

2-pentene nitrile

Chemical Identity

Brand names	2-pentene nitrile, 2PN	CAS number	25899-50-7
Chemical name (IUPAC)	(Z)-pent-2-enitrile	Molecular formula	C5H7N
Synonyms	1-cyano-1-butene ; cis-1-butenylcyanide ; cis-2-pentenitrile	Molecular weight	81.11 g/mol

Applications

2-pentene nitrile is a by-product of chemical synthesis, re-used mainly on-site as a combustile and also as intermediate for pharmaceuticals. It is used only for industrial purpose and handled under Strictly Controlled Conditions in accordance with REACH regulation for transported isolated intermediates.

Safety Assessment, Exposure and Risk Management Recommendations

Physical and Chemical properties

Property	Result
Physical state	Liquid at room temperature
Colour	Colourless
Odour	Strong
Boiling range	50 – 150 °C (peak at 130°C)
Relative density	0.816 at room temperature
Flash point	Flammable
Vapour pressure	Volatile organic compound
Water solubility	Soluble
Octanol water partition	Low potential for bioaccumulation

Health effect



2PN is a flammable liquid, very dangerous for human health by inhalation, dermal and oral routes. Safety measures must be strictly respected for industrial uses, for more details, consult the Safety Data Sheet.

Environmental effect



2PN is readily biodegradable, not persistent and has a low potential for bioaccumulation. Emissions in the air and in the effluent are strictly controlled in accordance with applicable regulation.

Regulatory information and certifications

Classification and labelling

EU regulation (EC) 1272/2008 (CLP)	
	Flammable liquids, Cat. 3 H226 Flammable liquid and vapour
	Acute toxicity Oral, Cat. 3 H301 Toxic if swallowed Dermal, Cat. 3 H317 Toxic in contact with skin Inhalation, Cat. 3 H331 Toxic if inhaled
	Skin sensitization, Cat. 1 H317 May cause an allergic skin reaction
	Specific Target Organ Toxicity repeated exposure, Cat. 1 H372 Causes damage to organs through prolonged or repeated exposure

Danger

Registration and certification

ISO 9001: 2008 certified
EU regulation on chemicals (EC) 1907/2006 (REACH)

GPS Safety Summary

This Product Safety Summary is intended to provide a general overview of the chemical substance in the context of ICCA Global Product Strategy. The information on the Summary is basic information and is not intended to provide emergency response information, medical information or treatment information. The summary should not be used to provide in-depth safety and health information. In-depth safety and health information can be found on the (extended) Safety Data Sheet (e)SDS for the chemical substance.

2-pentene nitrile

General Statement

2-pentene nitrile is a by-product of adiponitrile synthesis (intermediate for the synthesis of polyamide).

2-pentene nitrile is a flammable liquid which may have toxic effects on human health.

It is used only for industrial purpose and handled under Strictly Controlled Conditions in accordance with the REACH regulation for transported isolated intermediates.

Chemical Identity

Name: (Z)-pent-2-enenitrile

Brand names: 2-pentene nitrile, 2PN

Chemical name (IUPAC): (Z)-pent-2-enenitrile

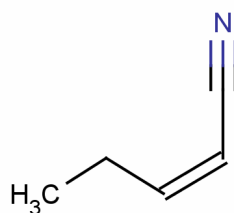
Synonyms: 1-cyano-1-butene ; cis-1-butenylcyanide ; cis-2-pentenitrile ; cis-2-pentenitrile ; 2PN

CAS number(s): 25899-50-7

EC number: 247-323-5

Molecular formula: C₅H₇N

Structure:



Uses and applications

2-pentene nitrile is a by-product of the adiponitrile synthesis (precursor for the production of polyamides, used in the textile, plastic and coating industries).

The product is mainly re-used on-site as a combustible and is also used as an intermediate in the pharmaceutical industry.

2-pentene nitrile is only used for industrial purpose, there is no direct consumer exposure.

Physical/Chemical Properties

Phys/Chem Safety Assessment

Property	Value
Physical state	Liquid at 20°C and atmospheric pressure
Colour	Colourless
Odour	Strong
Freezing Point	< - 150°C
Boiling Range	50 – 150 °C (peak at 130°C) Decomposition starting at ca. 270°C
Relative density	0.816 at 20°C
Molecular weight	81.11 g/mol
Vapour pressure	20 hPa at 20°C, volatile organic compound
Flash point	25.5°C (closed cup) at atmospheric pressure, flammable
Explosive properties	Non explosive
Self-ignition temperature	440°C at atmospheric pressure
Water solubility	11.2 g/l at 20°C, readily soluble in water
Octanol Water partition coefficient (log Kow)	1.39 (+/- 0.31) (calculated)

Based on available data, 2-pentene nitrile is classified as flammable liquid according to EU regulation (EC) 1272/2008.

Health Effects

Human Health Safety Assessment

Effect Assessment	Result
Acute Toxicity Oral /inhalation /dermal	Toxic if swallowed, inhaled or in contact with skin
Irritation / corrosion Skin/eye/respiratory tract	Not classified as irritating to skin and respiratory tract Slightly irritating to eyes but not sufficient for classification
Sensitisation	May cause an allergic skin reaction
Toxicity after repeated exposure Oral /inhalation /dermal	Causes damage to organs through prolonged or repeated exposure, by oral route (nose and nervous system) and by inhalation (nose)
Genotoxicity / Mutagenicity	No data needed regarding regulation
Carcinogenicity	No data needed regarding regulation
Toxicity for reproduction	Not classified for reproductive effects

All these results are based on available data and the classification is in accordance with EU regulation (EC) 1272/2008.

Environmental Effects

Environment Safety Assessment

Effect Assessment	Result
Aquatic Toxicity	Harmful to invertebrates Not harmful to fish and algae

Fate and behaviour	Result
Biodegradation	Readily biodegradable
Bioaccumulation potential	Not potentially bio accumulative (Log Kow = 1.39)
PBT / vPvB conclusion	Not considered to be either PBT nor vPvB

Based on available data, 2-pentene nitrile is considered to be harmful towards aquatic invertebrates but as it is readily biodegradable and not potentially bioaccumulative, it is not classified as dangerous for the environment, according to EU regulation (EC) 1272/2008.

Exposure

2-pentene nitrile is manufactured and handled under Strictly Controlled Conditions in accordance with the REACH regulation for intermediates.

Human health

2-pentene nitrile is manufactured in a closed, continuous and automated process which minimizes the workers' exposure potential.

However when workers have a risk of exposure, during (un)loading, sampling, analysis or maintenance operations, the exposure is kept at a safe level (strictly below exposure limits, when applied) by following appropriate risk management measures adapted to the workplace as suitable collective and personal protective equipment, good industrial hygiene practices and risk communication through appropriate training of workers.

Environment

Based on its physical and chemical properties, if 2-pentene nitrile was released in the environment, it would be distributed mainly in the air and in the water.

During industrial manufacture, there is no use of water (except for cooling), so no release to the aqueous effluent sewer is expected.

Emission in the air is controlled and followed in accordance with the environmental regulation concerning volatile organic compounds (VOC).

Risk Management Recommendations

2-pentene nitrile is manufactured and handled under Strictly Controlled Conditions (in accordance with the REACH regulation for intermediates) to control the risk of exposure and preserve human health and environment.

Human health

For industrial uses of 2-pentene nitrile and as recommended for the use of any chemical product, workers must be well informed and trained and must refer to the Safety Data Sheet (SDS).

In order to control possible risks during handling of the substance (during (un)loading, sampling, analysis or maintenance operations), handling must be under adequate ventilation with an effective exhaust ventilation system. Contact with the skin and the eyes must be avoided, appropriate personal protective equipment must be worn as recommended in the SDS (tightly fitting safety goggles, appropriate gloves, self-contained breathing apparatus, boots, appropriate suit, face and neck protection if risk of splashing).

Hygiene measures must be respected (accessible emergency equipment, well-maintained PPE, wash hands and skin following contact, do not eat, drink or smoke on the workplace).

Environment

Any release to the aqueous effluent sewer must be avoided.

Emission in the air is controlled and followed-up in accordance with the environmental regulation concerning volatile organic compounds (VOC).

State Agency Review

2-pentene nitrile has been registered under EU regulation (EC) 1907/2006 (REACH).

Regulatory Information / Classification and Labelling

Substance classification and labelling according to EU regulation (EC) 1272/2008 (CLP):

Classification

Flammable liquids, Category 3
 Acute toxicity, Oral, Category 3
 Acute toxicity, Dermal, Category 3
 Acute toxicity, Inhalation, Category 3
 Skin sensitization, Category 1
 Specific Target Organ Toxicity – repeated exposure, Category 1

H226 Flammable liquid and vapour
 H301 Toxic if swallowed
 H311 Toxic in contact with skin
 H331 Toxic if inhaled
 H317 May cause an allergic skin reaction
 H372 Causes damage to organs through prolonged or repeated exposure

Labelling

Pictogram :



Signal word :

Danger

Hazard statements :

H226 Flammable liquid and vapour
 H301 Toxic if swallowed
 H311 Toxic in contact with skin
 H331 Toxic if inhaled
 H317 May cause an allergic skin reaction
 H372 Causes damage to organs through prolonged or repeated exposure

Precautionary statements :

P210 Keep away from heat/sparks/open flames/hot surfaces
 P271 Use only outdoors or in a well-ventilated area
 P280 Wear protective gloves/protective clothing/eye protection/face protection
 P284 Wear respiratory protection
 P303+361+353: IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
 P312 Call a POISON CENTER or doctor/physician if you feel unwell

Contact information within company

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

Rhodia Global Product Strategy: http://www.rhodia.com/en/sustainability/global_product_strategy/index.tcm

Contact: globalproductstrategy@eu.rhodia.com

Additional information

ICCA Global Product Strategy: <http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/>

(extended) Safety Data Sheet available on demand: http://www.rhodia.com/en/contact/contact_form_business.tcm

Glossary of technical terms: http://www.rhodia.com/en/sustainability/global_product_strategy/glossary/index.tcm

Date of issue : May 2012

Revision : 0

Disclaimer

The information provided in the present Safety Summary is based on European data available in REACH regulatory dossier (EC N°1907/2006) and is correct to the best of our knowledge, information and belief at the date of its publication. Such information is only intended to provide a general overview of the chemical substance in the context of ICCA Global Product Strategy and is not to be considered as a warranty or quality specification. It does not replace the safety data sheet and technical sheets. Thus, the information provided in this Safety Summary only relates to the designated specific product and may not be applicable if such product is used in combination with other materials or in another manufacturing process, unless otherwise specifically indicated. It does not release the user from ensuring he is in conformity with all regulations linked to its activity.