SAFETY DATA SHEET

1. PRODUCT IDENTIFIER

Barium Chloride dihydrate

1.1 Trade Name: Barium Chloride Crystal

Synonyms: Barium Chloride dihydrate; Barium salt of hydrochloric acid

CAS Number: 10361-37-2 for Barium Chloride
10326-27-9 for Barium Chloride dihydrate

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

Recommended industrial uses:
- the synthesis of substances,
- as a fluxing agent
- treatment of wastewater for removal of radium by co-precipitation

Industrial uses advised against: None.

1.3 MANUFACTURER/Supplier of this SDS:

Chemical Products Corporation
102 Old Mill Road
P.O. Box 2470
Cartersville, Georgia 30120-1688
Telephone: 1-770-382-2144

1.4 EMERGENCY PHONE NUMBER: CHEMTREC, 800-424-9300
(24 hours every day)

2. HAZARD IDENTIFICATION

2.1 Classification in accordance with paragraph (d) of §1910.1200

Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category4), H332
Serious eye damage/eye irritation (Eye Irritant Category 2A), H319

2.2 Signal word, hazard statement(s), symbol(s) and precautionary statement(s) in accordance with paragraph (f) of §1910.1200.

Signal Word **DANGER**

Hazard Statements

- H301 Toxic if swallowed
- H332 Harmful if inhaled
- H319 Causes serious eye irritation

Precautionary Statements

Prevention

- P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
- P264 Wash skin thoroughly after handling.
- P270 Do not eat, drink or smoke when using this product.
- P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response

- P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER/doctor.
- P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P321 Specific treatment (see supplemental first aid instructions on this label) - Physician: Administer potassium intravenously to counteract the effect of barium.

2.3 Other hazards not otherwise classified that have been identified during the classification process

- None known.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	Common Name/Synonyms	CAS#	% by weight
Barium Chloride dihydrate	Barium Chloride Crystal	10326-27-9	<=100%

The CAS # for anhydrous Barium Chloride is 10361-37-2; this product contains about 85% anhydrous Barium Chloride.

4. FIRST AID MEASURES

4.1 Description of necessary first-aid measures

If swallowed

Rinse mouth with water. Consult a physician.
Give Epsom salts (magnesium sulfate) or Glauber's Salt (sodium sulfate) dissolved in water. Never give anything by mouth to an unconscious person.

If inhaled

Move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

For eye contact

Flush eyes with large amounts of water for at least 15 minutes and get IMMEDIATE medical attention.

For skin contact

Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician if irritation persists.

4.2 Most important symptoms and effects, both acute and delayed

In case of inhalation
- irritating to mucus membranes in the respiratory tract with possible delayed effect of barium absorbed into the bloodstream

In case of eye contact
- physical abrasion of the eye may occur in addition to damage resulting from dissolution.

In case of skin contact
- may be irritating to skin

In case of ingestion or inhalation
-Acute overexposure to soluble barium will cause severe abdominal pain, violent purging with watery and bloody stools, vomiting, muscle twitching, hypertension, and confusion, followed by transient muscle paralysis including potentially fatal paralysis of the respiratory muscles.

4.3 Indication of any immediate medical attention and special treatment needed, if necessary

- seek medical treatment if you feel unwell after being exposed to this product. **Physician:** Administer potassium intravenously to counteract the effects of barium.

5. FIRE FIGHTING MEASURES

5.1 Suitable (and unsuitable) extinguishing media.

This product is not flammable. Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Specific hazards arising from the chemical (e.g., nature of any hazardous combustion products).

No hazardous combustion products. This product is soluble in water and is harmful if swallowed or inhaled.

5.3 Special protective equipment and precautions for fire-fighters.

No special equipment is required. Wash away any barium chloride which may contact the body, clothing, or equipment.

Limit water runoff if it is likely to contain this material.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment, and emergency procedures.

Avoid generating dust. Use appropriate Personal Protective Equipment (PPE) as described in Section 8. Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Spilled product could be a RCRA D005 characteristic hazardous waste because of its soluble barium content. Do not dump into sewers, on the ground, or into any body of water.

6.2 Methods and materials for containment and cleaning up.

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal. For disposal see Section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling.

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

7.2 Conditions for safe storage, including any incompatibilities.

This material is water-soluble. Keep it dry. Keep containers closed. Emptied containers may still contain harmful amounts of this material. No known incompatibilities.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV)

Component	CAS-No.	Value	Control parameters	Basis
Barium chloride dihydrate	10326-27-9	TWA	0.889 mg/m3	USA. NIOSH Recommended Exposure Limits
[0.500 mg as Ba equals 0.889 mg of this product]		TWA	0.889 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.889 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye irritation - Muscular stimulation - Skin irritation Gastrointestinal irritation Not classifiable as a human carcinogen		

8.2 Appropriate engineering controls.

Control airborne concentrations below the exposure limits.

Use only with adequate ventilation.

8.3 Individual protection measures, such as personal protective equipment.

Use a NIOSH-approved dust mask if excessive dust is present. Cover exposed skin areas and wear general-purpose gloves. Wear safety glasses.
Use chemical goggles if excessive dust is present.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance (physical state, color, etc.): white granular solid /coarse powder
Odor: No data available. Expected to be odorless.
Odor Threshold: No data available.
pH: Approximately 7.0 for a 1% solution in water at 25 °C (77 °F)
Melting point/Freezing point: After loss of water of hydration at 113 °C, the resulting anhydrous barium chloride melts at 963 °C.
Initial boiling point and boiling range: No data available.
Flash point: No data available. Not flammable.
Evaporation rate: No data available.
Flammability (solid, gas): No data available. Not flammable.
Upper/lower flammability or explosive limits: No data available. Not flammable
Vapor pressure: No data available.
Vapor density: No data available.
Relative density – Specific Gravity: 3.1 g/cm3
Solubility: 43 g per 100 ml water at 30 °C.
Partition coefficient: n-octanol/water: No data available.
Auto-ignition temperature: No data available.
Decomposition temperatures: No data available.
Viscosity: No data available.

10. STABILITY AND REACTIVITY

10.1 Reactivity

Does not react with water.

10.2 Chemical Stability

Stable under recommended storage conditions.

10.3 Possibility of Hazardous Reactions

No data available. No known hazardous reactions.

10.4 Conditions to avoid (e.g., static discharge, shock, or vibration)

No data available.

10.5 Incompatible materials

No data available.

10.6 Hazardous decomposition products

Product loses water of crystallization at 113 °C (235 °F) and may "pop" and "spit" when heated rapidly to yield anhydrous barium chloride as a fine powder.

11. TOXICOLOGICAL INFORMATION

11.1 Information on the likely routes of exposure (inhalation, ingestion, skin and eye contact)

Skin: Contact may be slightly irritating. Barium ion is not expected to pass through intact skin.

Eye: The dust is expected to be slightly to moderately irritating.

Ingestion: The Oral LD_{50} values for male and female rats were found to be 419 (352-499) and 408 (342-487) mg/kg $BaCl_2$, respectively (Borzelleca, et al.). A National Toxicology Program study found no decrease in two-year survival for rats consuming 110 mg/kg/day for the entire two year period (lifetime exposure).

Inhalation: No studies. Inhaled dust is expected to exhibit the same systemic toxicity as ingestion as barium chloride is cleared from the lungs into the bloodstream.

11.2 Symptoms related to the physical, chemical and toxicological characteristics

Serious eye damage can result. Acute ingestion overexposure will cause severe abdominal pain, violent purging with watery and bloody stools, vomiting, muscle twitching, hypertension, and confusion, followed by transient muscle paralysis, including potentially fatal paralysis of the respiratory muscles. Barium is eliminated from the body over several days.

11.3 Delayed and immediate effects and also chronic effects from short- and long-term exposure

Rats and mice exposed to 1,250 ppm of barium chloride dihydrate in their drinking water continuously for two years showed no adverse effects (NIH Pub. No. 94-3163). Rats and mice exposed to 2500 ppm of barium chloride dihydrate in drinking water for two years showed no evidence of carcinogenic response. Rats exposed to 2000 ppm of barium chloride dihydrate in their drinking water for thirty days exhibited no teratogenic effects, and no fetotoxicity was detected.

11.4 Numerical measures of toxicity (such as acute toxicity estimates)

The Oral LD_{50} values for male and female rats were found to be 419 (352-499) and 408 (342-487) mg/kg $BaCl_2$, respectively (Borzelleca, et al.).

Inhalation: No studies - Inhaled dust is expected to exhibit the same systemic toxicity as ingested barium chloride.

Dermal: Contact may be slightly irritating. Barium ion is not expected to pass through intact skin.

Intraperitoneal - LD_{50} - Mouse - 51 mg/kg $BaCl_2$

11.5 Whether the hazardous chemical is listed in the National Toxicology Program (NTP) Report on Carcinogens (latest edition) or has been found to be a potential carcinogen in the International Agency for Research on Cancer (IARC) Monographs (latest edition), or by OSHA.

Rats and mice exposed to 2500 ppm of barium chloride dihydrate in drinking water for two years showed no evidence of carcinogenic response.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No effects were seen on reproductive indices in a mating trial after male rats were exposed to 2000 ppm of barium chloride dihydrate in their drinking water for sixty days and female rats were exposed to 2000 ppm in their drinking water for thirty days.

Specific target organ toxicity - repeated exposure
KIdney effects are observed for chronic ingestion of large amounts.

---

12. ECOLOGICAL INFORMATION

12.1 Ecotoxicity (aquatic and terrestrial, where available)

In turbid water at 20 °C, the 96 hour TLM is 1930 mg/l for Mosquito Fish (Gambusia Affinis).

12.2 Persistence and degradability

Soluble barium chloride is expected to be precipitated by sulfate in the environment to yield insoluble barium sulfate.

12.3 Bioaccumulative potential

No data available. No appreciable bioaccumulation is expected.

12.4 Mobility in soil

No data available. When barium chloride reacts with enviornmental sulfate, insoluble barium sulfate is formed which is not mobile.

12.5 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

Waste containing more than 0.2% soluble barium is hazardous under the RCRA criteria. Soluble barium can be rendered nonhazardous by reaction with excess sulfate to form insoluble barium sulfate. Any disposal practice must be in compliance with local, state, and federal laws and regulations. (Contact local or state environmental agency for specific rules). Do not dump into sewers, on the ground, or into any body of water.

14. TRANSPORT INFORMATION

This product is not regulated as a hazardous material by the U.S. Department of Transportation.

Technical shipping name: Barium compound

Freight Class - Package: Inorganic Chemical.

Product Label: Barium Chloride Crystal.

Poison Inhalation Hazard: No

Environmental hazards: Not a Marine pollutant.

IMDG

UN number: 1564 Class: 6.1 Packing group: III EMS-No: F-A, S-A

Proper shipping name: BARIUM COMPOUND, N.O.S. (Barium chloride dihydrate)

IATA

UN number: 1564 Hazard Class: 6.1 Packing group: III

Proper shipping name:

Barium compound, n.o.s. (Barium chloride dihydrate)

15. REGULATORY INFORMATION

OSHA Status: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard, 29 CFR 1910.1200. It is classified as toxic based on the oral rat LD50.

TSCA Status......: Listed on TSCA Inventory as ACTIVE

CERCLA Reportable Quantity...... : None.

SARA Title III:

Section 302, Extremely Hazardous Substances.... : None.
Section 311/312, Hazard Categories.....: Category 1 (Acute Hazard).
Section 313, Toxics Release Inventory: Barium Compounds, Code N040.

RCRA Status: If discarded in its purchased form, this product would be a hazardous waste by characteristic. Under RCRA, it is the responsibility of the

product user to determine, at the time of disposal, whether a waste containing the product, or derived from the product, should be classified as a hazardous waste under 40 CFR 261.20-24.

16. OTHER INFORMATION

NFPA Rating (National Fire Protection Association):

Health - 2 **(**Materials which on intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.)

Fire - 0 **(**Materials which are nonflammable).

Reactivity - 0 **(**Materials which in themselves are normally stable even under fire exposure conditions, and which are nor reactive with water).

Special - NA

Preparation Information

Prepared by..... : Jerry A. Cook.

Title..... : Technical Director.

Approval Date..... : February 12, 2019

Supersedes all earlier-dated SDSs

SDS Number.....: 42B

Disclaimer: The information contained herein is accurate to the best knowledge of Chemical Products Corporation. Chemical Products Corporation makes no warranty of any kind, express or implied, concerning the safe use of this material in your process or in combination with other substances.