1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product code: G1388
Product Name: GADOLINIUM CHLORIDE, HEXAHYDRATE
Chemical Name: Gadolinium chloride, hydrate (1:6)
Synonyms: Gadolinium chloride (GdCl3), hexahydrate
Gadolinium trichloride hexahydrate
Recommended use: No information available.
CAS #: 13450-84-5
Formula: GdCl3.6H2O
RTECS #: LW4050000
CI#: Not available
Supplier: Spectrum Chemicals and Laboratory Products, Inc.
14422 South San Pedro St.
Gardena, CA 90248
(310) 516-8000
Emergency Telephone Number: CHEMTREC: 1-800-424-9300
Contact Person: Martin LaBenz (West Coast)
Contact Person: Chris Terpak (East Coast)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

WARNING! Irritating to eyes. Irritating to skin. Irritating to respiratory system.

Odor: None.
Physical state: Solid.
Appearance: Crystals. Crystals with lumps.
Color: White. Light grey.

OSHA Regulatory Status
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)
2. HAZARDS IDENTIFICATION

POTENTIAL HEALTH EFFECTS

Principal Routes of Exposure:
Inhalation. Ingestion.

Acute Potential Health Effects:

Skin Contact:
Contact causes skin irritation.

Eye Contact:
Causes eye irritation.

Inhalation:
Irritating to respiratory system.

Ingestion:
May affect the liver. It may affect metabolism. May cause loss of appetite.

Chronic Potential Health Effects:

Target Organs: No information available
Carcinogen Status: No information available
Mutagenic Effects: No information available
Teratogenic Effects: No information available
Aggravated Medical Conditions: No information available

See Section 11 for additional Toxicological Information

POTENTIAL ENVIRONMENTAL EFFECTS

No information available

3. COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gadolinium Chloride, Hexahydrate</td>
<td>13450-84-5</td>
<td>100</td>
</tr>
</tbody>
</table>

4. FIRST AID MEASURES

General Advice: Poison information centres in each State capital city can provide additional assistance for scheduled poisons (13 1126).

Skin Contact: Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. Get medical attention. If skin irritation persists, call a physician.

Eye Contact: Flush eye with water for 15 minutes. Get medical attention.

Inhalation: Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Product code: G1388  Product name: GADOLINIUM CHLORIDE, HEXAHYDRATE
Ingestion:  Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Obtain medical attention.

Notes to Physician:  Treat symptomatically

5. FIRE-FIGHTING MEASURES

Flammable Properties

Flashpoint (°C/°F):  Not applicable

Tested according to:  Not applicable

Lower Explosion Limit (%):  No information available
Upper Explosion Limit (%):  No information available

Autoignition Temperature (°C/°F):  No information available

Suitable Extinguishing Media:  The product is not flammable. If it is involved in a fire, extinguish the fire using an agent suitable for the type of surrounding fire.

Unsuitable Extinguishing Media:  No information available.

Hazardous Combustion Products:  No information available.

Specific hazards:  The product is not flammable.

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

Specific Methods:  No information available.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions:  Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Avoid dust formation.

Environmental Precautions:  Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Do not let this chemical enter the environment.

Methods for Cleaning Up:  Sweep up and shovel into suitable containers for disposal. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Handling

Product code: G1388  Product name: GADOLINIUM CHLORIDE, HEXAHYDRATE
Technical Measures/Precautions:
Provide sufficient air exchange and/or exhaust in work rooms. Avoid dust formation. Keep away from incompatible materials.

Safe Handling Advice:
Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Do not ingest. Do not breathe vapours/dust. Avoid dust formation. Keep away from heat and sources of ignition. Handle in accordance with good industrial hygiene and safety practice.

Storage

Technical Measures/Storage Conditions:
Keep containers tightly closed in a dry, cool and well-ventilated place. Store away from incompatible materials.

Incompatible Products:
Bases.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures to reduce exposure: Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protective Equipment

Eye protection: Safety glasses. Safety glasses with side-shields.
Skin and body protection: Long sleeved clothing. Chemical resistant apron. Gloves.
Respiratory protection: Wear respirator with dust filter.
Hygiene measures: Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. When using, do not eat, drink or smoke.

National occupational exposure limits

United States
U.S Occupational Exposure Limits:

<table>
<thead>
<tr>
<th>Components</th>
<th>OSHA</th>
<th>NIOSH</th>
<th>ACGIH</th>
<th>AIHA WHEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gadolinium Chloride, Hexahydrate - 13450-84-5</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Canada
Canada Occupational Exposure Limits:

<table>
<thead>
<tr>
<th>Components</th>
<th>Alberta</th>
<th>British Columbia</th>
<th>Quebec</th>
<th>Ontario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gadolinium Chloride, Hexahydrate 13450-84-5</td>
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</table>

Australia and Mexico
Occupational Exposure Limits for Australia and Mexico:

<table>
<thead>
<tr>
<th>Components</th>
<th>Australia</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gadolinium Chloride, Hexahydrate 13450-84-5</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

Product code: G1388  Product name: GADOLINIUM CHLORIDE, HEXAhydrate
9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid.

Odor: None.

Flash point (°C): Not applicable

Autoignition Temperature (°C/°F): No information available

Melting point/range(°C/°F): No information available

Density (g/cm³): 2.42 @ 25 °C

Vapor density: No information available

Odor threshold (ppm): No information available

Solubility: No information available

Appearance: Crystals. Crystals with lumps.

Taste: No information available

Lower Explosion Limit (%): No information available

Decomposition temperature(°C/°F): No information available

Bulk density: No information available

Evaporation rate: No information available

Partition coefficient (n-octanol/water): No information available

Color: White. Light grey.

Molecular/Formula weight: 371.72

Boiling point/range(°C/°F): No information available

Specific gravity: No information available

Vapor pressure @ 20°C (kPa): No information available

VOC content (g/L): No information available

Miscibility: No information available

10. STABILITY AND REACTIVITY

Stability: Stable at normal conditions

Conditions to avoid: Avoid dust formation. Incompatible materials.

Materials to avoid: Bases.


Possibility of Hazardous Reactions: No information available

Polymerization: Hazardous polymerisation does not occur

Corrosivity: No information available

Special Remarks on Corrosivity: No information available

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Component Information

Gadolinium Chloride, Hexahydrate - 13450-84-5
LD50/oral/rat =
No information available

Product code: G1388 Product name: GADOLINIUM CHLORIDE, HEXAHYDRATE
Product Information

LC50/inhalation/rat = No information available
LC50/inhalation/mouse = No information available
LD50/dermal/rabbit = No information available
LD50/dermal/rat = No information available
LD50/oral/rat = No information available
LD50/oral/mouse = No information available

Local Effects

Skin irritation: Irritating to skin.
Eye irritation: Irritating to eyes.
Inhalation: Irritating to respiratory system.
Ingestion: May affect liver.
Sensitization: No information available

Chronic Toxicity

Chronic Toxicity Prolonged or repeated ingestion may cause loss of appetite. Prolonged or repeated ingestion may cause weight loss. Prolonged or repeated ingestion may affect behavior/central nervous system.

Carcinogenic effects: Not considered carcinogenic

<table>
<thead>
<tr>
<th>Component</th>
<th>NTP</th>
<th>IARC</th>
<th>OSHA</th>
<th>ACGIH - Carcinogens</th>
<th>Australia Prohibited Carcinogenic Substances</th>
<th>Australia Notifiable Carcinogenic Substances</th>
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</thead>
<tbody>
<tr>
<td>Gadolinium Chloride, Hexahydrate</td>
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<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
<td>Not listed</td>
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</tr>
</tbody>
</table>

Mutagenic Effects: No information available
Reproductive Effects: No information available
Teratogenic Effects: No information available
Target Organs: No information available

12. ECOLOGICAL INFORMATION

ECOTOXICITY

Toxicity to terrestrial and aquatic plants and animals: No information available

Product code: G1388  Product name: GADOLINIUM CHLORIDE, HEXAHYDRATE
Ecotoxicity effects: No data available
Aquatic toxicity: No information available
Mobility: No information available
Persistence and degradability: No information available
Bioaccumulative potential: No information available

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products:
Waste must be disposed of in accordance with Federal, State and Local regulation.

Contaminated packaging:
Empty containers should be taken for local recycling, recovery or waste disposal.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>GADOLINIUM CHLORIDE, Hexahydrate</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

14. TRANSPORT INFORMATION

DOT
- UN-No: Not regulated
- Proper Shipping Name: No information available
- Hazard Class: No information available
- Packing Group: None
- Subsidiary Risk: Not applicable
- Marine Pollutant: No data available
- ERG No: No information available
- DOT RQ (lbs): No information available

TDG (Canada)
- Proper Shipping Name: No information available
- UN-No: Not Regulated
- Hazard Class: No information available
- Packing Group: No information available
- Subsidiary Risk: No information available
- Description: No information available

ADR
- Proper Shipping Name: No information available
- UN-No: Not Regulated
- Hazard Class: No information available
- Packing Group: No information available
- Subsidiary Risk: No information available
- Classification Code: No information available
- Description: No information available
- CEFIC Tremcard No: No information available

IMO / IMDG
- Proper Shipping Name: No information available
- UN-No: Not Regulated
- Hazard Class: No information available
- Subsidiary Risk: No information available
- Packing Group: No information available

Product code: G1388  Product name: GADOLINIUM CHLORIDE, HEXAHYDRATE
15. REGULATORY INFORMATION

International Inventories

<table>
<thead>
<tr>
<th>Components</th>
<th>U.S. TSCA</th>
<th>Philippines (PICCS)</th>
<th>KOREA KECL</th>
<th>Japan ENCS</th>
<th>CHINA Not present</th>
<th>Australia (AICS)</th>
<th>EINECS-No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gadolinium Chloride, Hexahydrate</td>
<td>Not Listed</td>
<td>Not present</td>
<td>Not present</td>
<td>Not present</td>
<td>Not present</td>
<td>Not present</td>
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</tr>
</tbody>
</table>

U.S. Regulations


Chemicals Known to the State of California to Cause Cancer:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Chemicals Known to the State of California to Cause Reproductive Toxicity:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

<table>
<thead>
<tr>
<th>Components</th>
<th>Carcinogen</th>
<th>Developmental Toxicity</th>
<th>Male Reproductive Toxicity</th>
<th>Female Reproductive Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gadolinium Chloride, Hexahydrate</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

CERCLA/SARA

Product code: G1388  
Product name: GADOLINIUM CHLORIDE, HEXAHYDRATE
Components | CERCLA - Hazardous Substances and their Reportable Quantities | Section 302 Extremely Hazardous Substances and TPQs | Section 302 Extremely Hazardous Substances and RQs | Section 313 - Chemical Category | Section 313 - Reporting de minimis
--- | --- | --- | --- | --- | ---
Gadolinium Chloride, Hexahydrate | None | None | None | None | None

U.S. TSCA

| Components | TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS) | TSCA 8(d) - Health and Safety Reporting |
--- | --- | ---
Gadolinium Chloride, Hexahydrate | Not Applicable | Not Applicable |

Canada

**WHMIS hazard class:**
D2B  Toxic materials

**Canada Controlled Products Regulation:**
This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the MSDS contains all of the information required by the CPR.

Inventory

| Components | Canada (DSL) | Canada (NDSL) |
--- | --- | ---
Gadolinium Chloride, Hexahydrate | Not Listed | Not Listed |

EU Classification

**R -phrase(s)**
R36 - Irritating to eyes.
R37 - Irritating to respiratory system.
R38 - Irritating to skin.

**S -phrase(s)**
S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S37 - Wear suitable gloves.

The product is classified in accordance with Annex VI to Directive 67/548/EEC.

**Indication of danger:**
Xi - Irritant.

16. OTHER INFORMATION

The MSDS format complies with ANSI Z400.1-2004 standards.

**Preparation Date** 16-Mar-2011

**Product code:** G1388  **Product name:** GADOLINIUM CHLORIDE, HEXAHYDRATE
Reason for revision: Not applicable

Prepared by: Sonia Owen

Literature reference: No information available

All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. The physical properties reported in this MSDS are obtained from the literature and do not constitute product specifications. Information contained herein does not constitute a warranty, whether expressed or implied, as to the safety, merchantability or fitness of the goods for a particular purpose. Spectrum Chemicals & Laboratory Products, Inc. assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied. It shall be the user’s responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum assumes no responsibility for the completeness or accuracy of the information contained herein.