

**Acetyl Methionine / L-Arginine hydrochloride /  
Hydroxocobalamin Acetate Formulation**

Version 2.0      Revision Date: 14.04.2025      SDS Number: 5459060-00011      Date of last issue: 28.09.2024  
Date of first issue: 02.03.2020

**SECTION 1. PRODUCT AND COMPANY IDENTIFICATION**

Product name : Acetyl Methionine / L-Arginine hydrochloride / Hydroxocobalamin Acetate Formulation

**Manufacturer or supplier's details**

Company name of supplier : MSD  
Address : 126 E. Lincoln Avenue  
Rahway, New Jersey U.S.A. 07065  
Telephone : 908-740-4000  
Emergency telephone : 1-908-423-6000  
E-mail address : EHSDATASTEWARD@msd.com

**Recommended use of the chemical and restrictions on use**

Recommended use : Veterinary product  
Restrictions on use : Not applicable

**SECTION 2. HAZARDS IDENTIFICATION****GHS Classification**

Not a hazardous substance or mixture.

**GHS label elements**

No hazard pictogram, no signal word, no hazard statement(s), no precautionary statement(s) required.

**Other hazards**

None known.

**SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS**

Substance / Mixture : Mixture

**Components**

Chemical name	CAS-No.	Concentration (% w/w)
N-Acetyl-DL-methionine	1115-47-5	$\geq 20$ - $< 30$
Acetatocobalamin	22465-48-1	$< 0.1$

**SECTION 4. FIRST AID MEASURES**

If inhaled : If inhaled, remove to fresh air.  
Get medical attention if symptoms occur.

In case of skin contact : Wash with water and soap as a precaution.  
Get medical attention if symptoms occur.

In case of eye contact : Flush eyes with water as a precaution.  
Get medical attention if irritation develops and persists.

If swallowed : If swallowed, DO NOT induce vomiting.  
Get medical attention if symptoms occur.  
Rinse mouth thoroughly with water.

Most important symptoms and effects, both acute and : None known.

**Acetyl Methionine / L-Arginine hydrochloride /  
Hydroxocobalamin Acetate Formulation**

Version	Revision Date:	SDS Number:	Date of last issue: 28.09.2024
2.0	14.04.2025	5459060-00011	Date of first issue: 02.03.2020

delayed  
Protection of first-aiders : No special precautions are necessary for first aid responders.  
Notes to physician : Treat symptomatically and supportively.

**SECTION 5. FIRE-FIGHTING MEASURES**

Suitable extinguishing media : Water spray  
Alcohol-resistant foam  
Carbon dioxide (CO<sub>2</sub>)  
Dry chemical

Unsuitable extinguishing media : None known.

Specific hazards during fire fighting : Exposure to combustion products may be a hazard to health.

Hazardous combustion products : Carbon oxides  
Nitrogen oxides (NO<sub>x</sub>)  
Sulfur oxides  
Chlorine compounds

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.  
Use water spray to cool unopened containers.  
Remove undamaged containers from fire area if it is safe to do so.  
Evacuate area.

Special protective equipment for fire-fighters : Wear self-contained breathing apparatus for firefighting if necessary.  
Use personal protective equipment.

**SECTION 6. ACCIDENTAL RELEASE MEASURES**

Personal precautions, protective equipment and emergency procedures : Follow safe handling advice (see section 7) and personal protective equipment recommendations (see section 8).

Environmental precautions : Avoid release to the environment.  
Prevent further leakage or spillage if safe to do so.  
Prevent spreading over a wide area (e.g., by containment or oil barriers).  
Retain and dispose of contaminated wash water.  
Local authorities should be advised if significant spillages cannot be contained.

Methods and materials for containment and cleaning up : Soak up with inert absorbent material.  
For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container.

**Acetyl Methionine / L-Arginine hydrochloride /  
Hydroxocobalamin Acetate Formulation**

Version 2.0	Revision Date: 14.04.2025	SDS Number: 5459060-00011	Date of last issue: 28.09.2024 Date of first issue: 02.03.2020
----------------	------------------------------	------------------------------	-------------------------------------------------------------------

Clean up remaining materials from spill with suitable absorbent.  
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.  
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

**SECTION 7. HANDLING AND STORAGE**

- |                             |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Technical measures          | : | See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Local/Total ventilation     | : | Use only with adequate ventilation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Advice on safe handling     | : | Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment<br>Take care to prevent spills, waste and minimize release to the environment.                                                                                                                                                                                                                                                                                          |
| Hygiene measures            | : | If exposure to chemical is likely during typical use, provide eye flushing systems and safety showers close to the working place.<br>When using do not eat, drink or smoke.<br>Wash contaminated clothing before re-use.<br>The effective operation of a facility should include review of engineering controls, proper personal protective equipment, appropriate degowning and decontamination procedures, industrial hygiene monitoring, medical surveillance and the use of administrative controls. |
| Conditions for safe storage | : | Keep in properly labeled containers.<br>Store in accordance with the particular national regulations.                                                                                                                                                                                                                                                                                                                                                                                                    |
| Materials to avoid          | : | Do not store with the following product types:<br>Strong oxidizing agents<br>Gases                                                                                                                                                                                                                                                                                                                                                                                                                       |

**SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Ingredients with workplace control parameters**

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
N-Acetyl-DL-methionine	1115-47-5	TWA	2000 µg/m <sup>3</sup> (OEB 1)	Internal
Acetatocobalamin	22465-48-1	TWA	10 µg/m <sup>3</sup> (OEB 3)	Internal
		Wipe limit	100 µg/100 cm <sup>2</sup>	Internal

- Engineering measures** : Use appropriate engineering controls and manufacturing technologies to control airborne concentrations (e.g., drip-less quick connections).  
All engineering controls should be implemented by facility

**Acetyl Methionine / L-Arginine hydrochloride /  
Hydroxocobalamin Acetate Formulation**

Version 2.0	Revision Date: 14.04.2025	SDS Number: 5459060-00011	Date of last issue: 28.09.2024 Date of first issue: 02.03.2020
----------------	------------------------------	------------------------------	-------------------------------------------------------------------

design and operated in accordance with GMP principles to protect products, workers, and the environment. Containment technologies suitable for controlling compounds are required to control at source and to prevent migration of the compound to uncontrolled areas (e.g., open-face containment devices). Minimize open handling.

**Personal protective equipment**

Respiratory protection	:	If adequate local exhaust ventilation is not available or exposure assessment demonstrates exposures outside the recommended guidelines, use respiratory protection.
Filter type	:	Particulates type
Hand protection	:	
Material	:	Chemical-resistant gloves
Remarks	:	Consider double gloving.
Eye protection	:	Wear safety glasses with side shields or goggles. If the work environment or activity involves dusty conditions, mists or aerosols, wear the appropriate goggles. Wear a faceshield or other full face protection if there is a potential for direct contact to the face with dusts, mists, or aerosols.
Skin and body protection	:	Work uniform or laboratory coat. Additional body garments should be used based upon the task being performed (e.g., sleevelets, apron, gauntlets, disposable suits) to avoid exposed skin surfaces. Use appropriate degowning techniques to remove potentially contaminated clothing.

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**

Appearance	:	liquid
Color	:	pink
Odor	:	No data available
Odor Threshold	:	No data available
pH	:	5 - 7
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	No data available
Flash point	:	No data available
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable

**Acetyl Methionine / L-Arginine hydrochloride /  
Hydroxocobalamin Acetate Formulation**

Version 2.0	Revision Date: 14.04.2025	SDS Number: 5459060-00011	Date of last issue: 28.09.2024 Date of first issue: 02.03.2020
----------------	------------------------------	------------------------------	-------------------------------------------------------------------

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Flammability (liquids)	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Relative density	:	No data available
Density	:	No data available
Solubility(ies) Water solubility	:	No data available
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Molecular weight	:	No data available
Particle characteristics Particle size	:	Not applicable

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**SECTION 10. STABILITY AND REACTIVITY**

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Can react with strong oxidizing agents.
Conditions to avoid	:	None known.
Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

**Acetyl Methionine / L-Arginine hydrochloride /  
Hydroxocobalamin Acetate Formulation**

Version	Revision Date:	SDS Number:	Date of last issue: 28.09.2024
2.0	14.04.2025	5459060-00011	Date of first issue: 02.03.2020

**SECTION 11. TOXICOLOGICAL INFORMATION****Information on likely routes of exposure**

Inhalation  
Skin contact  
Ingestion  
Eye contact

**Acute toxicity**

Not classified based on available information.

**Components:****N-Acetyl-DL-methionine:**

Acute oral toxicity	: LD50 (Rat): > 5,000 mg/kg Remarks: Based on data from similar materials
Acute inhalation toxicity	: LC50 (Rat): > 5.25 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: OECD Test Guideline 403 Remarks: Based on data from similar materials

**Acetatocobalamin:**

Acute oral toxicity	: LD50 Oral (Mouse): > 5,000 mg/kg
Acute toxicity (other routes of administration)	: LD50 (Mouse): > 2,000 mg/kg Application Route: Intravenous  LDLo (Mouse): 1.4 mg/kg Application Route: Intraperitoneal  LDLo (Mouse): 2.7 mg/kg Application Route: Intravenous

**Skin corrosion/irritation**

Not classified based on available information.

**Components:****N-Acetyl-DL-methionine:**

Species	: Rabbit
Method	: OECD Test Guideline 404
Result	: No skin irritation
Remarks	: Based on data from similar materials

**Acetatocobalamin:**

Remarks	: No data available
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**Acetyl Methionine / L-Arginine hydrochloride /  
Hydroxocobalamin Acetate Formulation**

Version	Revision Date:	SDS Number:	Date of last issue: 28.09.2024
2.0	14.04.2025	5459060-00011	Date of first issue: 02.03.2020

**Serious eye damage/eye irritation**

Not classified based on available information.

**Components:****Acetatocobalamin:****||**Remarks : No data available**Respiratory or skin sensitization****Skin sensitization**

Not classified based on available information.

**Respiratory sensitization**

Not classified based on available information.

**Components:****N-Acetyl-DL-methionine:**

Test Type	: Buehler Test
Routes of exposure	: Skin contact
Species	: Guinea pig
Method	: OECD Test Guideline 406
Result	: negative
Remarks	: Based on data from similar materials

**Acetatocobalamin:****||**Remarks : No data available**Germ cell mutagenicity**

Not classified based on available information.

**Components:****N-Acetyl-DL-methionine:**

Genotoxicity in vitro	: Test Type: Bacterial reverse mutation assay (AMES)
	Result: negative
	Remarks: Based on data from similar materials
	Test Type: In vitro mammalian cell gene mutation test
	Result: negative
	Remarks: Based on data from similar materials
Genotoxicity in vivo	: Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
	Species: Mouse
	Application Route: Intraperitoneal injection
	Result: negative
	Remarks: Based on data from similar materials

**Acetatocobalamin:****||**Genotoxicity in vitro : Test Type: Mutagenicity (Escherichia coli - reverse mutation)

**Acetyl Methionine / L-Arginine hydrochloride /  
Hydroxocobalamin Acetate Formulation**

Version 2.0	Revision Date: 14.04.2025	SDS Number: 5459060-00011	Date of last issue: 28.09.2024 Date of first issue: 02.03.2020
----------------	------------------------------	------------------------------	-------------------------------------------------------------------

assay)  
Result: negative

Test Type: Ames test  
Test system: Salmonella typhimurium  
Result: negative

Test Type: Mutagenicity (Salmonella typhimurium - reverse  
mutation assay)  
Result: negative

**Carcinogenicity**

Not classified based on available information.

**Reproductive toxicity**

Not classified based on available information.

**STOT-single exposure**

Not classified based on available information.

**STOT-repeated exposure**

Not classified based on available information.

**Components:****Acetatocobalamin:**

Target Organs	: Kidney, Liver
Assessment	: May cause damage to organs through prolonged or repeated exposure.

**Repeated dose toxicity****Components:****N-Acetyl-DL-methionine:**

Species	: Rat
NOAEL	: > 100 mg/kg
Application Route	: Ingestion
Exposure time	: 90 Days
Method	: OECD Test Guideline 408
Remarks	: Based on data from similar materials

**Acetatocobalamin:**

Species	: Dog
LOAEL	: 300 mg/kg
Application Route	: Oral
Number of exposures	: 3 days
Target Organs	: Kidney, Liver
Symptoms	: kidney effects, liver function change
Remarks	: May cause damage to organs.

Species	: Dog
LOAEL	: 75 mg/kg



# Acetyl Methionine / L-Arginine hydrochloride / Hydroxocobalamin Acetate Formulation

Version	Revision Date:	SDS Number:	Date of last issue: 28.09.2024
2.0	14.04.2025	5459060-00011	Date of first issue: 02.03.2020

Application Route	: Intravenous
Number of exposures	: 4 weeks
Target Organs	: Kidney, Liver
Remarks	: May cause damage to organs.

## Aspiration toxicity

Not classified based on available information.

## Experience with human exposure

### Components:

#### Acetatocobalamin:

General Information	: Symptoms: asthenia, Dizziness, Headache, Nausea, sinusitis
Remarks:	The most common side effects are:

## SECTION 12. ECOLOGICAL INFORMATION

### Ecotoxicity

#### Components:

##### N-Acetyl-DL-methionine:

Toxicity to fish	: LC50 (Danio rerio (zebra fish)): > 100 mg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates	: EC50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: Based on data from similar materials
Toxicity to algae/aquatic plants	: ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials
	NOEC (Pseudokirchneriella subcapitata (green algae)): > 1 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials

### Persistence and degradability

#### Components:

##### N-Acetyl-DL-methionine:

Biodegradability	: Result: Readily biodegradable. Remarks: Based on data from similar materials
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**Acetyl Methionine / L-Arginine hydrochloride /  
Hydroxocobalamin Acetate Formulation**

Version 2.0	Revision Date: 14.04.2025	SDS Number: 5459060-00011	Date of last issue: 28.09.2024 Date of first issue: 02.03.2020
----------------	------------------------------	------------------------------	-------------------------------------------------------------------

**Bioaccumulative potential****Components:****N-Acetyl-DL-methionine:**

Partition coefficient: n-octanol/water	: log Pow: -0.313 Remarks: Calculation
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**Mobility in soil**

No data available

**Other adverse effects**

No data available

**SECTION 13. DISPOSAL CONSIDERATIONS****Disposal methods**

Waste from residues	: Do not dispose of waste into sewer. Dispose of in accordance with local regulations.
Contaminated packaging	: Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

**SECTION 14. TRANSPORT INFORMATION****International Regulations****UNRTDG**

Not regulated as a dangerous good

**IATA-DGR**

Not regulated as a dangerous good

**IMDG-Code**

Not regulated as a dangerous good

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code**

Not applicable for product as supplied.

**Domestic regulation****NOM-002-SCT**

Not regulated as a dangerous good

**Special precautions for user**

Not applicable

**SECTION 15. REGULATORY INFORMATION****Safety, health and environmental regulations/legislation specific for the substance or mixture**

Federal Law for the control of chemical precursors, essential chemical products and machinery for producing capsules, tablets and pills.	: Not applicable
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**Acetyl Methionine / L-Arginine hydrochloride /  
Hydroxocobalamin Acetate Formulation**

Version	Revision Date:	SDS Number:	Date of last issue: 28.09.2024
2.0	14.04.2025	5459060-00011	Date of first issue: 02.03.2020

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**The ingredients of this product are reported in the following inventories:**

AICS	:	not determined
DSL	:	not determined
IECSC	:	not determined

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**SECTION 16. OTHER INFORMATION**

Revision Date	:	14.04.2025
Date format	:	dd.mm.yyyy

**Full text of other abbreviations**

AIIC - Australian Inventory of Industrial Chemicals; ANTT - National Agency for Transport by Land of Brazil; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; Nch - Chilean Norm; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NOM - Official Mexican Norm; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TDG - Transportation of Dangerous Goods; TECL - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System

Sources of key data used to compile the Material Safety Data Sheet	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, <a href="http://echa.europa.eu/">http://echa.europa.eu/</a>
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# SAFETY DATA SHEET



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Version	Revision Date:	SDS Number:	Date of last issue: 28.09.2024
2.0	14.04.2025	5459060-00011	Date of first issue: 02.03.2020

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Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information is considered as correct, but not exhaustive, and will be used only as a guide, which is based in the current knowledge of the substance or mixture, and is applicable to proper safety precautions for the product.

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