ACR44920

# Hydrazine monohydrate

## SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

**产品说明:** **水合肼 (62%)**
**Product Description:** **Hydrazine monohydrate**

**Cat No. :** **449200000; 449200025; 449200500; 449202500**
**CAS No** 7803-57-8
**Molecular Formula** H4N2.H2O

**Supplier**

**UK entity/business name**
Fisher Scientific UK
Bishop Meadow Road,
Loughborough, Leicestershire LE11 5RG, United Kingdom

**EU entity/business name**
Thermo Fisher Scientific
Janssen Pharmaceuticalaan 3a, 2440 Geel, Belgium

**Emergency Telephone Number**

For information **US** call: 001-800-227-6701 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
**CHEMTREC** Tel. No. **US:**001-800-424-9300 / **Europe:**001-703-527-3887

**E-mail address** begel.sdsdesk@thermofisher.com

**Recommended Use** Laboratory chemicals.
**Uses advised against** No Information available

## SECTION 2. HAZARD IDENTIFICATION

| **Physical State** | **Appearance** | **Odor** |
|---|---|---|
| Liquid | Colorless | Ammonia-like |

**Emergency Overview**

Combustible liquid. Toxic if swallowed. Toxic in contact with skin. Causes severe skin burns and eye damage. May cause an allergic skin reaction. Fatal if inhaled. May cause cancer. Very toxic to aquatic life with long lasting effects. Air sensitive.

**Classification of the substance or mixture**

| | |
|---|---|
| Flammable liquids. | Category 4 |
| Acute Oral Toxicity | Category 3 |
| Acute Dermal Toxicity | Category 3 |
| Acute Inhalation Toxicity - Vapors | Category 2 |
| Skin Corrosion/Irritation | Category 1 B |
| Serious Eye Damage/Eye Irritation | Category 1 |
| Skin Sensitization | Category 1 |
| Carcinogenicity | Category 1B |
| Acute aquatic toxicity | Category 1 |
| Chronic aquatic toxicity | Category 1 |

**Label Elements**

**Signal Word** **Danger**

**Hazard Statements**
H227 - Combustible liquid
H314 - Causes severe skin burns and eye damage
H317 - May cause an allergic skin reaction
H330 - Fatal if inhaled
H350 - May cause cancer
H410 - Very toxic to aquatic life with long lasting effects
H301 + H311 - Toxic if swallowed or in contact with skin

**Precautionary Statements**
**Prevention**
P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P264 - Wash face, hands and any exposed skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P272 - Contaminated work clothing should not be allowed out of the workplace
P280 - Wear protective gloves
P284 - Wear respiratory protection
**Response**
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor
P330 - Rinse mouth
P331 - Do NOT induce vomiting
P370 + P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish
P362 + P364 - Take off contaminated clothing and wash it before reuse
**Storage**
P403 + P233 - Store in a well-ventilated place. Keep container tightly closed
P405 - Store locked up
**Disposal**
P501 - Dispose of contents/ container to an approved waste disposal plant

**Physical and Chemical Hazards**
Combustible material.
**Health Hazards**
Toxic if swallowed. Toxic in contact with skin. Corrosive. Causes skin and eye burns. May cause an allergic skin reaction. Fatal if inhaled. May cause cancer.
**Environmental hazards**
Very toxic to aquatic life with long lasting effects. Will likely be mobile in the environment due to its water solubility. The product is water soluble, and may spread in water systems.

**Other Hazards**

This product does not contain any known or suspected endocrine disruptors.

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Component | CAS No | Weight % |
|---|---|---|
| Hydrazine | 302-01-2 | - |
| Hydrazine monohydrate | 7803-57-8 | >95 |

## SECTION 4. FIRST AID MEASURES

**General Advice**
Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

**Eye Contact**
Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

**Skin Contact**
Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

**Inhalation**
If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Remove to fresh air. Immediate medical attention is required.

**Ingestion**
Do NOT induce vomiting. Call a physician or poison control center immediately.

**Most important symptoms and effects**
Causes burns by all exposure routes. May cause allergic skin reaction. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

**Self-Protection of the First Aider**
Use personal protective equipment as required.

**Notes to Physician**
Treat symptomatically.

## SECTION 5. FIRE-FIGHTING MEASURES

**Suitable Extinguishing Media**
Use:. Dry chemical. Carbon dioxide ($CO_2$). Water spray. Alcohol resistant foam. Water mist may be used to cool closed containers. $CO_2$, dry chemical, dry sand, alcohol-resistant foam.

**Extinguishing media which must not be used for safety reasons**
No information available.

**Specific Hazards Arising from the Chemical**
Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes. Combustible material. Containers may explode when heated. Do not allow run-off from fire-fighting to enter drains or water courses.

**Protective Equipment and Precautions for Firefighters**
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

## SECTION 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautions**
Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Remove all sources of ignition. Take precautionary measures against static discharges.

**Environmental Precautions**
Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

**Methods for Containment and Clean Up**
Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition.

Refer to protective measures listed in Sections 8 and 13.

## SECTION 7. HANDLING AND STORAGE

**Handling**
Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance. Keep away from open flames, hot surfaces and sources of ignition.

**Storage**
Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks and flame. Store under an inert atmosphere. Corrosives area.

**Specific Use(s)**
Use in laboratories

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Control Parameters**

| Component | China | Taiwan | Thailand | Hong Kong |
|---|---|---|---|---|
| Hydrazine | TWA: 0.06 mg/m³<br>STEL: 0.13 mg/m³<br>Skin | TWA: 0.1 ppm<br>TWA: 0.13 mg/m³ | TWA: 1 ppm | TWA: 0.01 ppm<br>TWA: 0.013 mg/m³ |

| Component | ACGIH TLV | OSHA PEL | NIOSH | The United Kingdom | European Union |
|---|---|---|---|---|---|
| Hydrazine | TWA: 0.01 ppm<br>Skin | (Vacated) TWA: 0.1 ppm<br>(Vacated) TWA: 0.1 mg/m³<br>Skin<br>TWA: 1 ppm<br>TWA: 1.3 mg/m³ | IDLH: 50 ppm<br>Ceiling: 0.03 ppm<br>Ceiling: 0.04 mg/m³ | STEL: 0.03 ppm 15 min<br>STEL: 0.039 mg/m³ 15 min<br>TWA: 0.01 ppm 8 hr<br>TWA: 0.013 mg/m³ 8 hr<br>Carc.<br>Skin | TWA: 0.013 mg/m³ (8h)<br>TWA: 0.01 ppm (8h)<br>Skin |

*Legend*

*ACGIH - American Conference of Governmental Industrial Hygienists*
*OSHA - Occupational Safety and Health Administration*
*NIOSH: NIOSH - National Institute for Occupational Safety and Health*

**Monitoring methods**
MDHS 86 Hydrazine in air. Laboratory method using sampling either onto acid-coated glass fibre filters followed by solvent desorption or into specially constructed impingers. Final analysis by derivatisation and HPLC BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents. MDHS70 General methods for sampling airborne gases and vapours

**Exposure Controls**

**Engineering Measures**
Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas. Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source.

**Personal protective equipment**

**Eye Protection** Goggles (European standard - EN 166)

**Hand Protection** Protective gloves

| Glove material | Breakthrough time | Glove thickness | EU standard | Glove comments |
|---|---|---|---|---|
| Nitrile rubber | > 480 minutes | 0.38 mm | Level 6 | As tested under EN374-3 Determination of |
| Neoprene | > 480 minutes | 0.45 mm | EN 374 | Resistance to Permeation by Chemicals |
| Butyl rubber | > 480 minutes | 0.35 mm | | |
| Viton (R) | > 480 minutes | 0.3 mm | | |

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

**Skin and body protection** Long sleeved clothing

**Respiratory Protection** When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.
To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly

**Large scale/emergency use** Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced
**Recommended Filter type:** Particulates filter conforming to EN 143 Ammonia and organic ammonia derivatives filter Type K Green conforming to EN14387

**Small scale/Laboratory use** Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
**Recommended half mask:-** Valve filtering: EN405; or; Half mask: EN140; plus filter, EN 141
When RPE is used a face piece Fit Test should be conducted

**Hygiene Measures** When using do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing.

**Environmental exposure controls** Prevent product from entering drains. Do not allow material to contaminate ground water system. Local authorities should be advised if significant spillages cannot be contained.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

| | | |
|---|---|---|
| **Appearance** | Colorless | |
| **Physical State** | Liquid | |
| **Odor** | Ammonia-like | |
| **Odor Threshold** | No data available | |
| **pH** | 12.0 | Alkaline |
| **Melting Point/Range** | -51.7 °C / -61.1 °F | |
| **Softening Point** | No data available | |
| **Boiling Point/Range** | 118 °C / 244.4 °F | |
| **Flash Point** | 75 °C / 167 °F | **Method -** No information available |

| | | |
|---|---|---|
| **Evaporation Rate** | No information available | |
| **Flammability (solid,gas)** | Not applicable | Liquid |
| **Explosion Limits** | **Lower** 3.4 vol% | |
| | **Upper** 100 vol% | |
| **Vapor Pressure** | 10mbar @ 20 deg C | |
| **Vapor Density** | No information available | (Air = 1.0) |
| **Specific Gravity / Density** | No data available | |
| **Bulk Density** | Not applicable | Liquid |
| **Water Solubility** | Miscible | |
| **Solubility in other solvents** | No information available | |
| **Partition Coefficient (n-octanol/water)** | | |
| **Component** | **log Pow** | |
| Hydrazine | -0.16 | |
| Hydrazine monohydrate | 1.1 | |
| **Autoignition Temperature** | No data available | |
| **Decomposition Temperature** | No data available | |
| **Viscosity** | 1.50 mPa s @ 20 deg C | |
| **Explosive Properties** | | explosive air/vapour mixtures possible |
| **Oxidizing Properties** | No information available | |

| | |
|---|---|
| **Molecular Formula** | H4N2.H2O |
| **Molecular Weight** | 50.06 |

## SECTION 10. STABILITY AND REACTIVITY

**Stability** Do not allow evaporation to dryness. Air sensitive.

**Hazardous Reactions** None under normal processing.

**Hazardous Polymerization** Hazardous polymerization does not occur.

**Conditions to Avoid** Incompatible products. Excess heat. Exposure to air. Keep away from open flames, hot surfaces and sources of ignition.

**Materials to avoid** Strong oxidizing agents. Acids. Metals. copper. Halogens. Peroxides.

**Hazardous Decomposition Products** Ammonia. Nitrogen oxides (NOx). Hydrogen.

## SECTION 11. TOXICOLOGICAL INFORMATION

**Product Information**

**(a) acute toxicity;**

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|---|---|---|---|
| Hydrazine | LD50 = 60 mg/kg ( Rat ) | LD50 = 91 mg/kg ( Rabbit ) | 570 ppm ( Rat ) 4 h<br>0.75 mg/L ( Rat ) 4 h |
| Hydrazine monohydrate | LD50 = 169 mg/kg ( Rat ) | | |

**(b) skin corrosion/irritation;** Category 1 B

**(c) serious eye damage/irritation;** Category 1

**(d) respiratory or skin sensitization;**

**Respiratory** Based on available data, the classification criteria are not met

**Skin** Category 1

May cause sensitization by skin contact

**(e) germ cell mutagenicity;** Based on available data, the classification criteria are not met

**(f) carcinogenicity;** Category 1B

The table below indicates whether each agency has listed any ingredient as a carcinogen

| Component | EU | UK | Germany | IARC |
|---|---|---|---|---|
| Hydrazine | Carc Cat. 1B | | Cat. 2 | Group 2A |

**(g) reproductive toxicity;** Based on available data, the classification criteria are not met

**(h) STOT-single exposure;** Based on available data, the classification criteria are not met

**(i) STOT-repeated exposure;** Based on available data, the classification criteria are not met

**Target Organs** None known.

**(j) aspiration hazard;** Based on available data, the classification criteria are not met

**Symptoms / effects,both acute and delayed** Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

## SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity effects** Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

| Component | Freshwater Fish | Water Flea | Freshwater Algae | Microtox |
|---|---|---|---|---|
| Hydrazine | LC50: 0.28 - 1.34 mg/L, 96h static (Poecilia reticulata)<br>LC50: 1.81 - 2.79 mg/L, 96h flow-through (Pimephales promelas)<br>LC50: = 1.17 mg/L, 96h (Lepomis macrochirus)<br>LC50: 0.54 - 1.31 mg/L, 96h static (Lepomis macrochirus)<br>LC50: 0.7 - 1.3 mg/L, 96h flow-through (Lepomis macrochirus) | | EC50: = 0.006 mg/L, 72h static (Pseudokirchneriella subcapitata)<br>EC50: = 0.071 mg/L, 72h (Pseudokirchneriella subcapitata)<br>EC50: = 0.02 mg/L, 96h static (Pseudokirchneriella subcapitata) | EC50 = 0.01 mg/L 15 min<br>EC50 = 0.01 mg/L 20 min<br>EC50 = 0.02 mg/L 5 min |

**Persistence and Degradability**

**Persistence** Persistence is unlikely.

**Degradation in sewage treatment plant** Contains substances known to be hazardous to the environment or not degradable in waste water treatment plants.

**Bioaccumulative Potential** Bioaccumulation is unlikely

| Component | log Pow | Bioconcentration factor (BCF) |
|---|---|---|

| | | |
|---|---|---|
| Hydrazine | -0.16 | No data available |
| Hydrazine monohydrate | 1.1 | No data available |

**Mobility in soil** The product is water soluble, and may spread in water systems Will likely be mobile in the environment due to its water solubility Highly mobile in soils

**Endocrine Disruptor Information** This product does not contain any known or suspected endocrine disruptors
**Persistent Organic Pollutant** This product does not contain any known or suspected substance
**Ozone Depletion Potential** This product does not contain any known or suspected substance

## SECTION 13. DISPOSAL CONSIDERATIONS

**Waste from Residues/Unused Products** Should not be released into the environment. Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.

**Contaminated Packaging** Dispose of this container to hazardous or special waste collection point.

**Other Information** Do not flush to sewer. Waste codes should be assigned by the user based on the application for which the product was used. Do not empty into drains. Large amounts will affect pH and harm aquatic organisms. Solutions with high pH-value must be neutralized before discharge. Do not let this chemical enter the environment.

## SECTION 14. TRANSPORT INFORMATION

**Road and Rail Transport**

**UN-No** UN2030
**Proper Shipping Name** HYDRAZINE AQUEOUS SOLUTION
**Hazard Class** 8
**Subsidiary Hazard Class** 6.1
**Packing Group** II

**IMDG/IMO**

**UN-No** UN2030
**Proper Shipping Name** HYDRAZINE, AQUEOUS SOLUTION
**Hazard Class** 8
**Subsidiary Hazard Class** 6.1
**Packing Group** II

**IATA**

**UN-No** UN2030
**Proper Shipping Name** HYDRAZINE, AQUEOUS SOLUTION
**Hazard Class** 8
**Subsidiary Hazard Class** 6.1
**Packing Group** II

**Special Precautions for User** No special precautions required

## SECTION 15. REGULATORY INFORMATION

**International Inventories**
China, X = listed, Australia, U.S.A. (TSCA), Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Australia (AICS), Korea (KECL), China (IECSC), Japan (ENCS), Philippines (PICCS).

| Component | The Inventory of Hazardous Chemicals (2015 Edition) | List of dangerous goods GB 12268 - 2012 | TCSI | IECSC | EINECS | TSCA | DSL | PICCS | ENCS | ISHL | AICS | KECL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hydrazine | X | X | X | X | 206-114-9 | X | X | X | X | X | X | KE-19981 |
| Hydrazine monohydrate | - | - | X | X | - | - | - | X | X | | X | KE-05-0709 |

| Component | Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification | Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements |
|---|---|---|
| Hydrazine | 0.5 tonne | 2 tonne |

**National Regulations**

| Component | Toxic Chemical Substances Control Act |
|---|---|
| Hydrazine<br>302-01-2 ( - ) | Class IV (1 wt%) |

## SECTION 16. OTHER INFORMATION

**Creation Date** 19-Apr-2010
**Revision Date** 12-Apr-2024
**Revision Summary** Not applicable.

**Training Advice**
Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.
First aid for chemical exposure, including the use of eye wash and safety showers.
Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.
Chemical incident response training.

**Legend**

**CAS** - Chemical Abstracts Service

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory

**EINECS/ELINCS** - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances

**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List

**PICCS** - Philippines Inventory of Chemicals and Chemical Substances

**ENCS** - Japanese Existing and New Chemical Substances

**IECSC** - Chinese Inventory of Existing Chemical Substances

**AICS** - Australian Inventory of Chemical Substances

**KECL** - Korean Existing and Evaluated Chemical Substances

**NZIoC** - New Zealand Inventory of Chemicals

**WEL** - Workplace Exposure Limit

**TWA** - Time Weighted Average

**ACGIH** - American Conference of Governmental Industrial Hygienists

**IARC** - International Agency for Research on Cancer

**DNEL** - Derived No Effect Level

**PNEC** - Predicted No Effect Concentration

**RPE** - Respiratory Protective Equipment

**LD50** - Lethal Dose 50%

**LC50** - Lethal Concentration 50%

**EC50** - Effective Concentration 50%

**NOEC** - No Observed Effect Concentration

**POW** - Partition coefficient Octanol:Water

**PBT** - Persistent, Bioaccumulative, Toxic

**vPvB** - very Persistent, very Bioaccumulative

**ICAO/IATA** - International Civil Aviation Organization/International Air Transport Association

**IMO/IMDG** - International Maritime Organization/International Maritime Dangerous Goods Code

**ADR** - European Agreement Concerning the International Carriage of Dangerous Goods by Road

**MARPOL** - International Convention for the Prevention of Pollution from Ships

**OECD** - Organisation for Economic Co-operation and Development

**ATE** - Acute Toxicity Estimate

**BCF** - Bioconcentration factor

**VOC** - (Volatile Organic Compound)

**Key literature references and sources for data**

https://echa.europa.eu/information-on-chemicals
Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

**Disclaimer**

**The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text**

## End of Safety Data Sheet