

SAFETY DATA SHEET

 Date of issue : JAN 5, 2015
 Revision date : JAN 2, 2017

Version 02

PRODUCT	L-ARGININE
CAS NO.	74-79-3
MANUFACTURER	DAESANG Corporation

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY UNDERTAKING

Product identifier	Product name CAS number EC number Index number Registration number Chemical Formula Molecular Weight	L-Arginine 74-79-3 200-811-1 Not applicable Not applicable $C_6H_{14}N_4O_2$ 174.20
Relevant identified uses	Applications	-
Details of the supplier	Names Address Tel/Fax Contact email	Daesang Corporation 26, Cheonho-daero, Dongdaemun-gu, Seoul, South Korea Tel: +82 2 2657 5371 & Fax: +82 2 2657 5333 bio@daesang.com
Emergency telephone no.	Telephone	+1 201 488 4010 for USA & Canada +31 20 640 6080 for Europe +82 2 2657 5371 for the rest countries

2. HAZARDS IDENTIFICATION

Classification of the substance	Physical hazards Health hazards Environmental hazards	Not hazardous according to CLP (1272/2008/EC)
Label elements	Hazard pictograms Signal word Hazard statement Precautionary statement	Not applicable Not applicable Not applicable Not applicable
Other hazards		The product does not have any harmful effects if it is used and handled as specified

3. COMPOSITION INFORMATION ON INGREDIENTS		
Substance	Name of substance CAS number EC number Index number Concentration	L-Arginine 74-79-3 200-811-1 - 100%
4. FIRST AID MEASURES		
Description of first aid measures	After eye contact	Flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.
	After skin contact	Immediately wash skin with soap and flush with water.
	After inhalation	Remove to fresh air If breathing becomes difficult, call a physician
	After ingestion	Wash out mouth with water provided person is conscious Call a physician
Most important symptoms and effects, both acute and delayed		Not determined
Indication of any immediate medical attention and special treatment needed		Not determined
5. FIRE FIGHTING MEASURES		
Extinguishing media	Water spray, Carbon dioxide, dry chemical powder or foam	
Special hazards arising from the substance or mixture	Emits toxic fumes under fire conditions Wear self-contained breathing apparatus Equipment should be thoroughly decontaminated after use	
Advice for firefighters	Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes	
6. ACCIDENTAL RELEASE MEASURES		
Personal precautions, protective equipment and emergency procedures	See precautions in section 7 and 8 Wear respirator, chemical safety goggles, rubber boots and heavy rubber gloves	
Environmental precautions	None	
Methods and material for containment and cleaning up	Sweep up, place in a bag and hold for waste disposal Ventilate area & wash spill site after material pickup is complete	
Reference to other sections	See precautions in section 7 and 8	
7. HANDLING AND STORAGE		
Precautions for safe handling	Avoid raising dust Avoid inhalation Avoid contact with eyes, skin and clothing Avoid prolonged or repeated exposure	

Conditions for safe storage, including any incompatibilities	Store in a cool and dry place Recommended storage temperature is 15~30°C Keep container tightly closed and inner bag sealed	
Specific end use(s)	Not applicable	
8. EXPOSURE CONTROLS / PERSONAL PROTECTION		
Control parameters	Not applicable	
Exposure controls	<u>Respiratory protection</u> : Respiratory protection required <u>Hand protection</u> : Compatible chemical-resistant gloves <u>Eye protection</u> : Chemical safety goggles <u>Body protection</u> : Safety shower and eye bath <u>Hygiene measures</u> : Wash thoroughly after handling Mechanical exhaust required.	
9. PHYSICAL AND CHEMICAL PROPERTIES		
Information of basic physical and chemical properties	Physical state	White crystal or crystalline powder
	Colour	White
	Odour	Not determined
	Odour threshold	Not determined
	pH	10.5-12.0
	Melting point	235°C
	Boiling point	Not determined
	Flash point	Not determined
	Evaporation rate	Not determined
	Flammability	Not determined
	Auto flammability	Not determined
	Upper/lower flammability or explosive limits	Not determined
	Explosive properties	Not determined
	Oxidising properties	Not determined
	Vapour pressure	Not determined
	% volatile by volume	Not determined
	Vapour density	Not determined
	Relative density	Not determined
	Solubility in water	Approx. 14.8% in water (20°C)
	Other solvents	Not determined
Partition coefficient (n-octanol/water)	Not determined	
Decomposition temperature	Not determined	
Viscosity	Not determined	
Other information	No other information	

10. STABILITY AND REACTIVITY	
Reactivity	Not determined
Chemical stability	Stable under recommended storage conditions
Possibility of hazardous reactions	Hazardous polymerization will not occur
Conditions to avoid	Not determined
Incompatible materials	Strong oxidizers
Hazardous decomposition materials	Carbon monoxide, Carbon dioxide, Nitrogen oxides
11. TOXICOLOGICAL INFORMATION	
Acute toxicity	May be harmful if absorbed through the skin May be harmful if inhaled May be harmful if swallowed.
Skin corrosion/irritation	Not hazardous
Serious eye damage/irritation	Not hazardous
Respiratory or skin sensitization	Not determined
Germ cell mutagenicity	Not determined
Carcinogenicity	Not determined
Reproductive toxicity	Not determined
STOT-single exposure	May be irritating to mucous membranes and upper respiratory tract
STOT-repeated exposure	Not determined
Aspiration hazard	Not determined
RTECS No.	CF 1934200
12. ECOLOGICAL INFORMATION	
Toxicity	Not determined
Persistence and degradability	Not determined
Bioaccumulative potential	Not determined
Mobility in soil	Not determined
Results of PBT and vPvB assessment	Not determined
Other adverse effects	Not determined
13. DISPOSAL CONSIDERATIONS	
Waste treatment methods	Contact a licensed professional waste disposal service to dispose of this material Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber
List of CER codes	Allocation of the waste code numbers according EC Directive 91/692/EEC must be realized under considerations of existing sector specifics and processes
14. TRANSPORT INFORMATION	

UN Number	None
UN proper shipping name	None
Transport hazard classes	None
Packing group	None
Environmental hazards	None
Land transport (ADR/RID)	None
Onland waterway craft (ADN/ADNR)	None
Marine transport (IMDG)	None
Air transport (IATA)	None
Special precautions for user	None
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code	Not determined
No special requirements for transport according to international regulations. For more information, contact Daesang Europe b.v.	
15. REGULATORY INFORMATION	
Safety, health and environmental regulations/legislation specific for the substance or mixture	OEL=MAK NOES 1983 : HZD X5534; NIS 4; TNF 792; NOS 14; TNE 19901; TFE 14903 EPA TSCA Section 8(B) chemical inventory EPA TSCA Section 8(D) unpublished Health/Safety studies EPA TSCA Test Submission (TSCATS) Data Base, January 2001
Chemical safety assessment	Not applicable
16. OTHER INFORMATION	
This information is based on our present knowledge and is provided according to the relevant EC and national regulations. This information is intended as a characterization of the product in order to provide guidance for the relevant safety issues. However, this document does not provide any warranty, expressed or implied, regarding the properties of the product. In no event will Daesang Corp. be responsible for damages of any nature whatsoever resulting from the use of or reliance on information.	

SAFETY DATA SHEET

 Date of issue : JAN 5, 2015
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Version 02

PRODUCT	L-ARGININE Hydrochloride
CAS NO.	1119-34-2
MANUFACTURER	DAESANG Corporation

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY UNDERTAKING

Product identifier	Product name CAS number EC number Index number Registration number	L-Arginine Hydrochloride 1119-34-2 214-275-1 Not applicable Not applicable
Relevant identified uses	Applications	-
Details of the supplier	Names Address Tel/Fax Contact email	Daesang Corporation 26, Cheonho-daero, Dongdaemun-gu, Seoul, South Korea Tel: +82 2 2657 5371 & Fax: +82 2 2657 5333 bio@daesang.com
Emergency telephone no.	Telephone	+1 201 488 4010 for USA & Canada +31 20 640 6080 for Europe +82 2 2657 5371 for the rest countries

2. HAZARDS IDENTIFICATION

Classification of the substance	Physical hazards Health hazards Environmental hazards	Not applicable Not applicable Not applicable
Label elements		Not applicable
Potential effects		May cause eye and skin irritation It will increase the biological oxygen demand (BOD) of water

3. COMPOSITION INFORMATION ON INGREDIENTS

Substance	Name of substance CAS number EC number Index number Concentration	L-Arginine Hydrochloride 1119-34-2 214-275-1 - 100%
4. FIRST AID MEASURES		
Description of first aid measures	After eye contact	Flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.
	After skin contact	Immediately wash skin with soap and flush with water.
	After inhalation	Remove to fresh air If breathing becomes difficult, call a physician
	After ingestion	Wash out mouth with water provided person is conscious Call a physician
Most important symptoms and effects, both acute and delayed		Not determined
Indication of any immediate medical attention and special treatment needed		Not determined
5. FIRE FIGHTING MEASURES		
Extinguishing media		Water spray, Carbon dioxide, dry chemical powder or foam
Special hazards arising from the substance or mixture		Emits toxic fumes under fire conditions Wear self-contained breathing apparatus Equipment should be thoroughly decontaminated after use
Advice for firefighters		Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes
6. ACCIDENTAL RELEASE MEASURES		
Personal precautions, protective equipment and emergency procedures		See precautions in section 7 and 8 Wear respirator, chemical safety goggles, rubber boots and heavy rubber gloves
Environmental precautions		None
Methods and material for containment and cleaning up		Sweep up, place in a bag and hold for waste disposal Ventilate area & wash spill site after material pickup is complete
Reference to other sections		See precautions in section 7 and 8
7. HANDLING AND STORAGE		
Precautions for safe handling		Avoid raising dust Avoid inhalation Avoid contact with eyes, skin and clothing Avoid prolonged or repeated exposure

Conditions for safe storage, including any incompatibilities	Store in a cool and dry place Recommended storage temperature is 15~30°C Keep container tightly closed and inner bag sealed	
Specific end use(s)	Not applicable	
8. EXPOSURE CONTROLS / PERSONAL PROTECTION		
Control parameters	Not applicable	
Exposure controls	<u>Respiratory protection</u> : Respiratory protection required <u>Hand protection</u> : Compatible chemical-resistant gloves <u>Eye protection</u> : Chemical safety goggles <u>Body protection</u> : Safety shower and eye bath <u>Hygiene measures</u> : Wash thoroughly after handling Mechanical exhaust required.	
9. PHYSICAL AND CHEMICAL PROPERTIES		
Information of basic physical and chemical properties	Physical state	White crystal or crystalline powder
	Colour	White
	Odour	Not determined
	Odour threshold	Not determined
	pH	5.5-7.0 (0.8% solution)
	Melting point	226-230°C
	Boiling point	Not determined
	Flash point	Not determined
	Evaporation rate	Not determined
	Flammability	Not determined
	Auto flammability	Not determined
	Upper/lower flammability or explosive limits	Not determined
	Explosive properties	Not determined
	Oxidising properties	Not determined
	Vapour pressure	Not determined
	% volatile by volume	Not determined
	Vapour density	Not determined
	Relative density	Not determined
	Solubility in water	Approx. 76.0% in water (20°C)
	Other solvents	Not determined
Partition coefficient (n-octanol/water)	Not determined	
Decomposition temperature	Not determined	
Viscosity	Not determined	
Other information	No other information	

10. STABILITY AND REACTIVITY	
Reactivity	Not determined
Chemical stability	Stable under recommended storage conditions
Possibility of hazardous reactions	Hazardous polymerization will not occur
Conditions to avoid	Not determined
Incompatible materials	Strong oxidizers
Hazardous decomposition materials	Carbon monoxide, Carbon dioxide, Nitrogen oxides
11. TOXICOLOGICAL INFORMATION	
Acute toxicity	May be harmful if absorbed through the skin May be harmful if inhaled May be harmful if swallowed.
Skin corrosion/irritation	May cause skin irritation
Serious eye damage/irritation	May cause eye irritation
Respiratory or skin sensitization	Not determined
Germ cell mutagenicity	Not determined
Carcinogenicity	Not determined
Reproductive toxicity	Not determined
STOT-single exposure	May be irritating to mucous membranes and upper respiratory tract
STOT-repeated exposure	Not determined
Aspiration hazard	Not determined
RTECS No.	CF 1995500
12. ECOLOGICAL INFORMATION	
Toxicity	Not determined
Persistence and degradability	Not determined
Bioaccumulative potential	Not determined
Mobility in soil	Not determined
Results of PBT and vPvB assessment	Not determined
Other adverse effects	Not determined
13. DISPOSAL CONSIDERATIONS	
Waste treatment methods	Contact a licensed professional waste disposal service to dispose of this material Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber
List of CER codes	Allocation of the waste code numbers according EC Directive 91/692/EEC must be realized under considerations of existing sector specifics and processes
14. TRANSPORT INFORMATION	

UN Number	None
UN proper shipping name	None
Transport hazard classes	None
Packing group	None
Environmental hazards	None
Land transport (ADR/RID)	None
Onland waterway craft (ADN/ADNR)	None
Marine transport (IMDG)	None
Air transport (IATA)	None
Special precautions for user	None
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code	Not determined
No special requirements for transport according to international regulations. For more information, contact Daesang Europe b.v.	
15. REGULATORY INFORMATION	
Safety, health and environmental regulations/legislation specific for the substance or mixture	OEL=MAK NOHS 1974: HZD 81859; NIS 2; TNF 86; NOS 3; TNE 857 NOES 1983: HZD 81859; NIS 3; TNF 585; NOS 13; TNE 5477; TFE 2954 EPA TSCA SECTION 8(B) CHEMICAL INVENTORY
Chemical safety assessment	Not applicable
16. OTHER INFORMATION	
This information is based on our present knowledge and is provided according to the relevant EC and national regulations. This information is intended as a characterization of the product in order to provide guidance for the relevant safety issues. However, this document does not provide any warranty, expressed or implied, regarding the properties of the product. In no event will Daesang Corp. be responsible for damages of any nature whatsoever resulting from the use of or reliance on information.	