1 Identification
Product identifier
Product name: Barium fluoride
Stock number: 38610
CAS Number: 7787-32-8
EC number: 232-108-0
Index number: 056-002-00-7

Relevant identified uses of the substance or mixture and uses advised against.
Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet
Manufacturer/Supplier:
Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Information Department: Health, Safety and Environmental Department
Emergency telephone number:
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification
Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)

GHS07
Acute Tox. 4 H302 Harmful if swallowed.
Acute Tox. 4 H332 Harmful if inhaled.

Hazards not otherwise classified No information known.

Label elements
GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms

GHS07

Signal word Warning
Hazard statements
H302+H332 Harmful if swallowed or if inhaled.

Precautionary statements
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P264 Wash thoroughly after handling.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P301+P312 IF SWALLOWED: Call a POISON CENTER/doctor/…/if you feel unwell.
P312 Call a POISON CENTER/doctor/…/if you feel unwell.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification
D1B - Toxic material causing immediate and serious toxic effects

Classification system
HMIS ratings (scale 0-4) (Hazardous Materials Identification System)

Health (acute effects) = 2
Flammability = 0
Physical Hazard = 0

Other hazards
Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

3 Composition/information on ingredients
Chemical characterization: Substances
CAS# Description: 7787-32-8 Barium fluoride
Identification number(s):
EC number: 232-108-0
Index number: 056-002-00-7

4 First-aid measures
Description of first aid measures
After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm. Seek immediate medical advice.
After skin contact
Immediately wash with water and soap and rinse thoroughly.

(Contd. on page 2)
5 Fire-fighting measures

Extinguishing media
Suitable extinguishing agents: Product is not flammable. Use fire-fighting measures that suit the surrounding fire.
Special hazards arising from the substance or mixture:
If this product is involved in a fire, the following can be released:
- Hydrogen fluoride (HF)
- Barium oxide
Advice for firefighters:
Protective equipment:
- Wear self-contained respirator.
- Wear fully protective impervious suit.

6 Accidental release measures

Personal precautions, protective equipment and emergency procedures
Wear protective equipment. Keep unprotected persons away.
Ensure adequate ventilation.
Environmental precautions:
- Do not allow material to be released to the environment without proper governmental permits.
Methods and material for containment and cleaning up:
- Dispose of contaminated material as waste according to section 13.
Ensure adequate ventilation.
Prevention of secondary hazards:
- No special measures required.
Reference to other sections:
- See Section 7 for information on safe handling.
- See Section 8 for information on personal protection equipment.
- See Section 13 for disposal information.

7 Handling and storage

Handling
Precautions for safe handling:
- Keep container tightly sealed.
- Store in cool, dry place in tightly closed containers.
- Ensure good ventilation at the workplace.
Information about protection against explosions and fires:
The product is not flammable.
Conditions for safe storage, including any incompatibilities:
Storage:
- Requirements to be met by storerooms and receptacles: No special requirements.
- Information about storage in one common storage facility: Do not store together with acids.
Further information about storage conditions:
- Keep container tightly sealed.
- Store in cool, dry conditions in well sealed containers.
Specific end use(s):
- No further relevant information available.

8 Exposure controls/personal protection

Additional information about design of technical systems:
- Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.
Control parameters:
Components with limit values that require monitoring at the workplace:

7787-32-8 Barium fluoride (100.0%)

<table>
<thead>
<tr>
<th>Limit Value</th>
<th>Type</th>
<th>Value</th>
<th>Unit</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEL (USA)</td>
<td>Long-term</td>
<td>2.5 mg/m³</td>
<td>F</td>
<td>USA</td>
</tr>
<tr>
<td>REL (USA)</td>
<td>Long-term</td>
<td>2.5 mg/m³</td>
<td>F</td>
<td>USA</td>
</tr>
<tr>
<td>TLV (USA)</td>
<td>Long-term</td>
<td>2.5 mg/m³</td>
<td>F, BEI</td>
<td>USA</td>
</tr>
<tr>
<td>EL (Canada)</td>
<td>Long-term</td>
<td>2.5 mg/m³</td>
<td>F</td>
<td>USA</td>
</tr>
</tbody>
</table>

Ingredients with biological limit values:

7787-32-8 Barium fluoride (100.0%)

<table>
<thead>
<tr>
<th>Limit Value</th>
<th>Type</th>
<th>Value</th>
<th>Unit</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>BET (USA)</td>
<td>Medium</td>
<td>12 mg/L</td>
<td></td>
<td>USA</td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td>prior to shift</td>
<td></td>
<td>USA</td>
</tr>
<tr>
<td></td>
<td>Parameter</td>
<td>Fluoride (background, nonspecific)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium</td>
<td>3 mg/L</td>
<td></td>
<td>USA</td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td>end of shift</td>
<td></td>
<td>USA</td>
</tr>
<tr>
<td></td>
<td>Parameter</td>
<td>Fluoride (background, nonspecific)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Additional information:
- No data

Exposure controls:
- General protective and hygienic measures:
The usual precautionary measures for handling chemicals should be followed.
- Keep away from foodstuffs, beverages and feed.
- Remove all soiled and contaminated clothing immediately.
- Wash hands before breaks and at the end of work.
- Maintain an ergonomically appropriate working environment.
- Breathing equipment:
- Use suitable respirator when high concentrations are present.
- Recommended filter device for short term use:
- Use a respirator with type P100 (USA) or P3 (EN 143) cartridges as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards.
Protection of hands:
Impervious gloves
Check protective gloves prior to each use for their proper condition.
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.

Material of gloves: Nitrile rubber, NBR
Penetration time of glove material (in minutes): 480
Glove thickness: 0.11 mm
Eye protection: Safety glasses
Body protection: Protective work clothing.

9 Physical and chemical properties
Information on basic physical and chemical properties
General Information
Appearance:
Form: Powder or lump
Color: Colorless
Odor: Odorless
Odor threshold: Not determined.

pH-value: Not applicable.

Change in condition
Melting point/Melting range: 1353 °C (2467 °F)
Boiling point/Boiling range: 2260 °C (4100 °F)
Sublimation temperature / start: Not determined
Flammability (solid, gaseous): Not determined.
Ignition temperature: Not determined
Decomposition temperature: Not determined
Auto ignition: Not determined.

Danger of explosion: Not determined.
Explosion limits:
Lower: Not determined
Upper: Not determined

Vapor pressure at 1436 °C (2617 °F): 1.3 hPa (1 mm Hg)
Density at 20 °C (68 °F): 4.83 g/cm³ (40.306 lbs/gal)
Relative density: Not determined.
Vapor density: Not applicable.
Evaporation rate: Not applicable.
Solubility in / Miscibility with
Water at 25 °C (77 °F): 1.2 g/l Soluble

Partition coefficient (n-octanol/water): Not determined.
Viscosity:
dynamic: Not applicable.
kinematic: Not applicable.

10 Stability and reactivity
Reactivity: No information known.
Chemical stability: Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions: No dangerous reactions known
Conditions to avoid: No further relevant information available.
Incompatible materials: Acids
Hazardous decomposition products:
Barium oxide
Hydrogen fluoride

11 Toxicological information
Information on toxicological effects
Acute toxicity:
Harmful if inhaled.
Harmful if swallowed.
The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for this substance.

LD/LC50 values that are relevant for classification:
Oral [LD50]: 250 mg/kg (rat)
Skin irritation or corrosion: May cause irritation
Eye irritation or corrosion: May cause irritation
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: No effects known.
Carcinogenicity:
ACGIH A4: Not classifiable as a human carcinogen: Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.
(oral) EPA-D: Not classifiable as to human carcinogenicity: inadequate human and animal evidence of carcinogenicity or no data are available.
(inhalation) EPA-OBD: Carcinogenic potential cannot be determined.
(oral) EPA-AL: Not likely to be carcinogenic to humans.
Reproductive toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for this substance.
Specific target organ system toxicity - repeated exposure: No effects known.
Specific target organ system toxicity - single exposure: No effects known.
Aspiration hazard: No effects known.
Subacute to chronic toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.
Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

12 Ecological information
Toxicity
Aquatic toxicity: No further relevant information available.
Persistence and degradability: No further relevant information available.
Bioaccumulative potential: No further relevant information available.
Mobility in soil: No further relevant information available.
13 Disposal considerations

Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

<table>
<thead>
<tr>
<th>UN-Number</th>
<th>DOT, IMDG, IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN1564</td>
<td></td>
</tr>
</tbody>
</table>

| UN proper shipping name |
| Barium compounds, n.o.s. (Barium fluoride, Puratronic®) |

| IMDG, IATA |
| BARIUM COMPOUND, N.O.S. (Barium fluoride, Puratronic®) |

Transport hazard class(es)

<table>
<thead>
<tr>
<th>Class</th>
<th>Label</th>
<th>DOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>Toxic substances.</td>
<td>6.1</td>
</tr>
</tbody>
</table>

| IMDG, IATA |
| BARIUM COMPOUND, N.O.S. (Barium fluoride, Puratronic®) |

<table>
<thead>
<tr>
<th>Class</th>
<th>Label</th>
<th>IMDG, IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>Toxic substances.</td>
<td>6.1</td>
</tr>
</tbody>
</table>

Packing group

| DOT, IMDG, IATA |
| III |

Environmental hazards:
Not applicable.

Special precautions for user

| EMS Number: |
| Warning: Toxic substances |

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable.

Transport/Additional information:

| DOT |
| Marine Pollutant (DOT): |
| No |

| UN "Model Regulation": |
| UN1564, Barium compounds, n.o.s. (Barium fluoride, Puratronic®), 6.1, III |

15 Regulatory information

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

| GHS label elements |
| The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS) |

Hazard pictograms

GHS07

Signal word Warning

Hazard statements

H302+H332 Harmful if swallowed or if inhaled.

Precautionary statements

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P264 Wash thoroughly after handling.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 IF SWALLOWED: Call a POISON CENTER/doctor...if you feel unwell.
P312 Call a POISON CENTER/doctor...if you feel unwell.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory. All components of this product are listed on the Canadian Domestic Substances List (DSL).

SARA Section 313 (specific toxic chemical listings)

7787-32-8 [Barium fluoride]

California Proposition 65

Prop 65 - Chemicals known to cause cancer Substance is not listed.
Prop 65 - Developmental toxicity Substance is not listed.
Prop 65 - Developmental toxicity, female Substance is not listed.
Prop 65 - Developmental toxicity, male Substance is not listed.

Information about limitation of use: For use only by technically qualified individuals.

Other regulations, limitations and prohibitive regulations

Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.

(Contd. on page 5)
The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.

Substance is not listed.

Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

16 Other information

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing SDS: Global Marketing Department

Date of preparation / last revision 11/24/2015 / -

Abbreviations and acronyms:
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
ICAO: International Civil Aviation Organization
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
vPvB: very Persistent and very Bioaccumulative
ACGIH: American Conference of Governmental Industrial Hygienists (USA)
OSHA: Occupational Safety and Health Administration (USA)
NTP: National Toxicology Program (USA)
IARC: International Agency for Research on Cancer
EPA: Environmental Protection Agency (USA)