GPS Safety Summary

Acrylonitrile

Chemical Identity

**Name:** Acrylonitrile

**CAS number:** 107-13-1

**Molecular formula:** C₃H₃N

**IUPAC name:** Acrylonitrile

**BASF brand names:**
- Acrylnitril
- Fumigrain
- Ventox
- Vinylcyanide

For synonyms see end of document

Product Uses

The largest use of acrylonitrile is the production of acrylic and modacrylic textile fibers. These fibres are used in clothing, domestic furnishing and other industrial purposes such as a precursor to carbon fibres, concrete reinforcement fibres and asbestos replacement.

The second essential use of ACN are acrylonitrile-butadiene-styrene (ABS) and styrene-acrylonitrile (SAN) plastics. Special types of products and in particular special grades strongly depend on the technology in manufacturing. To name only a few, the following main types should be mentioned:

SAN Polymers and SAN Lateces are based on Copolymers of ACN with styrene production. There are:

- Graft polymerizations: In the presence of the polybutadiene latex, a styrene acrylonitrile monomer mixture is graft polymerized by means of anionic emulsifiers
Resin polymerization: The resin component is produced via emulsion polymerization of styrene or alpha-methyl styrene and acrylonitrile.

ABS plastics: ABS plastic consists of a homogeneous physical mixture of a butadiene-acrylonitrile-styrene (ABS) graft polymer and a styrene-acrylonitrile (SAN) copolymer. ABS is placed on the market as plastic granulate which is ready for processing.

ACN is being used in the synthesis of polymer-modified Polyetherols, so called graft polyols. These types of polymers are used as polyols in the manufacturing of Polyurethanes, in particular lexibles foam with high load bearing.

Last but not least, ACN is used as laboratory reagent for the synthesis of many fine chemicals.

Benefits

The products derived from Acrylonitril are huge in volume and very diversified in their applications, covering almost the whole range of plastics in all essential market segments. The benefits of the final products are so manifold, that one could say, without these kind of products: No mobile phone, no TV, no PC, no automotive and transport applications, no train, no cars, no metro, no credit cards, and ........

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><strong>Acute Toxicity</strong></td>
<td>Of high toxicity after single ingestion.  Of high toxicity after short-term skin contact.  Of high toxicity after short-time inhalation.</td>
</tr>
<tr>
<td><strong>Irritation</strong></td>
<td>Irritating to skin.  May cause severe damage to the eyes.  Causes temporary irritation of the respiratory tract.</td>
</tr>
<tr>
<td><strong>Sensitization</strong></td>
<td>Sensitization after skin contact possible.</td>
</tr>
</tbody>
</table>
Mutagenicity
The substance was mutagenic in various test systems with microorganisms, mammalian cell culture and mammals.

Carcinogenicity
The substance caused cancer in animal studies, however the relevance of these finding for the worker exposure can not be finally addressed.

Toxicity after repeated exposure
After repeated exposure the prominent effect is local irritation. Based on the chemical structure a neurotoxic effect by repeated administration cannot be excluded.

Toxicity for reproduction
Animal studies gave no indication of a fertility impairing effect at doses which were not toxic to the parental animals. The potential to cause toxicity to development cannot be excluded at maternally toxic doses.

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.

<table>
<thead>
<tr>
<th>Effect Assessment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic Toxicity</td>
<td>Toxic to aquatic life. Long lasting adverse effects to aquatic life.</td>
</tr>
<tr>
<td>Bioaccumulation potential</td>
<td>Not bioaccumulative.</td>
</tr>
</tbody>
</table>

Physical/Chemical Properties

Phys/Chem Safety Assessment

- Acrylonitrile is a clear and colorless liquid with a pungent odor. The substance is highly flammable.
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>-83.5 °C</td>
</tr>
<tr>
<td>Boiling point</td>
<td>77.3 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>0 °C</td>
</tr>
<tr>
<td>Flammability</td>
<td>Highly flammable</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>Non-explosive</td>
</tr>
<tr>
<td>Self-ignition temperature</td>
<td>481°C</td>
</tr>
</tbody>
</table>

Exposure Potential

- **Workplace exposure:** Exposure can occur either in an acrylonitrile manufacturing facility or in the various industrial or manufacturing facilities that use acrylonitrile. Those working with acrylonitrile in manufacturing operations could be exposed during maintenance, sampling, testing, or other procedures. 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:** Acrylonitrile is used for the production of fibers and plastics as well as for the production of nitrile rubbers. There is no intended use of the pure substance for the general public. The concentration of unreacted acrylonitrile in consumer products is generally low; therefore acrylonitrile does not pose any hazard to the consumer. However, carefully read and follow the instructions given on product labels for proper use.

- **Environmental exposure:** Acrylonitrile is not readily but inherently biodegradable and it does not accumulate in organisms. It is however biodegradable after extended adaptation in sewage treatment plants. Although acrylonitrile is acutely toxic and has long lasting adverse effects in aquatic life, a risk for the environment is considered to be negligible. This was demonstrated in an exposure assessment that resulted in releases that do not pose a risk to aquatic or terrestrial organisms. 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:
H225: Highly flammable liquid and vapor.
H301: Toxic if swallowed.
H311: Toxic in contact with skin.
H315: Causes skin irritation.
H317: May cause an allergic skin reaction.
H318: Causes serious eye damage.
H331: Toxic if inhaled.
H335: May cause respiratory irritation.
H350: May cause cancer.
H361: Suspected of damaging fertility or the unborn child.
H401: Toxic to aquatic life.
H411: Toxic to aquatic life with long lasting effects.

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)

   http://esis.jrc.ec.europa.eu/

Most commonly used synonyms

» 2-Propenenitrile
» Cyanoethene
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