

## Global Product Strategy (GPS) Safety Summary

### Vinyl Acetate Monomer

This GPS Safety Summary is a high-level summary intended to provide the general public with an overview of product safety information on this chemical substance. It is not intended to provide emergency response, medical or treatment information, nor to provide an overview of all safety and health information. This summary is not intended to replace the Safety Data Sheet. For detailed guidance on the use or regulatory status of this substance, please consult the Safety Data Sheet and the Product Stewardship Bulletin (PSB).

#### Chemical Identity

**Name:** Vinyl Acetate Monomer

**Brand names:** Vinyl Acetate Monomer (VAM)

**Chemical name (IUPAC):** Ethenyl acetate

**CAS number:** 108-05-4

**EC number:** 203-545-4

**Molecular formula:** C<sub>4</sub>H<sub>6</sub>O<sub>2</sub>

#### Uses and Applications

Vinyl Acetate Monomer (VAM) is used to produce a variety of polymers and copolymers, such as ethylene-vinyl acetate and polyvinyl acetate. These polymers and copolymers are used in the manufacture of adhesives, water-based paint, textile coatings and paper coatings.

There are no supported uses of VAM in direct consumer products or applications.

#### Physical / Chemical Properties

VAM is a clear colorless liquid that is partly soluble in water. It has a sweet, fruity smell in small quantities, but the odor may become sharp and irritating at higher levels. The substance is highly flammable with a flash point of -8°C (18°F). The boiling and freezing points of VAM are 73°C (163°F) and -92°C (-134°F) respectively. VAM has been classified under the Globally Harmonized System on Classification and Labeling (GHS) for its high flammability.

VAM is a reactive molecule. Unless inhibited, or if proper handling and storage precautions are not met, VAM can polymerize uncontrollably. VAM is typically shipped with a polymerization inhibitor, generally hydroquinone (HQ). Properly inhibited, VAM is stable under recommended storage conditions. Prolonged or intense exposure to heat, sunlight, ultraviolet light or x-rays may result in polymerization. Spontaneous polymerization may also result from exposure to amines, strong acids, alkalis, silica, alumina, oxidizing agents or polymerization initiators.

## **Health Effects**

VAM has low acute toxicity by oral and dermal routes of exposure, can be harmful by inhalation, and may cause skin, eye and respiratory irritation. In addition it is a suspected human carcinogen. It has been classified as hazardous under GHS accordingly.

The table below gives a full overview of the health effects assessment results for VAM.

Effect Assessment	Result
Acute Toxicity Oral / inhalation / dermal	VAM is considered to have low acute toxicity by the oral and dermal routes of exposure. VAM can be harmful by inhalation. May cause central nervous system depression with prolonged exposure.
Irritation / corrosion Skin / eye/ respiratory tract	May cause slight skin and eye irritation; highly irritating when inhaled.
Sensitization	Not considered to be sensitizing.
Toxicity after repeated exposure Oral / inhalation / dermal	No systemic toxicity; Localized respiratory tissue inflammation may occur when inhaled repeatedly at high air concentrations.
Genotoxicity / Mutagenicity	Not considered to pose a mutagenic/genotoxic hazard
Carcinogenicity	Suspected human carcinogen. Lifetime inhalation and oral exposures have caused nasal and upper digestive tract (site of contact) cancers in laboratory animals exposed to high concentrations. Tumors can occur when exposure exceeds a threshold concentration such that tissue defense mechanisms are overwhelmed.
Toxicity for reproduction	No developmental toxicity or reproductive toxicity has been shown.

## **Environmental Effects**

VAM is considered to be of low toxicity to aquatic organisms. VAM is readily biodegraded by either anaerobic or aerobic mechanisms. VAM is also subject to biotic and abiotic hydrolysis in soils and sediments.

The table below gives a full overview of the environmental assessment results for VAM.

Effect Assessment	Result
Aquatic Toxicity	Considered to be of low toxicity 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.

PBT = Persistent, Bio-accumulative and Toxic in the environment.

vPvB = very Persistent and very Bio-accumulative in the environment.

## **Exposure**

### **Human health**

Consumers generally will not come into contact with VAM as there are no supported uses of VAM in direct consumer products or applications.

Exposure of workers to VAM in manufacturing facilities is considered low because the process, storage and handling operations are usually enclosed. However, worker exposure can potentially occur during operations such as product transfer, product sampling, or maintenance / repair activities on product containing systems. The risk of accidental exposure should be controlled by selecting and applying the appropriate Risk Management Measures.

### **Environment**

Exposure of VAM to the environment is considered low because the manufacture and handling of VAM is predominantly in closed continuous or batch systems.

VAM has low solubility in water. A large spill could float on the water and cause a fire/explosion hazard when drained into systems.

## **Risk Management Measures**

For detailed guidance on the use of VAM, the Safety Data Sheet should be consulted.

VAM should only be handled by knowledgeable and trained personnel.

### **Flammability / reactivity**

Cross-contamination of VAM with other chemicals, especially oxidizing materials or strong acids or bases, may lead to spontaneous polymerization and fire. VAM should be kept away from heat, sparks and flame. Prolonged or intense exposure to heat, sunlight, ultraviolet light or x-rays may also result in spontaneous polymerization.

Blanketing with dry gas is important because the presence of water initiates a hydrolysis reaction of the VAM to acetic acid and acetaldehyde. Nitrogen is preferred as the blanket gas for two reasons. First, it minimizes flammability concerns. Second, the presence of oxygen promotes formation of organic peroxides, which are polymerization initiators.

Also, equipment should be grounded to prevent build-up of static electricity.

### **Human health**

When using chemicals make sure that there is adequate ventilation. Always use appropriate chemical-resistant gloves to protect your hands and skin, always wear eye protection such as chemical goggles and always wear flame-retardant clothing. Do not eat, drink, or smoke where chemicals are handled, processed, or stored. Wash hands and skin following contact. If the substance gets into your eyes, rinse eyes thoroughly for at least 15 minutes with tap water and seek medical attention.

In the case of transfer or maintenance operations, always clear transfer lines prior to decoupling, and flush/drain to a closed system for recycle prior to opening equipment.

In cases where engineering controls cannot maintain airborne substance concentrations at exposure limits, or in cases with a risk of accidental exposure, additional risk management measures may be necessary, such as the use of a complete suit protecting against chemicals and supplied air, a self-contained breathing apparatus or respirator.

#### Environmental

In case of accidental release or spill do not allow the product to enter sewers, surface or ground water.

### **Regulatory Information / Classification and Labeling**

This substance has been registered under REACH by relevant companies of LyondellBasell in the European Union.

For a detailed overview of the regulatory status of this substance, please refer to the Product Stewardship Bulletin available from the LyondellBasell corporate website.

Under the Globally Harmonized System on Classification and Labeling (GHS) substances are classified according to their physical, health and environmental hazards. The hazards are communicated via specific labels on the product packaging and the Safety Data Sheet. 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.

For a detailed overview of the classification and labeling of this substance, please refer to the regional Safety Data Sheet, which can be found on the LyondellBasell corporate website.

### **Conclusion Statements**

- VAM is used to produce a variety of polymer products used in adhesives, water-based paint, textile coatings and paper coatings chemicals.
- VAM has low acute toxicity by oral and dermal routes of exposure. It can be harmful by inhalation, and it may cause skin, eye and respiratory irritation. It also is a suspected human carcinogen.
- Exposure to human health and environment is considered low as VAM only has supported industrial uses and the manufacturing process is enclosed.
- VAM has no supported uses in direct consumer products.

### **Information within Company**

For further information on this product in general, please consult the LyondellBasell corporate website ([www.lyb.com](http://www.lyb.com)).

### **Date of issue**

Date of issue: 5 June 2015.

### **Disclaimer**

Before using a product sold by a company of the LyondellBasell family of companies, users should make their own independent determination that the product is suitable for the intended use and can be used safely and legally.

SELLER MAKES NO WARRANTY; EXPRESS OR IMPLIED (INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY WARRANTY) OTHER THAN AS SEPARATELY AGREED TO BY THE PARTIES IN A CONTRACT.

This product(s) may not be used in:

(i) any U.S. FDA Class I, Health Canada Class I, and/or European Union Class I medical devices, without prior notification to Seller for each specific product and application; or  
(ii) the manufacture of any of the following, without prior written approval by Seller for each specific product and application: U.S. FDA Class II Medical Devices; Health Canada Class II or Class III Medical Devices; European Union Class II Medical Devices; film, overwrap and/or product packaging that is considered a part or component of one of the aforementioned medical devices; packaging in direct contact with a pharmaceutical active ingredient and/or dosage form that is intended for inhalation, injection, intravenous, nasal, ophthalmic (eye), digestive, or topical (skin) administration; tobacco related products and applications, electronic cigarettes and similar devices, and pressure pipe or fittings that are considered a part or component of a nuclear reactor. Additionally, the product(s) may not be used in: (i) U.S. FDA Class III Medical Devices; Health Canada Class IV Medical Devices; European Class III Medical Devices; (ii) applications involving permanent implantation into the body; (iii) life-sustaining medical applications; and (iv) lead, asbestos or MTBE related applications. All references to U.S. FDA, Health Canada, and European Union regulations include another country's equivalent regulatory classification.

Users should review the applicable Safety Data Sheet before handling the product.

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