

## TOLUENE Product Stewardship Summary

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CAS number

108-88-3

Chemical formula

C<sub>6</sub>H<sub>5</sub>CH<sub>3</sub>

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### What is toluene?

Toluene, also known as methyl benzene, phenyl methane and toluol, is produced primarily by reforming naphtha during the manufacture of gasoline. It is a clear, colourless liquid, with a characteristic 'aromatic' smell. Toluene has low volatility due to the methyl group (CH<sub>3</sub>) in its chemical structure, which makes it a good octane-enhancer for motor gasoline blending.

### How is toluene used?

Currently, three grades of toluene purity are available in the market: TDI, nitration, and commercial. TDI grade toluene is used to make isocyanates, which are combined with polyols in the manufacture of polyurethanes. In turn, polyurethanes are used in a wide variety of consumer goods, such as foams for furniture and bedding, coatings for floors and furniture, artificial sports tracks, ski suits and waterproof leisure wear.

Nitration grade toluene is widely used in the solvent market and also in the production of phenol, particularly in Europe.

Both nitration and commercial grades are used as feed in the hydrodealkylation process, which strips off the methyl group from toluene to make benzene. These grades are also used in the disproportionation process, which removes the methyl group from one toluene molecule and attaches it to another, resulting in one benzene and one xylene molecule.

Toluene is produced in very large quantities, most of which is never removed from the gasoline manufacturing streams. Most commercial grade toluene is returned to the gasoline pool as a blend component resulting in higher-octane grades.

## **Health, Safety and Environmental considerations**

Toluene can irritate the eyes. Low-to-moderate levels of long-term exposure can cause tiredness, confusion, weakness and 'drunken-type' actions. Breathing in high levels of toluene in a short period of time can cause light-headedness and dizziness. Repeated exposure to high levels of toluene – for example by glue-sniffers – can cause permanent brain damage or even death. Toluene can also damage the kidneys following prolonged or repeated exposure to high concentrations. There is no evidence that toluene causes cancer and the International Agency for Research on Cancer (IARC) has not classified toluene for carcinogenic effects. In a workplace environment, maximum occupational exposure limits for toluene are in the range of 50-100ppm, but in practice the levels present in normal circumstances are much lower. These limits are judged safe over a normal 40-year working life.

Toluene is flammable. Vapours are heavier than air. Vapours may travel across the ground and reach remote ignition sources causing a flashback fire. Electrostatic charges may be generated during pumping which may ignite and cause a fire.

Toluene is toxic to fish, however, in view of the high rate of loss due to evaporation, it is unlikely to pose a significant hazard to aquatic life. If it enters soil, it will be highly mobile and may contaminate groundwater. It is readily biodegradable and does not bioaccumulate significantly.

## **Storage and Transport**

Toluene should be stored in mild steel or stainless steel. Toluene is regulated for transport as a Class 3, Flammable, and is transported by truck, rail, and marine.

## **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. They are manufactured, stored and transported to customers in closed systems. Depending on the customer, end uses may vary from use as an intermediate for the manufacture other chemicals, commercial products, or certain formulated consumer products. Proper equipment design and handling procedures maintain low risk from exposure to toluene where the product is used as a chemical intermediate. Exposures may be higher in commercial and consumer applications. To minimize risk, additional controls, such as, special handling procedures and protective packaging, are implemented.

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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.