

GPS Safety Summary

Substance Name:

Hydrazine hydrate

1. General Statement

Hydrazine hydrate is a colourless liquid highly soluble in water. It is an aqueous solution containing 64% of Hydrazine.

The substance is marketed as hydrate form and is covered by the registration of the anhydrous form.

2. Chemical Identity

Name:	Hydrazine hydrate
Brand names:	Hydrazine hydrate 100%
Chemical name (IUPAC):	Hydrazine hydrate
CAS number(s):	7803-57-8 (Registered substance under Reach: 302-01-2 Hydrazine)
EC number:	206-114-9 (Hydrazine)
Molecular formula:	H ₆ N ₂ O
Structure:	



3. Use and applications

Hydrazine Hydrate is widely used as intermediate for the synthesis of active ingredients in Agrochemicals and Pharmaceuticals and for the manufacturing of various derivatives as well. The other main applications are the treatment of effluent and waste water in industrial boilers.

4. Physical / Chemical properties

Hydrazine hydrate is a liquid organic substance having the following characteristics and physico-chemical properties:

Property	Value
Physical state	liquid at 20°C and 1013 hPa
Colour	colourless
Odour	ammoniacal
Molecular weight	50.06 g/mol
Density	1.030 at 25°C

Vapour pressure	12 hPa at 25°C
Freezing / boiling points	-51.7°C / 120°C at 1013hPa
Flammability	Combustible liquid
Flash point	> 60°C (closed cup)
Self-ignition temperature	290°C at 1001 hPa
Explosive properties	Not explosive
Oxidizing properties	Not relevant based on its structure
Water solubility	Completely soluble at 20°C
Dissociation constant (pK _a)	6.05 at 20°C
Octanol-water partition coefficient (Log K _{ow})	Hydrazine: - 0.16

5. Health Effects

Hydrazine is well absorbed after oral, dermal or inhalation administration. It is distributed evenly in the body tissue after administration. Only the kidney reveals higher concentrations than other organs. The concentration of hydrazine in the blood decreases rapidly and is excreted to about 50 % unchanged in the urine. In addition to nitrogen eliminated through the lung, hydrazine metabolites appearing in the urine are mainly acetyl hydrazine, diacetylhydrazine, 1,4,5,6 tetrahydro-6 -oxo-3-pyridazine and pyruvate hydrazine and urea (BUA 1996).

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	Toxic by oral route, dermal contact and by inhalation exposure.
Irritation / corrosion Skin / eye/ respiratory tract	May cause skin burns, serious damage to the eyes and irritation to the respiratory tract.
Sensitisation	May cause skin sensitisation.
Toxicity after repeated exposure Oral / inhalation / dermal	No significant systemic toxicity following repeated inhalation administration while local irritation to the respiratory tract is recorded.
Genotoxicity / Mutagenicity	Not classified as a genotoxic.
Carcinogenicity	The substance is classified as a carcinogen Cat 1 B following chronic exposure by the inhalation or oral routes.
Reproductive / Developmental Toxicology	No effects were observed on fertility and foetal development in treated laboratory rats

6. Environmental Effects

Based on available data for the substance, hydrazine is very toxic to aquatic organisms. Biotic degradation processes can be neglected as hydrazine is an inorganic compound and cannot serve as energy supply for microorganisms. But there is evidence that hydrazine will be rapidly degraded in the environment and thus can be considered as not persistent.

Effect Assessment	Result
Aquatic Toxicity	Very toxic to aquatic organisms

Fate and behaviour	Result
Biodegradation	Not relevant (inorganic).
Other degradation (optional)	Mainly abiotically degraded through oxidative pathways when released in the aquatic, terrestrial and atmospheric compartment.
Bioaccumulation potential	Not expected.
PBT / vPvB conclusion	Not considered to be PBT or vPvB.

7. Exposure

7.1 Human health

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

The major use of hydrazine hydrate is as an intermediate handled under strictly controlled conditions as described in Article 18(3) of the REACH regulation.

For the other uses of hydrazine hydrate (not as intermediate handled under strictly controlled conditions), an exposure assessment and risk characterization have been carried out.

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 and 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

Regarding the uses not as intermediate handled under strictly controlled conditions, 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.

Hydrazine hydrate 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 measures	
Organizational	Collect the latest available Safety Data Sheet. Implement good basic standards of occupational health practices. 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.
Protection	Eye/Face protection: Safety glasses with side-shields, face-shield
	Skin and body protection: Protective clothing (cotton), boots
	Hand protection: Gloves tested to EN374:1 neoprene, nitrile rubber, butyl rubber
	Respiratory protection: High concentrations or prolonged activity: Self contained Breathing Apparatus Low concentrations or short activity: Respirator with a gas filter Full mask. Recommended Filter type: Filter type K
Environment 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. Elimination: Destroy the product by oxidation (see chap. 6 of the Safety Data Sheet).	

9. Regulatory Information / Classification and Labelling

9.1 Regulatory Information

The anhydrous form of the substance has been registered under:

- EU Regulation EC 1907/2006 (REACH)

9.2 Classification and labelling

Under GHS substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the eSDS. 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 CLP (EC) 1272/2008, implementation of the GHS in the European Union.

Classification
According to REGULATION (EC) no 1272/2008: Hydrazine hydrate: <ul style="list-style-type: none">– Acute toxicity - Inhalation: Category 2– Acute toxicity - Dermal: Category 3– Acute toxicity- Oral: Category 3– Skin corrosion: Category 1B– Eye irritation: Category 1– Skin sensitisation: Category 1A

<ul style="list-style-type: none"> – Carcinogenicity: Category 1B – Acute aquatic toxicity: Category 1 – Chronic aquatic toxicity: Category 1 	
Signal word	
Danger	
Pictogram	
– GHS06: skull and crossbones	
– GHS08: health hazard	
– GHS05: corrosion	
– GHS09: environment	
Hazard statement	
Hydrazine hydrate: <ul style="list-style-type: none"> – H311 : Toxic in contact with skin. – H330 : Fatal if inhaled. – H301 : Toxic if swallowed. – H314 : Causes severe skin burns and eye damage. – H317 : May cause an allergic skin reaction. – H350 : May cause cancer. – H410 : Very toxic to aquatic life with long lasting effects. 	
Alternative classification according to Globally Harmonized System (GHS)	
Hydrazine hydrate: <ul style="list-style-type: none"> – Flammable liquid: Category 4, H227 : Combustible liquid – Acute toxicity – Oral: Category 3, H301 : Toxic if swallowed. – Acute toxicity - Dermal: Category 3, H311 : Toxic in contact with skin. – Acute toxicity - Inhalation: Category 2, H330 : Fatal if inhaled. – Skin corrosion, Category 1B, H314 : Causes severe skin burns and eye damage. – Serious eye damage, Category 1, H318 : Causes serious eye damage. – Skin sensitisation, Category 1A, H317 : May cause an allergic skin reaction. – Carcinogenicity, Category 1B, H350 : May cause cancer. – Acute aquatic toxicity, Category 1, H400 : Very toxic to aquatic life. – Chronic aquatic toxicity, Category 1, H410 : Very toxic to aquatic life with long lasting effects. 	

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: 2014/10/31
- Date of revision:

12. Disclaimer

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