

SAFETY DATA SHEET

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Version 01

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

1. IDENTIFICATION OF THE SUBSTANCE AND OF THE COMPANY UNDERTAKING

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| 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 | Feed additive |
| 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

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| 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

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| 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 | | |
| Electrostatic properties | | - |
| Maximum Explosion Pressure Pmax (bar) | | 7.1 |
| Maximal Rate of Pressure Rise MRP (bar/s) | | 233 |
| Constant of the dust tested - Kmax, KST(bar.m/s) | | 63 |
| Explosion class (according to VDI recommendation): | | St-1 |
| Auto-ignition Temperature | | |
| 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 |

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| 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) | |

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| | 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 | | Hazard polymerization will not occur |
| Conditions to avoid | | Not determined |
| Incompatible materials | | Strong oxidizers |
| Hazardous decomposition materials | | Nitric oxide , Carbon monoxide and Carbon dioxide |
| 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 | | |

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| 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 |
| Proper shipping name | L-Arginine |
| 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. | |