



MATERIAL SAFETY DATA SHEET

Section 1 - Chemical Product and Company Identification

Product/Chemical Name: FUMARIC ACID

Chemical Formula: C₄H₄O₄

Molecular Weight: 116.07

CAS Number: 110-17-8

Other Designations: BUTENEDIOIC ACID, 1,2-ETHENEDICARBOXILIC ACID

Contact Information:

Company: Aurora Industry Co.,Ltd.

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Section 2 - Composition / Information on Ingredients

Ingredient Name CAS Number % wt or % vol

FUMARIC ACID 110-17-8 100%

Section 3 - Hazards Identification

Emergency Overview

Potential Health Effects

Primary Entry Routes: EYES, SKIN, INHALATION, AND INGESTION

Acute Effects

Inhalation: HAZARD IN THAT OF A NUISANCE DUST. COUGHING, SNEEZING, AND LABORED BREATHING MAY OCCUR, AND IF SYMPTOMS OF OVEREXPOSURE ARE EXPERIENCED, EVACUATE TO FRESH AIR.

Eye Contact: FUMARIC ACID DUST IS A SEVERE EYE IRRITANT.

Skin Contact: DUST MAY BE IRRITATING TO THE SKIN.

Ingestion: INGESTION OF LARGE AMOUNTS MAY CAUSE NAUSEA, VOMITING, CRAMPS, AND DIARRHEA AND MAY PRODUCE IRRITATION OF THE MOUTH AND THROAT. MODERATELY TOXIC BY SUBCUTANEOUS ROUTE.

Carcinogenicity: NDA

Medical Conditions Aggravated by Long-Term Exposure: NDA

Chronic Effects: NDA

SARA Title III Hazard Classification: IMMEDIATE HEALTH (ACUTE): NO

DELAYED HEALTH (CHRONIC): NO

FIRE: YES

SUDDEN RELEASE OF PRESSURE: NO

REACTIVE: YES

Section 4 - First Aid Measures

Inhalation: REMOVE VICTIM TO FRESH AIR IF NOT BREATHING, ADMINISTER CARDIO PULMONARY RESUSCITATION OR ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, ADMINISTER OXYGEN.

Eye: HOLD EYELIDS OPEN AND FLUSH WITH A STEADY, GENTLE STREAM OF WATER FOR AT LEAST 15 MINUTES.

Skin: WASH SKIN WITH PLENTY OF SOAP AND WATER. WASH CLOTHING BEFORE REUSE.

Ingestion: IF PATIENT IS CONSCIOUS AND ALERT, GIVE 2-3 GLASSES OF WATER OR MILK TO DRINK. IF AVAILABLE, GIVE ONE TABLESPOON OF SYRUP OF IPECAC TO INDUCE



VOMITING. IF VOMITING DOES NOT OCCUR WITHIN 20 MINUTES, THE SAME DOSE OF SYRUP OF IPECAC MAY BE REPEATED ONE ADDITIONAL TIME. ALTERNATIVELY, INDUCE VOMITING BY TOUCHING BACK OF THROAT WITH FINGER. DO NOT MAKE AN UNCONSCIOUS PERSON VOMIT.

After first aid, get appropriate in-plant, paramedic, or community medical support.

Section 5 - Fire-Fighting Measures

Flash Point: NDA

Flash Point Method: NDA

Autoignition Temperature: NDA

Flammability Classification: NDA

Extinguishing Media: NDA

Unusual Fire or Explosion Hazards: NDA

Hazardous Combustion Products: NDA

Fire-Fighting Instructions: WEAR PROTECTIVE CLOTHING AND USE SELF-CONTAINED BREATHING

APPARATUS. DIKE AREA TO PREVENT RUNOFF AND CONTAMINATION OF WATER RESOURCES.

Fire-Fighting Equipment: NDA

Section 6 - Accidental Release Measures

Spill /Leak Procedures: USE PROTECTIVE GLOVES TO AVOID SKIN CONTACT.

Large Spills: TO THE EXTENT POSSIBLE, CLEAN UP SPILLAGE USING SHOVELS.

Containment: CAREFULLY SCOOP UP LOOSE MATERIAL AND PLACE IN APPROPRIATE CONTAINERS SO AS TO AVOID DUST GENERATION. STAND CONTAINERS UP-WIND, IF POSSIBLE. IF SPILLED ON THE GROUND, THE AREA SHOULD BE SCRAPED CLEAN. DO NOT FLUSH MATERIAL TO PUBLIC WATERWAYS OR SEWER SYSTEMS. DECONTAMINATE TOOLS PROPERLY AFTER CLEANUP OF SPILLS.

REGULATORY REQUIREMENTS: FOLLOW APPLICABLE OSHA REGULATIONS.

Section 7 - Handling and Storage

Handling Precautions: FOLLOW USUAL SAFE-HANDLING PRECAUTIONS – DO NOT BREATHE DUST OR SWALLOW, AND AVOID EYE AND SKIN CONTACT

Storage Requirements: FOLLOW USUAL SAFE-STORAGE REQUIREMENTS. FUMARIC ACID MAY FORM AN EXPLOSIVE MIXTURE WITH AIR.

Storage Temperature: AMBIENT

Transport Temperature: AMBIENT

Loading/Unloading Temperature: AMBIENT

Storage/Transport Pressure: ATMOSPHERIC

Electrostatic Accumulation Hazard: YES, USE PROPER GROUNDING PROCEDURE.

Usual Shipping Containers: Truck

Material and Coatings Suitable: PLASTIC MATERIALS OF ANY KIND, STAINLESS STEEL, NICKEL RESISTANT STEEL, MONEL, EPOXY, EPOXY PHENOLICS, VITON, PROPYLENE, FLUORINATED SILICONE, NYLON 66, FLUON, CAF JOINTINGS, NATURAL & BUTYL RUBBERS, NITRILE RUBBERS, E/P COPOLYMERS, AND POLYETHYLENE.

Material and Coatings Unsuitable: CARCON & MILD STEELS, ALUMINUM, ZINC COATED STEELS.

Regulatory Requirements: FOLLOW APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS.



Section 8 - Exposure Controls / Personal Protection

Ventilation: Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

Respiratory Protection: Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or non-routine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA.

Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

Protective Clothing/Equipment: Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices.

Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

Contaminated Equipment: Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment.

Comments: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Section 9 - Physical and Chemical Properties

Physical State/Appearance: COLORLESS,

ODORLESS POWDER

Specific Gravity: 1.635 G/ML

pH (10% Solution): 2.6

Water Solubility: SOLUBLE

Melting Point: 287 °C

Bulk Density: 1.264 KG/L

Section 10 - Stability and Reactivity

Stability: FUMARIC ACID IS STABLE UNDER NORMAL HANDLING CONDITIONS, BUT DUST AND VAPOR MAY

FORM AN EXPLOSIVE MIXTURE WITH AIR.

Polymerization: WILL NOT OCCUR

Chemical Incompatibilities: NDA.

Conditions to Avoid: MAY REACT WITH STRONG OXIDIZING MATERIALS. AVOID EXCESSIVE MOISTURE AND

NITRIC ACID.

Hazardous Decomposition Products: NDA

Section 11- Toxicological Information

Toxicity Data: Eye Effects (rabbits): 100 mg/24 hr MOD TLVs: NDA

Oral (rat): LD₅₀ = 10700 MG/KG PELs: NDA

Section 12 - Ecological Information

Ecotoxicity: NDA Soil Absorption/Mobility: NDA

Environmental Fate: NDA Environmental Degradation: NDA



Section 13 - Disposal Considerations

Disposal: FOLLOW APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.

Disposal Regulatory Requirements: NDA

Container Cleaning and Disposal: NDA

Section 14 - Transport Information

DOT Transportation Data:

Transport Document Name:

FUMARIC ACID

Tremcard Product Name:

FUMARIC ACID

Packing Group:

III REGULATED BY SEA

(IMDG)

Marine Pollutant:NO

IATA/ICAO Cargo Max. Quantity/Pack:

21,000 KG (SEA SHIPMENT)

Section 15 - Regulatory Information

EPA Regulations:

RCRA Hazardous Waste Number: NDA (40 CFR 261.33)

RCRA Hazardous Waste Classification (40 CFR 261.21): NDA

CERCLA Hazardous Substance (40 CFR 302.4) listed/unlisted specific per RCRA, Sec. 3001; CWA, Sec.

311 (b)(4); CWA,

Sec. 307(a), CAA, Sec. 112

OSHA Regulations:

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): N.D.A.

OSHA Specifically Regulated Substance: NDA

Section 16 - Other Information

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