Propylene
Product Stewardship Summary
(CAS number 115-07-1)

Chemical Formula for Propylene

C3H6

What is Propylene?

Propylene, also known as propene, is one of the major building blocks of the petrochemical industry. Propylene is typically obtained via two main routes: either as a co-product of the refinery catalytic cracking process used to make gasoline (resultant product known as refinery grade propylene) or as a co-product of the steam cracking process used to make ethylene (known as chemical grade propylene). There are also a number of technologies for making propylene directly from other feedstocks. The most common of these on-purpose process routes are propane dehydrogenation and metathesis.

How is Propylene Used?

The materials that are derived from propylene include: polypropylene; acrylonitrile (which is converted to acrylic fibres and coatings); propylene oxide (which then goes into polyurethane resins and other chemicals); oxo alcohols (which are used in PVC plasticisers and coatings); cumene (which is ultimately used to make epoxy resins and polycarbonate); and isopropyl alcohol (which is used as a solvent).

As a result, propylene is a key component of countless end use products. Examples include automobile headlights, taillights, disk brake pads and bumpers; carpets; CDs and optical disks; clear film food wrap; eyeglasses; flexible foams used in bedding and furniture; rigid foam insulation; impact-resistant and bullet-proof windows; moulded plastic goods such as buckets, food containers, kitchen utensils and wastebaskets; nitrile rubber hoses, seals and gaskets; paints and protective coatings; grocery bags; synthetic fibers for blankets, sweaters, socks and fleeces; watercooler bottles; and wood products such as plywood, oriented strandboard and laminates.

Health, Safety and Environmental Considerations

At room temperature, propylene is a volatile, colourless, extremely flammable gas. It is a liquid under pressure.

Direct contact with liquefied propylene can cause frostbite-like burns to the eyes and skin. Propylene is an asphyxiant therefore it can displace oxygen resulting in an oxygen-deficient atmosphere. Symptoms of exposure to high levels of petroleum gas asphyxiants include shortness of breath, dizziness, incoordination and confusion but the effects are fully reversible if exposure stops.

There is no evidence from the production and handling of propylene over many years that it is hazardous to human health.

The ACGIH has adopted a 500 ppm Time Weighted Average (TWA) as the Threshold Limit Value (TLV) for the workplace and Occupational Exposure Limits (OELs) globally in general are also 500 ppm 8 hours TWA.

The primary hazard concern, if there is a spill or leak near the general public, is a fire and/or explosion based on the extremely flammable characteristics of propylene.

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

Storing and Transporting Propylene

Propylene is transported by pipeline and barge/vessel, with limited tank truck and rail car options. Most products are delivered directly to the customer. Propylene 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. It is manufactured, stored and transported to customers in closed systems. Depending on the customer, end uses may vary from use as an intermediate for the manufacture other chemicals, commercial products, or certain formulated consumer products. Proper equipment design and handling procedures maintain low risk from exposure where used as an intermediate. Exposures may be higher in commercial and consumer applications. To minimize risk, additional controls, such as, special handling procedures and protective packaging are implemented.

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 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.