GPS Safety Summary

Substance Name:

N, N-diethylhydroxylamine

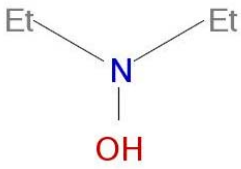
1. General Statement

N, N-diethylhydroxylamine is a colourless/light yellow liquid miscible in water. It is an amine commonly called DEHA. It is a flammable liquid.

2. Chemical Identity

Name:	N, N-diethylhydroxylamine
Brand name:	DEHA
Chemical name (IUPAC):	N-ethyl-N-hydroxyethanamine
CAS number(s):	3710-84-7
EC number:	223-055-4
Molecular formula:	$C_4H_{11}N_O$

Structure:



3. Use and applications

N, N-diethylhydroxylamine is mainly used in the following applications:

- Formulation of preparations,
- Oxygen scavenger for boilers,
- Polymer processing - Short-stopper in styrenic rubber polymerization,
- Colour stabilizer for film/photographic industry, for chemical products -fuel, resins (etc.) and for de-colourisation of phenols,
- Antioxidant for various industrial applications.

4. Physical / Chemical properties

N, N-diethylhydroxylamine is a flammable liquid organic substance having the following characteristics and physico–chemical properties:

Property	Value
Physical state	Liquid at 20°C and 1013 hPa
Colour	Colourless, light yellow
Odour	Characteristic, amines

Molecular weight	89.14 g/mol
Density	0.8689 at 20°C
Vapour pressure	5.30 hPa at 20°C
Freezing / boiling points	>-9 <-5°C / 134°C at 1013 hPa
Flammability	Flammable liquid and vapour
Flash point	49°C (closed cup)
Self-ignition temperature	265°C at 1013 hPa
Explosive / oxidizing properties	Not relevant based on its structure
Water solubility	450.5 g/L at 20°C
Dissociation constant (pK_a)	12.88 at 20°C
Octanol-water partition coefficient (Log K_{ow})	0.5 at 50°C

5. Health Effects

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	Of low toxicity by oral route. Harmful by inhalation and dermal contact
Irritation / corrosion Skin / eye / respiratory tract	Slightly irritating for the skin and the eyes. Irritating for the respiratory tract
Sensitisation	Not a skin sensitizer
Toxicity after repeated exposure Oral / inhalation / dermal	Irritation of the upper respiratory tract was the main effect observed following repeated inhalation exposure
Genotoxicity / Mutagenicity	No evidence of genetic toxicity
Carcinogenicity	Not anticipated to cause cancer under conditions of normal use
Reproductive / Developmental Toxicity	No effect was observed on fertility and foetal development in treated laboratory animals

6. Environmental Effects

The potential of N,N-diethylhydroxylamine for bioaccumulation is low. This product may persist in the environment. It is toxic to aquatic life with long lasting effects.

Effect Assessment	Result
Aquatic Toxicity	Toxic to aquatic life with long lasting effects

Fate and behaviour	Result
Biodegradation	Not readily biodegradable
Abiotic degradation	Not expected to hydrolyse
Bioaccumulation potential	Not expected to bioaccumulate
PBT / vPvB conclusion	Not considered as PBT* or vPvB**

*: Persistent, Bioaccumulative and Toxic (PBT)
**: very Persistent and very Bioaccumulative (vPvB)

7. Exposure

7.1 Human health

N, N-diethylhydroxylamine (DEHA) is manufactured, used and formulated within industrial settings. There are also professional applications.

The primary routes of industrial exposure of DEHA are skin contact and inhalation, ingestion is not an anticipated route of exposure. Workers may be exposed during cleaning, maintenance, transfer, sampling and analysis.

Some professional uses involve specific use processes such as roller application and brushing, spraying, treatment of articles, hand-mixing, etc. These processes involve higher exposure but workers are specifically trained and risks are controlled by adequate collective and individual risk management measures.

Based on the risk assessment, the exposure can be kept at a safe level (strictly below occupational exposure limits, when applied) when activities are carried out under conditions recommended in the Extended Safety Data Sheet (see Chap. 8 and Exposure Scenarios).

Procedures, controls, suitable collective and personal risk management measures, good industrial hygiene practices and risk communication through appropriate training of workers should be implemented. In case of exposure to the substance, workers should follow the first aid measures recommended in the Safety Data Sheet.

7.2 Environment

The assessment of the environmental exposure was made for all the uses and resulted life cycle stages of the substance from the manufacture to the waste stage.

DEHA is manufactured and used in continuous or batch processes within industrial settings.

Based on the risk assessment, environmental exposure can be kept at a safe level when activities are carried out under conditions recommended in the extended Safety Data Sheet (see Chap. 6, and Exposure Scenarios).

All industrial aqueous releases that may contain the substance must be treated to avoid any exposure to the environment.

Disposal, treatment or recycling of industrial waste must comply with chap. 13 of the Safety Data Sheet and applicable regulations to preserve the environment.

Procedures, controls and risk management measures should be implemented on industrial manufacturing and application sites; effluents that may contain the substance must be treated to avoid any exposure to the environment.

8. Risk Management recommendations

Human health protective measures	
Organizational	Collect the latest available Safety Data Sheet. Implement good basic standards of occupational health. Ensure operatives are well informed of the hazards and trained to minimise exposures. Handle and store according to the indications of the Safety Data Sheet.
Engineering controls	Provide appropriate local exhaust ventilation at points of emission. Ensure that eye- and handwash stations and safety showers are close to workstation locations.

Personal protective equipment	**Eye/Face protection:**	Safety glasses
	Skin protection:	At the workplace : protective clothing (cotton). Intervention at incident: combination with delayed penetration.
	Hand protection:	Splash contact, intermittent and prolonged: PVC gloves. According to permeation index EN 374: 1 (time elapsed > 10 mins).
	Respiratory protection:	High concentrations or prolonged activity: self contained Breathing Apparatus. Low concentrations or short activity: mask with specific cartridge (Recommended Filter type: A2B2E2K2P3).

Environmental protective measures
Do not release into the environment. Do not let product enter drains. Use waste water treatment systems. Do not spread sludge to soil. Neutralize with a sodium bisulphate solution. Destroy the product by incineration (in accordance with local and national regulations) (see chap. 13 of the Safety Data Sheet).

9. Regulatory Information / Classification and Labelling

9.1 Regulatory Information

This substance has been registered under:

- EU Regulation EC 1907/2006 (REACH)

9.2 Classification and labelling

Under GHS (Globally Harmonized System of classification and labelling of chemicals), substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and safety data sheets. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use. Substances registered for REACH are classified according to Regulation (EC) 1272/2008, implementation of the GHS in the European Union.

Classification and labelling according to Regulation (EC) n° 1272/2008:

Classification
– Flammable liquids: Category 3 – Acute toxicity – Dermal: Category 4 – Acute toxicity – Inhalation: Category 4 – Specific target organ toxicity - single exposure (inhalation): Category 3 – Chronic aquatic toxicity: Category 2

Labelling
Hazard pictogram(s)

Signal word
— Warning
Hazard statement(s)
— H226: Flammable liquid and vapour. — H312: Harmful in contact with skin. — H332: Harmful if inhaled. — H335: May cause respiratory irritation. — H411: Toxic to aquatic life with long lasting effects.

Classification and labelling according to GHS:

Classification
— Flammable liquids: Category 3 — Acute toxicity – Dermal: Category 4 — Acute toxicity – Inhalation: Category 4 — Acute toxicity – Oral: Category 5 — Specific target organ toxicity - single exposure (inhalation): Category 3 — Chronic aquatic toxicity: Category 2 — Acute aquatic toxicity: Category 2
Labelling
Hazard pictogram(s)

Signal word
— Warning
Hazard statement(s)
— H226: Flammable liquid and vapour. — H312: Harmful in contact with skin. — H332: Harmful if inhaled. — H303: May be harmful if swallowed. — H335: May cause respiratory irritation. — H411: Toxic to aquatic life with long lasting effects. — H401: Toxic to aquatic life.

10. Contact Information within Company

For further information on this substance or product safety summary in general, please contact:

- arkema-thiochem-reach-uses@arkema.com
- **ICCA portal where the GPS Safety Summary is posted**: http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/

11. Date of Issues / Revision

- Date of issue: 2014/11/30
- Date of revision:

12. Disclaimer

The information contained in this paper is intended as advice only and whilst the information is provided in utmost good faith and has been based on the best information currently available, is to be relied upon at the user's own risk.

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