

GPS Product Safety Summary

Acetic anhydride

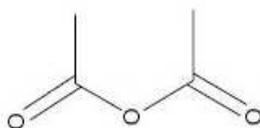
General Statement

This safety summary is provided within the scope of ICCA Global Product Strategy (GPS) and is not intended to give in-depth safety and health information and does not replace the Safety Data Sheet (SDS) of the chemical substance. GPS summaries are not intended for use in the management of emergencies by professionals.

Acetic anhydride is a colorless, combustible liquid with a pungent acetic acid odor. It is used primarily as a chemical intermediate, but is also marketed as solvent. This substance is used in industrial settings and in laboratories. When reacted it is not regenerated in use. Because it is reactive and readily hydrolyzed, its presence in end use products is not possible and exposure to consumers is therefore not applicable.

Chemical identity

EC Name:	Acetic anhydride
EC-No. :	203-564-8
CAS-No. :	108-24-7
IUPAC name:	Acetic anhydride
Molecular formula:	C ₄ H ₆ O ₃
Structural formula:	



Uses and applications

Acetic anhydride is primarily manufactured for captive use in production of acetyl cellulose, acetylsalicylic acid, acetanilide, nitrofurane, sulfonamides, vitamin B6 and related products, but is also marketed as solvent.

Physico-chemical properties

Acetic anhydride is a colorless liquid with pungent odor. Acetic anhydride is classified as a flammable liquid and vapor based on its physico-chemical properties (REGULATION (EC) No 1272/2008).

PROPERTY	RESULT
Density:	1.08 g/cm ³ (20 °C)
Melting point/range:	-73 °C

Boiling point/boiling range:	138 – 140.5 °C
Auto-flammability:	316 °C
Lower explosion limit:	2 %(V)
Upper explosion limit:	10.2 %(V)
Self-ignition temperature:	316 °C
Vapor pressure:	0.68 kPa at 25 °C)
Molecular Weight:	102.09 g/mol
Relative density:	1.082 g/cm ³ at 20 °C
Water solubility:	120 g/l at 20 °C (Hydrolyses)
Solubility:	organic solvent: completely soluble
Flash point: closed cup:	49 °C
log Kow:	-0.5774
Viscosity, dynamic:	0.91 mPa.s (20 °C)
Surface tension:	31.9 mN/m (25 °C)

Health effects

Although no health effects studies (human or non-human) are directly available for acetic anhydride it is known that this substance, like many acid anhydrides, readily hydrolyses within an aqueous environment to produce, in this case acetic acid. A similar human health effect profile should apply to acetic anhydride and acetic acid since acetic anhydride is rapidly and completely transformed to acetic acid. No consumer exposure to acetic anhydride is anticipated. Acetic anhydride is considered as harmful if swallowed, fatal if inhaled and to cause severe skin burns and eye damage based on its health effects (REGULATION (EC) No 1272/2008).

EFFECT ASSESSMENT	RESULT
Acute Toxicity (oral/dermal/inhalation)	Following inhalation exposure, severe irritation of the respiratory tract has been reported; with oral ingestion ulcers in the stomach have been reported. Although there is little quantitative information available on the acute effects of a single exposure to acetic anhydride in humans, there is evidence from accidental exposure that, qualitatively, similar effects are likely to occur in humans.
Irritation/Corrosivity (skin/eye/respiratory tract)	Although no recent skin or eye animal studies have been conducted, animal studies indicate that the liquid material is likely to be a severe eye irritant, whilst the vapor irritant to the eyes and respiratory tract. In humans severe irritation of the eyes and respiratory tract resulted from exposure to the vapor/aerosol and the liquid is corrosive to skin.
Sensitization	The weight of evidence indicates that acetic anhydride does not have skin or respiratory tract sensitizing potential.
Repeated Exposure	There is sufficient evidence to conclude that systemic toxicity is very unlikely.
Mutagenicity	It is concluded that the available data indicate that acetic anhydride has no significant genotoxic activity.
Carcinogenicity	There are sufficient data to conclude that at concentrations below the threshold for chronic irritation, there is no evidence of carcinogenic potential of acetic anhydride.
Reproductive Toxicity	There is no evidence to indicate adverse reproductive or developmental potential to humans for acetic anhydride.

Environmental effects

Acetic anhydride is not expected to persist in the environment because it will rapidly hydrolyze to acetic acid which is readily biodegradable, has a low potential for adsorption to organic matter and has a low potential for bioaccumulation. Based on the data of acetic acid, acetic anhydride is not classified for its environmental fate and ecotoxicological properties (REGULATION (EC) No 1272/2008).

EFFECT ASSESSMENT	RESULT
Aquatic Toxicity	Not considered toxic to aquatic organisms.

FATE AND BEHAVIOR	RESULT
Biodegradation	Readily biodegradable
Bioaccumulation potential	Not bioaccumulative
PBT/vPvB conclusion	Not considered to be either PBT or vPvB.

Exposure

Human Health

Acetic anhydride is used exclusively as a chemical intermediate in industrial facilities and there is no indication that it is used in consumer products. The critical effect for acetic anhydride is irritancy at the site of contact. Because of its well-known corrosive and irritating effects on the eyes, skin and respiratory tract and low odor threshold, procedures, equipment (e.g. goggles, gloves, respirators), training and engineering controls (closed systems) have been in place for many years in industrial operations. When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to workers during the manufacture of acetic anhydride or its use as an intermediate or process chemical or extraction agent.

Environment

When getting into contact with water acetic anhydride is rapidly hydrolyzed to acetic acid which is readily biodegradable. In the atmosphere, it is converted to acetic acid. The standard operating conditions reported by industry indicate that any acetic acid discharge is through waste water treatment plants. Acetic acid has virtually no potential for bioaccumulation and has a low potential for risk to the environment. The potential environment hazard associated with the pH effect of acetic acid will be minimized as all discharge through waste water treatment plants will be subject to a pH correction stage. If acetic anhydride enters the environment without having been through a waste water treatment plant, it will not represent a significant risk to the environment. It will likely be in low volumes (professional uses) and the characteristics of how acetic anhydride moves and transforms in the environment indicates that it will hydrolyze to acetic acid, which will in turn be degraded rapidly.

Risk management recommendations

For industrial or professional use handle this substance within a closed system. Ensure any operation is done outdoors, or, provide sufficient general ventilation (not less than 3 to 5 air changes per hour). Ensure material transfers are under containment or adequate extract ventilation. Avoid direct skin or eye contact with product. Chemically resistant gloves should be worn in combination with 'basic' employee training. Identify potential areas for indirect skin contact. Wash off any contamination immediately. Provide basic employee training to prevent / minimize exposures and to report any skin or eye problems that may develop. Other protection measures such as impervious suits and face shields or goggles may be required during high dispersion activities which are likely to lead to substantial aerosol release. For

laboratory activities the substance should be handled in a fume hood or under extract ventilation. Store and use under conditions which avoid all ignition sources. Clean up contamination/spills as soon as they occur.

State agency review

This substance has been registered under REACH (Registration number 01-2119486470-36-0005). The substance has been assessed under the OECD HPV Chemicals Assessment program in 2002. The conclusion is that it is currently considered as low priority for further work.

Regulatory information/classification and labeling

Classification of the substance according to REGULATION (EC) No 1272/2008:

Flammable liquids:	Category 3; H226 Flammable liquid and vapor.
Acute toxicity:	Category 4; Oral; H302 Harmful if swallowed.
Acute toxicity:	Category 2; Inhalation; H330 Fatal if inhaled.
Skin corrosion:	Category 1B; H314 Causes severe skin burns and eye damage.

Labeling according to REGULATION (EC) No 1272/2008:

Pictogram:



Signal word: Danger

Hazard statements:	H226: Flammable liquid and vapor. H302: Harmful if swallowed. H330: Fatal if inhaled. H314: Causes severe skin burns and eye damage.
---------------------------	---

Supplemental Hazard Statements: EUH071: Corrosive to the respiratory tract.

Contact information within company

For further information on this substance or product safety summaries in general, please contact:

Company: Lonza Ltd.
Department: Regulatory Compliance Europe
Address: Muenchensteinerstrasse 38
Town/Country: Basel, Switzerland
Postal code: 4002
E-mail: prodinfo@lonza.com

Glossary

Acute toxicity	Harmful effect resulting from a single or short term exposure to a substance.
Biodegradation	Decomposition or breakdown of a substance under natural conditions (actions of microorganisms etc).
Bioaccumulation	Progressive accumulation in living organisms of a chemical substance present in the environment.
Carcinogenicity	Substance effects causing cancer.
Chronic toxicity	Harmful effect after repeated exposures or long term exposure to a substance.
Flash point	The lowest temperature at which vapor of the substance may form an ignitable mixture with air.
Genotoxicity	Substance effect that causes damage to genes, including mutagenicity and clastogenicity.
Hydrolyze	Undergo hydrolysis; decompose by reacting with water.
Mutagenicity	Substance effect that cause mutation on genes.
PBT	Persistent, bioaccumulative, toxic chemical.
Persistence	Refers to the length of time a compound stays in the environment, once introduced.
Reprotoxicity	Including teratogenicity, embryotoxicity and harmful effects on fertility.
Sensitizing	Allergenic.
Sediment	Topsoil, sand and minerals washed from land into water forming in the end a layer at the bottom of rivers and sea.
Vapor pressure	A measure of a substance's property to evaporate.
vPvB	Very persistent, very bioaccumulative.

Date of issue

December 2011

Revision

Version 1.0

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. No representations or warranties are made with regards to its completeness or accuracy and no liability will be accepted by Lonza Ltd. for damages of any nature whatsoever resulting from the use of or reliance on the information.