**SAFETY DATA SHEET**

according to Regulation (EC) No 1907/2006 (REACH) as amended

**Hydrazine hydrate 24% water solution**

<table>
<thead>
<tr>
<th>Creation date</th>
<th>Revision date</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26. September 2019</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**SECTION 1: Identification of the substance/mixture and of the company/undertaking**

1.1. **Product identifier**

Hydrazine hydrate 24% water solution

mixture

1.2. **Relevant identified uses of the substance or mixture and uses advised against**

Mixture's intended use: Chemical production, analytical chemistry, laboratory synthesis, industrial applications.

Mixture uses advised against: The product should not be used in ways other than those referred in Section 1.

1.3. **Details of the supplier of the safety data sheet**

Supplier:

- Name or trade name: Ing. Petr Švec - PENTA s.r.o.
- Address: Radiová 1122/1, Praha 10, 102 00 Czech Republic
- Identification number (CRN): 02096013
- VAT Reg No: CZ02096013
- Phone: +420 226 060 681
- E-mail: info@pentachemicals.eu
- Web address: www.pentachemicals.eu

Competent person responsible for the safety data sheet:

- Name: Ing. Petr Švec - PENTA s.r.o.
- E-mail: info@pentachemicals.eu

1.4. **Emergency telephone number**

National Health Service (NHS) 111
National poisoning information centre Scotland, NHS 24: 111

**SECTION 2: Hazards identification**

2.1. **Classification of the substance or mixture**

Classification of the mixture in accordance with Regulation (EC) No 1272/2008

The mixture is classified as dangerous.

- Acute Tox. 4, H302+H312
- Skin Corr. 1B, H314
- Skin Sens. 1, H317
- Eye Dam. 1, H318
- Acute Tox. 3, H331
- Carc. 1B, H350
- Aquatic Acute 1, H400
- Aquatic Chronic 1, H410

Full text of all classifications and hazard statements is given in the section 16.

**Most serious adverse effects on human health and the environment**

Causes severe skin burns and eye damage. May cause an allergic skin reaction. May cause cancer. Toxic if inhaled. Causes serious eye damage. Harmful if swallowed or in contact with skin. Very toxic to aquatic life. Very toxic to aquatic life with long lasting effects.
SAFETY DATA SHEET
according to Regulation (EC) No 1907/2006 (REACH) as amended

Hydrazine hydrate 24% water solution

2.2. Label elements

Hazard pictogram

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

Precautionary statements

Obtain special instructions before use.
Avoid release to the environment.
Wear protective gloves/protective clothing/eye protection/face protection.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Immediately call a doctor.

2.3. Other hazards

Mixture does not contain any substance meet the criteria for PBT or vPvB in accordance with Annex XIII of Regulation (EC) No. 1907/2006 (REACH) as amended.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Chemical characterization
Mixture of substances and additives specified below.

Mixture contains these hazardous substances and substances with the highest permissible concentration in the working environment

<table>
<thead>
<tr>
<th>Identification numbers</th>
<th>Substance name</th>
<th>Content in % weight</th>
<th>Classification according to Regulation (EC) No 1272/2008</th>
<th>Note.</th>
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<tbody>
<tr>
<td>Index: 007-008-00-3</td>
<td>Hydrazine hydrate solution</td>
<td>24-26</td>
<td>Flam. Liq. 3, H226 Acute Tox. 3, H301+H311+H331 Skin Corr. 1B, H314 Skin Sens. 1, H317 Eye Dam. 1, H318 Carc. 1B, H350 Aquatic Acute 1, H400, M=10 Aquatic Chronic 1, H410, M=10 Specific concentration limit: Skin Irrit. 2, H315: 3 % ≤ C &lt; 10 % Skin Corr. 1B, H314: C ≥ 10 % Eye Irrit. 2, H319: 3 % ≤ C &lt; 10 %</td>
<td></td>
</tr>
</tbody>
</table>

CAS: 10217-52-4
EC: 206-114-9
Registration number: 01-2119492624-31

Full text of all classifications and hazard statements is given in the section 16.
SECTION 4: First aid measures

4.1. Description of first aid measures

Take care of your own safety. If any health problems are manifested or if in doubt, inform a doctor and show him information from this safety data sheet. If unconscious, put the person in the stabilized (recovery) position on his side with his head slightly bent backwards and make sure that airways are free; never induce vomiting. If the person vomits by himself, make sure that the vomit is not inhaled. In life threatening conditions first of all provide resuscitation of the affected person and ensure medical assistance. Respiratory arrest - provide artificial respiration immediately. Cardiac arrest - provide indirect cardiac massage immediately.

If inhaled
Take care of your own safety, do not let the affected person walk! Terminate the exposure immediately; move the affected person to fresh air. Beware of the contaminated clothes. Depending on the situation, call the medical rescue service and ensure medical treatment considering the frequent need of further observation for at least 24 hours.

If on skin
Remove contaminated clothes. Take off any rings, watches, bracelets before or during washing if worn in the contaminated areas of the skin. Depending on the situation, call the medical rescue service and always ensure medical treatment. Rinse contaminated areas with a flow of water, lukewarm at best, for 10-30 minutes; do not use any brush, soap or neutralizers. Rinse skin with water/shower. Rinse cautiously with water for several minutes.

If in eyes
Rinse eyes immediately with a flow of running water, open the eyelids (also using force if needed); remove contact lenses immediately if worn by the affected person. No neutralization should be performed in any case! Rinsing should be continued for 10-30 minutes from the inner to the outer eye corner to make sure that the other eye is not involved. Depending on the situation, call medical rescue service or ensure medical treatment as promptly as possible. Everyone must be referred for treatment even if affected only a little.

If swallowed
INDUCE VOMITING! Vomiting should be induced in the person only if conscious, within 1 hour from ingestion. If in doubt whether vomiting should be induced, contact the Toxicological Information Centre and give information about the substances or composition of the product as provided on the original packaging or in the safety data sheet of the product. FOLLOWING INGESTION OF TOXIC OR HIGHLY TOXIC SUBSTANCES, GIVE 10-20 CRUSHED TABLETS OF ACTIVATED CARBON, MIXED IN WATER, WITHIN NO LATER THAN 5 MINUTES - irrespective of whether vomiting could be induced. Call medical rescue service.

4.2. Most important symptoms and effects, both acute and delayed

If inhaled
Inhaling vapours can cause corrosion of the breathing system.

If on skin
Causes severe skin burns. May cause an allergic skin reaction.

If in eyes
Causes serious eye damage.

If swallowed
Corrosion of the digestion system can occur.

4.3. Indication of any immediate medical attention and special treatment needed

Symptomatic treatment.
SAFETY DATA SHEET
according to Regulation (EC) No 1907/2006 (REACH) as amended

Hydrazine hydrate 24% water solution

SECTION 5: Firefighting measures
5.1. Extinguishing media
Suitable extinguishing media
- Alcohol-resistant foam
- Carbon dioxide
- Powder
- Water spray jet
- Water mist

Unsuitable extinguishing media
- Water - full jet

5.2. Special hazards arising from the substance or mixture
In the event of fire, carbon monoxide, carbon dioxide and other toxic gases may arise. Inhalation of hazardous degradation (pyrolysis) products may cause serious health damage.

5.3. Advice for firefighters
- Self-Contained Breathing Apparatus (SCBA) with a chemical protection suit only where personal (close) contact is likely.
- Use a self-contained breathing apparatus and full-body protective clothing.
- Do not allow run-off of contaminated fire extinguishing material to enter drains or surface and ground water.

SECTION 6: Accidental release measures
6.1. Personal precautions, protective equipment and emergency procedures
- Use personal protective equipment for work. Follow the instructions in the Sections 7 and 8.
- Do not inhale aerosols.
- Prevent contact with skin and eyes.

6.2. Environmental precautions
- Do not allow to enter drains. Prevent contamination of the soil and entering surface or ground water.

6.3. Methods and material for containment and cleaning up
- Spilled product should be covered with suitable (non-flammable) absorbing material (sand, diatomaceous earth, earth and other suitable absorption materials); to be contained in well closed containers and removed as per the Section 13.
- In the event of leakage of the substantial amount of the product, inform fire brigade and other competent bodies.
- After removal of the product, wash the contaminated site with plenty of water. Do not use solvents.

6.4. Reference to other sections
- See the Section 7, 8 and 13.

SECTION 7: Handling and storage
7.1. Precautions for safe handling
- Prevent formation of gases and vapours in concentrations exceeding the occupational exposure limits. Do not inhale aerosols.
- Prevent contact with skin and eyes.
- Contaminated work clothing should not be allowed out of the workplace. Obtain special instructions before use. Do not eat, drink or smoke when using this product.
- Wash hands and exposed parts of the body thoroughly after handling.
- Do not handle until all safety precautions have been read and understood.
- Use only outdoors or in a well-ventilated area.
- Use personal protective equipment as per Section 8.
- Observe valid legal regulations on safety and health protection.
- Avoid release to the environment.

7.2. Conditions for safe storage, including any incompatibilities
- Store in tightly closed containers in cold, dry and well ventilated areas designated for this purpose.
- Store locked up.
- Keep container tightly closed.

7.3. Specific end use(s)
- not available

SECTION 8: Exposure controls/personal protection
8.1. Control parameters
- none
8.2. Exposure controls

Follow the usual measures intended for health protection at work and especially for good ventilation. This can be achieved only by local suction or efficient general ventilation. Do not eat, drink and smoke during work. Wash your hands thoroughly with water and soap after work and before breaks for a meal and rest.

Eye/face protection

Protective goggles or face shield (based on the nature of the work performed).

Skin protection

Hand protection: Protective gloves resistant to the product. When choosing appropriate thickness, material and permeability of the gloves, observe recommendations of their particular manufacturer. Observe other recommendations of the manufacturer. Other protection: protective workwear. Contaminated skin should be washed thoroughly.

Respiratory protection

Use insulating breathing apparatus when the exposition limits of the substances are exceeded or at the place with insufficient ventilation.

Thermal hazard

Not available.

Environmental exposure controls

Observe usual measures for protection of the environment, see Section 6.2. Collect spillage.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Appearance</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
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</tr>
<tr>
<td>color</td>
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<tr>
<td>Odour</td>
<td>characteristic</td>
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<td>Initial boiling point and boiling range</td>
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<td>Flash point</td>
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<td>Evaporation rate</td>
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<td>Flammability (solid, gas)</td>
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<td>Upper/lower flammability or explosive limits</td>
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<tr>
<td>explosive limits</td>
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<td>Vapour pressure</td>
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<td>Vapour density</td>
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<td>Relative density</td>
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<td>Solubility(ies)</td>
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<td>soluble</td>
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<td>solubility in fats</td>
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<tr>
<td>Partition coefficient: n-octanol/water</td>
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<tr>
<td>Auto-ignition temperature</td>
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<tr>
<td>Decomposition temperature</td>
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<td>Viscosity</td>
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<tr>
<td>Explosive properties</td>
<td>data not available</td>
</tr>
<tr>
<td>Oxidising properties</td>
<td>data not available</td>
</tr>
</tbody>
</table>

9.2. Other information

| Density            | 1.01 g/cm³ at 20 °C |
| ignition temperature | data not available |
SECTION 10: Stability and reactivity

10.1. Reactivity
not available

10.2. Chemical stability
The product is stable under normal conditions.

10.3. Possibility of hazardous reactions
Unknown.

10.4. Conditions to avoid
The product is stable and no degradation occurs under normal use. Protect against flames, sparks, overheating and against frost.

10.5. Incompatible materials
Protect against strong acids, bases and oxidizing agents.

10.6. Hazardous decomposition products
Not developed under normal uses. Dangerous outcomes such as carbon monoxide and carbon dioxide are formed at high temperature and in fire.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
No toxicological data is available for the mixture.

Acute toxicity
Toxic if inhaled. Harmful if swallowed or in contact with skin.

Skin corrosion/irritation
Causes severe skin burns and eye damage.

Serious eye damage/irritation
Causes severe skin burns and eye damage. Causes serious eye damage.

Respiratory or skin sensitisation
May cause an allergic skin reaction.

Germ cell mutagenicity
Based on available data the classification criteria are not met.

Carcinogenicity
May cause cancer.

Reproductive toxicity
Based on available data the classification criteria are not met.

Toxicity for specific target organ - single exposure
Based on available data the classification criteria are not met.

Toxicity for specific target organ - repeated exposure
Based on available data the classification criteria are not met.

Aspiration hazard
Inhalation of solvent vapors above values exceeding exposure limits for working environment may result in acute inhalation poisoning, depending on the level of concentration and exposure time. Based on available data the classification criteria are not met.
SAFETY DATA SHEET  
according to Regulation (EC) No 1907/2006 (REACH) as amended

**Hydrazine hydrate 24% water solution**

SECTION 12: Ecological information

12.1. **Toxicity**
   
   **Acute toxicity**
   Very toxic to aquatic life with long lasting effects.

12.2. **Persistence and degradability**
   Data not available.

12.3. **Bioaccumulative potential**
   Not available.

12.4. **Mobility in soil**
   Not available.

12.5. **Results of PBT and vPvB assessment**
   Product does not contain any substance meeting the criteria for PBT or vPvB in accordance with the Annex XIII of Regulation (EC) No 1907/2006 (REACH) as amended.

12.6. **Other adverse effects**
   Not available.

SECTION 13: Disposal considerations

13.1. **Waste treatment methods**
   Hazard of environmental contamination; dispose of the waste in accordance with the local and/or national regulations. Proceed in accordance with valid regulations on waste disposal. Any unused product and contaminated packaging should be put in labelled containers for waste collection and submitted for disposal to a person authorised for waste removal (a specialized company) that is entitled for such activity. Do not empty unused product in drainage systems. The product must not be disposed of with municipal waste. Empty containers may be used at waste incinerators to produce energy or deposited in a dump with appropriate classification. Perfectly cleaned containers can be submitted for recycling.

   **Waste management legislation**

SECTION 14: Transport information

14.1. **UN number**
   UN 3293

14.2. **UN proper shipping name**
   HYDRAZINE, AQUEOUS SOLUTION

14.3. **Transport hazard class(es)**
   6.1 Toxic substances

14.4. **Packing group**
   III - substances presenting low danger

14.5. **Environmental hazards**
   not available

14.6. **Special precautions for user**
   Reference in the Sections 4 to 8.

14.7. **Transport in bulk according to Annex II of Marpol and the IBC Code**
   not available
SAFETY DATA SHEET
according to Regulation (EC) No 1907/2006 (REACH) as amended

Hydrazine hydrate 24% water solution

Additional information

Hazard identification No.
60

UN number
3293

Classification code
T4

Safety signs
6.1+hazardous for the environment

Marine transport - IMDG
EmS (emergency plan)
F-E, S-D

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

15.2. Chemical safety assessment
not available

SECTION 16: Other information

A list of standard risk phrases used in the safety data sheet
H226 Flammable liquid and vapour.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H331 Toxic if inhaled.
H350 May cause cancer.
H400 Very toxic to aquatic life.
H410 Very toxic to aquatic life with long lasting effects.
H301+H311+H331 Toxic if swallowed, in contact with skin or if inhaled.
H302+H312+H332 Harmful if swallowed or in contact with skin.

Guidelines for safe handling used in the safety data sheet
P280 Wear protective gloves/protective clothing/eye protection/face protection.
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 doctor.
P201 Obtain special instructions before use.
P273 Avoid release to the environment.

Other important information about human health protection
The product must not be - unless specifically approved by the manufacturer/importer - used for purposes other than as per the Section 1. The user is responsible for adherence to all related health protection regulations.

Key to abbreviations and acronyms used in the safety data sheet
ADR European agreement concerning the international carriage of dangerous goods by road
BCF Bioconcentration Factor
SAFETY DATA SHEET

Hydrazine hydrate 24% water solution

Creation date: 26. September 2019
Revision date: 
Version: 1.0

CAS  Chemical Abstracts Service
CLP  Regulation (EC) No 1272/2008 on classification, labelling and packaging of substance and mixtures
DNEL  Derived no-effect level
EC  Identification code for each substance listed in EINECS
EC50  Concentration of a substance when it is affected 50% of the population
EINECS  European Inventory of Existing Commercial Chemical Substances
EmS  Emergency plan
EU  European Union
IATA  International Air Transport Association
IBC  International Code For The Construction And Equipment of Ships Carrying Dangerous Chemicals
IC50  Concentration causing 50% blockade
ICAO  International Civil Aviation Organization
IMDG  International Maritime Dangerous Goods
INCI  International Nomenclature of Cosmetic Ingredients
ISO  International Organization for Standardization
IUPAC  International Union of Pure and Applied Chemistry
LC50  Lethal concentration of a substance in which it can be expected death of 50% of the population
LD50  Lethal dose of a substance in which it can be expected death of 50% of the population
LOAEC  Lowest observed adverse effect concentration
LOAEL  Lowest observed adverse effect level
log Kow  Octanol-water partition coefficient
MARPOL  International Convention for the Prevention of Pollution From Ships
NOAEC  No observed adverse effect concentration
NOAEL  No observed adverse effect level
NOEC  No observed effect concentration
NOEL  No observed effect level
OEL  Occupational Exposure Limits
PBT  Persistent, Bioaccumulative and Toxic
PNEC  Predicted no-effect concentration
ppm  Parts per million
REACH  Registration, Evaluation, Authorisation and Restriction of Chemicals
RID  Agreement on the transport of dangerous goods by rail
UN  Four-figure identification number of the substance or article taken from the UN Model Regulations
UVCB  Substances of unknown or variable composition, complex reaction products or biological materials
VOC  Volatile organic compounds
vPvB  Very Persistent and very Bioaccumulative

Acute Tox.  Acute toxicity
Aquatic Acute  Hazardous to the aquatic environment
Aquatic Chronic  Hazardous to the aquatic environment
Carc.  Carcinogenicity
Eye Dam.  Serious eye damage
Flam. Liq.  Flammable liquid
Skin Corr.  Skin corrosion
Skin Sens.  Skin sensitization

Training guidelines
Inform the personnel about the recommended ways of use, mandatory protective equipment, first aid and prohibited ways of handling the product.
SAFETY DATA SHEET
according to Regulation (EC) No 1907/2006 (REACH) as amended

Hydrazine hydrate 24% water solution

Recommended restrictions of use
not available

Information about data sources used to compile the Safety Data Sheet

More information
Classification procedure - calculation method.

Statement
The safety data sheet provides information aimed at ensuring safety and health protection at work and environmental protection. The provided information corresponds to the current status of knowledge and experience and complies with valid legal regulations. The information should not be understood as guaranteeing the suitability and usability of the product for a particular application.