

Safety Data Sheet acc. to OSHA HCS

Date of issue: 07/09/2025

Revision date 07/09/2025

1 Identification

- **Product identifier**
- **Trade name:** Putrescine
- **Synonym** 1,4-Butanediamine; 1,4-Diaminobutane; NSC 60545
- **CAS Number:**
110-60-1
- **Other means of identification**
- **Article number:** 43878
- **EC number:**
203-782-3
- **Application of the substance / the mixture**
This product is for research use - Not for human or veterinary diagnostic or therapeutic use.
- **Details of the supplier of the safety data sheet**
- **Manufacturer/Supplier:**
Cayman Chemical Co.
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108
USA
- **Information department:** Product safety department
- **Emergency telephone number:**
During normal opening times: +1 (734) 971-3335
US/CANADA: 800-424-9300
Outside US/CANADA: 703-741-5970

2 Hazard(s) identification

- **Classification of the substance or mixture**



GHS06 Skull and crossbones

Acute toxicity - dermal 3 H311 Toxic in contact with skin.

Acute toxicity - inhalation 2 H330 Fatal if inhaled.



GHS05 Corrosion

Corrosive to metals 1 H290 May be corrosive to metals.

Skin corrosion 1B H314 Causes severe skin burns and eye damage.

Eye damage 1 H318 Causes serious eye damage.

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GHS07

Acute toxicity - oral 4 H302 Harmful if swallowed.

Aquatic Chronic 3 H412 Harmful to aquatic life with long lasting effects.

- **Label elements**

- **GHS label elements**

The substance is classified and labeled according to the Globally Harmonized System (GHS).

- **Hazard pictograms**



GHS05 GHS06

- **Signal word** Danger

- **Hazard-determining components of labeling:**

Putrescine

- **Hazard statements**

H290 May be corrosive to metals.

H302 Harmful if swallowed.

H311 Toxic in contact with skin.

H330 Fatal if inhaled.

H314 Causes severe skin burns and eye damage.

H412 Harmful to aquatic life with long lasting effects.

- **Precautionary statements**

P234 Keep only in original packaging.

P260 Do not breathe dusts or mists.

P264 Wash thoroughly after handling.

P270 Do not eat, drink or smoke when using this product.

P271 Use only outdoors or in a well-ventilated area.

P273 Avoid release to the environment.

P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

P284 [In case of inadequate ventilation] wear respiratory protection.

P301+P312 If swallowed: Call a poison center/doctor if you feel unwell.

P301+P330+P331 If swallowed: Rinse mouth. Do NOT induce vomiting.

P303+P361+P353 If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304+P340 If inhaled: Remove person to fresh air and keep 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.

P310 Immediately call a poison center/doctor.

P320 Specific treatment is urgent (see on this label).

P361+P364 Take off immediately all contaminated clothing and wash it before reuse.

P390 Absorb spillage to prevent material damage.

P403+P233 Store in a well-ventilated place. Keep container tightly closed.

P405 Store locked up.

P406 Store in a corrosion resistant container / container with a resistant inner liner.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

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- Information pertaining to particular dangers for man and environment:
- Classification system:
- NFPA ratings (scale 0 - 4)



Health = 4
Fire = 2
Reactivity = 0

- HMIS-ratings (scale 0 - 4)



Health = *4
Fire = 2
Reactivity = 0

- Other hazards
- Results of PBT and vPvB assessment
- PBT: Not applicable.
- vPvB: Not applicable.
- Classification according to (d)(1)(ii) of § 1910.1200
The SDS issuer does not object to the classifications provided by importers or manufacturers of precursor products.
- Hazards not otherwise classified
There are no adverse physical or health effects known that are not covered by the hazard classes of the Hazard Communications Standard.

3 Composition/information on ingredients

- Chemical characterization: Substances
- CAS No. Description
110-60-1 Putrescine
- Identification number(s)
- EC number: 203-782-3

4 First-aid measures

- Description of first aid measures
- General information:
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
Remove breathing apparatus only after contaminated clothing have been completely removed.
In case of irregular breathing or respiratory arrest provide artificial respiration.
- After inhalation:
Supply fresh air or oxygen; call for doctor.
In case of unconsciousness place patient stably in side position for transportation.
- After skin contact: Immediately wash with water and soap and rinse thoroughly.
- After eye contact: Rinse opened eye for several minutes under running water. Then consult a doctor.
- After swallowing:
Immediately call a doctor.
Drink copious amounts of water and provide fresh air. Immediately call a doctor.
- Most important symptoms and effects, both acute and delayed
No further relevant information available.

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- **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

- **Extinguishing media**
- **Suitable extinguishing agents:**
CO₂, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
- **Special hazards arising from the substance or mixture**
67-56-1 During heating or in case of fire poisonous gases are produced.
- **Advice for firefighters**
- **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

- **Personal precautions, protective equipment and emergency procedures**
Mount respiratory protective device.
Wear protective equipment. Keep unprotected persons away.
- **Environmental precautions:**
Do not allow product to reach sewage system or any water course.
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow to enter sewers/ surface or ground water.
- **Methods and material for containment and cleaning up:**
Use neutralizing agent.
Dispose contaminated material as waste according to section 13.
Ensure adequate ventilation.
- **Protective Action Criteria for Chemicals**

- **PAC-1:**

Substance is not listed.

- **PAC-2:**

Substance is not listed.

- **PAC-3:**

Substance is not listed.

- **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

- **Precautions for safe handling**
Thorough dedusting.
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
- **Information about protection against explosions and fires:**
Keep respiratory protective device available.
- **Conditions for safe storage, including any incompatibilities**
- **Storage:** Store in accordance with information listed on the product insert.
- **Requirements to be met by storerooms and receptacles:** No special requirements.

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- **Information about storage in one common storage facility:** Not required.
- **Further information about storage conditions:** Keep receptacle tightly sealed.
- **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

- **Control parameters**
- **Components with limit values that require monitoring at the workplace:** Not required.
- **Additional information:** The lists that were valid during the creation were used as basis.
- **Exposure controls**
- **Appropriate engineering controls** No further data; see section 7.
- **Personal protective equipment:**
- **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
- **Breathing equipment:**
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
- **Protection of hands:**



Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation. Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture. Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

- **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
- **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
- **Eye protection:**



Tightly sealed goggles

9 Physical and chemical properties

- **Information on basic physical and chemical properties**
- **General Information**
- **Physical state** Solid
- **Color:** Not determined.

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· Odor:	Characteristic
· Structural Formula	C ₄ H ₁₂ N ₂
· Molecular Weight	88.2 g/mol
· Storage Buffer	
· Odor threshold:	Not determined.
· Formulation	
· Melting point/Melting range:	27–28 °C (80.6–82.4 °F)
· Boiling point/Boiling range:	158–160 °C (316.4–320 °F)
· Flammability:	Product is not flammable.
· Explosion limits:	
· Lower:	Not determined.
· Upper:	Not determined.
· Flash point:	63 °C (145.4 °F)
· Decomposition temperature:	Not determined.
· pH-value:	Not applicable.
· Viscosity:	
· Kinematic:	Not applicable.
· SOLUBILITY	Methanol: Slightly soluble: 0.1-1 mg/ml; Water: Sparingly soluble: 1-10 mg/ml
· Dynamic:	Not applicable.
· Solubility in / Miscibility with	
· Water at 20 °C (68 °F):	40 g/l
· Partition coefficient (n-octanol/water):	Not determined.
· Vapor pressure:	Not applicable.
· Vapor pressure:	
· Density at 20 °C (68 °F):	0.877 g/cm ³ (7.31857 lbs/gal)
· Relative density	Not determined.
· Vapor density	Not applicable.
· Particle characteristics	Not determined.
· Other information	
· Appearance:	
· Form:	neat oil
· Important information on protection of health and environment, and on safety.	
· Ignition temperature:	Not determined.
· Danger of explosion:	Product does not present an explosion hazard.
· VOC content:	0.00 %
· Solids content:	100.0 %
· Change in condition	
· Evaporation rate	Not applicable.

10 Stability and reactivity

- **Reactivity** No further relevant information available.
- **Chemical stability**
- **Thermal decomposition / conditions to be avoided:**
No decomposition if used according to specifications.
- **Possibility of hazardous reactions** No dangerous reactions known.
- **Conditions to avoid** No further relevant information available.
- **Incompatible materials:** No further relevant information available.

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- **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

- **RTECS Number**

110-60-1 Putrescine EJ6800000

- **Information on toxicological effects**

- **Acute toxicity:**

- **LD/LC50 values that are relevant for classification:**

ATE (Acute Toxicity Estimate)

Oral	LD50	463 mg/kg (rat)
Dermal	LD50	300 mg/kg
Inhalative	LC50/4 h	0.05 mg/l

110-60-1 Putrescine

Oral	LDLO	1,600 mg/kg (mouse)
	LD50	463 mg/kg (rat)
	Intraperitoneal LD50	1,750 mg/kg (mouse)
	Subcutaneous LDLO	1 g/kg (rat)

- **Primary irritant effect:**

- **on the skin:** Caustic effect on skin and mucous membranes.

- **on the eye:**

Strong caustic effect.

Strong irritant with the danger of severe eye injury.

- **Sensitization:** No sensitizing effects known.

- **Additional toxicological information:**

Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

- **Interactive effects** No interactive effects between components are known.

- **Carcinogenic categories**

- **IARC (International Agency for Research on Cancer)**

Substance is not listed.

- **NTP (National Toxicology Program)**

Substance is not listed.

- **OSHA-Ca (Occupational Safety & Health Administration)**

Substance is not listed.

- **Alternative sources for toxicological information**

No non-standard sources for toxicological information where used.

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.

- **Results of PBT and vPvB assessment**

- **PBT:** Not applicable.

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- **vPvB:** Not applicable.
- **Other adverse effects**
- **Remark:** Harmful to fish
- **Additional ecological information:**
- **General notes:**
 Water hazard class 2 (Self-assessment): hazardous for water
 Do not allow product to reach ground water, water course or sewage system.
 Must not reach bodies of water or drainage ditch undiluted or unneutralized.
 Danger to drinking water if even small quantities leak into the ground.
 Harmful to aquatic organisms

13 Disposal considerations

- **Waste treatment methods**
- **Recommendation:**
 Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- **Uncleaned packagings:**
- **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

- | | |
|-------------------------------------|---|
| · UN-Number | UN2928 |
| · DOT, IMDG, IATA | |
| · UN proper shipping name | Toxic solids, corrosive, organic, n.o.s. (Putrescine) |
| · DOT | TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S. (Putrescine) |
| · IMDG | |
| · IATA | Toxic solid, corrosive, organic, n.o.s. (Putrescine) |
| · Transport hazard class(es) | |
| · DOT | |
| | |
| · Class | 6.1 Toxic substances |
| · Label | 6.1, 8 |
| · IMDG | |
| | |
| · Class | 6.1 Toxic substances |

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· Label	6.1/8
· IATA	
 	
· Class	6.1 Toxic substances
· Label	6.1 (8)
· Packing group	
· DOT, IMDG, IATA	II
· Environmental hazards:	Not applicable.
· Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code	Not applicable.
· Transport/Additional information:	
· DOT	
· Quantity limitations	On passenger aircraft/rail: 15 kg On cargo aircraft only: 50 kg
· IMDG	
· Limited quantities (LQ)	500 g
· Excepted quantities (EQ)	Code: E4 Maximum net quantity per inner packaging: 1 g Maximum net quantity per outer packaging: 500 g
· IATA	
· Remarks:	When sold in quantities of less than or equal to 1 mL, or 1 g, with an Excepted Quantity Code of E1, E2, E4, or E5, this item meets the De Minimis Quantities exemption, per IATA 2.6.10. Therefore packaging does not have to be labeled as Dangerous Goods/Excepted Quantity.
· Special precautions for user	Warning: Toxic substances
· Hazard identification number (Kemler code):	68
· EMS Number:	F-A,S-B
· Stowage Category	B
· Stowage Code	SW2 Clear of living quarters.
· UN "Model Regulation":	UN 2928 TOXIC SOLID, CORROSIVE, ORGANIC, N.O.S. (PUTRESCINE), 6.1 (8), II

15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
No further relevant information available.
- **Sara**

· **Section 355 (extremely hazardous substances):**

Substance is not listed.

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· **Section 313 (Specific toxic chemical listings):**

Substance is not listed.

· **TSCA (Toxic Substances Control Act):**

ACTIVE

· **Hazardous Air Pollutants**

Substance is not listed.

· **Chemicals known to cause cancer:**

Substance is not listed.

· **Chemicals known to cause reproductive toxicity for females:**

Substance is not listed.

· **Chemicals known to cause reproductive toxicity for males:**

Substance is not listed.

· **Chemicals known to cause developmental toxicity:**

Substance is not listed.

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**

Substance is not listed.

· **TLV (Threshold Limit Value)**

Substance is not listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

Substance is not listed.

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

16 Other information

All chemicals may pose unknown hazards and should be used with caution. This SDS 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 SDS. Cayman Chemical Company assumes no responsibility for incidental or consequential damages, including lost profits, arising from the use of these data. 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 SDS is based on technical data judged to be reliable, Cayman Chemical Company assumes no responsibility for the completeness or accuracy of the information contained herein.

· **Department issuing SDS:** Environment protection department.

· **Contact:** -

· **Date of preparation** 07/09/2025

· **Abbreviations and acronyms:**

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)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

VOC: Volatile Organic Compounds (USA, EU)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

PBT: Persistent, Bioaccumulative and Toxic

vPvB: very Persistent and very Bioaccumulative

NIOSH: National Institute for Occupational Safety

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OSHA: Occupational Safety & Health

TLV: Threshold Limit Value

PEL: Permissible Exposure Limit

REL: Recommended Exposure Limit

Corrosive to metals 1: Corrosive to metals – Category 1

Acute toxicity - oral 4: Acute toxicity – Category 4

Acute toxicity - dermal 3: Acute toxicity – Category 3

Acute toxicity - inhalation 2: Acute toxicity – Category 2

Skin corrosion 1B: Skin corrosion/irritation – Category 1B

Eye damage 1: Serious eye damage/eye irritation – Category 1

Aquatic Chronic 3: Hazardous to the aquatic environment - long-term aquatic hazard – Category 3

— US —