

## Global Product Strategy (GPS) Safety Summary

### Ethylene

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 (Material) Safety Data Sheet, the Product Safety Bulletin and the Regulatory Affairs Bulletin.

#### Chemical Identity

**Name:** Ethylene

**Brand names:** Ethylene, Ethene, Olefiant gas

**Chemical name (IUPAC):** Ethylene

**CAS number:** 74-85-1

**EC number:** 200-815-3

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

#### Uses and Applications

Ethylene is the most significant petrochemical in terms of worldwide production volume and is the key building block for polyethylene (PE) and a large number of other chemicals, plastics and synthetics. The production of ethylene results in co-products such as propylene, butadiene and aromatics, which include benzene and toluene. Ethylene and its co-products are fundamental to many segments of the economy, including the production of consumer products, packaging, housing and automotive components and other durable and nondurable goods.

Ethylene is used as a raw material to manufacture polyethylene, ethylene oxide, ethanol, ethylene dichloride, styrene and vinyl acetate monomer (VAM). Ethylene is not commonly sold directly to public.

#### Physical / Chemical Properties

At ambient temperature and pressure, Ethylene is a colorless gas with a very high vapor pressure.

Ethylene is extremely flammable with a flash point of -136°C (-213°F). Its double bond allows it to undergo chemical reactions under selective and controlled conditions. It is typically handled in industrial facilities where ignition sources and ventilation are adequately controlled. In industrial facilities, Ethylene can be refrigerated to very low temperatures and stored or shipped as a liquid.

Ethylene has been classified as hazardous under the Globally Harmonized System on classification and labeling (GHS) for its extreme flammability.

### **Health Effects**

The primary route to exposure is through inhalation. High Ethylene vapor concentrations may cause asphyxia (displacement of oxygen in the airways, reducing the levels of oxygen available to breath in), drowsiness and dizziness.

The table below gives an overview of the health effects assessment results for Ethylene.

<b>Effect Assessment</b>	<b>Result</b>
Acute Toxicity Oral / inhalation / dermal	This substance has a low order of acute toxicity by the inhalation route, but very high concentrations may cause anesthesia and asphyxia.
Irritation / corrosion Skin / eye/ respiratory tract	Ethylene is not considered to be a skin or eye irritant, but evaporating liquid may cause frost injuries.
Sensitization	Ethylene produces eosinophilic rhinitis in rats following short-term repeated exposure.
Toxicity after repeated exposure Oral / inhalation / dermal	No adverse systemic effects to organs were reported following repeated exposures to high concentrations of Ethylene.
Genotoxicity / Mutagenicity	Not classified as a mutagen.
Carcinogenicity	Not classified as a carcinogen.
Toxicity for reproduction	Not classified as toxic to reproduction.

### **Environmental Effects**

When released into the environment, this material will volatilize rapidly. Therefore, water contamination and aquatic toxicity are not expected.

The table below provides an overview of the environmental assessment results for Ethylene.

<b>Effect Assessment</b>	<b>Result</b>
Aquatic Toxicity	This material is expected to be Non-Toxic to aquatic life.

<b>Fate and behavior</b>	<b>Result</b>
Biodegradation	This material is expected to be readily biodegradable.
Bioaccumulation potential	This material has low potential to bioaccumulate.
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**

Personnel exposure to Ethylene in manufacturing facilities is considered very low because the process, storage and handling operations are enclosed and continuous. It is not used in a widespread or dispersive manner. Also, Ethylene is mainly transported by pipeline.

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 and mitigated by selecting and applying the appropriate Risk Management Measures.

### **Environment**

Ethylene is manufactured in a closed and automated process with no aqueous effluent or gaseous effluent released to the environment.

## **Risk Management Measures**

For detailed guidance on the use of Ethylene, the [\(Material\) Safety Data Sheet](#) should be consulted.

Ethylene should only be handled by knowledgeable and trained personnel.

### **Flammability**

Flammable materials should be stored in a separate safety storage cabinet or room. Vapors may form explosive mixtures with air. Vapor space above stored liquid may be flammable/explosive unless blanketed with inert gas.

Bonding and grounding measures may not be enough if nonconductive flammable liquids are involved. This liquid may accumulate static electricity even when transferred into properly grounded containers. Static electricity accumulation may be significantly increased by the presence of small quantities of water.

### **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 below 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 [Regulatory Affairs Bulletin](#) which is 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 [\(Material\) Safety Data Sheet](#) which can be found on the LyondellBasell corporate website.

#### **Conclusion Statements**

- Ethylene is used as a chemical intermediate and/or monomer for industrial purposes.
- Ethylene has been classified as hazardous. The main hazards are its extreme flammability and the risk of asphyxia in case of exposure to a very high concentration.
- Exposure to human health and environment is considered very low as *Ethylene* manufacturing process, storage and handling operations are enclosed.

#### **Contact Information within Company**

For further information on this product in general, please consult the [LyondellBasell corporate website](#).

For specific Product Safety related questions, please contact [PSInfo@lyondellbasell.com](mailto:PSInfo@lyondellbasell.com).

#### **Date of issue**

Date of issue: 23 January 2012.

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USERS SHOULD REVIEW THE APPLICABLE MATERIAL SAFETY DATA SHEET BEFORE HANDLING THE PRODUCT.

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