

DEBUTANIZED AROMATIC CONCENTRATE (DAC)

This Product Risk Profile is intended to provide the general public with an overview of product safety information. This document is not intended to replace Safety Data Sheets (SDS). It is not intended to provide emergency response, medical or treatment information or provide discussion of all safety and health information.

Product Summary

Debutanized Aromatic Concentrate (DAC) is an industrial product that consists of a mixture of hydrocarbon products, predominantly C5 through C11. NOVA Chemicals' DAC contains benzene at a concentration of 30 to 50%.

DAC is a product of the ethylene manufacturing process at NOVA Chemicals' Geismar, Louisiana facility. DAC production occurs in closed systems and the product is transported in bulk by barge to other industrial sites in the United States for additional processing. DAC is typically stored in bulk storage tanks equipped with floating roofs, or vapors are vented to a vapour combustion unit to reduce emissions.

Based on testing of similar materials, this product exhibits low acute toxicity by oral or inhalation routes of exposure. DAC vapors can be seriously irritating to the eyes and the skin, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. Prolonged and or repeated skin contact may defat the skin resulting in possible irritation and dermatitis. The product contains substances, such as benzene, that individually are considered to be more toxic. However, the toxicity of this product in repeated exposure is less severe than benzene due to lower individual component concentrations, less component interaction and competitive inhibition.

Product Use Information

The primary use of the DAC product is in the isolation of high purity benzene and other products. It has to be further processed prior to its use as a feedstock for making other industrial chemicals and plastics. There are no identified consumer product uses for this liquid stream sold by NOVA Chemicals.

Human Exposure

Occupational exposure to DAC is minimal under normal operating conditions because DAC is used in a closed system process unit. There are limited circumstances where occupational exposure could occur, e.g. accidental releases, storage, handling, sampling operations, and fugitive emissions from process equipment (such as pumps or valves). Permitted occupational exposure to the most toxic component, benzene, is limited to 0.5 parts per million (ppm) exposure averaged over 8-hours of work or a 40-hour work week in most of Canada and in the United States. Workplace air quality measurements taken by NOVA Chemicals in typical industrial operations indicate that good equipment design, maintenance and good operating practices and procedures minimize exposure to levels well below 0.5 ppm. The Occupational Safety and Health Administration (OSHA) Benzene Standard, and the American Conference of Governmental Industrial Hygienists (ACGIH) values for occupational exposure Guidelines apply to this product. OSHA and ACGIH have also established guidelines for other components (e.g. toluene, dicyclopentadiene, styrene, cyclopentadiene) found in this product. In addition, ACGIH have established workplace biological exposure indices (BEI) for benzene as well as other components found in this product.

General population exposure to DAC from industrial facilities is limited because industrial air emissions are subject to federal and state/provincial environmental regulations. These regulations cover not only emissions of benzene, but also emissions of other volatile organic compounds.

Health Information

Evaluation¹ of scientific and health information on this product as a whole indicates that DAC is considered to have low acute toxicity by oral or inhalation routes of exposure. Material can cause skin and serious eye irritation.

Benzene is a predominant component of this product. As an acute poison, benzene produces narcotic effects: the probable human oral lethal dose would be between 50 to 500 mg/kg (body weight per day). People who inhale benzene vapors over a prolonged period may experience harmful effects in the tissues that form blood cells especially the bone marrow. This can lead to anemia. Also long-term exposure to benzene can cause cancer of the blood-forming organs. Exposure to benzene has been associated with the development of a particular type of leukemia called acute myeloid leukemia (AML). Prolonged exposure of an aging population of workers to benzene can cause myelodysplastic syndrome (MDS) (abnormal growth of red, white or platelet stem cells in the bone marrow).

Environmental Exposure

Environmental exposure to DAC can occur through accidental spills, fugitive emissions, leakage or release of vapors into the atmosphere during tankage, delivery, or transfer for storage. Emissions from storage and loading equipment is typically controlled by

¹ Category Summary For High Benzene Naphthas Category, Prepared by the Olefins Panel of the American Chemistry Council, December 10, 2004, US High Production Volume Chemical Program.

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using floating roof storage tanks. Among other reasons, the release of DAC product from the process, storage and transportation equipment at industrial facilities is avoided because this stream is similar in flammability and volatility characteristics to gasoline.

Industrial volatile organic compound emissions and spills are regulated in Canada and in the United States and must be reported to regulatory agencies.

Ecological Information

Components of the DAC product are toxic to freshwater fish, invertebrates and freshwater algae. Calculated atmospheric half-lives of representative constituent chemicals identified a half-life of 0.9 to 65.8 hours as a result of indirect hydrolysis. This product is likely to biodegrade significantly.

Physical Hazards

DAC is a volatile, pale yellow, flammable liquid that does not dissolve easily in water. DAC has a pungent, unpleasant odor at very low concentrations. DAC poses a serious fire and explosive hazard when exposed to heat or flame. DAC vapor is heavier than air and may collect in low areas. The vapors can travel for some distance; if vapors come into contact with ignition sources, the flame may then be propagated along the vapor trail back to the source and cause an explosion. Industrially produced DAC is kept within closed systems during production, storage, transportation and use to help minimize these risks.

Risk Management at NOVA Chemicals

Risk management priorities focus efforts on controls and improvements in process design, operation and maintenance of our industrial facilities and transportation equipment to prevent accidental releases and minimize the potential for fires or explosion. Use of suitable packing materials and sealing technology minimizes releases from pump seals, valve packings, pipe connections or gaskets. Ongoing preventative Leak Detection and Repair (LDAR) programs are in place at Geismar's production and storage facility. Emergency response teams are prepared and equipped to rapidly respond to on-site and off-site incidents. Processes are designed to eliminate possible ignition sources and undergo periodic detailed Process Hazard and Risk Assessment reviews (HAZOPs).

All processing, storage, and transport are conducted in closed systems designed to minimize the potential for exposure or releases to the environment. Industrial Hygiene programs periodically review all workplace potential exposures to ensure controls are in place and effective. Personal protective equipment is used to prevent exposure in those situations where exposure cannot be controlled using engineering controls or other methods.

NOVA Chemicals continues to carefully review all relevant information on the safety and suitability of DAC and other chemical products for their known and intended end uses. In addition, NOVA Chemicals is committed to sharing information on the safe handling and end use of our products with customers and other interested parties. Safety Data Sheets (SDS) are provided to our customers and can be accessed by interested members of the public electronically at the NOVA Chemicals' website at www.novachemicals.com.

NOVA Chemicals is a member of the American Chemistry Council (ACC) and the Chemistry Industry Association of Canada (CIAC). Through these and other industry associations, we actively monitor and participate in public regulatory processes impacting DAC. We also seek to better understand health and environmental challenges related to all our products. We actively support industry sponsored product testing initiatives and other industry initiatives supporting responsible actions, sound science and lifecycle stewardship of our products.

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For detailed information on this product, please review the product Safety Data Sheet (SDS). In the case of an emergency involving this product, please call our 24-hour hotline at 1-800-561-6682 or 1-403-314-8767.

For more information on this product risk profile, please contact us at 1-412-490-4063 or email us at stewardp@novachem.com.

For more information on any NOVA Chemicals' product, please contact us at the nearest location below during business hours or visit our website at www.novachemicals.com.

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