

BUTADIENE Product Stewardship Summary

CAS number

106-99-0

Chemical formula

C₄H₆

What is butadiene?

Butadiene, also known as 1,3-butadiene, is a colourless gas that condenses to a liquid at minus 4.5 degrees centigrade. Butadiene is derived, using an extractive distillation process, from the crude C₄ stream, one of the cracker by-products of ethylene and propylene production.

How is butadiene used?

The largest single use for butadiene is in the production of styrene-butadiene rubber (SBR) which, in turn, is principally used in the manufacture of automobile tyres. SBR is also used in adhesives, sealants, coatings and in rubber articles like shoe soles. Polybutadiene is also used in tyres and can be used as an intermediate in the production of acrylonitrile-butadiene-styrene (ABS). ABS is widely used in items such as telephones, computer casings and other appliances.

Other polymers made from butadiene include styrene-butadiene latex, used for example in carpet backings and adhesives; nitrile rubber, used in hoses, fuel lines, gasket seals, gloves and footwear; and styrene-butadiene block copolymers which are used in many end-uses ranging from asphalt modifiers (road and roofing construction applications), to adhesives, footwear and toys.

Chemical intermediates made from butadiene include adiponitrile and chloroprene which are used, respectively, in the manufacture of nylon and neoprene.

Health, Safety and Environmental considerations

Direct contact with liquefied butadiene can cause frostbite-like burns to the eyes and skin. Inhaling high concentrations of butadiene gas may cause dizziness, headache and nausea.

International agencies like the International Agency for Research on Cancer (IARC) regard butadiene as a human carcinogen. Maximum Occupational Exposure Limits for butadiene in the European Union member

states are in the range of 1-20 parts per million (ppm). These are based on the average exposure over an eight-hour period. In the US, the equivalent limit value is 1ppm.

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

Automobile exhaust fumes and other forms of combustion or burning are constant sources of butadiene being released to the atmosphere. Due to the compound's presence in the atmosphere, the general population is exposed to low levels (parts per billion range) of butadiene through normal breathing. Under routine conditions, the contribution of butadiene from manufacturing sources is a small percentage of the total amount in the environment.

Butadiene is extremely flammable and reactive. It presents a significant fire and explosion hazard. It can spontaneously 'polymerise' into rubber.

Storage and Transport

Butadiene is shipped by barge/ship, rail and pipeline. To prevent peroxide formation, which could lead to uncontrolled polymerisation when the product is transported or stored, another chemical is added as an inhibitor and the product is stored under a non-flammable (inert) gas.

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. Control measures including equipment design and handling procedures have been established to minimize the exposure potential to workers, community and the environment. As such, the risks associated with the product are judged to be low.

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.