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

1.1 Product identifier
Product Name: Lanthanum Chloride Crystal, Cerium Doped
Synonyms: B350

1.2 Relevant identified uses of the substance or mixture and uses advised against
Relevant identified use(s): Inorganic Scintillation Detector Crystal

1.3 Details of the supplier of the safety data sheet
Manufacturer: Saint-Gobain Crystals
17900 Great Lakes Parkway
Hiram, OH 44234
United States
www.crystals.saint-gobain.com
scintillation@saint-gobain.com
Telephone (General): 440-834-5600

1.4 Emergency telephone number
Manufacturer: 1-800-424-9300 - ChemTrec
Manufacturer: 703-525-3887 - Outside U.S.

Section 2: Hazards Identification

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

2.1 Classification of the substance or mixture
CLP
- Skin Irritation 2 - H315
- Eye Irritation 2 - H319
- Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation - H335
- Hazardous to the aquatic environment Acute 1 - H400
- Hazardous to the aquatic environment Chronic 1 - H410

DSD/DPD
- Irritant (Xi)
- Dangerous to the Environment (N)
R36/37/38, R50, R53

2.2 Label Elements
CLP
WARNING

Hazard statements
• H315 - Causes skin irritation
• H319 - Causes serious eye irritation
• H335 - May cause respiratory irritation
• H400 - Very toxic to aquatic life
• H410 - Very toxic to aquatic life with long lasting effects

Precautionary statements
Prevention
• P261 - Avoid breathing dust, fume, gas, mist, vapours and/or spray.
• P264 - Wash thoroughly after handling.
• P271 - Use only outdoors or in a well-ventilated area.
• P273 - Avoid release to the environment.
• 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.
• 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.
• P302+P352 - IF ON SKIN: Wash with plenty of soap and water.
• P362 - Take off contaminated clothing and wash before reuse.
• P332+P313 - If skin irritation occurs: Get medical advice/attention.
• P321 - Specific treatment, see supplemental first aid information.
• P391 - Collect spillage.

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
• R36/37/38 - Irritating to eyes, respiratory system and skin.
• R50 - Very toxic to aquatic organisms.
• R53 - May cause long-term adverse effects in the aquatic environment.

Safety phrases
• S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
• S57 - Use appropriate containment to avoid environmental contamination.

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 preparation 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
• 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, fume, gas, mist, vapours and/or spray.
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 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.
If on skin: Wash with plenty of water.
If skin irritation occurs: Get medical advice/attention.
Take off contaminated clothing and wash before reuse.
Specific treatment, see supplemental first aid information.

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 • This product is not considered hazardous under the U.S. OSHA 29 CFR 1910.1200 Hazard Communication Standard.

Canada
According to: WHMIS

2.1 Classification of the substance or mixture

WHMIS • 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

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Identifiers</th>
<th>%</th>
<th>LD50/LC50</th>
<th>Classifications According to Regulation/Directive</th>
<th>Comments</th>
</tr>
</thead>
</table>
| Lanthanum chloride | CAS:10099-58-8 | 90% TO 95% | Ingestion/Oral-Rat LD50: 2370 mg/kg | EU DSD/DPD: Self Classified: N; R50-53  
EU CLP: Self Classified: Aquatic Acute 1, H400; Aquatic Chronic 1, H410  
OSHA HCS 2012: Not Classified | NDA      |
| Cerium chloride    | CAS:7790-86-5 | 5% TO 10%  | Ingestion/Oral-Rat LD50: 2111 mg/kg | EU DSD/DPD: Self Classified: N; R50-53  
EU CLP: Self Classified: Aquatic Acute 1, H400; Aquatic Chronic 1, H410  
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 300ºC, evolving chlorine 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**
- No applicable exposure limits available for product or components.

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

## Section 9 - Physical and Chemical Properties

### 9.1 Information on Basic Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Physical Form</th>
<th>Appearance/Description</th>
<th>Odor Threshold</th>
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<tbody>
<tr>
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<td>Solid</td>
<td>Transparent crystal with no odor.</td>
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</table>

<table>
<thead>
<tr>
<th>General Properties</th>
<th>Boiling Point</th>
<th>Melting Point/Freezing Point</th>
<th>Decomposition Temperature</th>
<th>pH</th>
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<tbody>
<tr>
<td></td>
<td>&gt; 1000 °C(&gt; 1832 °F)</td>
<td>860 °C(1580 °F)</td>
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</table>

<table>
<thead>
<tr>
<th>Specific Gravity/Relative Density</th>
<th>Water Solubility</th>
<th>Explosive Properties</th>
<th>Viscosity</th>
<th>Oxidizing Properties:</th>
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<tbody>
<tr>
<td>≥ 3.86 Water=1</td>
<td>Soluble 492 g/L @ 25 °C(77 °F)</td>
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<table>
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<tr>
<th>Volatility</th>
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<table>
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<th>Flammability</th>
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<th>LEL</th>
<th>Autoignition</th>
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</thead>
<tbody>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental</th>
<th>Octanol/Water Partition coefficient</th>
<th>Data lacking</th>
</tr>
</thead>
</table>

### 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 chlorine gas. Reacts with water at temperatures exceeding 150°C, with evolution of hydrochloric acid vapors.
Section 11 - Toxicological Information

11.1 Information on toxicological effects

<table>
<thead>
<tr>
<th>Components</th>
<th>Acute Toxicity: Ingestion/Oral-Rat LD50 • 2370 mg/kg; Multi-dose Toxicity: Inhalation-Rat TCLo • 100 mg/m³ 2 Hour(s) 30 Day(s)-Intermittent; Cardiac: EKG changes not diagnostic of above; Lungs, Thorax, or Respiration: Other changes; Blood: Leukopenia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanthanum chloride (90% TO 95%)</td>
<td>10099-58-8</td>
</tr>
<tr>
<td>Cerium chloride (5% TO 10%)</td>
<td>7790-86-5</td>
</tr>
</tbody>
</table>

GHS Properties

<table>
<thead>
<tr>
<th>Classification</th>
</tr>
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<tbody>
<tr>
<td>Acute toxicity</td>
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<tr>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td>Skin corrosion/Irritation</td>
</tr>
<tr>
<td>OSHA HCS 2012 • Skin Irritation 2</td>
</tr>
<tr>
<td>Serious eye damage/Irritation</td>
</tr>
<tr>
<td>OSHA HCS 2012 • Eye Irritation 2</td>
</tr>
<tr>
<td>Skin sensitization</td>
</tr>
<tr>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
<tr>
<td>Respiratory sensitization</td>
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<td>OSHA HCS 2012 • Data lacking</td>
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<td>OSHA HCS 2012 • Data lacking</td>
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<td>Carcinogenicity</td>
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<td>Germ Cell Mutagenicity</td>
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<td>OSHA HCS 2012 • Data lacking</td>
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<tr>
<td>Toxicity for Reproduction</td>
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<tr>
<td>OSHA HCS 2012 • Data lacking</td>
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<td>STOT-SE</td>
</tr>
<tr>
<td>OSHA HCS 2012 • Specific Target Organ Toxicity Single Exposure 3: Respiratory Tract Irritation</td>
</tr>
<tr>
<td>STOT-RE</td>
</tr>
<tr>
<td>OSHA HCS 2012 • Data lacking</td>
</tr>
</tbody>
</table>

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.

Key to abbreviations
LD = Lethal Dose
TC = Toxic Concentration

Section 12 - Ecological Information

12.1 Toxicity

| CAS       | Aquatic Toxicity-Crustacea: 2 Day(s) EC50 *Daphnia carinata* 0.0432 mg/L Comments: Lanthanum chloride (10099-58-8)  
|           | Aquatic Toxicity-Algae and Other Aquatic Plant(s): 3 Day(s) EC50 *Green Algae* 0.74-0.85 mg/L Comments: Cerium chloride (7790-86-5)  

• Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.

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
14.6 Special precautions for user
• None specified.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code
• No data available

Section 15 - Regulatory Information

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

SARA Hazard Classifications
• Acute

State Right To Know

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>PA</th>
</tr>
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<tbody>
<tr>
<td>Cerium chloride</td>
<td>7790-86-5</td>
<td>No</td>
</tr>
<tr>
<td>Lanthanum chloride</td>
<td>10099-58-8</td>
<td>No</td>
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Inventory

<table>
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<tr>
<th>Component</th>
<th>CAS</th>
<th>Canada DSL</th>
<th>Canada NDSL</th>
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<th>EU ELNICS</th>
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<tbody>
<tr>
<td>Cerium chloride</td>
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<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>Lanthanum chloride</td>
<td>10099-58-8</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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Inventory (Con't.)

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<tbody>
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<tr>
<td>Lanthanum chloride</td>
<td>10099-58-8</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Canada

Labor

Canada - WHMIS - Classifications of Substances

• Lanthanum chloride 10099-58-8 Uncontrolled product according to WHMIS classification criteria (including 10%)
• Cerium chloride 7790-86-5 Not Listed

Canada - WHMIS - Ingredient Disclosure List

• Lanthanum chloride 10099-58-8 Not Listed
• Cerium chloride 7790-86-5 Not Listed

Environment

Canada - CEPA - Priority Substances List

• Lanthanum chloride 10099-58-8 Not Listed
• Cerium chloride 7790-86-5 Not Listed

United States

Labor

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals
### U.S. - OSHA - Specifically Regulated Chemicals

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<thead>
<tr>
<th>Chemical</th>
<th>CAS Number</th>
<th>OSHA Status</th>
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<tbody>
<tr>
<td>Lanthanum chloride</td>
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<td>7790-86-5</td>
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### Environment

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

<table>
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<th>Chemical</th>
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<tbody>
<tr>
<td>Lanthanum chloride</td>
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#### U.S. - CERCLA/SARA - Hazardous Substances and their Reportable Quantities

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<tbody>
<tr>
<td>Lanthanum chloride</td>
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#### U.S. - CERCLA/SARA - Radionuclides and Their Reportable Quantities

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#### U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances EPCRA RQs

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<th>OSHA Status</th>
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#### U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

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<td>Cerium chloride</td>
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#### U.S. - CERCLA/SARA - Section 313 - Emission Reporting

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<tbody>
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</tr>
<tr>
<td>Cerium chloride</td>
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#### U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing

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<th>CAS Number</th>
<th>OSHA Status</th>
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<tbody>
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<td>Cerium chloride</td>
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### United States - California

#### Environment

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

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<th>Chemical</th>
<th>CAS Number</th>
<th>OSHA Status</th>
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#### U.S. - California - Proposition 65 - Developmental Toxicity

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<td>Cerium chloride</td>
<td>7790-86-5</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS Number</th>
<th>OSHA Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanthanum chloride</td>
<td>10099-58-8</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Cerium chloride</td>
<td>7790-86-5</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS Number</th>
<th>OSHA Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanthanum chloride</td>
<td>10099-58-8</td>
<td>Not Listed</td>
</tr>
<tr>
<td>Cerium chloride</td>
<td>7790-86-5</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Chemical</th>
<th>CAS Number</th>
<th>OSHA Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanthanum chloride</td>
<td>10099-58-8</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>
15.2 Chemical Safety Assessment

- No Chemical Safety Assessment has been carried out.

Section 16 - Other Information

Revision Date: 24/May/2017
Preparation Date: 20/May/2015

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Key to abbreviations
NDA = No data available