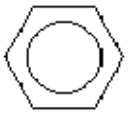
Product Stewardship Summary
Benzene

The 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 all health and safety information. Additional information on the chemical is available through the applicable Material Safety Data Sheet which should always be consulted before use of the chemical. The product stewardship summary does not supplant or replace required regulatory and/or legal communication documents.

Chemical identity:
Benzene is the simplest aromatic chemical substance with six carbon and six hydrogen molecules forming a ring. Benzene is a widely used chemical and can be formed from both natural processes and human activities. Benzene is manufactured from five main sources, which include catalytic reforming of naphtha; dealkylation of toluene, recovery from ethylene plant pyrolysis gasoline; coke oven; and selective toluene disproportionation.

Chemical Formula: C_6H_6 CAS Number: 71-43-2
Chemical Structure:



Synonyms: Benzol, phenyl hydride, cyclohexatriene, annulene, benzole, coal naphtha, phene, pyrobenzole, pyrobenzol

Product Uses:
As a widely used chemical building block, most benzene is consumed in the chemical industry as a raw material for organic chemicals and in the manufacture of plastics. Benzene itself is not directly used by consumers. Benzene is used as the basis for the manufacture of plastics, synthetic rubber, dyestuffs, resins, raw materials for detergents and plant protection agents. The list of the numerous everyday products generated from benzene is too long to fit on this summary. Just to name a few: clothing, packaging, paints, plywood, dyes, vehicle tires, cosmetics, detergents, agrochemicals, and pharmaceuticals.

Physical/chemical properties: Benzene is a clear, colorless, volatile, and sweet-smelling liquid at room temperature. Benzene is a highly flammable chemical. Benzene is not considered a

highly reactive material under normal ambient and anticipated storage and handling conditions of temperature and pressure.

Health Information:
Benzene has low acute toxicity via the oral, dermal and inhalation routes. Direct contact with benzene can cause skin and eye irritation. Repeated exposure to benzene can cause skin defatting. Breathing very high levels of benzene can result in death, while high levels can cause drowsiness, dizziness, rapid heart rate, headaches, tremors, confusion, and unconsciousness. Eating or drinking foods containing high levels of benzene can cause vomiting, irritation of the stomach, dizziness, sleepiness, convulsions, rapid heart rate, and death. Prolonged exposure to benzene at high concentration may cause acute myelocytic leukemia, decrease in circulating red blood cells, white blood cells and/or platelets. Benzene has also been shown to have adverse immunotoxic effects and genetic effects in humans. There is insufficient evidence that benzene may cause adverse reproductive effects. Exposure to > 300 ppm may cause reversible acute central nervous system depression. The toxicity of benzene has been extensively reviewed by various regulatory agencies.

Environmental Information:
Benzene ranges from being harmful to toxic in fish, algae and some aquatic invertebrates. Benzene is not expected to bioaccumulate in aquatic organisms. Benzene rapidly evaporates from surface water and soil to air where it degrades within a few days. Benzene left in water and soil is expected to biodegrade or adsorb to soil particles. In the U.S., benzene is emitted to the environment in large quantities, but due to natural degradation, it is found in air and water at very low concentrations.

Exposure Potential:

- *Workplace use:* This refers to potential exposure to benzene to persons in a manufacturing facility or through various industrial applications. Occupational exposure to benzene is expected to be low because benzene is typically manufactured, processed, stored, transported, and used in closed systems with low potential of release.

- *Consumer use:* The general population is exposed to benzene in ambient air containing low levels of benzene from tobacco smoke, automobile service stations, exhaust from motor vehicles, and industrial emissions. Vapors or gases from products that contain benzene, such as glues, paints, furniture wax, and detergents, can also be a source of exposure. Tobacco smoke is the major source of benzene exposure in non-occupational settings.

- *Potential environmental release:* There may be some potential for exposure to the environment from an accidental release of benzene due to transportation of large quantities over long distances by vessel, barge, or pipeline; however, exposure due to release is believed to be very low. Chevron Phillips Chemical Company LP is committed to operating in an environmentally responsible manner and has adopted the American Chemistry Council's Responsible Care® initiative.

Risk Management:
Chevron Phillips Chemical Company LP is committed to Product Stewardship and doing business responsibly. We endeavor to provide sufficient information for the safe use and handling of all our products. We begin by ensuring that all of our customers, distributors, carriers and users of benzene are well informed about the properties of the product. To that end, a Material Safety Data Sheet accompanies each shipment from our manufacturing plant.

Regulatory Information:
Regulations exist that govern the manufacture, sale, transportation, use and/or disposal of benzene. These regulations may vary by city, state, country or geographic region. Additional helpful information may be found by consulting the relevant product Material Safety Data Sheet.

Sources of Additional Information:

- ATSDR (Agency for Toxic Substances and Disease Registry) ToxFAQs™ for benzene: http://www.atsdr.cdc.gov/tfacts3.html
- ATSDR Toxicological Profile for Benzene: http://www.atsdr.cdc.gov/toxprofiles/tp3.html
- U.S. Environmental Protection Agency (USEPA) – Integrated Risk Information System (IRIS): http://www.atsdr.cdc.gov/toxprofiles/tp3.html
- European Aromatics Producers Association: Aromatics: Improving the Quality of Your Life http://www.petrochemistry.net/ftp/pressroom/APAEN.pdf
- European Chemical Substances Information System (ESIS): http://ecb.jrc.it/esis/
- Organization for Economic Cooperation and Development (OECD) – eChemPortal web-based search tool (use applicable CAS No.): http://webnet3.oecd.org/echemportal/
- Voluntary Children's Chemical Evaluation Program (VCCEP) submission and peer consultation on benzene: http://www.tera.org/peer/VCCEP/benzene/benzeneWelcome.html
- Our Aromatics product website: http://www.cpchem.com/bl/aromatics/en-us/Pages/Aromatics.aspx
- Our Material Safety Data Sheet for benzene: http://www.cpchem.com/msds/100000068511_SDS_US_EN.PDF

Conclusion:
Benzene is an important industrial basic chemical. It is highly flammable. Acute toxicity is low at typical exposure levels. High levels of exposure for short or long periods can cause eye, nose and throat irritation， headaches, and other reversible central nervous system effects ranging from dizziness to unconsciousness. Prolonged exposure to benzene at high concentration may cause leukemia. Benzene is classified as a known human carcinogen by various regulatory agencies worldwide. Control measures have been put in place to minimize exposure potentials to workers, public, and the environment. However, prior to use or handling benzene, make sure to consult the relevant product Material Safety Data Sheet and review applicable regulatory guidelines and requirements, including but not limited to OSHA guidelines.

Contact Information:
http://www.cpchem.com/

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