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----------ISO 9001: 2015----------

MATERIAL SAFETY DATA SHEET

1.Identification
1.1GHS Product identifier
Diethylamine, 99%
Code D 1645

2.Hazard identification
2.1Classification of the substance or mixture
Flammable liquids, Category 2
Acute toxicity - Oral, Category 4
Acute toxicity - Dermal, Category 4
Skin corrosion, Category 1A
Acute toxicity - Inhalation, Category 4
2.2GHS label elements, including precautionary statements
Pictogram(s)

Signal word	Danger
Hazard statement(s)	H225 Highly flammable liquid and vapour H302 Harmful if swallowed H312 Harmful in contact with skin H314 Causes severe skin burns and eye damage H332 Harmful if inhaled
Precautionary statement(s)	
Prevention	P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. P233 Keep container tightly closed. P240 Ground and bond container and receiving equipment. P241 Use explosion-proof [electrical/ventilating/lighting/...] equipment. P242 Use non-sparking tools. P243 Take action to prevent static discharges. P280 Wear protective gloves/protective clothing/eye protection/face protection. P264 Wash ... thoroughly after handling. P270 Do not eat, drink or smoke when using this product. P260 Do not breathe dust/fume/gas/mist/vapours/spray. P261 Avoid breathing dust/fume/gas/mist/vapours/spray. P271 Use only outdoors or in a well-ventilated area.
Response	P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower]. P370+P378 In case of fire: Use ... to extinguish. P301+P312 IF SWALLOWED: Call a POISON CENTER/doctor/\u2026if you feel unwell. P330 Rinse mouth. P302+P352 IF ON SKIN: Wash with plenty of water/... P312 Call a POISON CENTER/doctor/\u2026if you feel unwell. P321 Specific treatment (see ... on this label). P362+P364 Take off contaminated clothing and wash it before reuse. P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P363 Wash contaminated clothing before reuse. P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing. P310 Immediately call a POISON CENTER/doctor/\u2026 P305+P351+P338 IF IN EYES: Rinse cautiously with water for

	several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Storage	P403+P235 Store in a well-ventilated place. Keep cool. P405 Store locked up.
Disposal	P501 Dispose of contents/container to ...

2.3Other hazards which do not result in classification
none

3.Composition/information on ingredients
3.1Substances

Chemical name	Common names and synonyms	CAS number	EC number	Concentration
Diethylamine	Diethylamine	109-89-7	none	100%

4.First-aid measures
4.1Description of necessary first-aid measures
General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.
If inhaled
Fresh air, rest. Half-upright position. Refer immediately for medical attention.
In case of skin contact
First rinse with plenty of water for at least 15 minutes, then remove contaminated clothes and rinse again. Refer immediately for medical attention.
In case of eye contact
Rinse with plenty of water (remove contact lenses if easily possible). Refer immediately for medical attention.
If swallowed
Rinse mouth. Do NOT induce vomiting. Refer immediately for medical attention.
4.2Most important symptoms/effects, acute and delayed
Irritation and burning of eyes, skin, and respiratory system. High concentration of vapor can cause asphyxiation. (USCG, 1999)
4.3Indication of immediate medical attention and special treatment needed, if necessary
Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR as necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. /Organic bases/amines and related compounds/

5.Fire-fighting measures
5.1Extinguishing media
Suitable extinguishing media
Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical, or carbon dioxide.
5.2Specific hazards arising from the chemical
Special Hazards of Combustion Products: Vapors are irritating Behavior in Fire: Vapors are heavier than air and may travel considerable distance to a source of ignition and flash back. (USCG, 1999)
5.3Special protective actions for fire-fighters
Wear self-contained breathing apparatus for firefighting if necessary.

6.Accidental release measures
6.1Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust. For personal protection see section 8.
6.2Environmental precautions
Remove all ignition sources. Evacuate danger area! Personal protection: chemical protection suit including self-contained breathing apparatus. Do NOT let this chemical enter the environment. Do NOT wash away into sewer. Ventilation. Collect leaking liquid in sealable plastic containers. Carefully collect remainder. Then store and dispose of according to local regulations.
6.3Methods and materials for containment and cleaning up
ACCIDENTAL RELEASE MEASURES: Personal precautions, protective equipment and emergency procedures: Wear respiratory protection. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided. Methods and materials for containment and cleaning up: Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations.

7.Handling and storage
7.1Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Avoid exposure - obtain special instructions before use.Provide appropriate exhaust ventilation at places where dust is formed. For precautions see section 2.2.
7.2Conditions for safe storage, including any incompatibilities
Fireproof. Separated from strong oxidizers, strong acids, organic compounds and food and feedstuffs. Cool. Well closed. Store only in original container. Store in an area without drain or sewer access.Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Storage class (TRGS 510): Flammable liquids.

8.Exposure controls/personal protection
8.1Control parameters
Occupational Exposure limit values
Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 10 ppm (30 mg/cu m).
Recommended Exposure Limit: 15 Min Short-Term Exposure Limit: 25 ppm (75 mg/cu m).
Biological limit values
no data available
8.2Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.
8.3Individual protection measures, such as personal protective equipment (PPE)
Eye/face protection
Safety glasses with side-shields conforming to EN166. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
Skin protection
Wear impervious clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique(without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.
Respiratory protection
Wear dust mask when handling large quantities.
Thermal hazards
no data available

9.Physical and chemical properties

Physical state	Clear to slightly yellowish liquid
Colour	Colorless liquid
Odour	Fishy, ammonia-like odor
Melting point/ freezing point	-50\u00baC
Boiling point or initial boiling point and boiling range	55\u00b0C(lit.)
Flammability	Class IB Flammable Liquid: Fl.P. below 22.78\u00b0C and BP at or above 37.78\u00b0C.Flammable. Gives off irritating or toxic fumes (or gases) in a fire.
Lower and upper explosion limit / flammability limit	Lower flammable limit: 1.8% by volume; Upper flammable limit: 10.1% by volume.
Flash point	-23\u00b0C
Auto-ignition temperature	312.22\u00b0C
Decomposition temperature	no data available
pH	STRONGLY ALKALINE
Kinematic viscosity	0.319 mPa.s at 25\u00b0C; 0.239 mPa.s at 50\u00b0C
Solubility	In water:soluble
Partition coefficient n-octanol/water (log value)	log Kow = 0.58
Vapour pressure	14.14 psi (55 \u00b0C)
Density and/or relative density	0.707g/mLat 25\u00b0C(lit.)
Relative vapour density	2.5 (vs air)
Particle characteristics	no data available

10.Stability and reactivity
10.1Reactivity
no data available
10.2Chemical stability
Stable under recommended storage conditions.
10.3Possibility of hazardous reactions
A very dangerous fire hazard when exposed to heat, flame, or oxidizers.The vapour is heavier than air and may travel along the ground; distant ignition possible.DIETHYLAMINE is strongly alkaline. Incompatible with strong oxidizing agents and with strong acids. Violent reactions occur with sulfuric acid. Causes ignition on contact with cellulose nitrate. Explodes on contact with dicyanofurazan or dicyanofuroxan. Attacks some forms of plastics, rubber and coatings.
10.4Conditions to avoid
no data available
10.5Incompatible materials
Incompatible materials: Aldehydes, alcohols, dicyanofurazan, ketones, phenols, acids, halogenated hydrocarbon, oxidizing agents, epoxides.
10.6Hazardous decomposition products
When heated to decomp it emits toxic fumes of /nitrogen oxides/.

11.Toxicological information

Acute toxicity
Oral: LD50 Rat oral 540 mg/kg
Inhalation: LC50 Rat inhalation 4000 ppm/4 hr
Dermal: no data available
Skin corrosion/irritation
no data available
Serious eye damage/irritation
no data available
Respiratory or skin sensitization
no data available
Germ cell mutagenicity
no data available
Carcinogenicity
A4: Not classifiable as a human carcinogen.
Reproductive toxicity
no data available
STOT-single exposure
no data available
STOT-repeated exposure
no data available
Aspiration hazard
no data available

12.Ecological information
12.1Toxicity
Toxicity to fish: LC50; Species: Pimephales promelas (Fathead minnow) age 30 days; Conditions: flow through, 24.7\u00b0C, pH 7.71, dissolved oxygen 7.1 mg/L, hardness 48.5 mg/L CaCO3, alkalinity 49.5 mg/L CaCO3; Concentration: 855 mg/L for 96 hr /98% purity
Toxicity to daphnia and other aquatic invertebrates: LC50; Species: Daphnia magna (Water flea); Conditions: freshwater, renewal; Concentration: 56000 ug/L for 48 hr (95% confidence interval: 32000-100000 ug/L) /99% purity
Toxicity to algae: EC50; Species: Pseudokirchneriella subcapitata (Green algae); Conditions: freshwater, static; Concentration: 20000 ug/L for 96 hr; Effect: general growth
Toxicity to microorganisms: no data available
12.2Persistence and degradability
AEROBIC: Diethylamine, present at 100 mg/L, reached 69-89% of its Theoretical BOD in 4 weeks using an activated sludge inoculum at 30 mg/L in the Japanese MITI test(1). In a screening study, diethylamine at 10 ppm degraded with both an activated sludge and freshwater/sediment inoculum, 59 and 38% of the Theoretical BOD was obtained after 12 days of incubation, respectively(2). Inhibition was noted at moderate concentrations and sizeable reductions in BOD were noted at 50 ppm(2). Diethylamine was degraded slowly by activated sludge even when acclimatized (53% of Theoretical BOD was achieved after 13 days)(3). However the concentration levels used in this study could not be ascertained. When added to stream water, the maximum rate of biodegradation of diethylamine was proportional to an initial amine concentration over a concentration range from several nanograms to several milligrams per liter(4). At the highest concentration studied, 10 mg/L, the half-life of diethylamine was 0.9 days(4).
12.3Bioaccumulative potential
An estimated BCF of 3 was calculated in fish for diethylamine(SRC), using a log Kow of 0.58(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC).
12.4Mobility in soil
Using a structure estimation method based on molecular connectivity indices(1), the Koc of diethylamine can be estimated to be 27(SRC). According to a classification scheme(2), this estimated Koc value suggests that diethylamine is expected to have very high mobility in soil. The pKa of diethylamine is 11.09(3), indicating that this compound will exist entirely in cation form in the environment and cations generally adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts(4).
12.5Other adverse effects
no data available

13.Disposal considerations
13.1Disposal methods
Product
The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.
Contaminated packaging
Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

14.Transport information
14.1UN Number
ADR/RID: UN1154 IMDG: UN1154 IATA: UN1154
14.2UN Proper Shipping Name

ADR/RID: DIETHYLAMINE
IMDG: DIETHYLAMINE
IATA: DIETHYLAMINE
14.3Transport hazard class(es)
ADR/RID: 3 IMDG: 3 IATA: 3
14.4Packing group, if applicable
ADR/RID: II IMDG: II IATA: II
14.5Environmental hazards
ADR/RID: no IMDG: no IATA: no
14.6Special precautions for user
no data available
14.7Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
no data available

15.Regulatory information
15.1Safety, health and environmental regulations specific for the product in question

Chemical name	Common names and synonyms	CAS number	EC number
Diethylamine	Diethylamine	109-89-7	none
European Inventory of Existing Commercial Chemical Substances (EINECS)			Listed.
EC Inventory			Listed.
United States Toxic Substances Control Act (TSCA) Inventory			Listed.
China Catalog of Hazardous chemicals 2015			Listed.
New Zealand Inventory of Chemicals (NZIoC)			Listed.
Philippines Inventory of Chemicals and Chemical Substances (PICCS)			Listed.
Vietnam National Chemical Inventory			Listed.
Chinese Chemical Inventory of Existing Chemical Substances (China IECSC)			Listed.

Section 16: Other Information
This safety data sheet should be used in conjunction with technical sheets. It does not replace them. The information given is based on our knowledge of this product, at the time of publication. It is given in good faith. The attention of the user is drawn to the possible risks incurred by using the product for any other purpose other than that for which it was intended. This does not in any way excuse the user from knowing and applying all the regulations governing his activity. It is the sole responsibility of the user to take all precautions required in handling the product. The aim of the mandatory regulations mentioned is to help the user to fulfill his obligations regarding the use of hazardous products.