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

1.1 Product identifier
Product Name • Cesium Iodide (Tl) Scintillation Crystal

1.2 Relevant identified uses of the substance or mixture and uses advised against
Relevant identified use(s) • Please provide product use

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 • Due to formed nature of this product, no airborne concentrations are expected.
Acute Toxicity Oral 4 - H302

DSD/DPD • Due to formed nature of this product, no airborne concentrations are expected.
Harmful (Xn)
R20/22

2.2 Label Elements

CLP

WARNING
Hazard statements • H302 - Harmful if swallowed

Precautionary statements

Prevention • P264 - Wash thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.

Response • P301+P312 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician if you feel unwell.
P330 - Rinse mouth.

Storage/Disposal • P501 - Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

DSD/DPD

Risk phrases • R20/22 - Harmful by inhalation and if swallowed.

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. Acute Toxicity Oral 4

2.2 Label elements

OSHA HCS 2012

WARNING

Hazard statements • Harmful if swallowed

Precautionary statements

Prevention • Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.

Response • IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician if you feel unwell.
Rinse mouth.

Storage/Disposal • Dispose of content and/or container in accordance with local, regional, national, and/or international regulations.

2.3 Other hazards


Canada
According to: WHMIS

Preparation Date: 08/January/2015
Revision Date: 24/May/2017
2.1 Classification of the substance or mixture

WHMIS

- Due to formed nature of this product, no airborne concentrations are expected.
  Not classified

2.2 Label elements

WHMIS

- No label element(s) required.

2.3 Other hazards

WHMIS

- In Canada, the product mentioned above is not 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

<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>
<tbody>
<tr>
<td>Cesium iodide</td>
<td>CAS:7789-17-5</td>
<td>99% TO 100%</td>
<td>NDA</td>
<td>EU DSD/DPD: Self Classified: Xn; R22 EU CLP: Self Classified: Acute Tox. 4, H302  OSHA HCS 2012: Acute Tox. 4 (orl)</td>
<td>NDA</td>
</tr>
<tr>
<td></td>
<td>EINECS:232-145-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thallium iodide</td>
<td>CAS:7790-30-9</td>
<td>&lt; 1%</td>
<td>Ingestion/Oral-Rat LD50 • 24100 µg/kg</td>
<td>EU DSD/DPD: Annex VI, Table 3.2: T+; R26/28; R33; N; R51-53  EU CLP: Annex VI, Table 3.1: Acute Tox. 2*, H330; Acute Tox. 2*, H300; STOT RE 2*, H373; Aquatic Chronic 2, H411  OSHA HCS 2012: Acute Tox. 2 (orl); STOT RE 1 (liver, kidney, nervous system, gastrointestinal system)</td>
<td>NDA</td>
</tr>
<tr>
<td></td>
<td>EINECS:232-199-7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See Section 16 for full text of H-statements and R-phrases.

### 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**
  - 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**
- Use water, carbon dioxide or foam.

**Unsuitable Extinguishing Media**
- No data available.

5.2 Special hazards arising from the substance or mixture

**Unusual Fire and Explosion Hazards**
- Not a fire or explosion hazard. However, toxic emissions are possible in a fire situation.

**Hazardous Combustion Products**
- No data available

5.3 Advice for firefighters

- Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection. Fire fighters should wear complete protective clothing including self-contained breathing apparatus.

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 tightly closed container. Store in a cool, dry, well ventilated area.

7.3 Specific end use(s)

- Refer to Section 1.2 - Relevant identified uses.
Section 8 - Exposure Controls/Personal Protection

8.1 Control parameters

<table>
<thead>
<tr>
<th>Exposure Limits/Guidelines</th>
<th>ACGIH</th>
<th>Poland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thallium iodide</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STELs</td>
<td>Not established</td>
<td>0.3 mg/m³ STEL [NDSCh] (as Tl) as Thallium compounds</td>
</tr>
<tr>
<td>TWAs</td>
<td>0.02 mg/m³ TWA (inhalable fraction, as Tl) as Thallium compounds</td>
<td>0.1 mg/m³ TWA [NDS] (as Tl) as Thallium compounds</td>
</tr>
</tbody>
</table>

Exposure Control Notations
ACGIH
- Thallium iodide as Thallium compounds: Skin: (Skin - potential significant contribution to overall exposure by the cutaneous route)

Exposure Limits Supplemental
ACGIH
- Thallium iodide as Thallium compounds: TLV Basis - Critical Effects: (gastrointestinal damage; peripheral neuropathy)

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
STEL = Short Term Exposure Limits are based on 15-minute exposures
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

<table>
<thead>
<tr>
<th>Material Description</th>
<th>Solid</th>
<th>White</th>
<th>White crystal; odorless.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>White</td>
<td>Odor</td>
<td>Odorless</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>Data lacking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Properties</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cesium Iodide (Tl) Scintillation Crystal

<table>
<thead>
<tr>
<th>Physical Properties</th>
<th>Value/Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point</td>
<td>1280 °C (2336 °F)</td>
</tr>
<tr>
<td>Melting Point/Freezing Point</td>
<td>621 °C (1149.8 °F)</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>Data lacking</td>
</tr>
<tr>
<td>pH</td>
<td>Not relevant</td>
</tr>
<tr>
<td>Specific Gravity/Relative Density</td>
<td>4.5 Water=1</td>
</tr>
<tr>
<td>Water Solubility</td>
<td>Soluble</td>
</tr>
<tr>
<td>Viscosity</td>
<td>Data lacking</td>
</tr>
<tr>
<td>Explosive Properties</td>
<td>Data lacking</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Octanol/Water Partition coefficient</td>
</tr>
</tbody>
</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
- None expected.

10.5 Incompatible materials
- Bromine trifluoride, perchloric acid.

10.6 Hazardous decomposition products
- When heated to decomposition, emits toxic fumes of iodine.

Section 11 - Toxicological Information

11.1 Information on toxicological effects

<table>
<thead>
<tr>
<th>Components</th>
<th>Acute Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cesium iodide (99% TO 100%)</td>
<td>Ingestion/Oral-Rat LD50 • 1400 mg/kg</td>
</tr>
<tr>
<td>Thallium iodide (&lt; 1%)</td>
<td>Ingestion/Oral-Rat LD50 • 24100 µg/kg</td>
</tr>
</tbody>
</table>

GHS Properties
- Acute toxicity

Classification
- EU/CLP: Acute Toxicity - Oral 4
- OSHA HCS 2012: Acute Toxicity - Oral 4
Potential Health Effects

Inhalation

Acute (Immediate) • 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) • No data available

Skin

Acute (Immediate) • Exposure to dust may cause mechanical irritation.

Chronic (Delayed) • No data available.

Eye

Acute (Immediate) • 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) • Harmful if swallowed. 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

Section 12 - Ecological Information

12.1 Toxicity

• Material data lacking.

12.2 Persistence and degradability
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

<table>
<thead>
<tr>
<th>14.1 UN number</th>
<th>14.2 UN proper shipping name</th>
<th>14.3 Transport hazard class(es)</th>
<th>14.4 Packing group</th>
<th>14.5 Environmental hazards</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOT</td>
<td>NDA</td>
<td>Not Regulated</td>
<td>NDA</td>
<td>NDA</td>
</tr>
<tr>
<td>TDG</td>
<td>NDA</td>
<td>Not Regulated</td>
<td>NDA</td>
<td>NDA</td>
</tr>
<tr>
<td>IMO/IMDG</td>
<td>NDA</td>
<td>Not Regulated</td>
<td>NDA</td>
<td>NDA</td>
</tr>
<tr>
<td>IATA/ICAO</td>
<td>NDA</td>
<td>Not Regulated</td>
<td>NDA</td>
<td>NDA</td>
</tr>
</tbody>
</table>

14.6 Special precautions for user
- None specified.

14.7 Transport in bulk according to Annex II of Marpol and the IBC Code
- Data lacking.

### 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>
</thead>
<tbody>
<tr>
<td>Cesium iodide</td>
<td>7789-17-5</td>
<td>No</td>
</tr>
<tr>
<td>Thallium iodide</td>
<td>7790-30-9</td>
<td>No</td>
</tr>
</tbody>
</table>

**Inventory**

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS</th>
<th>Canada DSL</th>
<th>Canada NDSL</th>
<th>China</th>
<th>EU EINECS</th>
<th>EU ELNICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cesium iodide</td>
<td>7789-17-5</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Component</td>
<td>CAS</td>
<td>Korea KECL</td>
<td>TSCA</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---------------------</td>
<td>-------</td>
<td>------------</td>
<td>------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cesium iodide</td>
<td>7789-17-5</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thallium iodide</td>
<td>7790-30-9</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Canada**

**Labor**

Canada - WHMIS - Classifications of Substances

- Cesium iodide
  - 7789-17-5: Uncontrolled product according to WHMIS classification criteria
- Thallium iodide
  - 7790-30-9: Not Listed

Canada - WHMIS - Ingredient Disclosure List

- Cesium iodide
  - 7789-17-5: Not Listed
- Thallium iodide
  - 7790-30-9: 1%

**Environment**

Canada - CEPA - Priority Substances List

- Cesium iodide
  - 7789-17-5: Not Listed
- Thallium iodide
  - 7790-30-9: Not Listed

**United States**

**Labor**

U.S. - OSHA - Process Safety Management - Highly Hazardous Chemicals

- Cesium iodide
  - 7789-17-5: Not Listed
- Thallium iodide
  - 7790-30-9: Not Listed

U.S. - OSHA - Specifically Regulated Chemicals

- Cesium iodide
  - 7789-17-5: Not Listed
- Thallium iodide
  - 7790-30-9: Not Listed

**Environment**

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

- Cesium iodide
  - 7789-17-5: Not Listed
- Thallium iodide
  - 7790-30-9: Not Listed

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

- Cesium iodide
  - 7789-17-5: Not Listed
- Thallium iodide
  - 7790-30-9: Not Listed

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

- Cesium iodide
  - 7789-17-5: Not Listed
- Thallium iodide
  - 7790-30-9: Not Listed

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

- Cesium iodide
  - 7789-17-5: Not Listed
- Thallium iodide
  - 7790-30-9: Not Listed

U.S. - CERCLA/SARA - Section 302 Extremely Hazardous Substances TPQs

- Cesium iodide
  - 7789-17-5: Not Listed
- Thallium iodide
  - 7790-30-9: Not Listed
U.S. - CERCLA/SARA - Section 313 - Emission Reporting
- Cesium iodide 7789-17-5 Not Listed
- Thallium iodide 7790-30-9 Not Listed

U.S. - CERCLA/SARA - Section 313 - PBT Chemical Listing
- Cesium iodide 7789-17-5 Not Listed
- Thallium iodide 7790-30-9 Not Listed

United States - California
Environment
U.S. - California - Proposition 65 - Carcinogens List
- Cesium iodide 7789-17-5 Not Listed
- Thallium iodide 7790-30-9 Not Listed

U.S. - California - Proposition 65 - Developmental Toxicity
- Cesium iodide 7789-17-5 Not Listed
- Thallium iodide 7790-30-9 Not Listed

U.S. - California - Proposition 65 - Maximum Allowable Dose Levels (MADL)
- Cesium iodide 7789-17-5 Not Listed
- Thallium iodide 7790-30-9 Not Listed

U.S. - California - Proposition 65 - No Significant Risk Levels (NSRL)
- Cesium iodide 7789-17-5 Not Listed
- Thallium iodide 7790-30-9 Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Female
- Cesium iodide 7789-17-5 Not Listed
- Thallium iodide 7790-30-9 Not Listed

U.S. - California - Proposition 65 - Reproductive Toxicity - Male
- Cesium iodide 7789-17-5 Not Listed
- Thallium iodide 7790-30-9 Not Listed

United States - Pennsylvania
Labor
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
- Cesium iodide 7789-17-5 Not Listed
- Thallium iodide 7790-30-9 Not Listed

U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances
- Cesium iodide 7789-17-5 Not Listed
- Thallium iodide 7790-30-9 Not Listed

15.2 Chemical Safety Assessment
- No Chemical Safety Assessment has been carried out.

Section 16 - Other Information
Relevant Phrases (code & full text)
- H330 - Fatal if inhaled
- H300 - Fatal if swallowed
H373 - May cause damage to organs through prolonged or repeated exposure.
H411 - Toxic to aquatic life with long lasting effects
R26/28 - Very toxic by inhalation and if swallowed.
R33 - Danger of cumulative effects.
R51 - Toxic to aquatic organisms.
R53 - May cause long-term adverse effects in the aquatic environment.

Revision Date
• 24/May/2017

Preparation Date
• 08/January/2015

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