



Product Stewardship Summary Butadiene Feedstock

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 this chemical is available through the applicable Material Safety Data Sheet which must be consulted before using this chemical. The product stewardship summary does not supplant or replace required regulatory and/or legal communication documents.

Chemical Identity:

Butadiene feedstock (BDFS), also commonly known as crude butadiene, is a colorless gas at ambient temperatures (liquid under pressure) produced at three Chevron Phillips Chemical facilities located in Texas: Port Arthur, Sweeny and Cedar Bayou. Butadiene feedstock is a byproduct of steam cracking paraffinic hydrocarbons during the commercial production of ethylene monomer.

CAS Number: 68955-28-2 Synonyms: Crude C4, gases (petroleum), light steam-cracked, crude butadiene.

Product Uses:

There are no direct consumer uses for Crude Butadiene Feedstock (BDFS). BDFS is sold as an intermediate stream to chemical processors who further separate the stream into various concentrates. Processors extract the contained 1,3-butadiene in BDFS for sale as a feedstock for the production of synthetic rubber, latex, nylon and various butadiene-styrene resins. Processors sell the remainder of the BDFS stream typically known as Raff-1 to alkylation plants as a reactant in the manufacture and refining of gasoline.

Physical/Chemical Properties:

BDFS is a highly flammable gas (flash point of -76°C) and presents an extreme fire hazard. BDFS is also a highly reactive material that reacts vigorously with many chemicals, including aluminum, strong oxidizing agents (such as chlorates, nitrates and peroxides), and air. Reaction with these materials may form highly explosive hydrogen or peroxides. Decreased or no inhibitor content will lead to rapid polymerization. Presence of low amounts of oxygen can lead to formation of "popcorn" polymer or polyperoxides, which can be explosive. BDFS is normally stored under pressure as a liquid. Release of BDFS to the atmosphere and contact with the expanding vapor stream or liquid may produce local freezing (frostbite) of skin and eyes due to rapid evaporation and cooling of the liquid. Electrostatic charge may accumulate and create a hazardous condition during handling of this material. Mitigating procedures (bonding and grounding) may be needed.

Health Information:

Exposure to high vapor concentrations of BDFS for several hours may cause reversible eye irritation and even higher concentrations may cause acute central nervous system depression, and, possibly, cardiac sensitization (increased sensitivity of the heart to

endogenous epinephrine). Very high concentrations in an enclosed space can be lethal as oxygen is displaced and asphyxiation can occur within seconds. The danger of fire or explosion may supersede these acute health hazards in such situations. Direct skin and eye contact with liquefied BDFS can cause irritation and frostbite-like cold burns.

BDFS is classified as human carcinogen due to the presence of butadiene, a major component of BDFS. Butadiene is listed as a known human carcinogen by the [International Agency for Research on Cancer \(IARC\)](#) and other agencies. It has been shown to cause cancer in laboratory animals. Butadiene epidemiology studies have linked employment in two different chemical operations each with a different type of cancer. The factors causing these excess cancers have not been determined because the workers are also exposed to other chemicals in these workplaces.

Butadiene has caused birth defects in laboratory animals only at doses toxic to the mother; however butadiene has been shown to be toxic to the fetus in laboratory animals at doses that are not toxic to the mothers. Butadiene has been shown to cause injury to reproductive organs in mice, although no reproductive effects were observed in rats following exposure to high levels of butadiene.

Environmental Information:

Environmental exposure to BDFS is minimal because the material is a gas at ambient temperature and is transported and stored in closed, pressurized systems. In case of an accidental release of BDFS to the environment, the highly volatile BDFS is expected to partition into air where it will rapidly degrade. BDFS is not expected to accumulate and present an environmental hazard.

Exposure Potential:

Exposure to BDFS in occupational and non-occupational settings is expected to be very limited. BDFS is usually handled in a closed, pressurized system and human exposure is minimal. In the case of an accidental release, BDFS is expected to volatilize quickly into the atmosphere.

- *Workplace use:* This refers to potential exposure to BDFS to persons in a manufacturing facility or through various industrial applications. Manufacturing and transport involving BDFS are usually conducted in closed and pressurized systems, so human exposure is expected to be very limited. Occupational exposure may occur during sampling or due to unexpected leakages resulting from equipment failure.
- *Consumer use:* There is no direct consumer use of BDFS. Non-occupational exposure to BDFS is expected to be limited to exposure following inadvertent release of the product.
- *Potential environmental release:* BDFS is stored and transported in closed, pressurized systems. Exposure to the environment is expected to be very low. Chevron Phillips Chemical 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 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. To that end, Material Safety Data Sheet and certificate of analysis are provided to the customers. In addition, we have completed a product risk assessment to evaluate the potential risks associated with the distribution and use of BDFS.

Regulatory Information:

Regulations exist that govern the manufacture, sale, transportation, use and/or disposal of BDFS. 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 and local and Federal regulations.

Sources of Additional Information:

- Organization for Economic Cooperation and Development (OECD) - eChemPortal web-based search tool (use applicable CAS No):
<http://webnet3.oecd.org/echempportal/>
- U.S. Environmental Protection Agency (US EPA) - High Production Volume Information System (HPVIS):
<http://www.epa.gov/hpvis/index.html>
- European Chemicals Agency (ECHA) – Information on Registered Substances:
<http://apps.echa.europa.eu/registered/registered-sub.aspx>
- American Chemistry Council Butadiene Product Summary
<http://www.americanchemistry.com/Butadiene>
- Chevron Phillips Chemical's olefins product website:
<http://www.cpchem.com/bl/olefins/en-us/Pages/Products.aspx>
- Chevron Phillips Chemical's Material Safety Data Sheets:
<http://www.cpchem.com/en-us/pages/msdssearch.aspx>

Conclusion:

Butadiene feedstock (BDFS) is an important petrochemical feedstock. BDFS is highly flammable. Exposure at high levels may cause central nervous system effects and exposure to compressed liquid form may cause frostbite-like cold burns. BDFS is classified as human carcinogen. Appropriate personal protective equipment practices and labeling, storage, and transportation procedures must be followed. Further, the relevant product Material Safety Data Sheets and applicable regulatory guidelines and requirements, including, but not limited to, Occupational Health and Safety Administration (OSHA) guidelines, should be consulted prior to the use or handling of BDFS.

Contact Information:

<http://www.cpchem.com/>

Date: November 22, 2011