

SAFETY DATA SHEET

Republic of Korea

In accordance with the Standard for Classification and Labeling of Chemical Substance and Safety Data Sheet, Article 10 Paragraph 1

Section 1. Chemical product and company identification

A. Product name Chemically Defined Insect Medium Prototype (ADCF)

Catalogue Number SH31205

Article Number SH31205

B. Recommended use of the chemical

For Further Manufacturing or Research Use. Not for Diagnostic or Therapeutic Use.

Restrictions on use

Uses advised against

Not applicable.

Reason

C. Supplier's information

Manufacturer HyClone Laboratories
925 West 1800 South
Supplier Logan, Utah 84321
Phone: (435) 792-8000

Cytiva Austria
Kremslstr. 5
4061 Pasching
AUSTRIA
Phone: +43 7229 64865
Fax (+43) 7229 64866

Cytiva Singapore
1 Maritime Square #13-01
Harbourfront Centre
Singapore 099253

Distributor 유통업자 글로벌 라이프 사이언스 솔루션즈 코리아 유한회사
BRC BLDG., 2동 2층
송도미래로 9, 연수구
인천시
대한민국
+82 2 3478 4584

Emergency telephone number (with hours of operation) +82-2-3478-4584
(9.00 am - 6.00 pm)

Section 2. Hazards identification

A. Hazard classification SKIN IRRITATION - Category 2
EYE IRRITATION - Category 2A
RESPIRATORY SENSITIZATION - Category 1
GERM CELL MUTAGENICITY - Category 1B
AQUATIC HAZARD (LONG-TERM) - Category 3

This product is classified in accordance with the Industrial Safety and Health Act and the Chemical Control Act.

Percentage of the mixture consisting of ingredient(s) of unknown hazards to the aquatic environment: 77.7%

B. GHS label elements, including precautionary statements

Symbol



Signal word	Danger
Hazard statements	Causes skin irritation. Causes serious eye irritation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause genetic defects. Harmful to aquatic life with long lasting effects.
Precautionary statements	
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves, protective clothing and eye or face protection. Wear respiratory protection. Avoid release to the environment. Avoid breathing dust or mist. Wash thoroughly after handling.
Response	IF exposed or concerned: Get medical advice or attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. If experiencing respiratory symptoms: Call a POISON CENTER or doctor. IF ON SKIN: Wash with plenty of water. If skin irritation occurs: Get medical advice or attention. Take off contaminated clothing and wash it before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice or attention. Specific treatment (see the label).
Storage	Store locked up.
Disposal	Dispose of contents and container in accordance with all local, regional, national and international regulations.
C. Other hazards which do not result in classification	May form explosible dust-air mixture if dispersed.

Section 3. Composition/information on ingredients

Substance/mixture	Mixture		
Other means of identification	Not available.		
Ingredient name	Common name	Identifiers	%
L-BETA-ASPARAGINE		CAS: 70-47-3 EC: 200-735-9	≥5 - ≤10
ASPARTIC ACID		CAS: 56-84-8 EC: 200-291-6	≥1 - ≤5
POTASSIUM CHLORIDE		CAS: 7447-40-7 EC: 231-211-8	≥1 - ≤5
L-(+)-ARGININE MONOHYDROCHLORIDE		CAS: 1119-34-2 EC: 214-275-1	≥1 - ≤5
L-(+)-LYSINE MONOHYDROCHLORIDE		CAS: 657-27-2 EC: 211-519-9	≥1 - ≤5
L-(-)-METHIONINE		CAS: 63-68-3 EC: 200-562-9	≥1 - ≤5
L-serine		CAS: 56-45-1 EC: 200-274-3	≥1 - ≤5
L-valine		CAS: 72-18-4 EC: 200-773-6	≥1 - ≤5
MAGNESIUM SULFATE		CAS: 7487-88-9 EC: 231-298-2	≥1 - ≤5
L-(-)-LEUCINE		CAS: 61-90-5 EC: 200-522-0	≥1 - ≤5
Copper chloride (CuCl2), dihydrate		CAS: 10125-13-0 EC: 231-210-2	≤0.1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

A. Eye contact	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
B. Skin contact	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

C. Inhalation	Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours. In the event of any complaints or symptoms, avoid further exposure.
D. Ingestion	Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
E. Notes to physician	In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
Specific treatments	No specific treatment.
Protection of first-aiders	No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

A. Extinguishing media

Suitable	Use dry chemical powder.
Not suitable	Avoid high pressure media which could cause the formation of a potentially explosible dust-air mixture.

B. Specific hazards arising from the chemical	May form explosible dust-air mixture if dispersed. This material is harmful to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
--	--

Hazardous thermal decomposition products	Decomposition products may include the following materials: carbon dioxide carbon monoxide nitrogen oxides sulfur oxides phosphorus oxides halogenated compounds metal oxide/oxides
---	--

C. Special protective equipment for fire-fighters	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.
Special precautions for fire-fighters	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Section 6. Accidental release measures

A. Personal precautions, protective equipment and emergency procedures	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
B. Environmental precautions	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.
C. <u>Methods and materials for containment and cleaning up</u>	
Small spill	Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Place spilled material in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.
Large spill	Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Avoid dust generation. Do not dry sweep. Vacuum dust with equipment fitted with a HEPA filter and place in a closed, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor.

Section 7. Handling and storage

A. Precautions for safe handling

Protective measures

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Advice on general occupational hygiene

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

B. Conditions for safe storage, including any incompatibilities

Store between the following temperatures: 2 to 8°C (35.6 to 46.4°F). Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

A. Control parameters

Occupational exposure limits

Not applicable.

Biological exposure indices

No exposure indices known.

B. Appropriate engineering controls

Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls

Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

C. Personal protective equipment

Respiratory protection

Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Eye protection

Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles. If operating conditions cause high dust concentrations to be produced, use dust goggles.

Hand protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Skin protection

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Hygiene measures

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Section 9. Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

A. Appearance

Physical state

Solid. [Powder.]

Color

Off-white.

B. Odor

Not available.

C. Odor threshold

Not available.

D. pH

3.8 to 4.2 [Conc. (% w/w): 4.8%]

E. Melting/freezing point

Not available.

F. Boiling point or initial boiling point and boiling range	Not available.
G. Flash point	Not applicable.
Fire point	Not available.
Burning time	Not available.
Burning rate	Not available.
H. Evaporation rate	Not available.
I. Flammability (solid, gas)	Not available.
J. Lower and upper explosive (flammable) limits	Not applicable.
K. Vapor pressure	Not available.
L. Solubility in water	Not available.
M. Vapor density	Not applicable.
N. Relative density	Not available.
O. Partition coefficient: n-octanol/water	Not applicable.
P. Auto-ignition temperature	Not applicable.
Q. Decomposition temperature	Not available.
SADT	Not available.
R. Viscosity	Dynamic (room temperature): Not available. Kinematic (room temperature): Not available. Kinematic (40°C (104°F)): Not available.
Flow time (ISO 2431)	Not available.
S. Molecular weight	Not applicable.

Particle characteristics

Median particle size	Not available.
-----------------------------	----------------

Section 10. Stability and reactivity

A. Chemical stability	The product is stable.
Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous reactions will not occur.
B. Conditions to avoid	Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame). Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Prevent dust accumulation.
C. Incompatible materials	Reactive or incompatible with the following materials: oxidizing materials
D. Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological information

A. <u>Information on the likely routes of exposure</u>	Routes of entry anticipated: Oral, Dermal, Inhalation, Eyes.
<u>Potential acute health effects</u>	
Respiratory	Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs. May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Oral	No known significant effects or critical hazards.
Skin	Causes skin irritation.
Eyes	Causes serious eye irritation.
<u>Over-exposure signs/symptoms</u>	
Inhalation	Adverse symptoms may include the following: respiratory tract irritation coughing wheezing and breathing difficulties asthma
Ingestion	No specific data.

Skin contact

Adverse symptoms may include the following:
irritation
redness

Eye contact

Adverse symptoms may include the following:
pain or irritation
watering
redness

B. Health hazards**Acute toxicity****Product/ingredient name**

ASPARTIC ACID

Result**Rat - Oral - LD50**

5000 mg/kg

Rabbit - Dermal - LD50

5000 mg/kg

POTASSIUM CHLORIDE

Rat - Male - Oral - LD50

2600 mg/kg

Toxic effects: Gastrointestinal - Hypermotility, diarrhea Gastrointestinal - Nausea or vomiting

L-(+)-ARGININE MONOHYDROCHLORIDE

Rat - Oral - LD50

12 g/kg

Toxic effects: Behavioral - Altered sleep time (including change in righting reflex) Behavioral - Ataxia Lung, Thorax, or Respiration - Dyspnea

L-(+)-LYSINE MONOHYDROCHLORIDE

Rat - Oral - LD50

10 g/kg

Toxic effects: Behavioral - Altered sleep time (including change in righting reflex) Behavioral - Ataxia Lung, Thorax, or Respiration - Dyspnea

L-(-)-METHIONINE

Rat - Oral - LD50

36 g/kg

Toxic effects: Behavioral - Changes in motor activity (specific assay) Immunological including allergic - Uncharacterized

L-serine

Rat - Oral - LD50

14 g/kg

L-valine

Rat - Oral - LD50

2000 mg/kg

L-(-)-LEUCINE

Rat - Oral - LD50

16000 mg/kg

**Conclusion/Summary
[Product]**

Not available.

Skin corrosion/irritation

Not available.

**Conclusion/Summary
[Product]**

Not available.

Ingredient name

L-(+)-LYSINE MONOHYDROCHLORIDE

L-(-)-METHIONINE

L-serine

L-valine

L-(-)-LEUCINE

Conclusion/Summary

May cause skin irritation.

May cause skin irritation.

May cause skin irritation.

May cause skin irritation.

May cause skin irritation.

Serious eye damage/eye irritation

Not available.

**Conclusion/Summary
[Product]**

Not available.

Ingredient name

L-(+)-LYSINE MONOHYDROCHLORIDE

L-(-)-METHIONINE

L-serine

L-valine

L-(-)-LEUCINE

Conclusion/Summary

May cause eye irritation.

May cause eye irritation.

May cause eye irritation.

May cause eye irritation.

May cause eye irritation.

Respiratory corrosion/irritation

Not available.

**Conclusion/Summary
[Product]** Not available.

Respiratory or skin sensitization

Not available.

Skin

**Conclusion/Summary
[Product]** Not available.

Respiratory

**Conclusion/Summary
[Product]** Not available.

Not available.

Germ cell mutagenicity

Not available.

**Conclusion/Summary
[Product]** Not available.

Carcinogenicity

Not available.

**Conclusion/Summary
[Product]** Not available.

Reproductive toxicity

Not available.

**Conclusion/Summary
[Product]** Not available.

Specific target organ toxicity (single exposure)

Product/ingredient name

L-BETA-ASPARAGINE

ASPARTIC ACID

POTASSIUM CHLORIDE

L-(-)-METHIONINE

Result

SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)
(Respiratory tract irritation) - Category 3

SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)
(Respiratory tract irritation) - Category 3

SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) -
Category 2

SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)
(Respiratory tract irritation) - Category 3

SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE)
(Respiratory tract irritation) - Category 3

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Potential chronic health effects

Not available.

**Conclusion/Summary
[Product]** Not available.

General

Repeated or prolonged inhalation of dust may lead to chronic respiratory irritation. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity

No known significant effects or critical hazards.

Mutagenicity

May cause genetic defects.

Reproductive toxicity

No known significant effects or critical hazards.

Numerical measures of toxicity**Acute toxicity estimates**

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapors) (mg/l)	Inhalation (dusts and mists) (mg/l)
DPM-HyClone™ CD BEVS complete medium	33136.2	30529.8	N/A	N/A	N/A
ASPARTIC ACID	5000	5000	N/A	N/A	N/A
POTASSIUM CHLORIDE	2600	N/A	N/A	N/A	N/A
L-(+)-ARGININE MONOHYDROCHLORIDE	12000	N/A	N/A	N/A	N/A
L-(+)-LYSINE MONOHYDROCHLORIDE	10000	N/A	N/A	N/A	N/A
L-(-)-METHIONINE	36000	N/A	N/A	N/A	N/A
L-serine	14000	N/A	N/A	N/A	N/A
L-valine	2000	N/A	N/A	N/A	N/A
L-(-)-LEUCINE	16000	N/A	N/A	N/A	N/A

Section 12. Ecological information**A. Ecotoxicity**

Product/ingredient name	Result
POTASSIUM CHLORIDE	Acute - LC50 - Fresh water Crustaceans - Water flea - <i>Pseudosida ramosa</i> - Neonate <u>Age:</u> ≤24 hours 9.68 mg/l [48 hours] <u>Effect:</u> Mortality Acute - EC50 - Fresh water ISO Algae - Green algae - <i>Desmodesmus subspicatus</i> 9.24 g/l [72 hours] <u>Effect:</u> Population Acute - LC50 - Fresh water Fish - Zebra danio - <i>Danio rerio</i> 509.65 mg/l [96 hours] <u>Effect:</u> Mortality Acute - EC50 Daphnia 83 mg/l [48 hours] Acute - NOEC Algae 1000 mg/l [72 hours] LC50 Fish 10000 mg/l [96 hours] Chronic - NOEC - Fresh water Daphnia - Water flea - <i>Daphnia magna</i> - Neonate <u>Age:</u> <24 hours 360 mg/l [3 weeks] <u>Effect:</u> Reproduction Chronic - IC10 - Fresh water Aquatic plants - Lesser Duckweed - <i>Lemna aequinoctialis</i> 1.9 mg/l [96 hours] <u>Effect:</u> Population Acute - IC50 - Fresh water Aquatic plants - Lesser Duckweed - <i>Lemna aequinoctialis</i> 4.4 mg/l [96 hours] <u>Effect:</u> Population Acute - LC50 - Fresh water Fish - Purple Spotted Gudgeon - <i>Mogurnda mogurnda</i> - Larvae 40 mg/l [96 hours] <u>Effect:</u> Mortality Acute - EC50 - Fresh water Daphnia - Water flea - <i>Daphnia magna</i> 343.56 mg/l [48 hours] <u>Effect:</u> Intoxication Acute - EC50 - Marine water US EPA Algae - Diatom - <i>Skeletonema costatum</i> <u>Age:</u> 3 days 9.52 ppb [72 hours] <u>Effect:</u> Population Chronic - NOEC - Marine water US EPA Crustaceans - Harpacticoid copepod - <i>Tisbe battagliai</i> <u>Age:</u> <24 hours 18 ppb [21 days] <u>Effect:</u> Mortality
L-serine	
L-valine	
MAGNESIUM SULFATE	
Copper chloride (CuCl ₂), dihydrate	

Conclusion/Summary	Not available.
[Product]	
Ingredient name	Conclusion/Summary
L-BETA-ASPARAGINE	Naturally occurring substance
ASPARTIC ACID	Naturally occurring substance
L-(+)-ARGININE MONOHYDROCHLORIDE	Naturally occurring substance
L-(+)-LYSINE MONOHYDROCHLORIDE	Naturally occurring substance
L-(-)-METHIONINE	Naturally occurring substance
L-serine	Naturally occurring substance
L-valine	Naturally occurring substance
L-(-)-LEUCINE	Naturally occurring substance

B. Persistence/degradability

Product/ingredient name		Result	
L-valine		82% [28 days]	
Conclusion/Summary	Not available.		
[Product]			
Ingredient name		Conclusion/Summary	
ASPARTIC ACID		Not expected to bioaccumulate. Naturally occurring substance	
L-(+)-ARGININE MONOHYDROCHLORIDE		Not expected to bioaccumulate. Naturally occurring substance	
L-(+)-LYSINE MONOHYDROCHLORIDE		Not expected to bioaccumulate. Naturally occurring substance	
L-(-)-METHIONINE		Not expected to bioaccumulate. Naturally occurring substance	
L-serine		Not expected to bioaccumulate. Naturally occurring substance	
L-valine		Not expected to bioaccumulate. Naturally occurring substance	
L-(-)-LEUCINE		Not expected to bioaccumulate. Naturally occurring substance	
Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
L-valine	-	-	Readily

C. Bioaccumulative potential

Product/ingredient name	LogP_{ow}	BCF	Potential
asparagine	-3.82	3	Low
aspartic acid	-3.89	-	Low
lysine hydrochloride	<-3.3	1.041	Low
L-methionine	-1.87	0.221	Low
L-serine	-3.07	0.609	Low
L-valine	-2.26	0.846	Low
L-leucine	-1.52	0.849	Low

D. Mobility in soil

Soil/Water partition coefficient Not available.

E. Other adverse effects No known significant effects or critical hazards.

Section 13. Disposal considerations

- A. Disposal methods** The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.
- B. Disposal precautions** This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information**UN**

- A. UN number** Not regulated.
- B. Proper shipping name** Not regulated.
- C. Classes** Not regulated.
- D. Packing group** Not regulated.
- E. Marine pollutant** No.
- F. Additional information** -
- Label**

IMDG

- A. UN number** Not regulated.
- B. Proper shipping name** Not regulated.

C. Classes	Not regulated.
D. Packing group	Not regulated.
E. Marine pollutant	No.
F. Additional information	-
Label	

IATA

A. UN number	Not regulated.
B. Proper shipping name	Not regulated.
C. Classes	Not regulated.
D. Packing group	Not regulated.
E. Marine pollutant	No.
F. Additional information	-
Label	

Special precautions for user **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to IMO instruments Not available.

Section 15. Regulatory information

A. Regulation according to ISHA

ISHA article 117 (Harmful substances prohibited from manufacture) None of the components are listed.

ISHA article 118 (Harmful substances requiring permission) None of the components are listed.

Exposure Limits of Chemical Substances and Physical Factors

None of the components have an OEL.

ISHA Enforcement Regs Annex 19 (Exposure standards established for harmful factors) The following components are listed: manganese and its inorganic compounds

ISHA Enforcement Regs Annex 21 (Harmful factors subject to Work Environment Measurement) None of the components are listed.

ISHA Enforcement Regs Annex 22 (Harmful Factors Subject to Special Health Check-up) None of the components are listed.

Standard of Industrial Safety and Health Annex 12 (Hazardous substances subject to control) None of the components are listed.

B. Regulation according to Chemicals Control Act

Article 11 (TRI) None of the components are listed.

Article 18 Prohibited (K-Reach Article 27) None of the components are listed.

Article 19 Candidate substances subject to authorization (K-Reach Article 25) None of the components are listed.

Article 19 Subject to authorization (K-Reach Article 25) None of the components are listed.

Article 20 Toxic Chemicals (K-Reach Article 20) Not applicable

Article 20 Restricted (K-Reach Article 27) None of the components are listed.

Article 39 (Accident Precaution Chemicals)

Not listed.

MoE 2021-51 - Regulations on the quantity of toxic substances, restricted substances, prohibited substances and permitted substances

Ingredient name	Higher regulated quantity	Lower regulated quantity
inorganic zinc, salts	400 tonnes	20 tonnes
selenium compounds	200 tonnes	5 tonnes

Existing Chemical Substances Subject to Registration The following components are listed: Sulfuric acid, zinc salt (1:1), heptahydrate

C. Dangerous Materials Safety Management Act

Not applicable.

D. Wastes regulation

Dispose of contents and container in accordance with all local, regional, national and international regulations.

E. Regulation according to other foreign laws

Article 2 of Youth Protection Act on Substances Hazardous to Youth Not applicable.

International regulations**Chemical Weapon Convention List Schedules I, II & III Chemicals**

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Republic of Korea	Not determined.
United States	Not determined.
China	At least one component is not listed.
Japan	Japan inventory (CSCL): Not determined. Japan inventory (ISHL): Not determined.

Section 16. Other information**A. References****B. First issue date** 27 January 2026**C. Date of issue/Date of revision** 27 January 2026 / 27 January 2026**D. Version** 1**Date of printing** 27 January 2026

sds_author@cytiva.com

E. Other Indicates information that has changed from previously issued version.**Key to abbreviations**

ATE = Acute Toxicity Estimate
 BCF = Bioconcentration Factor
 GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 IATA = International Air Transport Association
 IBC = Intermediate Bulk Container
 IMDG = International Maritime Dangerous Goods
 LogPow = logarithm of the octanol/water partition coefficient
 MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
 N/A = Not available
 UN = United Nations

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.
