

Product Safety Summary Raffinate

Chemical Identity

Raffinate is primarily a mixture of the butylenes and butane components such as, isobutane and n-butane. Raffinate is a colorless gas (liquid under pressure) with a mild petroleum odor. Raffinate 1 is the hydrocarbons remaining after extraction of butadiene. Raffinate 1 is a combination of- butenes with butane. Raffinate 2 is the hydrocarbons remaining after extraction of isobutylene. It consists of n-butenes and n-butane. Raffinate 3 is the C4 hydrocarbons remaining after butane-1 is removed; primarily butane-2 and butanes.

Product Uses

Raffinate 1 is a chemical building block used in the manufacture of methyl tertiary butyl ether (MTBE). Raffinate 2 is used in the manufacture of secondary butyl alcohol (SBA) and methyl ethyl ketone (MEK). Raffinate 3 is primarily used as feedstock in the production of gasoline

Physical Information

Raffinates are a significant fire hazard based on its physical properties, including flash point, vapor pressure, and boiling point. It can quite readily form explosive mixtures in air as a result of its high vapor pressure. Vapors are heavier than air. Therefore, preventive measure must be taken to minimize potential for fire or explosion.

Even though raffinates are an extremely flammable liquid and vapor, it is stable under recommended storage conditions. If a release occurs, vapors may travel a long distance and ignition and/or flash back may occur.

Health Information

In poorly ventilated areas, raffinate vapors can accumulate, exclude oxygen and lead to asphyxiation. Direct contact with liquefied raffinate can cause frostbite-like burns to the eyes and skin.

Raffinate may contain as a minor component butadiene. 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;

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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

Raffinate has high volatility and low-water solubility. When released to the environment from industrial sources, raffinate evaporates to the air, even from water and soil; and raffinate breaks down quickly in sunlight and degrades in the air. Environmental sources include industrial releases from raffinate production and use.

Because of raffinate's high volatility it has a low potential to bioaccumulate, suggesting that toxicity from long-term exposure to aquatic organisms is of low concern. Raffinate has a low bioconcentration potential.

Exposure Potential

The primary route of potential human exposure to raffinate is by inhalation.

Workplace Exposure - Generally, exposure of personnel to raffinate in manufacturing facilities and industrial workplace is relatively low because the process, storage and handling operations are closed, with little potential for releases to the air. Typically industrial workplaces have control programs and work practices to limit exposure.

Consumer Use - Raffinate is not sold to the general public. Consumer exposure from industrial facilities is limited. Exposure to consumers would be expected to be low, while fueling a vehicle or as a combustion product as part of gasoline.

Environmental Releases - As a chemical manufacturer, we are committed to operating in an environmentally responsible manner. Our efforts are guided by understanding of the environmental impact of our operations, as well as by the social and economic needs of the communities in which we operate. Industrial spills or releases are rare; however a spill or release may pose a significant flammability issue. Our operational improvement targets and plans are based on driving incidents with real environmental impact to zero and delivering superior environmental performance.

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Risk Management

Workplace Risk Management – A variety of risk management strategies are used in raffinate manufacturing and use facilities.

Processes are designed to eliminate ignition sources and intrinsically safe equipment is used. Processing, storage, and transport are conducted in closed systems and systems are designed to minimize the potential for exposure or releases to the environment.

Personal Protective Equipment is used in the workplace to prevent exposure in situations where exposure cannot be controlled using engineering controls or other methods.

In addition, through Responsible Care, ACC's global industry performance initiative, since 1988 ACC member companies in the United States have reduced emissions of core Hazardous Air Pollutants (HAPs) chemicals by 86 percent; and reduced emissions of all TRI listed HAPs chemicals by 79 percent. Responsible Care companies go above and beyond government requirements and openly communicate their results to the public.

Consumer Risk Management - This material is not sold directly to the public for general consumer uses. As a result of its use in industrial chemical reactions, consumer exposure is highly unlikely. If exposure should occur, it is expected to be infrequent and of short duration. Always follow manufacturers' instructions, warnings and handling precautions when using their products. The best way to prevent exposure to vapors is to work in well-ventilated areas.

Transportation Information

Raffinate is transported commercially by barge or ship, rail, truck, and pipeline.

Disclaimer

Before using this product, the user is advised to make its own determination and assessment of the safety and suitability of the product for the specific use in question and is further advised against relying on the information contained in this document as it may relate to any specific use or application. It is the ultimate responsibility of the user to ensure that the product is suited and the information is applicable to the user's specific application. TPC Group does not make, and expressly disclaims, all warranties, including warranties of merchantability or fitness for a particular purpose, regardless of whether oral or written, express or implied, or allegedly arising from any usage of any trade or from any course of dealing in connection with the use of the information contained in this document or the product itself. TPC Group further makes no representations, and extends no warranties of any kind, that the use, sale, or other disposition of the product, whether alone or in combination with other products, will not infringe any patent, copyright, trademark, or other proprietary right. The user expressly assumes all risk and liability, whether based in contract, tort or otherwise, in connection with the use of the information contained herein or the product itself. Information contained in this

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