SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

- Trade name: BARIUM CARBONATE - HIGH PURITY BM040
- Chemical Name: Barium carbonate
- Synonyms: Barium salt
- Molecular formula: BaCO3

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

**Uses of the Substance / Mixture**

- Use in the manufacturing of other barium substances
- Use as reactive processing aid (sulfate removal)
- Glass industry
- Manufacture of ceramic materials
- Manufacture of electro-ceramic materials
- Manufacture of glazes, frits and enamels
- Use in welding electrode coating
- Use in the preparation of slurry
- Manufacture of pyrotechnical products
- Welding in industrial and professional settings
- Contact your supplier for additional information

**Uses advised against**

- none

1.3 Details of the supplier of the safety data sheet

**Company**

SOLVAY FLUORIDES, LLC
3333 RICHMOND AVENUE
77098-3099, HOUSTON
USA
Tel: +1-800-7658292; +1-713-5256700
Fax: +1-713-5257805

1.4 Emergency telephone

FOR EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT CONTACT: CHEMTREC 800-424-9300 within the United States and Canada, or 703-527-3887 for international collect calls.

SECTION 2: Hazards identification

Although OSHA has not adopted the environmental portion of the GHS regulations, this document may include information on environmental effects.

2.1 Classification of the substance or mixture

**HCS 2012 (29 CFR 1910.1200)**

Acute toxicity, Category 4

H302: Harmful if swallowed.
2.2 Label elements

HCS 2012 (29 CFR 1910.1200)

Pictogram

Signal Word
- Warning

Hazard Statements
- H302 Harmful if swallowed.

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

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

2.3 Other hazards which do not result in classification
- None known.

SECTION 3: Composition/information on ingredients

3.1 Substance
- Not applicable, this product is a mixture.

3.2 Mixture
- Synonyms Barium salt
- Formula BaCO3

Hazardous Ingredients and Impurities

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>Identification number CAS-No.</th>
<th>Concentration [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium carbonate</td>
<td>513-77-9</td>
<td>99</td>
</tr>
<tr>
<td>Citric Acid</td>
<td>77-92-9</td>
<td>1</td>
</tr>
</tbody>
</table>

SECTION 4: First aid measures

4.1 Description of first-aid measures

In case of inhalation
- Move to fresh air.
- If symptoms persist, call a physician.
In case of skin contact
- Remove and wash contaminated clothing before re-use.
- Wash off with plenty of water.
- If symptoms persist, call a physician.

In case of eye contact
- Rinse thoroughly with plenty of water, also under the eyelids.
- If eye irritation persists, consult a specialist.

In case of ingestion
- Call a physician immediately.
- Take victim immediately to hospital.
- If swallowed, rinse mouth with water (only if the person is conscious).
- Artificial respiration and/or oxygen may be necessary.

4.2 Most important symptoms and effects, both acute and delayed

In case of inhalation
Effects
- May cause irritation of the mucous membranes.
- Risk of pulmonary overload (respirable particulates)
- Possible risk of irreversible effects through inhalation.

In case of skin contact
Effects
- Prolonged skin contact may cause skin irritation.

In case of eye contact
Effects
- Contact with eyes may cause irritation.

In case of ingestion
Effects
- Acute intoxication by inhalation or ingestion of water soluble barium salts causes vomiting, diarrhea, convulsive tremors and muscular paralysis.
- Risk of convulsions, pulmonary arrest.
- Risk of cardiac rhythm alteration, sudden cardiac failure.
- Risk of shock.

4.3 Indication of any immediate medical attention and special treatment needed
Notes to physician
- Give to drink 30 grams of sodium sulfate in 250 ml of fresh water.
- Immediate medical attention is required.
- Medical examination necessary even only on suspicion of intoxication.

SECTION 5: Firefighting measures

Flash point
Not applicable

Autoignition temperature
Not applicable
SAFETY DATA SHEET

BARIUM CARBONATE - HIGH PURITY BM040

Revision Date 05/15/2015

Flammability / Explosive limit
no data available

5.1 Extinguishing media

Suitable extinguishing media
- Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
- None.

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire fighting
- Not combustible.

Hazardous combustion products:
- Barium oxide
- Other hazardous decomposition products may be formed.

5.3 Advice for firefighters

Special protective equipment for fire-fighters
- In the event of fire, wear self-contained breathing apparatus.
- Use personal protective equipment.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for emergency responders
- Use personal protective equipment.
- Prevent further leakage or spillage.

Advice for non-emergency personnel
- Evacuate personnel to safe areas.
- Avoid dust formation.

6.2 Environmental precautions
- Should not be released into the environment.
- Local authorities should be advised if significant spillages cannot be contained.

6.3 Methods and materials for containment and cleaning up
- Pick up and transfer to properly labeled containers.
- Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
- Refer to protective measures listed in sections 7 and 8.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
- Keep away from incompatible products
- Ensure adequate ventilation.
- Avoid contact with skin and eyes.
- Use only in well-ventilated areas.

**Hygiene measures**
- Handle in accordance with good industrial hygiene and safety practice.
- Wash hands before breaks and at the end of workday.
- When using do not eat, drink or smoke.
- Eye wash bottles or eye wash stations in compliance with applicable standards.

**7.2 Conditions for safe storage, including any incompatibilities**

**Technical measures/Storage conditions**
- Keep away from:
  - Incompatible products
- Store in original container.
- Keep in a well-ventilated place.
- Keep in a dry place.
- Keep in properly labeled containers.
- Keep container closed.

**Packaging material**

**Suitable material**
- Paper.
- Polyethylene

**7.3 Specific end use(s)**
- Contact your supplier for additional information

---

**SECTION 8: Exposure controls/personal protection**

Introductory Remarks: These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Assistance with selection, use and maintenance of worker protection equipment is generally available from equipment manufacturers.

**8.1 Control parameters**

**Components with workplace occupational exposure limits**

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Value type</th>
<th>Value</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium carbonate</td>
<td>TWA</td>
<td>0.5 mg/m³</td>
<td>Occupational Safety and Health Administration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Table Z-1 Limits for Air Contaminants</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Expressed as : Barium</td>
</tr>
<tr>
<td>Barium carbonate</td>
<td>TWA</td>
<td>0.5 mg/m³</td>
<td>American Conference of Governmental Industrial Hygienists</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Expressed as : Barium</td>
</tr>
<tr>
<td>Barium carbonate</td>
<td>TWA</td>
<td>0.5 mg/m³</td>
<td>National Institute for Occupational Safety and Health</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Expressed as : Barium</td>
</tr>
</tbody>
</table>
NIOSH IDLH (Immediately Dangerous to Life or Health Concentrations)

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium carbonate</td>
<td>513-77-9</td>
<td>50 milligram per cubic meter</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

Control measures

### Engineering measures
- Ensure adequate ventilation.
- Apply technical measures to comply with the occupational exposure limits.

### Individual protection measures

#### Respiratory protection
- Self-contained breathing apparatus.
- Respirator with a dust filter
- Use NIOSH approved respiratory protection.
- Use only respiratory protection that conforms to international/national standards.

#### Hand protection
- Impervious gloves

**Suitable material**
- PVC
- Natural Rubber
- Neoprene

#### Eye protection
- Chemical resistant goggles must be worn.

#### Skin and body protection
- Long sleeved clothing

#### Hygiene measures
- Handle in accordance with good industrial hygiene and safety practice.
- Wash hands before breaks and at the end of workday.
- When using do not eat, drink or smoke.
- Eye wash bottles or eye wash stations in compliance with applicable standards.

SECTION 9: Physical and chemical properties

Physical and Chemical properties here represent typical properties of this product. Contact the business area using the Product information phone number in Section 1 for its exact specifications.

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Appearance</th>
<th>Form: powder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state: solid</td>
<td></td>
</tr>
<tr>
<td>Color: white</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Particle size</th>
<th>0.2 - 0.6 µm</th>
</tr>
</thead>
<tbody>
<tr>
<td>d 50</td>
<td></td>
</tr>
</tbody>
</table>
0.4 - 0.6 µm
d 90

**Odor**
odorless

**Odor Threshold**
no data available

**pH**
5.0 - 7.0

**pKa:**
Not applicable

**Melting point/range**
>= 1652 °F (>= 900 °C)
Decomposition: yes

**Boiling point/boiling range**
Thermal decomposition: yes
Not applicable

**Flash point**
Not applicable

**Evaporation rate (Butylacetate = 1)**
Not applicable

**Flammability (solid, gas)**
The product is not flammable.

**Flammability / Explosive limit**
Explosiveness:
Not explosive

**Autoignition temperature**
Not applicable

**Vapor pressure**
Not applicable

**Vapor density**
Not applicable

**Density**
Bulk density: 350 - 700 kg/m3

**Relative density:**
4.43 (68 °F (20 °C))

**Solubility**
Water solubility:
14 mg/l (68 °F (20 °C))

Solubility in other solvents:
Hydrogen chloride: soluble
Nitric acid: soluble
Ethanol: soluble
Sulphuric acid: insoluble

**Partition coefficient: n-octanol/water**
Not applicable

**Thermal decomposition**
2,516 °F (1,380 °C)

**Viscosity**
Viscosity, dynamic: Not applicable
Explosive properties
no data available

Oxidizing properties
Not considered as oxidizing.

9.2 Other information
Molecular weight
197.3 g/mol

SECTION 10: Stability and reactivity

10.1 Reactivity
- Contact with acids liberates CO2, sometimes violently.

10.2 Chemical stability
- Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
- No dangerous reaction known under conditions of normal use.

10.4 Conditions to avoid
- none

10.5 Incompatible materials
- Acids

10.6 Hazardous decomposition products
- Barium oxide
- Other hazardous decomposition products may be formed.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Acute oral toxicity
LD50: 1,690 mg/kg - Rat

Acute inhalation toxicity
LC50 study scientifically unjustified

Acute dermal toxicity
Barium chloride anhydrous
LD50: > 2,000 mg/kg - Rat
Method: OECD Test Guideline 402
Not classified as hazardous for acute dermal toxicity according to GHS.

Acute toxicity (other routes of administration)
no data available

Skin corrosion/irritation
Rabbit
No skin irritation
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Serious eye damage/eye irritation
Rabbit
No eye irritation

Respiratory or skin sensitization
Barium chloride anhydrous
Mouse
not sensitizing

Local lymph node assay - Mouse
Does not cause skin sensitization.
Method: OECD Test Guideline 429
Unpublished internal reports

Mutagenicity

Genotoxicity in vitro
Barium chloride anhydrous
Ames test
with and without metabolic activation
negative
Method: Mutagenicity (Salmonella typhimurium - reverse mutation assay)
In vitro tests did not show mutagenic effects
Published data

Chromosome aberration test in vitro
Strain: CHO
with and without metabolic activation
negative
Method: OECD Test Guideline 473
In vitro tests did not show mutagenic effects
Published data

Gene mutation assays in mammalian cells.
Strain: mouse lymphoma cells
with and without metabolic activation
negative
Method: OECD Test Guideline 476
In vitro tests did not show mutagenic effects
Published data

Genotoxicity in vivo
no data available
Carcinogenicity

Barium chloride anhydrous

Rat
Oral
Exposure time: two-year
NOAEL: 91mg/kg

Animal testing did not show any carcinogenic effects.
Published data

Mouse
Oral
Exposure time: two-year
NOAEL: 91mg/kg

Animal testing did not show any carcinogenic effects.
Published data

This product does not contain any ingredient designated as probable or suspected human carcinogens by:
NTP
IARC
OSHA
ACGIH

Toxicity for reproduction and development

Toxicity to reproduction / fertility
Barium chloride anhydrous
Repeated exposure
NOAEL parent: 258 - 290 mg/kg
Effects on fertility

Rat , male and female
Oral
NOAEL parent: 272 - 306 mg/kg
Published data

Mouse , male and female
Oral
NOAEL parent: 272 - 306 mg/kg
Published data

Developmental Toxicity/Teratogenicity
Barium chloride anhydrous
20 days - Rat , female
Application Route: Gavage
NOAEL teratogenicity: 100 mg/kg
NOAEL maternal: 30 mg/kg
Method: OECD Test Guideline 414
Unpublished internal reports

STOT

STOT-single exposure
Routes of exposure: Oral
The substance or mixture is not classified as specific target organ toxicant, single exposure.
no observed effect

STOT-repeated exposure
inhalation (dust) Repeated exposure - Rat
NOAEL: 5.2 mg/m3
Target Organs: Cardio-vascular system, hematology system, Respiratory system observed effect

inhalation (dust) NOAEL: 1 mg/m3

CMR effects

Carcinogenicity
Barium chloride anhydrous
No evidence of carcinogenicity in animal studies.

Mutagenicity
Barium chloride anhydrous
Tests on bacterial or mammalian cell cultures did not show mutagenic effects.

Aspiration toxicity
no data available

Further information
Harmful if swallowed.
The toxicity is mainly linked to the barium ion (nervous, cardiovascular, respiratory and gastro-intestinal troubles).
Risk of effect on the liver, the cardiovascular system, the hematological system and the adrenals
Irritating to eyes and skin.

No data exists on the effects of nanometer sized particles on the body.

SECTION 12: Ecological information

12.1 Toxicity

Aquatic Compartment

Acute toxicity to fish
Aquatic toxicity is unlikely due to low solubility.

Acute toxicity to daphnia and other aquatic invertebrates.
Barium chloride anhydrous
EC50 - 48 h: 14.5 mg/l - Daphnia magna (Water flea)
static test
Analytical monitoring: yes
Method: OECD Test Guideline 202
Not harmful to aquatic invertebrates. (EC50 > 100 mg/L)
By analogy
Published data

Toxicity to aquatic plants
NOEC - 72 h: >= 61 mg/l - Pseudokirchneriella subcapitata (green algae)
Growth rate

EC50 - 72 h: > 100 mg/l - Pseudokirchneriella subcapitata (green algae)
Growth rate
Toxicity to microorganisms
Barium chloride anhydrous

NOEC - 3 h: 622 mg/l - activated sludge static test
Analytical monitoring: yes
Method: OECD Test Guideline 209
By analogy
Unpublished internal reports

Chronic toxicity to fish
Barium chloride anhydrous

NOEC: > 1.26 mg/l - 33 Days - Danio rerio (zebra fish) semi-static test
Analytical monitoring: yes
Method: OECD Test Guideline 210
No adverse chronic effect observed up to and including the threshold of 1 mg / L.
By analogy
Unpublished internal reports

Chronic toxicity to daphnia and other aquatic invertebrates.

EC50: 2.9 mg/l - 21 Days - Daphnia magna (Water flea)

12.2 Persistence and degradability

Abiotic degradation

Photodegradation
slow ionization and cation precipitation in presence of sulfates or carbonates
Medium
Water
Soil

Biodegradation

Biodegradability
The methods for determining biodegradability are not applicable to inorganic substances.

Degradability assessment
Barium chloride anhydrous
Water/soil
cation precipitation in presence of sulphates or carbonates

12.3 Bioaccumulative potential

Bioconcentration factor (BCF)
potential accumulation of the cation

12.4 Mobility in soil

Adsorption potential (Koc)
Water/soil
low solubility and mobility

Air
mobility as solid aerosols

12.5 Results of PBT and vPvB assessment
no data available
12.6 Other adverse effects

no data available

Ecotoxicity assessment

Acute aquatic toxicity
Barium chloride anhydrous
No toxicity at the limit of solubility.

Chronic aquatic toxicity
Barium chloride anhydrous
No adverse chronic effect observed up to and including the threshold of 1 mg / L.

Remarks
Ecological injuries are not known or expected under normal use., Persistent product mainly in its inert form.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product Disposal
- In accordance with local and national regulations.
- Use a solution of sodium or magnesium sulfate or possibly a dilute solution of sulfuric acid to form a sulfate precipitate.
- Dispose of wastes in an approved waste disposal facility.

Waste Code
- Environmental Protection Agency
- Hazardous Waste – YES
- RCRA Hazardous Waste (40 CFR 302)
- D005 - Barium

Advice on cleaning and disposal of packaging
- Containers that cannot be cleaned must be treated as waste.
- Must be incinerated in a suitable incineration plant holding a permit delivered by the competent authorities.

SECTION 14: Transport information

DOT
not regulated

TDG
not regulated

NOM
not regulated

IMDG
not regulated

IATA
not regulated

Note: The above regulatory prescriptions are those valid on the date of publication of this sheet. Given the possible evolution of transportation regulations for hazardous materials, it would be advisable to check their validity with your sales office.
SECTION 15: Regulatory information

15.1 Notification status

<table>
<thead>
<tr>
<th>Inventory Information</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States TSCA Inventory</td>
<td>Listed on Inventory</td>
</tr>
<tr>
<td>Mexico INSQ (INSQ)</td>
<td>In compliance with the inventory</td>
</tr>
<tr>
<td>Canadian Domestic Substances List (DSL)</td>
<td>Listed on Inventory</td>
</tr>
<tr>
<td>New Zealand. Inventory of Chemical Substances</td>
<td>In compliance with the inventory</td>
</tr>
<tr>
<td>Australia Inventory of Chemical Substances (AICS)</td>
<td>Listed on Inventory</td>
</tr>
<tr>
<td>Japan. CSCL - Inventory of Existing and New Chemical Substances</td>
<td>Listed on Inventory</td>
</tr>
<tr>
<td>Korea. Korean Existing Chemicals Inventory (KECI)</td>
<td>Listed on Inventory</td>
</tr>
<tr>
<td>China. Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>Listed on Inventory</td>
</tr>
<tr>
<td>Philippines Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>Listed on Inventory</td>
</tr>
</tbody>
</table>

15.2 Federal Regulations

**US. EPA EPCRA SARA Title III**

**SARA HAZARD DESIGNATION SECTIONS 311/312 (40 CFR 370)**

<table>
<thead>
<tr>
<th>Hazard</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire Hazard</td>
<td>no</td>
</tr>
<tr>
<td>Reactivity Hazard</td>
<td>no</td>
</tr>
<tr>
<td>Sudden Release of Pressure Hazard</td>
<td>no</td>
</tr>
<tr>
<td>Acute Health Hazard</td>
<td>yes</td>
</tr>
<tr>
<td>Chronic Health Hazard</td>
<td>no</td>
</tr>
</tbody>
</table>

**Section 313 Toxic Chemicals (40 CFR 372.65)**

The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>CAS-No.</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barium carbonate</td>
<td>513-77-9</td>
<td>99 %</td>
</tr>
</tbody>
</table>

**Section 302 Emergency Planning Extremely Hazardous Substance Threshold Planning Quantity (40 CFR 355)**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**Section 302 Emergency Planning Extremely Hazardous Substance Reportable Quantity (40 CFR 355)**

This material does not contain any components with a SARA 302 RQ.

**Section 304 Emergency Release Notification Reportable Quantity (40 CFR 355)**

This material does not contain any components with a section 304 EHS RQ.

**US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)**

This material does not contain any components with a CERCLA RQ.
15.3 State Regulations

**US, California Safe Drinking Water & Toxic Enforcement Act (Proposition 65)**

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

SECTION 16: Other information

**NFPA (National Fire Protection Association) - Classification**

<table>
<thead>
<tr>
<th>Category</th>
<th>NFPA Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>2</td>
<td>moderate</td>
</tr>
<tr>
<td>Flammability</td>
<td>0</td>
<td>minimal</td>
</tr>
<tr>
<td>Instability or Reactivity</td>
<td>1</td>
<td>slight</td>
</tr>
</tbody>
</table>

**HMIS (Hazardous Materials Identification System (Paint & Coating)) - Classification**

<table>
<thead>
<tr>
<th>Category</th>
<th>HMIS Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>2</td>
<td>moderate</td>
</tr>
<tr>
<td>Flammability</td>
<td>0</td>
<td>minimal</td>
</tr>
<tr>
<td>Reactivity</td>
<td>1</td>
<td>slight</td>
</tr>
<tr>
<td>PPE</td>
<td>Determined by User; dependent on local conditions</td>
<td></td>
</tr>
</tbody>
</table>

Further information

- Product evaluated under the US GHS format.

**Date Prepared:** 05/15/2015

Key or legend to abbreviations and acronyms used in the safety data sheet

- **TWA**: 8-hour, time-weighted average
- **ACGIH**: American Conference of Governmental Industrial Hygienists
- **OSHA**: Occupational Safety and Health Administration
- **NTP**: National Toxicology Program
- **IARC**: International Agency for Research on Cancer
- **NIOSH**: National Institute for Occupational Safety and Health

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information, and belief at the date of its publication. Such information is only given as a guidance to help the user handle, use, process, store, transport, dispose, and release the product in satisfactory safety conditions and is not to be considered as a warranty or quality specification. It should be used in conjunction with technical sheets but do not replace them. Thus, the information only relates to the designated specific product and may not be applicable if such product is used in combination with other materials or in any other manufacturing process, unless otherwise specifically indicated. It does not release the user from ensuring he is in conformity with all regulations linked to its activity.