GPS Safety Summary

Nitric acid

Chemical Identity

Name: Nitric acid
CAS number: 7697-37-2
Molecular formula: HNO₃

Structure

OH

NO₂

IUPAC name:
Nitric acid

BASF brand names:
Nitric acid

For synonyms see end of document

Product Uses

One of the biggest uses of nitric acid in industry is the production of ammonium nitrate for the fertilizer industry. It is used in organic synthesis to introduce the nitro-group into a molecule. Also, as nitric acid is a strong oxidizer, it is widely used for extraction and purification of metals from their respective ores. Further industrial and professional uses include distribution of the substance, including re-packaging, loading, sampling, formulation of mixtures by dilution or reaction (precursors to fertilizers, metal and non-metal surface treatment products, and industrial cleaning products), use as an intermediate in synthesis of a wide range of inorganic and organic chemical substances, use in cleaning products (cleaning fluids on its own or in formulation), use as a surface treatment product (electronic and semiconductor industry, metal cleaner, degreaser, descaler, plastic surface treatment), use as processing aid in industry, including laboratory applications, such as pH regulator, as neutralization agent and as oxidizing agent.
Benefits

Nitric acid is a strong acid and an oxidizing agent. As such, it is an important raw material for the chemical and pharmaceutical industry. Nitric acid is used in the fertilizer industry, as nitrating agent for the production of organic nitro compounds, for cleaning and etching metallic and non-metallic surfaces, and for the production of pure nitrates. BASF supplies both, chemical and technical pure nitric acid in various grades, always meeting highest quality standards.

Health Information

Human Health Safety Assessment
Note: The information contained in the table below may be useful to someone handling the concentrated substance such as a manufacturer or transporter. Consumers are not likely to come in contact with the concentrated substance. The data, while verifiable, are not intended to be comprehensive nor replace the data found in the (M)SDS.

<table>
<thead>
<tr>
<th>Effect Assessment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Toxicity</td>
<td>The toxicity of the product is based on its corrosivity.</td>
</tr>
<tr>
<td>Irritation</td>
<td>Highly corrosive! Damages skin and eyes.</td>
</tr>
<tr>
<td>Sensitization</td>
<td>Not considered to be sensitizing after skin contact.</td>
</tr>
<tr>
<td>Mutagenicity</td>
<td>Not considered to be mutagenic.</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>Not considered to be carcinogenic.</td>
</tr>
<tr>
<td>Toxicity after repeated exposure</td>
<td>After repeated administration the prominent effect is the induction of corrosion.</td>
</tr>
<tr>
<td>Toxicity for reproduction</td>
<td>Not considered to be toxic for reproduction.</td>
</tr>
</tbody>
</table>

Environmental Information

Environment Safety Assessment
Note: The information in this chapter is intended to provide brief and general information of this substance’s environmental impact. The results in the table below refer to testing performed with the concentrated substance. The data contained in this section explain the relative effect of the concentrated substance on the environment, as defined by certain tests.
Effect Assessment | Result
--- | ---
Aquatic Toxicity | With high probability acutely not harmful to aquatic organisms.
Persistence and degradability | Inorganic substance, therefore biodegradation testing is not applicable.
Bioaccumulation potential | Accumulation in organisms is not to be expected.

Physical/Chemical Properties

Phys/Chem Safety Assessment

- Nitric acid is a colorless inorganic liquid. It is non-flammable and non-explosive. However, being a very strong acid, nitric acid solutions which are at least 20% concentrated are corrosive to metals. Furthermore, nitric acid solutions of at least 5% are oxidizing, and may intensify fire.

*Note: The results in the table below refer to testing performed with the concentrated substance. It is not intended to be comprehensive or to replace information found in the (M)SDS.*

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Melting / freezing point</td>
<td>-41.15 °C</td>
</tr>
<tr>
<td>Boiling point</td>
<td>82.85 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Flammability</td>
<td>Non-flammable</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Non-explosive</td>
</tr>
<tr>
<td>Self-ignition temperature</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

Exposure Potential

- **Workplace exposure:** Nitric acid is a corrosive substance. For the handling of corrosive substances and formulations immediate dermal contacts occur only occasionally and accidentally (e.g. splashes, etc) as wearing of gloves is mandatory. Ocular exposure could be possible due to hand-eye contact. Generally, ocular exposure is prevented as wearing of gloves and goggles are required. Additionally, effective control measures are in place.
to prevent dermal, eye or inhalation exposure. Furthermore, protective clothing and
 gloves are considered to be used consistently when handling corrosive substances. Each
manufacturing facility should have a thorough training program for employees and
appropriate work processes, as well as safety equipment in place to limit unnecessary
exposure. Safety showers and eye-wash stations should be accessible nearby. Workers
should follow the recommended safety measures in the extended Safety Data Sheet
(eSDS).

- **Consumer exposure**: Nitric acid is used i.e. in cleaning agents and fertilizers. The
  concentration of nitric acid in consumer products is generally low (< 5%); therefore nitric
  acid does not pose any hazard to the consumer. However, carefully read and follow the
instructions given on product labels for proper use.

- **Environmental exposure**: Due to the inorganic nature of the chemical biodegradation is
  per definition not possible. Nitric acid is with high probability not acutely harmful to
  aquatic life and it does not accumulate in the food chain. Nevertheless, the substance
  can lead to pH changes in aquatic environments and thus an exposure assessment has
  been performed to show that aquatic organisms are sufficiently protected concerning
  pH changes induced by nitric acid. Conclusively, all identified uses are safe for the
  environment based on the scientific facts summarized above and when carried out in
  compliance with recommended risk management measures and applicable regulations.

**Recommended Handling Measures**

*The recommended safety measures generally apply in contact with the concentrated substance.*

*It is NOT intended to replace the comprehensive guidance found in the (M)SDS, only supplement
it. Please refer to the (M)SDS for specific safety and first aid measures.*

When using concentrated chemicals always make sure that there is adequate ventilation. Always
use appropriate chemical resistant gloves to protect your hands and skin and always
wear eye protection such as chemical goggles. Do not eat, drink, or smoke where chemicals are
handled, processed, or stored. Wash hands and skin following contact. If the substance gets into
your eyes, rinse eyes thoroughly for at least 15 minutes with tap water and seek medical
attention. For specific advice please consult the corresponding (Material) Safety Data Sheet of
the substance.

All effluent releases that may include the substance must be directed to a (municipal) waste
water treatment plant that removes the substance from the final releases to the receiving water.
Regulatory Information / Classification and Labeling

Under GHS substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the (M)SDS. 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.

*Note: The hazard statements and symbols presented here refer to the hazard properties of the concentrated substance and are meant to provide a brief overview of the substance’s labeling. It is not intended to be comprehensive or to replace information found in the (M)SDS.*

Labeling according to UN GHS
UN GHS is the basis for country specific GHS labeling

Signal word:
Danger

Hazard statements:
H314: Causes severe skin burns and eye damage.
H290: May be corrosive to metals.
H272: May intensify fire; oxidizer.

Additional information

1. IFA GESTIS-database on hazardous substances
   http://www.dguv.de/ifa/en/gestis/stoffdb/index.jsp

2. Information on registered substance (ECHA)

3. BASF Homepage
   http://www.inorganics.basf.com/ca/internet/en/content/Produkte/Basischemikalien/Sal	petersaeure
Most commonly used synonyms

» Nitric acid (8Cl, 9Cl)
» Nitryl hydroxide
» Hydrogen nitrate
» Azotic acid
» Nitric acid (HONO2)
» Nitric acid t.p. 87%
» Nitric Acid technical grade 21%
» Nitric Ac.EG 100%

Disclaimer

This Product Safety Summary is intended to provide a general overview of the chemical substance. It contains basic information and is not intended to provide emergency response information, medical information or treatment information. The summary cannot be relied on to provide in-depth safety and health information. In-depth safety and health information must be obtained from the Material Safety Data Sheet ((M)SDS) for the chemical substance.

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Contact

For further information on this substance or GPS safety summaries in general, please contact: info.gps@basf.com