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Mtbe melting point

physical condition; The appearance of a colorless liquid with a characteristic smell. Physical danger Vapors are heavier than air and can travel on the ground; possible distant ignition. Chemical hazards React strongly with strong oxidants. This poses a risk of fire. Decomposes in contact with acids. Formula: (CH3)3COCH3 / C5H12O Molecular weight: 88,2 Boiling point: 55 °C Melting point: -109°С Relative density (water = 1):0,7 Water solubility, g/100 ml at 20 °C: 4,2 Vapour pressure, kPa at 20 °C: 27 Relative vapour density (air = 1): 3,0 Relative density of the vapour/air mixture at 20 °C (air = 1): 1,5Flash point: -28 °C c.c.Auto-ignition temperature: 375 °C Explosive limits, vol% in air: 1.6-15.1Octanol/water partition coefficient log Pow: 1.06 MTBE is a colourless mobile liquid with a characteristic terpenes-like odour. Its melting point is - 108,6 °C (Scholz et al., 1990) and boiling in the range of 55,3 °C (Scholz et al., 1990). MTBE has a relative density of 0,74 at 20 °C (Budavari, 1989), MTBE vapour pressure is 33000 Pa at 25 °C (Harlan Laboratories Ltd, 2009). MTBE water solubility is 41850 mg/l at 20 °C (Petroleum Products Research, 1997). The octanol/water partition coefficient (log Pow) is 1,06 (Hüls, 1989). The substance is not surface active; The surface tension of 1,07 g/l of the surface tension in water shall be 72,5 mN/m at 21,5 °C (SafePharm Laboratories, 2008). Mtbe has a static viscosity of 0,464 mm²/s at 0,409 mm²/s (SafePharm Laboratories, 2008) at 40 °C. The flash point of the substance shall be -28 °C (Scholz et al., 1990). Based on this value and boiling point at 55,3 °C, MTBE should be classified as flammable liquid of category 2 (H225) in accordance with the criteria of the CLP Regulation. The molecular structure of MTBE does not contain groups indicating possible reactivity with water or pyrophoric properties. Mtbe automatic ignition temperature is 460 °C. The substance is not expected to have explosive and oxidising properties. The substance remains unsegregated in water because it does not contain chemical groups that can undergo dissociation. MTBE is a stable chemical and is not expected to cause instability when mixed with typical organic solvents. According to reach Annex VII, column 2, the study of granulometry is not necessary because MTBE is a liquid and is used in unclear or granular form. Methyl tert-butyl ether Names IUPAC name 2-methoxy-2-methylpropane Other names Methyl tert-butyl ether; Methyl tert-butyl ether; Methyl-t-butyl ether; MTBE; tBME; tert-BuOMe Identifiers CAS Number 1634-04-4 Y 3D Model (JSmol) Interactive Image ChEBI ChEBI:27642 Y ChemSpider 14672 Y ECHA InfoCard 100.015.140 KEGG C11344 Y PubChem CID 15413 UNI 2914YB3S89 y Comptox dashboard (EPA) DTXSID3020833 inChI SMILES O(C(C)C)C Properties Chemical formula C5H12O Molar mass 88.150 g·mol−1 Appearance colourless liquid Density 0.7404 g/cm³ Melting point −109 °C (−164 °F; 164 K) Boiling point 55.2 °C (131,4 °F; 328,3 K) Water solubility 26 g/G (20 °C)[1] Viscosity 0,36 cP at 25 °C Hazard NFPA 704 (fireman) 3 1 Flash point −33,0 °C (−27,4 °F; 240,2 K) Unless otherwise specified, material data are provided in their standard condition (25 °C [77 °F, 100 kPa). Y check (what is YN?) The information form references Methyl tert-butyl ether (MTBE), also known as tert-butyl methyl ether, is an organic compound in the structural formula (CH3)3COCH3. MTBE is a volatile, flammable and colourless liquid which is low in water[1]. Mtbe is mainly used as a fuel additive and is mixed with petrol to increase impact resistance and reduce unwanted emissions. [2] [3] MTBE manufactures the production and properties by means of a chemical reaction of methanol and isobutylene. Methanol is mainly derived from natural gas[4], where steam reforming converts various light hydrocarbons into natural gas (mainly methane) into carbon monoxide and hydrogen. [5] The gases obtained are then further reacted in the presence of the catalyst to form methanol. [6] Isobutylene can be produced using various methods. One method of following the method is through the isomerization of n-butane into isobutane, which then undergoes dehydrogenation to form the desired product. [7] MTBE production in the USA reached 260,000 barrels per day[8] before dropping to around 50,000 barrels per day and keeping it stable.[9] mainly for the export market. Following the acquisition of SABIC[10][11], the oil giant Saudi Aramco is now considered the world's largest producer[12] with a production capacity of 2.37 million tonnes per year (mtyear). [13] Mtbe's worldwide production capacity was estimated to be 35 million tonnes in 2018. [14] Used by MTBE used as fuel component for fuel gasoline engines. It is one of a group of chemicals known as oxygen products because they increase the oxygen content of petrol. As an anti-knocking agent in the US, MTBE has used gasoline at a low level since 1979, replacing tetraethyllead (TEL) as an antiknock (octane rating) additive to prevent engine knocking. Oxygen compounds also help petrol to burn completely by reducing exhaust emissions and diluting or displacing gasoline components such as aromatic substances (e.g. benzene). Before the introduction of other oxygen products and octane boosters, refineries chose MTBE for its blending characteristics and low costs. Alternatives to MTBE as an anti-knock agent Other oxygen compounds are available as additives to gasoline, including ethanol and other aethers such as ETBE. Ethanol is advertised as a safe alternative to agriculture and other interest groups in the US and Europe. In 2003, was the first U.S. state to start replacing MTBE with ethanol. An alternative to ethanol is ETBE, which is produced from ethanol and isobutene. Its activity as an additive is similar to MTBE, but due to the higher price of ethanol compared to methanol, it is more expensive. Higher quality gasoline is also an alternative to additives such as MTBE being unnecessary. Use the iso-octane number itself. MTBE plants can be upgraded to extract isooctan from isobutylene. [15] [16] As mtbe solvent is widely used in industry as a safer alternative to diethyl ether (commonly used in academic studies), as the tert-butyl group does not allow MTBE to form potentially explosive peroxides. It is also used as a solvent in academic studies[17][18][19], although it is used less frequently than diethyl ethers. Although ether, MTBE has a poor Lewis base and does not support the formation of Grignard reagents. It is also unstable against strong acids. It reacts dangerously with bromine. [20] MTBE consists of azeotropes with water (52,6 °C; 96,5% MTBE)[21] and methanol (51,3 °C; 68,6% MTBE). [22] In a medical procedure called contact dissolution, MTBE is injected directly into the gallbladth to dissolve the gallstones. [23] [24] Mtbe permeability and permeability provide water with an unpleasant taste at very low concentrations. MTBE is often injected into water supply aquifers, leaking underground storage tanks (USTs) at a gasoline station or gasoline containing MTBE being spilled on the ground. Higher water solubility and persistence of MTBE cause it to travel faster and further than many other components of gasoline when released into the aqueous layer. [25] MTBE is biodegradable due to bacterial exposure. In the form of an appropriate bioreactor, e.g. liquid bed bioreactor, MTBE can be rapidly and economically discharged from water to undetected levels. Activated carbon produced from coconut shells and optimised for mtbe adsorption may reduce MTBE to undetectable levels[26], although this level of reduction can only occur under the most self-defining conditions. There are currently no known published cases where an in-situ treatment method would have been used, which could reduce the concentration of pollutants to the initial (pre-development) conditions in the water surface matrix. According to IARC, the cancer research agency of the World Health Organization, MTBE is not classified as a human carcinogen. MTBE may be tasted in water at a concentration of 5 to 15 µg/l.[27] From 2007, researchers have limited data on the health effects of ingestion of MTBE. The United States Environmental Protection Agency (EPA) has concluded that the available data are not sufficient to determine MTBE health risks at low exposure levels in drinking water, but the data support the conclusion that high doses of MTBE are a potential carcinogen for humans. [28] Regulation and u.S. main article: MTBE disputes restrictions on MTBE production and use in 2000, EPA developed plans to phase out MTBE across the country for more than four years. [quote required] Some states introduced MTBE bans without waiting for federal restrictions. California banned MTBE as a gasoline additive in 2002. [30] However, MTBE remains legal with regard to other industrial uses. [31] The Energy Policy Act of 2005, approved by the US House of Representatives, did not contain a provision to protect MTBE producers from water pollution lawsuits. This provision was first proposed in 2003, and some considered them to be a priority for Tom DeLay and Rep. Joe Barton, then chairman of the Energy and Trade Committee. [32] This bill was included in a provision that gave MTBE makers, including some major oil companies, \$2 billion in transition assistance, while MTBE was phased off over the next nine years. [33] Due to opposition from the Senate,[34] the conference report will send all MTBE rules. The final bill was signed by President George W. Bush. [35] Due to the lack of liability of MTBE, the use of ethanol as a gasoline additive is changed. It was estimated that cleaning costs and litigation cost mtbe separation from groundwater and soil pollution in the US from USD 1 billion[36] to USD 30 billion.[37], including removing the compound from aquifers and municipal water supply and replacing leaky underground oil tanks. In one case, the cost to oil companies to clean MTBE wells owned by the city of Santa Monica, California was estimated to exceed \$200 million. [38] In another case, New York City estimated the \$250 million cost of cleaning one wellfield in the borough of Queens in 2009. [39] In 2013, a jury awarded the State of New Hampshire \$236 million in damages for treating MTBE contaminated groundwater. [40] As of 2016, hundreds of lawsuits have not yet been dealt with regarding MTBE contamination in public and private drinking water supplies. [quote required] The Drinking Water Regulations EPA first listed MTBE in 1998 as a candidate to develop the national Maximum Pollutant Level (MCL) standard for drinking water. [41] As of 2020, the Agency has not announced whether it will develop an MCL. [42] EPA uses toxicity data to develop MML for public water systems. [43] California established a state-level MCL MTBE in 2000, 13 micrograms per litre. [44] See also cyclolophenyl methyl ether (CPEK) Ethyl-tert-butyl ether (ETBE) tert-amyl methyl ether (TAME) Tetraethylelead (TEL) reference^ a b Methyl tertbutylether record in the GESTIS substance database of the Institute for Occupational Safety and Health ^ Prices, markets and analysis of methyl tertiary butyl ether. ICIS Explore. Retrieve ^ Oxygenates. www.api.org. Retrieved 2020-06-28. METHANOL INSTITUTE. Updated: 2020-06-29. ^ Anzelmo, Bryce; Samantha, Aivars. , I'm a Liguori, Simon. Production of hydrogen using natural gas vapour, which is being reformed in the Pd-Au membrane reactor. Study of response temperature and GHSV effects and long-term stability (PDF). 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