

ETHYLENE Product Stewardship Summary

CAS number

74-85-1

Chemical formula

C₂H₄

What is ethylene?

Ethylene – also known as ethene - is a key building block for the petrochemical industry. It is a colourless, flammable gas with a slightly sweet odour and is the main product of the steam cracking of hydrocarbons such as naphtha and gas oil. In this process, the feedstock molecules are ‘cracked’ at high temperatures and in the presence of steam to produce, among other things, hydrogen, ethylene, propylene, butadiene, benzene and toluene.

How is ethylene used?

The applications of ethylene are numerous and ethylene derivatives are traded around the world.

Polyethylenes of various density and melt flow account for more than 50% of world ethylene demand. The primary use of polyethylene is in film applications for packaging, carrier bags and trash liners. Other applications include injection moulding, pipe extrusion, wire and cable sheathing and insulation, as well as extrusion coating of paper and cardboard.

Health, Safety and Environmental considerations

At room temperature, ethylene is a volatile, colourless, gas that has a faint, sweet odour. Reported values for the odour threshold are in the 260 – 290 ppm range. Ethylene presents a significant fire and explosion hazard based on its physical properties. Ethylene is extremely flammable and reactive.

The American Conference of Governmental Industrial Hygienists (ACGIH) has adopted 200 ppm TWA (Time Weighted Average) as the Threshold Limit Value (TLV) for the workplace.

The primary health hazard of ethylene is the displacement of oxygen resulting in an oxygen-deficient atmosphere. No toxic effects on humans have been attributed to ethylene exposures below the level of asphyxiation. Chronic animal inhalation exposures have also failed to demonstrate any adverse effects of

ethylene. Ethylene is classified as a Group 3 product by the International Agency for Research on Cancer (IARC) and as A4 by the ACGIH, which means it is not a human carcinogen. One country has classified ethylene as a category 3 mutagen. Additionally, exposure to vapours may cause dizziness and drowsiness.

In the aquatic environment, ethylene will evaporate rapidly, followed by rapid atmospheric oxidation.

Storage and Transport

Ethylene is transported by Shell chemicals companies via ship and pipeline. Most products are delivered directly to the customer. However, ethylene may be stored in storage tanks or underground salt wells (domes).

Risk Characterization Summary

Risks associated with exposure to this product have been evaluated for the following “chain-of-commerce” activities: manufacture, storage, product transfer, transportation, and customers/markets. Due to health, safety and environmental considerations, it is only manufactured, stored and transported to customers in closed systems. Likewise, customers are limited to those who only use the product in closed systems as an intermediate for the manufacture of other chemicals. Proper equipment design and handling procedures maintain low risk from exposure to the product where the product is used as a chemical intermediate

This product stewardship summary is intended to give general information about the chemical or categories of chemicals addressed. It is not intended to provide an in-depth discussion of health and safety information. Additional information is available through the chemical’s applicable Material Safety Data Sheet, which should be consulted before use of the chemical. This product stewardship summary does not supplant or replace required regulatory and/or legal communication documents.