3 Composition and Information on Ingredients

Nanomaterial or contains nanomaterials (engineered) with at least one dimensions of <100 nm)? No

Component	CAS #	% by wt
Tetraethylenepentamine	112-57-2	30-60
Substituted piperazine	Trade secret	30-60
Polyamine	Trade secret	5-10
3,6,9,12-tetraazatetradecamethylenediamine	4067-16-7	5-10
Triethylenetetramine	112-24-3	1-5
Polyamine N7	29320-38-5	1-5

Section 4 First Aid Measures

Eye Contact: Flush eyes immediately with plenty of water for at least 15 minutes and seek medical advice.

Skin Contact: Immediately flush skin with plenty of water (using soap, if available). Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

Inhalation: Remove person to fresh air. If symptoms develop and persist get medical attention.

Ingestion: Clean mouth with water and drink afterwards plenty of water. Get medical attention immediately.



SAFETY DATA SHEET

Notes to physician: Treat symptomatically and supportively. Aspiration may cause pulmonary edema or aspiration pneumonia.

Section 5 Fire Fighting Measures

See Section 9 for flammable properties.

Special Fire Fighting Procedures: See below under protective equipment.

Extinguishing media: Water spray (fog), foam, dry chemical or carbon dioxide.

Protective Equipment: Wear self-contained breathing apparatus and full protective clothing, such as turn-out gear. Cartridge respirators do not provide adequate protection for fire fighters or exotherm mitigation.

Unusual Fire or Explosion Hazards: Closed containers may rupture (due to build up of pressure) when exposed to extreme heat.

Hazardous combustion products: Oxides of carbon and nitrogen, aldehydes, acids and undetermined organics.

Section 6 Accidental Release Measures

Isolate the spill and deny entry to unnecessary and unprotected personnel.

Personal Protection: Wear PPE per Section 8.

Spill Procedures: Prevent further leakage or spillage if safe to do so. Contain spill. Do not let product enter drains. Do not flush into surface water. Soak up with inert absorbent material (e.g. sand silica gel, acid binder, universal binder, sawdust). Recover as much material as possible and store in a closed container until ready for disposal.

Environmental Precautions and Cleanup Methods: Do not put down drain and see Section 13.

Section 7 Handling and Storage

Precautions: Avoid contact with eyes, skin and clothing. Avoid breathing vapor and mist. Wash thoroughly after handling. For the Part A plus Part B adhesive mixture, follow curing schedule as recommended in product literature. Do not heat Part B at temperatures greater than 100 °C (212 °F). This material may self-react at higher temperatures and cause an exotherm. The exotherm has the potential for release of excessive energy and toxic gasses. Empty containers retain product residue, so obey hazard warnings and handle empty containers as if they were full. Do not cut, grind, weld, or drill on or near this container.

Storage: Keep in a cool, well ventilated area. Keep container closed.

Section 8 Exposure Controls and Personal Protection

Engineering Controls/Ventilation: Local exhaust ventilation is recommended when general ventilation is not sufficient to control airborne contamination below occupational exposure limits.

Eye Protection: Safety glasses/goggles

Respiratory Protection: Observe OSHA regulations for respiratory use (29 CFR 1910.134) based on



SAFETY DATA SHEET

workplace hazards.

Skin Protection: Use chemical resistant gloves, such as nitrile, and other protective clothing to prevent skin contact.

Component(s)	CAS #	OSHA/PEL	ACGIH/TLV
Tetraethylenepentamine	112-57-2	None	None
Substituted piperazine	Trade secret	None	None
Polyamine	Trade secret	None	None
3,6,9,12-tetraazatetradecamethylene diamine	4067-16-7	None	None
Triethylenetetramine	112-24-3	None	None
Polyamine N7	29320-38-5	None	None

Section 9 Physical and Chemical Properties

Appearance (color, physical form, shape):	Red/orange liquid
Odor Characteristics:	Ammoniacal
Odor Threshold:	Not determined
pH:	Not determined
Flash Point:	>93°C (>200°F), estimated
Flammability (solid, gas):	Not determined
Initial Boiling Point and Boiling Range:	340°C (644°F)
Evaporation Rate:	Not determined
Melting/Freezing Point:	Not determined
Upper/Lower Flammability or Explosive Limits:	Not determined
Vapor Pressure:	<0.1 mm Hg (20°C (68°F))
Vapor Density:	Not determined
Specific Gravity or Relative Density:	Not determined
Solubility (specify solvent):	Soluble in water
Auto-ignition Temperature:	Not determined
Decomposition Temperature:	Not determined
% Volatile:	Not determined
Partition Coefficient:	Not determined
Viscosity:	Not determined

Section 10 Stability and Reactivity

Stability:	Stable under normal conditions of storage and use.
Hazardous polymerization:	May occur
Hazardous Decomposition Products:	Oxides of carbon and nitrogen, aldehydes, acids and undetermined organics.
Incompatibilities:	Keep away from strong oxidizing agents, strong Lewis or mineral acids.

Conditions to avoid: Avoid mixing resin (Part A) and curing agent (Part B) unless you plan to use immediately. Do not heat mixed adhesive unless curing surfaces to be bonded. Failure to observe these precautions may result in excessive heat build-up causing an exotherm.



SAFETY DATA SHEET

Section 11 Toxicological Information

Carcinogenicity

Carcinogenic listed by IARC: No If yes, list groups: N/A

Carcinogenic by NTP: No

Carcinogenic by OSHA: No

Acute or Chronic Toxicity

Acute Effects: Mixture has not been tested as a whole. Oral, dermal and inhalation toxicity testing has been performed for some mixture components and LD50 and LC50 data is available for these components. Contact Luna Innovations Incorporated for additional information.

Chronic Effects: May cause allergic skin and respiratory reaction

Section 12 Environmental Information

Ecotoxicological Information: No specific studies have been conducted on the ecotoxicity of this sample material.

Chemical Fate Information: No specific studies have been conducted on the environmental fate of this sample material.

Section 13 Disposal Considerations

Recover or recycle if possible.

Do not discard into any sewers, on the ground, or into any body of water.

Upon completion of tests, dispose of material safely and in accordance with local, state, and federal regulations. It is the responsibility of the waste generator to determine the proper waste identification and disposal methods.

Section 14 Transportation Information

Note(s):

DOT:

Proper Shipping Name: Amines, liquid, corrosive, n.o.s. (Tetraethylene pentamine / Substituted Piperazine)

Hazard Class: 8

Packing Group: III

UN Number: 2735

IATA:

Proper Shipping Name: Amines, liquid, corrosive, n.o.s. (Tetraethylene pentamine / Substituted Piperazine)

Hazard Class: 8

Packing Group: III

UN Number: 2735

24-hr Transportation Emergency Numbers:

For Hazardous Materials [or Dangerous Goods] Incident (Spill, Leak, Fire, Exposure, or Accident):

Within USA and Canada: 1-800-424-9300

Outside USA and Canada: +1 703-527-3887 (collect calls accepted)



SAFETY DATA SHEET

Section 15 Regulatory Information

TSCA Inventory Status: All components comprising this sample are either exempt or listed on the TSCA inventory.

Section 313: None

California Proposition 65: No California Proposition 65 listed chemicals are known to be present.

Section 16 Other Information

Research Notice: The information provided herein is for a research sample and represents the results of preliminary investigations. This research sample is for use by qualified research personnel only. It is offered in good faith, consistent with 29 CFR 1910.1200, recognizing that additional information, including data on hazardous properties, may be developed at a later time.

Disclaimer:

Any information or materials are being provided to you "as is" and Luna Innovations makes no representation or warranty as to the comprehensiveness or accuracy of any information or of the suitability for any purpose of any material. This document is intended only as a guide to the appropriate precautionary handling of the material by a properly trained person using this product. Recipients must exercise their independent judgment in determining its appropriateness for a particular purpose and are responsible for making sure their use is safe and lawful and does not infringe on the rights of any third parties. Luna Innovations hereby disclaims any representations or warranties, either express or implied, including without limitation any implied warranties of fitness for a particular purpose, merchantability or non-infringement. Luna Innovations will not be responsible for damages arising from the use of or reliance upon the information or materials provided and recipient hereby agrees to indemnify Luna Innovations for any such damages, including without limitation legal fees and expenses.