



SAFETY DATA SHEET

GHS / OSHA HazCom 2012 Compliant

Minuteman Peptides, LLC

methycobalamin

CAS: 13422-55-4

Formula: C₆₃H₉₁CoN₁₃O₁₄P

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Revision Date: 2026-08-14

Version: 1.0

Section 1 — Product and Company Identification

Product Name	methycobalamin
Synonyms	methycobalamin; Mecobalamin; 13422-55-4
CAS Number	13422-55-4
Molecular Formula	C ₆₃ H ₉₁ CoN ₁₃ O ₁₄ P
IUPAC Name	carbanide;cobalt(3+);[(2R,3S,4R,5S)-5-(5,6-dimethylbenzimidazol-1-yl)-4-hydroxy-2-(hydroxymethyl)oxolan-3-yl] 1-[3-[(1R,2R,3R,5Z,7S,10Z,12S,13S,15Z,17S,18S,19R)-2,13,18-tris(2-amino-2-oxoethyl)-7,12,17-tris(3-amino-3-oxopropyl)-3,5,8,8,13,15,18,19-octamethyl-2,7,12,17-tetrahydro-1H-corrin-24-id-3-yl]propanoylamino]propan-2-yl phosphate
Identified Uses	Research laboratory chemical for in vitro scientific research and development use only.
Restriction on Use	Not for human or veterinary use. Not for food, drug, cosmetic, household, agricultural, clinical, therapeutic, or diagnostic applications.

Supplier

Company	Minuteman Peptides, LLC
Address	53 Knox Trail, Suite 200, Acton, MA 01720, US
Phone	978-596-1533
Website	https://minutemanpeptides.com/
Emergency Phone	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

Section 2 — Hazard Identification

Classification of the substance

Not classified based on currently available data; however, data is limited and hazards cannot be fully characterized. The absence of classification should not be interpreted as a determination of the absence of hazard.

Classification has been conducted in accordance with 29 CFR 1910.1200 (OSHA HazCom 2012) and GHS Rev.8 using all available data and scientifically valid weight-of-evidence approaches (GHS Rev.8 Chapter 1.3.2.4), including read-across from chemical class and structural considerations where substance-specific study data is not available.

Signal Word: None

GHS Pictograms:

None required based on classification.

Hazard Statements

None. This substance is not classified for any GHS hazard class based on available data.

Precautionary Statements

- P261: Avoid breathing dust, fume, gas, mist, vapors, or spray.
- P264: Wash hands and exposed skin thoroughly after handling.
- P280: Wear protective gloves, protective clothing, and eye/face protection.
- P501: Dispose of contents and container in accordance with local, regional, national, and international regulations.

Precautionary statements are provided as best practice for handling substances with limited toxicological data, and are not a declaration of GHS classification.

Hazards Not Otherwise Classified (HNOC)

None known based on available data and weight-of-evidence assessment. The toxicological properties of this substance have not been fully characterized; handle as a potentially bioactive substance of unknown toxicity.

Section 3 — Composition / Information on Ingredients

Single-substance product. Chemical identity:

Ingredient	CAS Number	Mol. Formula	Mol. Weight	Concentration
methylcobalamin	13422-55-4	C63H91CoN13O14P	1344.4 g/mol	>98% (research grade)

Impurities

No hazardous impurities known to be present above the GHS classification thresholds specified in 29 CFR 1910.1200 Appendix A. Residual synthesis reagents, solvents, and counter-ions may be present at levels consistent with research-grade (>98% purity) material. Balance: non-hazardous impurities. Refer to the accompanying Certificate of Analysis (CoA) for the lot-specific impurity profile.

Section 4 — First Aid Measures

Eye Contact

Rinse cautiously with water for several minutes. If irritation persists, seek medical advice.

Skin Contact

Wash with soap and water. Remove contaminated clothing and wash before reuse. If irritation persists, seek medical advice.

Inhalation

Move affected person to fresh air. If symptoms develop, seek medical advice.

Ingestion

Rinse mouth thoroughly with water. If large amounts are swallowed or if symptoms develop, seek medical advice. Do not induce vomiting unless directed by medical personnel.

Note to Physician

Treat symptomatically. No specific antidote known.

Section 5 — Fire Fighting Measures

Flash Point: *Not determined*

Suitable Extinguishing Media

Use extinguishing media appropriate to the surrounding fire conditions. Carbon dioxide (CO₂), dry chemical powder, foam, or water spray.

Special Hazards

May produce toxic gases upon combustion. Carbon monoxide and other combustion products may be generated.

Protective Equipment for Firefighters

Wear self-contained breathing apparatus (SCBA) and full protective gear. Do not enter fire area without proper protective equipment.

Section 6 — Accidental Release Measures

Personal Precautions

Avoid dust formation. Avoid breathing vapors, mist, or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Use personal protective equipment as described in Section 8.

Environmental Precautions

Prevent further leakage or spillage if safe to do so. Do not allow the product to enter drains, sewers, or waterways.

Containment and Cleanup

Sweep up and shovel. Keep in suitable, closed containers for disposal. Avoid raising dust. Clean contaminated surface thoroughly. Dispose of waste in accordance with local regulations (see Section 13).

Section 7 — Handling and Storage

Handling Precautions

Handle only in areas equipped with appropriate engineering controls (chemical fume hood or equivalent local exhaust ventilation). Because methylcobalamin (CAS 13422-55-4) is a corrinoid cobalt complex that is highly photolabile (peer-reviewed stability data show significant degradation upon light exposure; Hoyte et al., 2019, PMID 31085783), all weighing, dissolution, and transfer operations should be conducted under subdued/yellow lighting or with the container protected from direct light. Treat as a potentially bioactive substance of incompletely characterized toxicity: minimize the generation of dust and aerosols, do not eat, drink, smoke, or apply cosmetics in the work area, and wash hands and exposed skin thoroughly after handling as recommended by OSHA 29 CFR 1910.1200 general hygiene practice. Use personal protective equipment specified in Section 8 (chemical-resistant gloves, safety eyewear, laboratory coat, and, if airborne exposure is possible, an appropriate NIOSH-approved particulate respirator). Avoid contact with skin, eyes, and clothing, and avoid inhalation of dust. Ground and bond containers when transferring to prevent static discharge. Keep containers tightly closed when not in use and return promptly to designated storage. No specific OSHA PEL, NIOSH REL, or ACGIH TLV has been established for this compound.

Storage Conditions

Store in tightly closed, light-resistant (amber glass or opaque) containers under an inert atmosphere (nitrogen or argon) where feasible, protected from light, moisture, and air. Published pharmaceutical stability data (Hoyte et al., 2019, PMID 31085783) demonstrate that methylcobalamin is markedly degraded by light and requires protection from light regardless of storage temperature; store in a cool, dry, well-ventilated area away from direct sunlight and sources of heat or ignition. For long-term storage of the solid, refrigeration or freezing in a desiccated, light-protected container is generally recommended for corrinoids; follow the storage temperature indicated on the container label or Certificate of Analysis. Keep separated from incompatible materials (see below) and from foodstuffs. Restrict access to trained personnel and store in a manner consistent with laboratory chemical storage practices described in OSHA 29 CFR 1910.1450 (Laboratory Standard). No specific shelf-life is assigned in the absence of manufacturer data.

Incompatibilities

Incompatible with strong oxidizing agents, which may react vigorously with the organic corrin macrocycle. Avoid strong acids and strong bases, which can hydrolyze the phosphate/nucleotide linkage and cleave the Co-C bond. Avoid reducing agents and other cobalt-reactive species that may alter the oxidation state of the central cobalt(III) center. Avoid prolonged exposure to light (UV and visible), heat, air (oxygen), and moisture, all of which promote photolytic and oxidative degradation of the Co-methyl bond (Hoyte et al., 2019, PMID 31085783). Hazardous decomposition products on thermal breakdown may include carbon monoxide, carbon dioxide, nitrogen oxides (NO_x), phosphorus oxides, and cobalt-containing metal oxide fumes, based on constituent-element considerations.

Section 8 — Exposure Controls / Personal Protection

Exposure Limits

No regulatory occupational exposure limits (OEL) have been established by OSHA, ACGIH, NIOSH, or equivalent bodies for methylcobalamin (CAS 13422-55-4). No biological exposure indices (BEIs) have been established. Control exposure to the lowest level reasonably achievable (ALARA) using the engineering controls and PPE specified below. For reference only, exposure limits established for elemental cobalt and inorganic cobalt compounds (as Co) - which are not directly applicable to this organometallic vitamin B12 analog - include the OSHA PEL of 0.1 mg/m³ (8-hr TWA) for cobalt metal, dust and fume (as Co), the NIOSH REL of 0.05 mg/m³ (10-hr TWA) for cobalt metal, dust and fume (as Co), and the ACGIH TLV-TWA of 0.02 mg/m³ for cobalt and inorganic compounds. These values are provided as conservative reference points only and do not constitute an OEL for methylcobalamin itself.

Engineering Controls

Handle as a potentially bioactive substance of unknown toxicity. Use in a well-ventilated area, preferably within a certified chemical fume hood, ventilated weighing enclosure, or laminar-flow containment device (e.g., glove box or ventilated balance safety enclosure) to minimize airborne dust or aerosol generation during weighing, transfer, and dissolution. For routine handling of small quantities of solid or solution, local exhaust ventilation (LEV) meeting ANSI/ASHRAE 110 face velocity guidelines (typically 80-120 fpm at the sash) is recommended. Note that methylcobalamin is light-sensitive; handle under subdued lighting or amber conditions where feasible, but this does not substitute for containment. Ensure eyewash stations and safety showers (ANSI Z358.1) are accessible in the work area. Do not eat, drink, or smoke in areas where the material is handled. Wash hands and exposed skin thoroughly after handling.

Personal Protective Equipment

Respiratory Protection: Under normal laboratory handling with adequate local exhaust ventilation, respiratory protection is typically not required. Where engineering controls are insufficient or where dust, mist, or aerosols may be generated (e.g., weighing bulk powder, sonication, lyophilization), use a NIOSH-approved (42 CFR Part 84) particulate respirator such as an N95 filtering facepiece at minimum; use a half-face or full-face air-purifying respirator with P100

(HEPA) cartridges for larger-scale handling or when exposure potential is higher. Respirator selection, fit testing, medical evaluation, and use must comply with the OSHA Respiratory Protection Standard (29 CFR 1910.134).

Hand Protection: Wear chemically resistant, disposable protective gloves that meet EN 374 / ASTM D6978 standards. Nitrile rubber gloves (minimum 4-8 mil thickness) are generally suitable for handling solids and aqueous solutions. For prolonged contact or handling of organic-solvent solutions (e.g., DMSO stocks, which enhance skin penetration), use double gloves and change immediately if contamination, degradation, or puncture is suspected. Inspect gloves before use and wash hands with soap and water after glove removal. Specific breakthrough data for methylcobalamin have not been established by the glove manufacturers; select gloves based on the solvent system in use.

Eye / Face Protection: Wear tight-fitting chemical safety goggles meeting ANSI/ISEA Z87.1 requirements when handling powders or solutions. A full-face shield worn over goggles is recommended when there is potential for splash, spray, or when handling larger volumes or performing operations under pressure. Contact lenses should not be relied upon as eye protection. An emergency eyewash station compliant with ANSI Z358.1 must be readily accessible in the work area.

Skin Protection: Wear a laboratory coat or long-sleeved chemical-resistant lab garment, closed-toe shoes, and full-length trousers to minimize skin exposure. For handling larger quantities or preparing solutions, wear a chemically resistant apron or disposable sleeve covers over the lab coat. Remove and launder contaminated clothing before reuse; discard disposable garments as chemical waste. Contaminated skin should be washed promptly with soap and water. Treat methylcobalamin as a potentially bioactive substance of unknown toxicity and avoid all skin contact.

Section 9 — Physical and Chemical Properties

Physical State	Solid (research-grade lyophilised powder or crystalline solid)
Appearance	Dark red crystalline powder
Odor	Odorless
Odor Threshold	Not available.
Boiling Point	<i>Not determined</i>
Melting Point	<i>Not determined</i>
Flash Point	<i>Not determined</i>
Auto-ignition Temperature	No data available.
Decomposition Temperature	No experimental data available.
Vapor Pressure	<i>Not determined</i>
Vapor Density	<i>Not determined</i>
Specific Gravity	<i>Not determined</i>
Partition Coefficient (log Kow)	No experimental data available.
Solubility	Soluble in water; slightly soluble in ethanol; insoluble in acetone and diethyl ether
Stability in Solution	Subject to hydrolytic and oxidative degradation typical of the chemical class; store reconstituted solutions refrigerated or frozen, protect from light, and use within the stability window indicated on the Certificate of Analysis.
pH	<i>Not determined</i>
Molecular Weight	1344.4 g/mol
Molecular Formula	C63H91CoN13O14P

Section 10 — Stability and Reactivity

Chemical Stability: Stable under normal conditions of use, storage, and transport.

Conditions to Avoid: Excessive heat, open flames, sparks, incompatible materials.

Incompatible Materials: Incompatible with strong oxidizing agents, which may react vigorously with the organic corrin macrocycle. Avoid strong acids and strong bases, which can hydrolyze the phosphate/nucleotide linkage and cleave the Co-C bond. Avoid reducing agents and other cobalt-reactive species that may alter the oxidation state of the central cobalt(III) center. Avoid prolonged exposure to light (UV and visible), heat, air (oxygen), and moisture, all of which promote photolytic and oxidative degradation of the Co-methyl bond (Hoyte et al., 2019, PMID 31085783). Hazardous decomposition products on thermal breakdown may include carbon monoxide, carbon dioxide, nitrogen oxides (NO_x), phosphorus oxides, and cobalt-containing metal oxide fumes, based on constituent-element considerations.

Hazardous Decomposition Products: Upon combustion or decomposition may produce: carbon monoxide (CO), carbon dioxide (CO₂), nitrogen oxides (NO_x), phosphorus oxides.

Hazardous Polymerization: Will not occur.

Section 11 — Toxicological Information

The toxicological properties of this substance have not been fully characterized. Where no authoritative study data was identified, endpoint classifications are based on a weight-of-evidence approach using read-across from the compound's chemical class and structural features, per GHS Rev.8 Chapter 1.3.2.4. "Not classified" entries below mean "not classified based on currently available data" — hazards cannot be excluded.

Acute Toxicity: Acute toxicity data for methylcobalamin (CAS 13422-55-4) are limited and the toxicological properties of this substance are not fully characterized. A reported oral LD₅₀ in rats of >5,000 mg/kg (secondary compilation, ChemicalBook) suggests low acute oral toxicity, but this value has not been independently verified through a primary regulatory source (ECHA, NIOSH, or peer-reviewed literature) and should be interpreted with caution. No reliable acute inhalation (LC₅₀) or acute dermal (LD₅₀) values from authoritative sources (ECHA, NIOSH, CDC, EPA) have been located. Not classified for acute toxicity (oral, dermal, or inhalation) based on currently available data; hazards cannot be excluded (per GHS Rev.8 S1.3.2.4). Handle as a substance of unknown acute toxicity: avoid ingestion, inhalation of dust/aerosol, and dermal contact.

Skin Corrosion / Irritation: No validated in vivo or in vitro skin irritation/corrosion study conforming to OECD TG 404/431/439 has been located for methylcobalamin in ECHA or other authoritative regulatory databases. Not classified for skin corrosion/irritation based on currently available data; hazards cannot be excluded (GHS Rev.8 S1.3.2.4). Because the substance contains cobalt(III) coordinated within a corrin ring, and because cobalt-containing materials are recognized skin sensitizers/irritants in some individuals, prudent practice is to prevent skin contact.

Serious Eye Damage / Irritation: No validated eye irritation study (OECD TG 405/437/438/492) for methylcobalamin has been identified in ECHA or peer-reviewed literature. Not classified for serious eye damage/eye irritation based on currently available data; hazards cannot be excluded (GHS Rev.8 S1.3.2.4). Particulates and solutions of the substance may cause mechanical or chemical irritation on eye contact; eye protection is recommended.

Skin / Respiratory Sensitization: No dedicated respiratory or skin sensitization study (OECD TG 429/442A/B/C/D/E, or human data) for methylcobalamin has been located in ECHA or authoritative peer-reviewed sources. Not classified for skin or respiratory sensitization based on currently available data; hazards cannot be excluded (GHS Rev.8 S1.3.2.4). Note that cobalt is a known human skin sensitizer, and case reports (e.g., NCBI Bookshelf, StatPearls on cyanocobalamin) describe hypersensitivity reactions in cobalt-sensitized individuals exposed to cobalamins; individuals with known cobalt allergy may therefore be at increased risk.

Germ Cell Mutagenicity / Genotoxicity: Not classified based on currently available data; hazards cannot be excluded. Weight-of-evidence assessment applied using read-across from chemical class and structural considerations (GHS Rev.8 Chapter 1.3.2.4); no authoritative substance-specific study data identified.

Carcinogenicity: Methylcobalamin (CAS 13422-55-4) is not listed by IARC (Monographs Volumes 1-142), the U.S. National Toxicology Program (NTP Report on Carcinogens, 15th Edition), OSHA (29 CFR 1910 Subpart Z), or ACGIH as a carcinogen. No adequate long-term carcinogenicity bioassay conforming to OECD TG 451/453 has been identified. Not classified for carcinogenicity based on currently available data; hazards cannot be excluded (GHS Rev.8 S1.3.2.4). The toxicological properties are not fully characterized.

Reproductive Toxicity: No adequate developmental or reproductive toxicity study (OECD TG 414, 416, 421/422, or 443) for methylcobalamin has been identified in ECHA, EPA, or authoritative peer-reviewed literature. Not classified for reproductive toxicity or effects on/via lactation based on currently available data; hazards cannot be excluded (GHS Rev.8 S1.3.2.4). The toxicological properties of this substance are not fully characterized with respect to fertility and developmental endpoints.

Specific Target Organ Toxicity (STOT): Specific target organ toxicity - single exposure (STOT-SE): No authoritative studies identifying target organs after a single exposure to methylcobalamin have been located in ECHA, NIOSH, or peer-reviewed sources. Not classified for STOT-SE based on currently available data; hazards cannot be excluded (GHS Rev.8 S1.3.2.4). Specific target organ toxicity - repeated exposure (STOT-RE): No sub-acute (OECD TG 407/412), sub-chronic (OECD TG 408/413), or chronic (OECD TG 452) repeated-dose toxicity studies conforming to authoritative guidelines have been identified for this substance. Not classified for STOT-RE based on currently available data; hazards cannot be excluded (GHS Rev.8 S1.3.2.4). The toxicological properties of methylcobalamin are not fully characterized; exposures should be minimized as a precaution.

Aspiration Hazard: Not classified based on currently available data; hazards cannot be excluded. Weight-of-evidence assessment applied using read-across from chemical class and structural considerations (GHS Rev.8 Chapter 1.3.2.4); no authoritative substance-specific study data identified.

Derived No-Effect Level (DNEL): No data available — no substance-specific DNEL has been derived.

Predicted No-Effect Concentration (PNEC): No data available — no substance-specific PNEC has been derived.

Section 12 — Ecological Information

No authoritative substance-specific ecotoxicity study data was identified. In the absence of experimental data, adverse environmental effects cannot be fully excluded.

Ecotoxicity: No substance-specific experimental aquatic toxicity data (e.g., fish LC50, Daphnia EC50, algal ErC50) have been identified for methylcobalamin (CAS 13422-55-4) in authoritative databases (PubChem, ECHA, EPA ECOTOX) at the time of authorship. The substance is a cobalt(III)-corrinoid coenzyme form of vitamin B12; cobalt is an essential trace element but cobalt-containing complexes may exhibit toxicity to aquatic organisms under certain conditions (e.g., photoactivation of cyanocobalt species has been reported in the peer-reviewed literature, Little et al., 2007). In the absence of substance-specific test data, not classified as hazardous to the aquatic environment (acute or chronic) under GHS Rev.8 based on a weight-of-evidence assessment. Prevent release to surface water, drains, and soil.

Persistence and Degradability: No substance-specific experimental data on ready biodegradability (e.g., OECD 301 series) or abiotic degradation half-lives have been identified for methylcobalamin in authoritative sources (ECHA, PubChem, EPA). Cobalamins are known to be photolabile and sensitive to strong oxidants, reductants, and extremes of pH (Obeid et al., Nutrients 2022), which may contribute to abiotic transformation in environmental compartments; however, quantitative environmental half-lives have not been established. The corrin macrocycle contains a non-degradable cobalt center that is expected to persist as inorganic cobalt species following mineralization of the organic ligand.

Bioaccumulative Potential: No experimentally determined bioconcentration factor (BCF) or measured log Kow value for methylcobalamin has been identified in authoritative databases (PubChem, ECHA). Given the high molecular weight (1344.4 g/mol), highly polar/ionic character (cobalt(III) corrinoid complex with multiple amide and hydroxyl groups, phosphate, and nucleotide moiety), and water solubility of the vitamin B12 class, significant bioconcentration

in aquatic organisms is not anticipated; however, this conclusion is based on physicochemical read-across and not on substance-specific measured data.

Mobility in Soil: No substance-specific experimental data identified.

Other Adverse Effects: No other adverse environmental effects identified. The substance is not included on the Montreal Protocol list of ozone-depleting substances.

Section 13 — Disposal Considerations

Dispose of contents and container in accordance with all local, state, and federal regulations. Do not dispose of this material into sewers or waterways. Contact a licensed waste disposal company for disposal guidance.

US: Dispose in accordance with 40 CFR Parts 261-270 (RCRA). **EU:** Dispose according to Directive 2008/98/EC (Waste Framework Directive).

Section 14 — Transport Information

DOT (US)	Not regulated as dangerous goods under DOT (49 CFR) based on current classification.
IATA	Not regulated as dangerous goods under IATA Dangerous Goods Regulations based on current classification.
IMDG	Not regulated as dangerous goods or as a marine pollutant under the IMDG Code based on current classification.
UN Number	Not applicable.

Transport classifications above are based on the substance's intrinsic hazard classification; the shipper must independently verify the classification, packaging, labelling, and documentation requirements for their specific shipment configuration, quantity, and carrier (including airline policies) prior to dispatch.

Section 15 — Regulatory Information

United States

TSCA (Toxic Substances Control Act): May be eligible for exemption from TSCA inventory listing requirements under the R&D provisions of 40 CFR 720.36, depending on actual conditions of use. This substance is supplied solely for use in scientific research and development in small quantities; it is not intended for, and shall not be used for, any commercial manufacturing, processing, or distribution in commerce. The importer/end user is responsible for confirming that the R&D exemption criteria are met for their specific use. **OSHA HazCom 2012:** This SDS was prepared in accordance with 29 CFR 1910.1200 (HazCom 2012), aligned with the Globally Harmonized System (GHS) Rev. 8. **CERCLA / SARA Title III:** Not listed as a CERCLA Hazardous Substance (40 CFR 302.4); not subject to SARA 313 reporting based on available classification data. Users must independently verify applicability for their facility.

European Union

REACH (EC 1907/2006): Supplied solely for Scientific Research and Development (SR&D) use in quantities below 1 tonne per year per legal entity. Where applicable, this use may be exempt from REACH registration obligations under the scientific research and development provisions of REACH Article 3(23) and the conditions of Article 26(3); importers/users should independently verify the applicable exemption pathway for their specific use. If the substance is used as part of a formally notified Product and Process Oriented Research and Development (PPORD) programme,

the separate notification procedure under REACH Article 9 (with a 5-year exemption renewable once) may apply instead. **CLP (EC 1272/2008):** Not classified under CLP based on available data; no harmonized classification entry identified in Annex VI of CLP or the ECHA Classification and Labelling (C&L) Inventory.

Canada

WHMIS 2015 / HPR: Not classified as a hazardous product under the Hazardous Products Act and Hazardous Products Regulations (SOR/2015-17) based on available data and weight-of-evidence assessment. Supplied for laboratory research use only. **DSL/NDSL:** Research-use exemption applies; substance is not intended for commercial import or manufacture in Canada.

Note: The regulatory statements above reflect the intended use of this substance for scientific research and development only and do not constitute a legal determination of regulatory status. If the substance is used outside the R&D exemption scope, users are solely responsible for independently verifying applicable regulatory obligations (TSCA, REACH, WHMIS, state, and local) for their specific use and jurisdiction prior to any such use.

Section 16 — Other Information

Document ID	f4cfc119-4e51-4b81-bbe2-0ae7c506be16
Revision Date	2026-08-14
Version	1.0
Prepared By	Prepared in accordance with GHS Rev.8 and OSHA HazCom 2012 (29 CFR 1910.1200). Independent review by a qualified chemical safety professional is recommended prior to use.

Revision History

Revision date: 2026-08-14
Version: 1.0
Change description: Initial issue. Document prepared in 16-section GHS Rev.8 / OSHA HazCom 2012 format.

Sources Used

- PubChem (U.S. National Library of Medicine / NCBI) — <https://pubchem.ncbi.nlm.nih.gov>
- Peer-reviewed chemistry and toxicology literature (class-based read-across and weight-of-evidence assessment per GHS Rev.8 Chapter 1.3.2.4)
- OSHA HazCom 2012 / 29 CFR 1910.1200 Appendix A–C; GHS Rev.8; OECD Test Guidelines

Key to Abbreviations

CAS = Chemical Abstracts Service; GHS = Globally Harmonized System of Classification and Labelling of Chemicals; OSHA = U.S. Occupational Safety and Health Administration; HazCom = Hazard Communication Standard; REACH = Registration, Evaluation, Authorisation and Restriction of Chemicals; CLP = Classification, Labelling and Packaging Regulation; TSCA = Toxic Substances Control Act; WHMIS = Workplace Hazardous Materials Information System; OEL = Occupational Exposure Limit; PEL = Permissible Exposure Limit; TLV = Threshold Limit Value; REL = Recommended Exposure Limit; STOT = Specific Target Organ Toxicity; LD50 = Median Lethal Dose; LC50 = Median Lethal Concentration; PPE = Personal Protective Equipment; SCBA = Self-Contained Breathing Apparatus; R&D = Research and Development.

Disclaimer

DISCLAIMER: The information in this Safety Data Sheet is compiled from the authoritative sources cited above, supplemented by weight-of-evidence assessment based on the compound's chemical class and published literature. It is believed to be accurate as of the revision date but is provided "as is" without warranty of any kind, express or implied, including fitness for a particular purpose. The preparer of this document has not independently tested the substance

described herein. Users bear sole responsibility for verifying all information, ensuring safe handling, and compliance with all applicable federal, state, provincial, and local regulations. This SDS is not a substitute for independent chemical safety assessment by a qualified professional. This product is intended for scientific research and development use only and is not for human consumption, drug, food, cosmetic, agricultural, or household use.

This SDS complies with GHS Revision 8 / UN GHS Rev.8 and OSHA HazCom 2012 (29 CFR 1910.1200).