



Safety Data Sheet

Section 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product identifier

- Product Name** • **LaBr₃(Ce)**
- Synonyms** • Lanthanum Bromide Crystal, Cerium Doped; Rare Earth Bromide Mixture

1.2 Relevant identified uses of the substance or mixture and uses advised against

- Relevant identified use(s)** • Inorganic Scintillator Detector Crystal

1.3 Details of the supplier of the safety data sheet

- Manufacturer** • Luxium Solutions
 17900 Great Lakes Parkway
 Hiram, OH 44234
 United States
 www.luxiumsolutions.com
- Telephone (General)** • 440-834-5600

1.4 Emergency telephone number

- Contract #** 6493674
- U.S. & Canada** • 1-800-255-3924 – VelocityEHS
- International** • +1-813-248-0585 – VelocityEHS

Section 2: Hazards Identification

EU/EEC

According to: Regulation (EC) No 1272/2008 (CLP)/REACH 1907/2006 [amended by 453/2010]

According to: EU Directive 67/548/EEC (DSD) or 1999/45/EC (DPD)

2.1 Classification of the substance or mixture

- CLP**
- Due to formed nature of this product, no airborne concentrations are expected.
 Skin Irritation 2 - H315
 Eye Irritation 2 - H319
 Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation - H335
- DSD/DPD**
- Due to formed nature of this product, no airborne concentrations are expected.
 Irritant (Xi)
 R36, R37, R38

2.2 Label Elements

CLP

WARNING



- Hazard statements**
- H315 - Causes skin irritation
 - H319 - Causes serious eye irritation
 - H335 - May cause respiratory irritation

Precautionary statements

- Prevention**
- P261 - Avoid breathing dust.
 - P264 - Wash thoroughly after handling.
 - P271 - Use only outdoors or in a well-ventilated area.
 - P280 - Wear protective gloves/protective clothing/eye protection/face protection.
- Response**
- P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 - P312 - Call a POISON CENTER or doctor/physician if you feel unwell.
 - P302+P352 - IF ON SKIN: Wash with plenty of soap and water.
 - P321 - Specific treatment, see supplemental first aid information.
 - P332+P313 - If skin irritation occurs: Get medical advice/attention.
 - P362 - Take off contaminated clothing and wash before reuse.
 - P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 - P337+P313 - If eye irritation persists: Get medical advice/attention.
- Storage/Disposal**
- P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
 - P405 - Store locked up.
 - P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

DSD/DPD



- Risk phrases**
- R36 - Irritating to eyes.
 - R37 - Irritating to respiratory system.
 - R38 - Irritating to skin.
- Safety phrases**
- S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

2.3 Other Hazards

- CLP**
- According to Regulation (EC) No. 1272/2008 (CLP) this material is considered hazardous.
- DSD/DPD**
- According to European Directive 1999/45/EC this material is considered dangerous.

United States (US)

According to: OSHA 29 CFR 1910.1200 HCS

2.1 Classification of the substance or mixture

- OSHA HCS 2012**
- Due to formed nature of this product, no airborne concentrations are expected.
 - Skin Irritation 2
 - Eye Irritation 2
 - Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation

2.2 Label elements

OSHA HCS 2012

WARNING



- Hazard statements**
- Causes skin irritation
 - Causes serious eye irritation
 - May cause respiratory irritation

Precautionary statements

- Prevention**
- Avoid breathing dust.
 - Wash thoroughly after handling.
 - Use only outdoors or in a well-ventilated area.
 - Wear protective gloves/protective clothing/eye protection/face protection.
- Response**
- **IF INHALED:** Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 - Call a POISON CENTER or doctor/physician if you feel unwell.
 - **IF ON SKIN:** Wash with plenty of soap and water.
 - Specific treatment, see supplemental first aid information.
 - If skin irritation occurs: Get medical advice/attention.
 - Take off contaminated clothing and wash before reuse.
 - **IF IN EYES:** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 - If eye irritation persists: Get medical advice/attention.
- Storage/Disposal**
- Store in a well-ventilated place. Keep container tightly closed.
 - Store locked up.
 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

2.3 Other hazards

OSHA HCS 2012

- Under United States Regulations (29 CFR 1910.1200 - Hazard Communication Standard), this product is considered hazardous.

Canada

According to: WHMIS

2.1 Classification of the substance or mixture

WHMIS

- Due to formed nature of this product, no airborne concentrations are expected.
- Other Toxic Effects - D2B

2.2 Label elements

WHMIS



WHMIS

- Other Toxic Effects - D2B

2.3 Other hazards

WHMIS

- In Canada, the product mentioned above is considered hazardous under the Workplace Hazardous Materials Information System (WHMIS).

Section 3 - Composition/Information on Ingredients

3.1 Substances

- Material does not meet the criteria of a substance.

3.2 Mixtures

Composition					
Chemical Name	Identifiers	%	LD50/LC50	Classifications According to Regulation/Directive	Comments
Lanthanum bromide, anhydrous	CAS:13536-79-3 EINECS:236-896-7	90% TO 95%	NDA	EU DSD/DPD: Not Classified EU CLP: Not Classified OSHA HCS 2012: Not Classified	NDA
Cerium bromide, anhydrous	CAS:14457-87-5 EINECS:238-447-0	5% TO 10%	NDA	EU DSD/DPD: Not Classified EU CLP: Not Classified OSHA HCS 2012: Not Classified	NDA

Section 4 - First Aid Measures

4.1 Description of first aid measures

Inhalation

- Move victim to fresh air. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. If signs/symptoms continue, get medical attention.

Skin

- Wash skin with soap and water. If irritation develops and persists, get medical attention.

Eye

- Flush eyes with water for at least 15 minutes while holding eyelids open. If eye irritation persists: Get medical advice/attention.

Ingestion

- Rinse mouth. Do not give anything by mouth to an unconscious person. Do NOT induce vomiting. Obtain medical attention immediately if ingested.

4.2 Most important symptoms and effects, both acute and delayed

- Refer to Section 11 - Toxicological Information.

4.3 Indication of any immediate medical attention and special treatment needed

Notes to Physician

- All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred.

Section 5 - Firefighting Measures

5.1 Extinguishing media

Suitable Extinguishing Media • In case of fire use media as appropriate for surrounding fire.

Unsuitable Extinguishing Media

- No data available.

5.2 Special hazards arising from the substance or mixture

Unusual Fire and Explosion Hazards

- Material is non-combustible and is not expected to pose a fire or explosion hazard.

Hazardous Combustion Products

- Product will oxidize in air at temperatures exceeding 300°C, evolving bromine gas.

5.3 Advice for firefighters

- Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal Precautions

- Ventilate the area before entry. Do not walk through spilled material. Wear appropriate personal protective equipment, avoid direct contact.

Emergency Procedures

- As an immediate precautionary measure, isolate spill or leak area for at least 25

meters (75 feet) in all directions. Keep unauthorized personnel away.

6.2 Environmental precautions

- Avoid release to the environment.

6.3 Methods and material for containment and cleaning up

Containment/Clean-up Measures

- Avoid generating dust.
SMALL DRY SPILLS: With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.
LARGE SPILLS: Cover powder spill with plastic sheet or tarp to minimize spreading.

6.4 Reference to other sections

- Refer to Section 8 - Exposure Controls/Personal Protection and Section 13 - Disposal Considerations.

Section 7 - Handling and Storage

7.1 Precautions for safe handling

Handling

- Use only with adequate ventilation. Minimize dust generation and accumulation. Wear appropriate personal protective equipment, avoid direct contact. Avoid breathing dust. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco.

7.2 Conditions for safe storage, including any incompatibilities

Storage

- Store in a cool, dry, well ventilated area. Keep away from moisture and excessive heat. Unsealed/unfinished material is hygroscopic and can absorb CO₂; store in tightly closed container with desiccant.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.

Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

Exposure Limits/Guidelines			
	Result	ACGIH	OSHA
Lanthanum bromide, anhydrous	TWAs	10 mg/m ³ TWA (inhalable particles, recommended); 3 mg/m ³ TWA (respirable particles, recommended) <i>as Particulates not otherwise classified (PNOC)</i>	15 mg/m ³ TWA (total dust); 5 mg/m ³ TWA (respirable fraction) <i>as Particulates not otherwise classified (PNOC)</i>

8.2 Exposure controls

Engineering Measures/Controls

- Adequate ventilation systems as needed to control concentrations of airborne contaminants below applicable threshold limit values. Ensure that dust handling systems (such as exhaust ducts, dust collectors, vessels and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is not leakage from the equipment).

Personal Protective Equipment

Respiratory

- For limited exposure use an N95 dust mask. For prolonged exposure use an air-purifying respirator with high efficiency particulate air (HEPA) filters. Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or symptoms are experienced.

Eye/Face

- Wear safety goggles.

Skin/Body

- Wear appropriate gloves. Wear long sleeves and/or protective coveralls.

Environmental Exposure Controls

- Follow best practice for site management and disposal of waste.

Key to abbreviations

ACGIH = American Conference of Governmental Industrial Hygiene

OSHA = Occupational Safety and Health Administration

TWA = Time-Weighted Averages are based on 8h/day, 40h/week exposures

Section 9 - Physical and Chemical Properties**9.1 Information on Basic Physical and Chemical Properties**

Material Description			
Physical Form	Solid	Appearance/Description	Transparent crystal with no odor.
Color	Transparent	Odor	Odorless
Odor Threshold	Data lacking		
General Properties			
Boiling Point	> 1000 °C(> 1832 °F)	Melting Point/Freezing Point	820 °C(1508 °F)
Decomposition Temperature	Data lacking	pH	Data lacking
Specific Gravity/Relative Density	Data lacking	Water Solubility	Soluble > 100 g/L @ 25 °C(77 °F)
Viscosity	Data lacking	Explosive Properties	Not explosive.
Oxidizing Properties:	Not an oxidizer.		
Volatility			
Vapor Pressure	Data lacking	Vapor Density	Data lacking
Evaporation Rate	Data lacking		
Flammability			
Flash Point	Not relevant	UEL	Not relevant
LEL	Not relevant	Autoignition	Not relevant
Flammability (solid, gas)	Not flammable.		
Environmental			
Octanol/Water Partition coefficient	Data lacking		

9.2 Other Information

- No additional physical and chemical parameters noted.

Section 10: Stability and Reactivity**10.1 Reactivity**

- No dangerous reaction known under conditions of normal use.

10.2 Chemical stability

- Stable under normal temperatures and pressures.

10.3 Possibility of hazardous reactions

- Hazardous polymerization not indicated.

10.4 Conditions to avoid

- Avoid dispersion of dust in air. Unfinished material is hygroscopic, store in airtight container.

10.5 Incompatible materials

- None known.

10.6 Hazardous decomposition products

- Product will oxidize in air at temperatures exceeding 300°C, evolving bromine gas. Reacts with water at temperatures exceeding 150°C, with evolution of hydrobromic acid vapors.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

GHS Properties	Classification
Acute toxicity	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Skin corrosion/Irritation	EU/CLP • Skin Irritation 2 OSHA HCS 2012 • Skin Irritation 2
Serious eye damage/Irritation	EU/CLP • Eye Irritation 2 OSHA HCS 2012 • Eye Irritation 2
Skin sensitization	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Respiratory sensitization	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Aspiration Hazard	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Carcinogenicity	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Germ Cell Mutagenicity	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
Toxicity for Reproduction	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking
STOT-SE	EU/CLP • Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation OSHA HCS 2012 • Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation
STOT-RE	EU/CLP • Data lacking OSHA HCS 2012 • Data lacking

Potential Health Effects

Inhalation

Acute (Immediate)

- May cause respiratory irritation. Processes such as cutting, grinding, crushing, or impact may result in generation of excessive amounts of airborne dusts in the workplace. Nuisance dust may affect the lungs but reactions are typically reversible.

Chronic (Delayed)

- Repeated and prolonged exposure to dust may cause lung effects including pneumoconiosis.

Skin

Acute (Immediate)

- Causes skin irritation.

Chronic (Delayed)

- No data available.

Eye

Acute (Immediate)

- Causes serious eye irritation. Excessive concentrations of nuisance dust in the workplace may reduce visibility and may cause unpleasant deposits in eyes.

Chronic (Delayed)

- No data available.

Ingestion

- Acute (Immediate)** • Excessive concentrations of nuisance dust in the workplace may cause mechanical irritation to mucous membranes.
- Chronic (Delayed)** • No data available.

Section 12 - Ecological Information

12.1 Toxicity

- Material data lacking.

12.2 Persistence and degradability

- Material data lacking.

12.3 Bioaccumulative potential

- Material data lacking.

12.4 Mobility in Soil

- Material data lacking.

12.5 Results of PBT and vPvB assessment

- No PBT and vPvB assessment has been conducted.

12.6 Other adverse effects

- No studies have been found.

Section 13 - Disposal Considerations

13.1 Waste treatment methods

- Product waste** • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.
- Packaging waste** • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

Section 14 - Transport Information

	14.1 UN number	14.2 UN proper shipping name	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards
DOT	NDA	Not Regulated	NDA	NDA	NDA
TDG	NDA	Not Regulated	NDA	NDA	NDA
IMO/IMDG	NDA	Not Regulated	NDA	NDA	NDA
IATA/ICAO	NDA	Not Regulated	NDA	NDA	NDA

- 14.6 Special precautions for user** • None known.
- 14.7 Transport in bulk according to Annex II of Marpol and the IBC Code** • Not relevant.

Section 15 - Regulatory Information

15.1 Safety, health and environmental regulations/legislation specific for the substance or

mixture**SARA Hazard Classifications** • Acute

Inventory						
Component	CAS	Canada DSL	Canada NDSL	EU EINECS	EU ELNICS	TSCA
Cerium bromide, anhydrous	14457-87-5	No	Yes	Yes	No	Yes
Lanthanum bromide, anhydrous	13536-79-3	No	Yes	Yes	No	Yes

Canada**Labor****Canada - WHMIS - Classifications of Substances**

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

Canada - WHMIS - Ingredient Disclosure List

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

Environment**Canada - CEPA - Priority Substances List**

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

United States**Labor****U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals**

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

Environment**U.S. - CAA (Clean Air Act) - 1990 Hazardous Air Pollutants**

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed

• Cerium bromide, anhydrous	14457-87-5	Not Listed
U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs		
• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed
U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs		
• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed
U.S. - CERCLA/SARA - Section 313 - Emission Reporting		
• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed
U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing		
• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

United States - California

Environment

U.S. - California - Proposition 65 - Carcinogens List

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male

• Lanthanum bromide, anhydrous	13536-79-3	Not Listed
• Lanthanum bromide, anhydrous as Particulates not otherwise classified (PNOC)		Not Listed
• Cerium bromide, anhydrous	14457-87-5	Not Listed

15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

Section 16 - Other Information

Revision Date

- 22/May/2023

Preparation Date

- 07/November/2014

Disclaimer/Statement of Liability

- Reasonable care has been taken in the preparation of this information, but the supplier gives no warranty of merchantability or of fitness for a particular purpose. Any product purchased is sold on the assumption the purchaser will make his own tests to determine the quality and suitability of the product. Supplier expressly disclaims any and all liability for incidental and/or consequential property damage arising out of the use of this product. No information provided shall be deemed to be a recommendation to use any product in conflict with any existing patent rights. Read the Safety Data Sheet before handling product.

Key to abbreviations

NDA = No data available