

Product Stewardship Summary

N-vinyl-2-pyrrolidone

General Statement

N-vinyl-2-pyrrolidone (VP) is commonly used as a reactive diluent for radiation curing in UV-coating, UV-inks, and UV-adhesives. It is also used as a monomer for the production of water soluble polyvinylpyrrolidone (PVP) with uses not limited to oral care, home care, personal care, pharmaceutical, food, beverage, and industrial segments.

Chemical Identity

Name: 1-vinyl-2-pyrrolidone

Brand Names Used in: Ashland uses 1-vinyl-2-pyrrolidone in a wide variety of products throughout the Ashland portfolio

Chemical names (IUPAC):

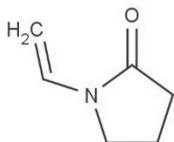
- 1-Ethenyl-2-pyrrolidinone
- 1-ethenyl-2-pyrrolidone
- 1-ethenylpyrrolidin-2-one
- 1-ethenylpyrrolidin-2-one
- 1-vinil-2-pirrolidona
- 1-VINYL-2-PYRROLIDINE
- 1-Vinyl-2-pyrrolidon
- 1-Vinyl-2-pyrrolidone
- 1-Vinyl-2-pyrrolidone (stabilized with N,N'-Di-sec-butyl-p-phenylenediamine)
- 1-vinyl-2pyrrolidone
- 1-vinylpyrrolidin-2-one
- N-ethenyl pyrrolid-2-one
- N-Vinyl-2-pyrrolidon
- N-Vinyl-2-pyrrolidone
- N-Vinyl-2-pyrrolidone, optical grade
- Vinyl Pyrrolidone
- VINYL-N-PYRROLIDONE-2
- Vinylpyrrolidone

CAS number(s): 88-12-0

EC number: 201-800-4

Molecular formula: C₆H₉NO

Structure:



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Uses and Applications

VP is used by Asland as a reactive diluent for radiation curing in UV-coating, UV-inks, and UV-adhesives. In addition, VP also used as a monomer for the production of water soluble polyvinylpyrrolidone (PVP) with uses not limited to oral care, home care, personal care, pharmaceutical, food, beverage, and industrial businesses.

Physical/Chemical Properties

Phys/Chem Safety Assessment

VP is a colorless to slightly yellow liquid. It is fully miscible in water and it is non-flammable and non-explosive. No Physical hazards have been identified with VP.

Property	Value
Form	Liquid
Physical state	Liquid
Color	Colorless to slightly yellow
Odor	Characteristic odor
Density	1.04 g/cm ³ @ 20°C
Melting / boiling point	14°C / 95°C
Flammability	Non-flammable
Explosive properties	Non-flammable
Self-ignition temperature	240-364°C
Vapor pressure	1.97 hPa @ 56.9°C; 133.2 hPa @ 148°C
Mol weight	111.14
Water solubility	49941 mg/L@25°C
Flash point	100.5°C @ 101.3 hPa
Octanol-water partition coefficient (LogPow)	0.4

Health Effects

Human Health Safety Assessment

Consumer: There is no intended use of VP in consumer products and no direct exposure to consumer is expected. Although VP is used in the manufacture of various products that may come into contact with consumers, it is either part of a processing aid, or polymerized into non-monomeric forms, which are considered to be nonhazardous.

Worker: Exposure to VP can occur to workers in either the manufacturing facility manufacturing VP or in manufacturing facility that use VP. The workers can be exposed to VP during maintenance related activities, 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 to VP. The occupational use of this substance is considered safe for the worker following the recommended safety measures in the SDS.

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	H302: Harmful if swallowed H312: Harmful in contact with skin H332: Harmful if inhaled
Irritation / corrosion Skin / eye / respiratory test	H318: Causes serious eye damage H335: May cause respiratory irritation
Toxicity after repeated exposure Oral / inhalation / dermal	H373: May cause damage to organ system through prolonged or repeated exposure

Genotoxicity / Mutagenicity	Not classified
Carcinogenicity	H351: Suspected of causing cancer
Toxicity for reproduction	Not classified

Environmental Effects

Environmental Safety Assessment

VP is readily biodegradable and should be degraded within the wastewater treatment process. The the substance can be considered to be acutely toxic to aquatic organisms, a risk for the environment is not identified since the exposure of surface waters is expected to be negligible due to the rapid degradation.

Effect Assessment	Result
Aquatic Toxicity	H402: Harmful to aquatic life

Fate and behavior	
Biodegradation	Readily biodegradable
Bioaccumulation potential	Not bioaccumulative
PBT / vPvB conclusion	Not PBT

Exposure

Human Health

Consumer exposure to VP is not expected, as there is no direct use of VP in any consumer products. Workers may be exposed to VP during VP-manufacturing processes and manufacturing process using VP. This potential exposure should be mitigated by workplace controls such as respiratory protection equipment.

Environment

As VP degrades rapidly in aqueous environments, significant environmental exposure to VP is unlikely except in cases of significant spills.

Risk Management Recommendations

Exposure to VP in the workplace can be controlled by sufficient ventilation and proper handling and storage techniques. Respiratory protection should be worn in applications with the potential to generate vapor or aerosol release. Suitable hand and eye protection should be worn to reduce unnecessary exposure to VP.

A selection of occupational exposure limits are below.

ACGIH TLV: 0.05 ppm (8 hr TWA)

Regulatory Agency Review

Regulatory Information / Classification and Labeling

Under the Globally Harmonized System for classification and labeling (GHS), substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the (Extended) 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.

GHS Classification:

Acute oral toxicity Category 4

Acute dermal toxicity Category 4

Acute inhalation toxicity Category 4

Eye irritation Category 1

Specific target organ toxicity: Single exposure Category 3: Respiratory irritation

Specific target organ toxicity: Repeated exposure Category 2: Respiratory system by inhalation
Carcinogenicity Category 2

Hazard Statements:

H351: Suspected of causing cancer

H332: Harmful if inhaled

H312: Harmful in contact with skin

H302: Harmful if swallowed

H373: May cause damage to organs through prolonged or repeated exposure

H335: May cause respiratory irritation

H318: Causes serious eye damage

Signal Word: Danger

Precautionary Statements:

P201: Obtain special instructions before use

P202: Do not handle until all safety precautions have been read and understood

P281: Use personal protective equipment as required

P308 + P313: IF exposed or concerned: Get medical advice/ attention

P261: Avoid breathing dust/ fume/ mist/ vapor/ spray

P271: Use only outdoors or in a well-ventilated area

P280: Wear protective gloves/ protective clothing/ eye protection/ face protection

P302 + P352: IF ON SKIN: Wash with plenty of water

Hazard Pictograms:

GHS05: corrosion



GHS07: exclamation mark



GHS08: health hazard



Conclusion

VP is a useful chemical in the production of polyvinylpyrrolidone polymers and as reactive diluent for various UV-curing processes. When handled responsibly, the potential for ocular damage and concern for cancer can be minimized, allowing

workers to use Vp and materials containing VP safely.

Contact Information with Company

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Date of Issue: October 17, 2016

Revision: 1

Additional Information

For more information on GHS, visit <http://www.osha.gov/dsg/hazcom/ghsguideoct05.pdf> or http://live.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html.
Ashland product stewardship summaries are located at <http://www.ashland.com/stewardship>

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Inclusion on the New Zealand Inventory of Chemicals applies only to the pure substance listed. The importer of record must determine whether or not their substances are in compliance.