Minuteman Peptides, LLC

Retatrutide

Formula: C221H342N46O68

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Section 1 — Product and Company Identification

Product Name	Retatrutide
Synonyms	Retatrutide (sodium salt); CHEMBL5590721; AT42614
CAS Number	*Not determined*
Molecular Formula	C221H342N46O68
IUPAC Name	20-[[(1S)-4-[2-[2-[2-[[(5S)-5-[[(2S)-6-amino-2-[[(2S)-2-[[(2S)-2-[[(2S)-2-[[(2S,3S)-2-[[(2S)-2-[[(2S)-2-[[(2S)-2-[[(2S)-2-[[(2S,3R)-2-[[(2S)-2-[[(2S,3R)-2-[[2-[[(2S)-5-amino-2-[[2-[[(2S)-2-amino-3-(4-hydroxyphenyl)propanoyl]amino]-2-methylpropanoyl]amino]-5-oxopentanoyl]amino]acetyl]amino]-3-hydroxybutanoyl]amino]-3-phenylpropanoyl]amino]-3-hydroxybutanoyl]amino]-3-hydroxypropanoyl]amino]-3-carboxypropanoyl]amino]-3-(4-hydroxyphenyl)propanoyl]amino]-3-hydroxypropanoyl]amino]-3-methylpentanoyl]amino]-2,4-dimethylpentanoyl]amino]-4-methylpentanoyl]amino]-3-carboxypropanoyl]amino]hexanoyl]amino]-6-[[(2S)-1-[[(2S)-5-amino-1-[[1-[[(2S)-1-[[(2S)-1-[[(2S,3S)-1-[[(2S)-1-[[(2S)-1-[[(2S)-1-[[(2S)-1-[[2-[[2-[[(2S)-2-[[(2S)-1-[[(2S)-1-[[2-[[(2S)-1-[(2S)-2-[(2S)-2-[(2S)-2-[[(2S)-1-amino-3-hydroxy-1-oxopropan-2-yl]carbamoyl]pyrrolidine-1-carbonyl]pyrrolidine-1-carbonyl]pyrrolidin-1-yl]-1-oxopropan-2-yl]amino]-2-oxoethyl]amino]-3-hydroxy-1-oxopropan-2-yl]amino]-3-hydroxy-1-oxopropan-2-yl]carbamoyl]pyrrolidin-1-yl]-2-oxoethyl]amino]-2-oxoethyl]amino]-4-carboxy-1-oxobutan-2-yl]amino]-4-methyl-1-oxopentan-2-yl]amino]-4-methyl-1-oxopentan-2-yl]amino]-3-(4-hydroxyphenyl)-1-oxopropan-2-yl]amino… [truncated — full value in PDF metadata]
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.

Manufacturer / Supplier

Company	Minuteman Peptides, LLC
Address	53 Knox Trail, Suite 200, Acton, MA 01720, US
Phone	978-596-1533
Website	https://minutemanpeptides.com/
Emergency Contact	CHEMTREC
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

Retatrutide	Not determined	C221H342N46O68	4731 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 adequate ventilation, preferably within a chemical fume hood, biological safety cabinet, or equivalent containment device. Because Retatrutide is a synthetic peptide of high molecular weight (~4731 Da) that may be encountered as a fine lyophilized powder, take precautions to prevent generation and inhalation of dust or aerosols when weighing, opening containers, or reconstituting. In accordance with OSHA 29 CFR 1910.132-1910.138 (PPE) and 29 CFR 1910.1450 (Laboratory Standard), wear chemically resistant nitrile gloves, a buttoned lab coat, and ANSI Z87.1-compliant safety eyewear; add a NIOSH-approved particulate respirator (e.g., N95 or higher) and/or a face shield when handling outside of containment or when bulk powder transfers are required. Follow the precautionary principle described in the NRC publication 'Prudent Practices in the Laboratory' and treat this material as a potentially bioactive substance of unknown toxicity. Avoid all contact with skin, eyes, and clothing, and avoid inhalation and ingestion. Do not eat, drink, smoke, or apply cosmetics in areas where the substance is handled. Wash hands and exposed skin thoroughly with soap and water immediately after handling and before leaving the work area. Decontaminate work surfaces and reusable equipment with appropriate cleaning agents (e.g., aqueous detergent followed by 70% ethanol) after each use. Use the smallest practicable quantity, employ secondary containment during transport, and ground/bond containers if static-sensitive dry powder transfers occur. Collect waste in clearly labeled, closed containers segregated from incompatible materials, and dispose in accordance with applicable federal, state, and local regulations.

Storage Conditions

Store the lyophilized solid tightly closed in its original container, protected from light, moisture, and air, in a cool, dry, well-ventilated area dedicated to laboratory chemicals. As is general practice for synthetic peptides (Sigma-Aldrich Technical Bulletin, 'Handling and Storage Guidelines for Peptides and Proteins'), long-term storage of the dry powder is recommended at <= -20 degC; brief handling at 2-8 degC is acceptable to minimize condensation, and the container should be allowed to equilibrate to room temperature before opening to prevent moisture uptake by the hygroscopic peptide. Storage of reconstituted solutions reduces stability; prepare working solutions fresh, aliquot to avoid repeated freeze-thaw cycles, and store frozen aliquots in sterile, low-binding containers. Peptides containing residues such as Cys, Met, Trp, Asn, and Gln are particularly susceptible to oxidation, deamidation, and hydrolysis in solution; use buffers in the mildly acidic range (pH ~ 5-6) where compatible with the experimental design. Keep separated from incompatible materials (see below). Do not return unused material to the original container. Refer to the manufacturer's certificate of analysis for any compound-specific expiration or re-test date; no authoritative shelf-life value for Retatrutide has been established in the public regulatory literature.

Incompatibilities

No comprehensive reactivity data for Retatrutide are available in authoritative regulatory sources (OSHA, NIOSH, EPA, ECHA, PubChem). Based on the general reactivity of polypeptides, avoid contact with strong oxidizing agents (which can oxidize Met, Cys, Trp, and Tyr side chains), strong acids and strong bases (which catalyze hydrolysis of peptide bonds and deamidation of Asn/Gln residues), strong reducing agents (which can cleave any disulfide bonds and reduce side-chain functionalities), heavy-metal salts, and electrophilic alkylating or acylating reagents. Avoid prolonged exposure to elevated temperatures, ultraviolet light, humid air, and proteolytic contamination, all of which can accelerate degradation. Incompatible storage neighbors include concentrated mineral acids, peroxides, hypochlorites, and other reactive industrial chemicals.

Section 8 — Exposure Controls / Personal Protection

Exposure Limits

No regulatory occupational exposure limits (OEL) have been established by OSHA, ACGIH, NIOSH, or equivalent bodies. 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. Retatrutide is an investigational synthetic peptide (C221H342N46O68; MW ~ 4731 Da); handle as a potentially bioactive substance of unknown toxicity. Where a facility-specific health-based OEL or occupational exposure band (OEB) has been derived by a qualified industrial hygienist or toxicologist following ISPE/EMA Q&A risk-MaPP guidance, those internal limits should govern site practice.

Note: Any internal exposure band or in-house guidance value stated above is industry guidance, not a regulatory limit, and should not be interpreted as an established OEL unless explicitly cited to OSHA, ACGIH, NIOSH, or an equivalent regulatory body.

Engineering Controls

Use in a controlled laboratory setting following the principles of 29 CFR 1910.1450 (OSHA Laboratory Standard) and Prudent Practices in the Laboratory (NRC, 2011). Weighing, transfer, and reconstitution of the dry powder should be performed inside a ventilated containment device - a certified Class I or Class II Type A2/B2 biological safety cabinet, a ducted fume hood with HEPA-filtered exhaust, a powder weighing/containment hood, or a glove box - to prevent generation of airborne particulates. Maintain inward airflow at the working face (typical fume hood face velocity 80-120 fpm per ANSI/AIHA Z9.5). Keep containers closed when not in use. Provide a readily accessible eyewash station and emergency safety shower in the work area per ANSI Z358.1. Decontaminate work surfaces and reusable equipment after each use; HEPA-vacuum or wet-wipe - do not dry-sweep or use compressed air. Prohibit eating, drinking, smoking, and cosmetic application in areas where the material is handled (29 CFR 1910.141).

Personal Protective Equipment

Respiratory Protection: Respiratory protection is generally not required when handling is conducted within a properly functioning containment device. If powder handling occurs outside primary containment, if visible dust or aerosols may be generated, or if exposure cannot otherwise be controlled, use a NIOSH-approved air-purifying respirator with N100/P100 particulate filters, or a powered air-purifying respirator (PAPR) with HEPA cartridges, selected and used in accordance with OSHA's Respiratory Protection Standard (29 CFR 1910.134), including a written program, medical clearance, and fit-testing. Respirator selection should be based on a site-specific exposure assessment.

Hand Protection: Wear chemically resistant, disposable nitrile gloves meeting EN 374 / ASTM D6319. Double-gloving is recommended for direct handling of the neat powder or concentrated stock solutions. Inspect gloves before use; change immediately if punctured, torn, or contaminated, and at minimum every 30 minutes for prolonged work or per the breakthrough time provided by the glove manufacturer. Remove gloves using an inversion technique and wash hands thoroughly with soap and water before leaving the work area.

Eye / Face Protection: Wear ANSI Z87.1-compliant safety glasses with side shields as a minimum. For operations with splash potential (handling solutions, reconstitution, sonication) or when working outside a sash-protected hood, wear indirectly vented chemical splash goggles (EN 166). A full face shield worn over goggles is recommended for large-scale transfers or any procedure where aerosolization or splashing is foreseeable.

Skin Protection: Wear a fastened laboratory coat or chemical-resistant gown with knit cuffs and full-length closed-front sleeves. For handling of the neat powder or potential splash operations, a fluid-resistant disposable coverall (e.g., Tyvek or equivalent) is recommended. Wear full-length trousers and closed-toe, non-absorbent footwear; chemical-resistant shoe covers should be used where contamination is foreseeable. Remove and segregate contaminated clothing immediately; launder reusable garments separately from street clothes and do not take potentially contaminated PPE home. Wash exposed skin promptly with soap and water after handling and before breaks.

Section 9 — Physical and Chemical Properties

Physical State	Solid (research-grade lyophilised powder or crystalline solid)
Appearance	White to off-white lyophilized powder
Odor	Odorless
Odor Threshold	Not available.
Boiling Point	*Not determined*
Melting Point	*Not determined*
Flash Point	*Not determined*
Auto-ignition Temperature	No data available.
Decomposition Temperature	No experimental data available.
Vapor Pressure	*Not determined*
Vapor Density	*Not determined*
Specific Gravity	*Not determined*
Partition Coefficient (log Kow)	No experimental data available.
Solubility	Soluble in water and aqueous buffers; soluble in DMSO
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	*Not determined*
Molecular Weight	4731 g/mol
Molecular Formula	C221H342N46O68

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: No comprehensive reactivity data for Retatrutide are available in authoritative regulatory sources (OSHA, NIOSH, EPA, ECHA, PubChem). Based on the general reactivity of polypeptides, avoid contact with strong oxidizing agents (which can oxidize Met, Cys, Trp, and Tyr side chains), strong acids and strong bases (which catalyze hydrolysis of peptide bonds and deamidation of Asn/Gln residues), strong reducing agents (which can cleave any disulfide bonds and reduce side-chain functionalities), heavy-metal salts, and electrophilic alkylating or acylating reagents. Avoid prolonged exposure to elevated temperatures, ultraviolet light, humid air, and proteolytic contamination, all of which can accelerate degradation. Incompatible storage neighbors include concentrated mineral acids, peroxides, hypochlorites, and other reactive industrial chemicals.

Hazardous Decomposition Products: Upon combustion or decomposition may produce: carbon monoxide (CO), carbon dioxide (CO_2), nitrogen oxides (NOx).

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 specific to Retatrutide (C221H342N46O68; MW ~4731) have not been fully characterized in the publicly available authoritative toxicological literature. No LD50 or LC50 values for this substance are reported by OSHA, NIOSH, NTP, ECHA, or in peer-reviewed publications indexed in PubChem (CID 171390338; CID 171934787 for the sodium salt). Based on currently available data, the substance is not classified for acute oral, dermal, or inhalation toxicity under GHS Rev.8 / OSHA HazCom 2012; however, hazards cannot be excluded given the absence of substance-specific studies. Handle as a substance of unknown acute toxicity and minimize exposure via all routes. Dust or aerosol generation should be avoided.

Skin Corrosion / Irritation: No substance-specific skin corrosion or irritation studies for Retatrutide are available from authoritative sources (ECHA, NTP, OSHA, NIOSH, or peer-reviewed literature). Not classified for skin corrosion/irritation based on currently available data; hazards cannot be excluded per GHS Rev.8 Chapter 1.3.2.4 weight-of-evidence guidance. Mechanical irritation from solid material in contact with skin is possible. Direct contact should be avoided.

Serious Eye Damage / Irritation: No substance-specific serious eye damage or eye irritation studies for Retatrutide are available from authoritative sources (ECHA, NTP, OSHA, NIOSH, or peer-reviewed literature). Not classified for serious eye damage/eye irritation based on currently available data; hazards cannot be excluded per GHS Rev.8 Chapter 1.3.2.4. Particulate contact with the eye may cause mechanical irritation. Avoid contact with eyes.

Skin / Respiratory Sensitization: No substance-specific respiratory or skin sensitization studies for Retatrutide are reported by ECHA, NTP, NIOSH, or in peer-reviewed literature. Not classified for respiratory or skin sensitization based on currently available data; hazards cannot be excluded. High-molecular-weight molecules of this class have, in general, the potential to elicit immunogenic responses on repeated exposure; therefore handling that generates inhalable dust or aerosol should be avoided as a precaution.

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: Retatrutide is not listed by IARC, the U.S. National Toxicology Program (NTP) Report on Carcinogens, OSHA (29 CFR 1910.1003), or the ACGIH TLV carcinogen list. No long-term carcinogenicity bioassay data for this specific substance have been published in the authoritative toxicological literature. Not classified for carcinogenicity based on currently available data; hazards cannot be excluded in the absence of substance-specific chronic studies (GHS Rev.8 Chapter 1.3.2.4).

Reproductive Toxicity: Retatrutide is not listed as a reproductive or developmental toxicant by the U.S. EPA, NTP, ECHA CLP Annex VI, or California Proposition 65 as of the date of this SDS. No substance-specific reproductive or developmental toxicity studies for this material are available in the public authoritative literature. Not classified for reproductive toxicity based on currently available data; hazards cannot be excluded per GHS Rev.8 Chapter 1.3.2.4. As a precaution, exposure should be minimized, particularly for pregnant or nursing workers.

Specific Target Organ Toxicity (STOT): Specific Target Organ Toxicity - Single Exposure (STOT-SE) and Repeated Exposure (STOT-RE): No substance-specific STOT-SE or STOT-RE data for Retatrutide are reported by OSHA, NIOSH, ECHA, NTP, or in peer-reviewed publications indexed by PubChem. Not classified for STOT-SE or STOT-RE based on currently available data; hazards cannot be excluded per GHS Rev.8 Chapter 1.3.2.4. The toxicological properties of this substance are not fully characterized. Repeated or prolonged occupational exposure should be controlled through engineering controls and personal protective equipment.

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 retatrutide in authoritative sources such as ECHA, EPA ECOTOX, or PubChem. Not classified as hazardous to the aquatic environment based on weight-of-evidence assessment (no authoritative experimental data identified). As a high-molecular-weight (~4731 g/mol) multifunctional synthetic GLP-1/GIP/glucagon receptor tri-agonist intended for parenteral pharmaceutical use, release to the environment should be minimized in accordance with good laboratory and pharmaceutical-waste practice.

Persistence and Degradability: No substance-specific experimental data identified regarding biotic or abiotic degradation, hydrolysis, or photolysis of retatrutide in environmental media. No standardized ready-biodegradability study (e.g., OECD 301 series) results have been located in authoritative databases (ECHA, EPA, PubChem).

Bioaccumulative Potential: No substance-specific experimental bioconcentration factor (BCF) or measured log Kow has been identified in authoritative sources for retatrutide. Given the very high molecular weight (~4731 g/mol), large polar surface area, multiple ionizable groups, and expected low membrane permeability characteristic of large modified-peptide therapeutics, significant bioaccumulation is not anticipated; however, this is a qualitative assessment in the absence of 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

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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: 2026-07-18
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).