GPS Safety Summary

Substance Name:

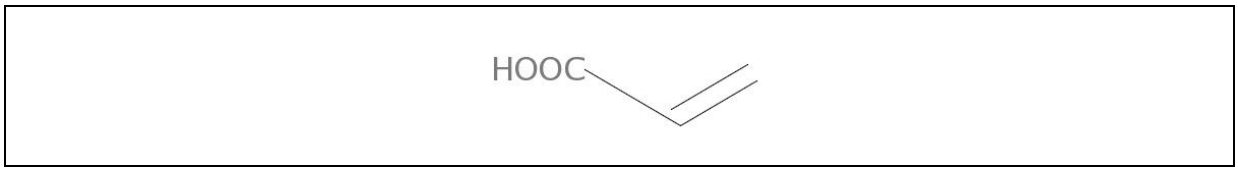
Acrylic acid

1. General Statement

Acrylic acid is a highly reactive material that will readily polymerise if not properly controlled by inhibitors. It is mostly used as a chemical intermediate to produce other acrylic monomers (acrylates, acrylic salts) and also as a building block to produce homo- and co-polymers. The resulting materials are ingredients used in coatings, elastomers, water treatment, leather finishing, detergents, hygiene products, adhesives/sealants, thickeners, surfactants, fibres, plastics, textiles and inks.

2. Chemical Identity

Name:	Acrylic acid
Brand names:	NORSOCRYL® AA
Chemical name (IUPAC):	Prop-2-enoic acid
CAS number:	79-10-7
EC number:	201-177-9
Molecular formula:	$C_3H_4O_2$
Structure:	



3. Use and applications

Acrylic acid has two main industrial uses:

- **Use as a chemical intermediate**:
  Acrylic acid is mainly transformed into a variety of other chemicals, including other monomers such as acrylic salts or acrylic esters (such as methyl acrylate, ethyl acrylate, butyl acrylate and 2-ethylhexyl acrylate). After polymerisation, these ingredients are used in:
  - hygienic product with superabsorbent polymers;
  - water-based paints and coatings;
  - construction adhesives and pressure-sensitive adhesives;
  - coatings for textiles, wood and paper;
  - leather finishing, particularly for nubuck and suede;
  - manufacture of various plastics;
  - manufacture of fibres of both woven and non-woven textiles.

- **Use as monomer for polymerisation:**
  The homo- or copolymers derived from Acrylic acid are used in:
  - hygienic products and detergents;
  - waste water treatment chemicals.

Acrylic acid is not sold to consumers.

4. Physical / Chemical properties

Acrylic acid is a flammable liquid organic substance with the following physicochemical properties:

Property	Value
Physical state	Liquid at 20°C and 1013 hPa
Colour	Colourless
Odour	Acrid, pungent
Molecular weight	72.1 g/mol
Density	1.05 g/cm^3 at 20°C
Vapour pressure	5.29 hPa at 25°C
Freezing / boiling points	13°C / 141°C at 1013 hPa
Flash point – flammability	48.5°C at 1013 hPa – flammable liquid and vapour
Self-ignition temperature	438°C at 1013 hPa
Explosive / oxidizing properties	Not expected based on structure
Dissociation constant (pK_a)	pK_a = 4.3 at 25°C
Water solubility	~ 1 kg/L at 25°C
Octanol-water partition coefficient (Log K_{ow})	0.46 at 25°C

5. Health Effects

Acrylic acid is a hazardous chemical which should be handled with care. The low odour threshold serves as a good warning property.

Effect Assessment	Results
Acute Toxicity Oral / inhalation / dermal	Based on animal studies, acrylic acid is considered harmful if swallowed or inhaled. Swallowing can result in severe gastrointestinal irritation or ulceration and burns of the mouth and throat. Skin contact can result in skin irritation or burns. Vapour concentrations attainable at room temperature are not immediately hazardous, however, exposures of an hour or more can lead to injury or death.
Irritation / corrosion Skin / eye/ respiratory tract	Causes severe skin irritation with local redness, swelling and chemical burns and destruction of tissues. Liquid can cause severe irritation and serious damage to eyes, even blindness. Vapour or mists are severely irritating to the respiratory tract.
Sensitisation	Does not cause an allergic skin reaction.

Toxicity after repeated exposure Oral / inhalation / dermal	The predominant effect is local irritation. The degree of irritation depends on the concentration of the product and the duration of exposure. Does not cause toxicity to internal organs after repeated exposure in animal studies.
Genotoxicity / Mutagenicity	Based on the available test data, not expected to cause genetic effects.
Carcinogenicity	Did not cause tumours in long term animal studies.
Reproductive / Developmental Toxicity	Did not cause birth defects or adverse reproductive effects or damage to reproductive organs in laboratory animals.

6. Environmental Effects

Acrylic acid has a pK_a value of 4.0 so its anionic form is predominating under normal environmental conditions.

Among aquatic organisms, Acrylic acid is very toxic to algae while invertebrates and fish are much less sensitive to it.

Acrylic acid is unlikely to persist in the environment since it biodegrades rapidly in sewage treatment plants and soil. It is not expected to bind significantly to soil or sediment. If released to air, photochemical degradation is expected to occur within days. It is not expected to accumulate in the food chain, *i.e*., the bioaccumulative potential is low.

Effect Assessment	Result
Aquatic Toxicity	Acute: very toxic; Chronic: toxic

Fate and behaviour	Result
Biodegradation	Readily biodegradable
Bioaccumulation potential	Not expected to bioaccumulate
PBT / vPvB conclusion	Not considered to be PBT* or vPvB**

*: Persistent, Bioaccumulative and Toxic (PBT)
**: very Persistent and very Bioaccumulative (vPvB)

7. Exposure

7.1 Human health

Consumers:

Consumers are not directly exposed to Acrylic acid because it is transformed into other substances present in consumer products.

Indirect exposure via the environment is negligible due to the biodegradability and low bioaccumulative potential.

Workers:

Acrylic acid is industrially manufactured and used in closed systems in a continuous or batch process, minimizing the occupational exposure potential. Workers may be exposed during cleaning, maintenance, transfer, sampling and analysis.

Procedures, controls, collective and personal risk management measures are in place, which limit the occupational exposure during the manufacture and use of the substance. Workers who might accidentally come into contact with the undiluted substance should follow the safety measures recommended in the Extended Safety Data Sheet.

Based on the risk assessment, the risk is controlled when activities are carried out under conditions recommended in the Extended Safety Data Sheet (see Chap. 8 and Exposure Scenarios).

7.2 Environment

Acrylic acid is industrially manufactured and used in closed systems in a continuous or batch process, minimizing release to the environment. Potential releases may occur via wastewater and exhaust gases.

Procedures, controls and risk management measures are in place, which limit the environmental exposure.

The main expected release compartment is the water compartment due to the high water solubility. Any released amount would rapidly biodegrade in waste water treatment plants. Release to the atmosphere is expected to be negligible due to the low volatility. Partition to soil and sediments is expected to be negligible.

Based on the risk assessment, the risk is controlled when activities are carried out under conditions recommended in the Extended Safety Data Sheet (see Chap. 8 and Exposure Scenarios).

8. Risk Management recommendations

<table>
<tr><th colspan="3">Human health measures</th></tr>
<tr><td>Organizational</td><td colspan="2">Collect the latest available Safety Data Sheet.
Implement good basic standards of occupational hygiene.
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.</td></tr>
<tr><td>Engineering controls</td><td colspan="2">Provide appropriate local exhaust ventilation at points of emission.
Ensure that eye- and handwash stations and safety showers are close to workstation locations.</td></tr>
<tr><td rowspan="4">Protection</td><td>Eye/Face protection:</td><td>Tightly fitting safety goggles</td></tr>
<tr><td>Skin protection:</td><td>Protective suit</td></tr>
<tr><td>Hand protection:</td><td>Neoprene gloves tested to EN374</td></tr>
<tr><td>Respiratory protection:</td><td>Respirator conforming to EN 140 with type A filter if ventilation is insufficient</td></tr>
<tr><th colspan="3">Environment protective measures</th></tr>
<tr><td colspan="3">Do not release into the environment. Do not let product enter drains. Incinerate any waste. Use waste water treatment systems. Do not spread sludge to soil.</td></tr>
</table>

9. Regulatory Information / Classification and Labelling

9.1 Regulatory Information

This substance has notably been registered and assessed under:

- EU Regulation EC 1907/2006 (REACH)
- OECD SIDS (Screening Information Data Set) program

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	
– Flammable liquids: Category 3. – Acute toxicity - Inhalation: Category 4. – Acute toxicity - Dermal: Category 4. – Acute toxicity - Oral: Category 4. – Skin corrosion: Category 1A. – Serious eye damage: Category 1. – Specific target organ toxicity - single exposure (inhalation): Category 3. – Acute aquatic toxicity: Category 1. – Chronic aquatic toxicity: Category 2.	
Signal word	
Danger	
Pictograms	
– GHS02: Flame	
– GHS05: Corrosion	
– GHS07: Exclamation mark	
– GHS09: Environment	

Hazard statements
— H226: Flammable liquid and vapour. — H332: Harmful if inhaled. — H312: Harmful in contact with skin. — H302: Harmful if swallowed. — H314: Causes severe skin burns and eye damage. — H335: May cause respiratory irritation. — H400: Very toxic to aquatic life. — H411: 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:

— **ICCA portal where the GPS Safety Summary is posted**: http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/

— Arkema-acrylics-reach-uses@arkema.com

11. Date of Issues / Revision

— Date of issue: 2012-08-30

— Date of revision:

12. Disclaimer

The information contained in this paper is intended as advice only and whilst the information is provided in utmost good faith and has been based on the best information currently available, is to be relied upon at the user's own risk.

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