

# Polyvinylpyrrolidone

sc-203204



The Power is Question

## Material Safety Data Sheet

Hazard Alert Code Key:

EXTREME

HIGH

MODERATE

LOW

## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

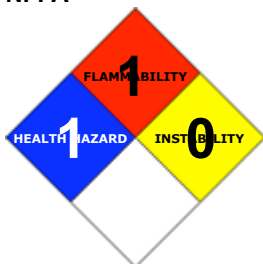
### PRODUCT NAME

Polyvinylpyrrolidone

### STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

### NFPA



### SUPPLIER

Santa Cruz Biotechnology, Inc.  
2145 Delaware Avenue  
Santa Cruz, California 95060  
800.457.3801 or 831.457.3800

### EMERGENCY

ChemWatch  
Within the US & Canada: 877-715-9305  
Outside the US & Canada: +800 2436 2255  
(1-800-CHEMCALL) or call +613 9573 3112

### SYNONYMS

(C<sub>6</sub>H<sub>9</sub>NO)<sub>n</sub>, poly(vinylpyrrolidone), "polyvinyl pyrrolidone", polyvinylpyrrolidone, PVP, PVPP, Povidone, "Kollidon 90 F", "Luviskol K17 K25 K30 K60 K80 K90 KPO", "1-ethenyl-2-pyrrolidinone polymer", "1-ethenyl-2-pyrrolidinone homopolymer", "2-pyrrolidinone, 1-ethenyl polymer", "2-pyrrolidinone, 1-ethenyl homopolymer", Hemodesis, Hemodez, Peragal, Periston, Peviston, Plasdone, Polyclar, "vinylpyrrolidone polymer", "vinylpyrrolidone homopolymer (sic)", "polyvinylpyrrolidone (sic)", "polyvinyl pyrrolidone (sic)", "Huepners Polymer 1, 2, 3, 4, 5, 6, 7", Crosopovidone, PVP-25, PVP-40, PVP-50, PVP-1230, "Disentex 75"

## Section 2 - HAZARDS IDENTIFICATION

### CHEMWATCH HAZARD RATINGS

		Min	Max
Flammability:	1		
Toxicity:	2		
Body Contact:	0		Min/Nil=0 Low=1
Reactivity:	1		Moderate=2
Chronic:	2		High=3 Extreme=4

### CANADIAN WHMIS SYMBOLS



**EMERGENCY OVERVIEW  
RISK**

**POTENTIAL HEALTH EFFECTS**

**ACUTE HEALTH EFFECTS**

**SWALLOWED**

- Accidental ingestion of the material may be damaging to the health of the individual.
- High molecular weight material; on single acute exposure would be expected to pass through gastrointestinal tract with little change / absorption.

Occasionally accumulation of the solid material within the alimentary tract may result in formation of a bezoar (concretion), producing discomfort.

**EYE**

- Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result.

**SKIN**

- The material is not thought to produce adverse health effects or skin irritation following contact (as classified using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

**INHALED**

- The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified using animal models). Nevertheless, adverse effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
- Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

**CHRONIC HEALTH EFFECTS**

- There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment. Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. This material contains a substantial amount of polymer considered to be of low concern. These are classified under having MWs of between 1000 to 10000 with less than 25% of molecules with MWS under 1000 and less than 10% under 500; or having a molecular weight average of over 10000. Polyvinylpyrrolidone (syn: vinylpyrrolidone polymer; PVP) is non-antigenic and generally well tolerated. PVP has been shown to cause sarcomas in rats but there is not confirmation that it is carcinogenic in human patients. [Martindale] The material may cause irritation or dermatitis in some individuals upon prolonged contact.

**Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS**

NAME	CAS RN	%
vinylpyrrolidone homopolymer	9003-39-8	>90
residual as		
<a href="#">2-pyrrolidinone</a>	616-45-5	>0.5-<1.5

**Section 4 - FIRST AID MEASURES**

**SWALLOWED**

· If swallowed do NOT induce vomiting. · If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.

**EYE**

- If this product comes in contact with the eyes: · Wash out immediately with fresh running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

**SKIN**

- If skin or hair contact occurs: · Flush skin and hair with running water (and soap if available). · Seek medical attention in event of irritation.

## INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Other measures are usually unnecessary.

## NOTES TO PHYSICIAN

- Treat symptomatically.

## Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	1.23-1.29
Lower Explosive Limit (%):	Not available.

## EXTINGUISHING MEDIA

- Foam.
- Dry chemical powder.

## FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.

## GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible solid which burns but propagates flame with difficulty.
- Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), other pyrolysis products typical of burning organic material.

May emit poisonous fumes.

Dusts with Minimum Ignition Energies (MIEs) ranging between 10 and 20 mJ are highly sensitive to ignition. They require that:

- plant is grounded
- personal might also need to be grounded
- the use of high resistivity materials (such as plastics) should be restricted or avoided during handling or in packaging
- electrostatic hazards from bulk powders of high resistivity are considered.

Minimum Ignition Energy (MIE) 10-30 mJ, 1 bar approx. 23 C (VDI 2263, sheet 1, 2.5)

## FIRE INCOMPATIBILITY

- Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

## PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

Respirator:

Type A-P Filter of sufficient capacity

## Section 6 - ACCIDENTAL RELEASE MEASURES

### MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Control personal contact by using protective equipment.
- Use dry clean up procedures and avoid generating dust.
- Place in a suitable, labelled container for waste disposal.

### MAJOR SPILLS

- Moderate hazard.
- CAUTION: Advise personnel in area.
- Alert Emergency Responders and tell them location and nature of hazard.

## Section 7 - HANDLING AND STORAGE

### PROCEDURE FOR HANDLING

- Avoid generation of static electricity. Earth all lines and equipment.
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.

- Do NOT cut, drill, grind or weld such containers.
- In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

**RECOMMENDED STORAGE METHODS**

- Polyethylene or polypropylene container.
- Check all containers are clearly labelled and free from leaks.

**STORAGE REQUIREMENTS**

- Store in original containers.
- Keep containers securely sealed.

**Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION**

**EXPOSURE CONTROLS**

Source	Material	TWA ppm	TWA mg/m <sup>3</sup>	STEL ppm	STEL mg/m <sup>3</sup>	Peak ppm	Peak mg/m <sup>3</sup>	TWA F/CC	Notes
US - California Permissible Exposure Limits for Chemical Contaminants	vinylpyrrolidone homopolymer (Particulates not otherwise regulated Respirable fraction)		5						(n)
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	vinylpyrrolidone homopolymer (Particulates not otherwise regulated Respirable fraction)		5						
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	vinylpyrrolidone homopolymer (Particulates not otherwise regulated (PNOR)(f)-Respirable fraction)		5						
US - Michigan Exposure Limits for Air Contaminants	vinylpyrrolidone homopolymer (Particulates not otherwise regulated, Respirable dust)		5						
Canada - Prince Edward Island Occupational Exposure Limits	vinylpyrrolidone homopolymer (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles)		10						See Appendix B current TLV/BEI Book

**ENDOELTABLE**

The following materials had no OELs on our records

- 2-pyrrolidinone: CAS:616-45-5

**PERSONAL PROTECTION**



**RESPIRATOR**

Type A-P Filter of sufficient capacity  
 Consult your EHS staff for recommendations

**EYE**

- Safety glasses with side shields
- Chemical goggles.

**HANDS/FEET**

- Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:
  - frequency and duration of contact,
  - chemical resistance of glove material,
  - glove thickness and

- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.

· Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocautchouc
- polyvinyl chloride

Gloves should be examined for wear and/ or degradation constantly.

#### OTHER

- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

#### ENGINEERING CONTROLS

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

### PHYSICAL PROPERTIES

Solid.

State	Divided solid	Molecular Weight	10,000 upwards.
Melting Range (°F)	>266 (decomposes)	Viscosity	Not Applicable
Boiling Range (°F)	Not available.	Solubility in water (g/L)	Varies by MW
Flash Point (°F)	>419 (DIN 51755)	pH (1% solution)	4.5-7.0
Decomposition Temp (°F)	Not available.	pH (as supplied)	Not applicable
Autoignition Temp (°F)	797 (DIN 51794)	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	1.23-1.29
Lower Explosive Limit (%)	Not available.	Relative Vapor Density (air=1)	Not Applicable
Volatile Component (%vol)	Negligible	Evaporation Rate	Not Applicable

### APPEARANCE

■ Family of products which vary in their physical properties as a result of variations in production. Data presented here is for typical family member. White powder, very soluble in water. No odour. Hygroscopic and soluble in organic solvents. Compatible with hydrophilic and hydrophobic resins. Aqueous solutions are stable and may be sterilized by autoclaving. Molecular Weights 10,000; 40,000; 160,000; 360,000.

2-P is slightly volatile liquid with high water solubility. 2-P will not bioaccumulate (log Kow -0.71) and will distribute primarily to water where it will be subject to limited volatilization and rapid biodegradation. It is expected to react rapidly with atmospheric hydroxyl radicals with a half-life of about 11 hours.

Material	Value
----------	-------

## Section 10 - CHEMICAL STABILITY

### CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.

### STORAGE INCOMPATIBILITY

- Avoid storage with reducing agents.
  - Avoid strong acids, bases.
- Avoid reaction with oxidizing agents.  
Avoid storage chlorinated organic compounds.

For incompatible materials - refer to Section 7 - Handling and Storage.

## Section 11 - TOXICOLOGICAL INFORMATION

vinylpyrrolidone homopolymer

### TOXICITY AND IRRITATION

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

VINYLPYRROLIDONE HOMOPOLYMER:

TOXICITY	IRRITATION
Oral (rat) LD50: 3000 mg/kg	Skin (rabbit):non-irritating(Draize)**
Oral (rat) LD50: >100,000 mg/kg *	Eye (rabbit):non-irritating (Draize)*
Oral (Rabbit) LD50: 1040 mg/kg	
Inhalation (Rat) LC50: >5200 mg/m <sup>3</sup> /4h **	

#### ■ The substance is classified by IARC as Group 3:

NOT classifiable as to its carcinogenicity to humans.

Evidence of carcinogenicity may be inadequate or limited in animal testing.

Chronic toxicity \*\*

#### Genetic toxicity:

No mutagenic effect was found in various tests with microorganisms and mammalian cell culture.

The substance was not mutagenic in studies with mammals.

#### Carcinogenicity:

In long-term animal studies in which the substance was given in high doses by feed, a carcinogenic effect was not observed.

#### Developmental toxicity/teratogenicity:

No indications of a developmental toxic / teratogenic effect were seen in animal studies

\* ISP MSDS

\*\*BASF MSDS

TOXICITY	IRRITATION
----------	------------

### 2-PYRROLIDINONE:

Oral (rat) LD50: 328 mg/kg

Intraperitoneal (rat) LD50: 160 mg/kg

Intraperitoneal (rat) LD50: 3700 mg/kg

Oral (g.pig) LD50: 6500 mg/kg

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

For 2-pyrrolidone (syn: 2-pyrrolidinone; 2-P)

The oral LD50 of 2-P is very high with values of 8000 and greater than 5000 mg/kg being reported Exposure of rats to saturated vapor for 8 hours did not produce any adverse effects and the dermal LD50 in rabbits is greater than 2000 mg/kg.

A subchronic drinking water study of 2-P showed low repeated-dose toxicity with a 90-day NOAEL of 2400 ppm and a LOAEL of 7200 ppm in drinking water. The kidneys many have been affected but no target organs were identified by histopathological examination.

Genetic toxicity: Adequate in vitro tests of genetic toxicity for 2-P are available. A Salmonella typhimurium reverse mutation assay shows lack of mutagenic activity in the presence or absence of metabolic activation and a guideline cytogenetics study using human lymphocytes displayed a lack of genotoxicity activity in the presence or absence of metabolic activation.

Developmental toxicity has been investigated using an OECD 414 Guideline study. The results of this investigation conducted in rats by oral gavage at 0, 190, 600 or 1900 mg/kg-day indicate that 2-P affects the conceptus only at doses that exceed the maternally toxic level. The developmental NOAEL was found to be 600 mg/kg-day while the maternal NOAEL was 190 mg/kg-day.

The combination of the negative developmental toxicity study with a robust subchronic study in which specific damage to reproductive organs was not observed fulfills the current requirement for reproductive toxicity information.

Coma, dyspnea recorded.

## Section 12 - ECOLOGICAL INFORMATION

No data

### Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
vinylpyrrolidone homopolymer	HIGH		LOW	HIGH
2-pyrrolidinone	LOW		LOW	HIGH

## Section 13 - DISPOSAL CONSIDERATIONS

### Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

! Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

## Section 14 - TRANSPORTATION INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

## Section 15 - REGULATORY INFORMATION

**vinylpyrrolidone homopolymer (CAS: 9003-39-8,25249-54-1) is found on the following regulatory lists;**

"Canada Domestic Substances List (DSL)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "CODEX General Standard for Food Additives (GSFA) - Additives Permitted for Use in Food in General, Unless Otherwise Specified, in Accordance with GMP", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "International Fragrance Association (IFRA) Survey: Transparency List", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US Cosmetic Ingredient Review (CIR) Cosmetic ingredients found safe as used", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US Food Additive Database", "US Toxic Substances Control Act (TSCA) - Inventory"

### Regulations for ingredients

**2-pyrrolidinone (CAS: 616-45-5) is found on the following regulatory lists;**

"Canada Domestic Substances List (DSL)", "International Council of Chemical Associations (ICCA) - High Production Volume List", "OECD Representative List of High Production Volume (HPV) Chemicals", "US - Pennsylvania - Hazardous Substance List", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US EPA High Production Volume Program Chemical List", "US Toxic Substances Control Act (TSCA) - Inventory"

## Section 16 - OTHER INFORMATION

### ND

Substance CAS Suggested codes 2- pyrrolidinone 616- 45- 5

### Ingredients with multiple CAS Nos

Ingredient Name CAS vinylpyrrolidone homopolymer 9003-39-8, 25249-54-1

*Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.*

- Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:  
www.chemwatch.net/references.

- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

*This document is copyright. Apart from any fair dealing for the purposes of private study, research, review or criticism, as permitted under the Copyright Act, no part may be reproduced by any process without written*

*permission from CHEMWATCH. TEL (+61 3) 9572 4700.*

Issue Date: Apr-5-2009

Print Date:Feb-17-2011