

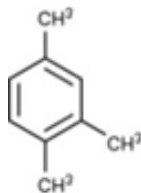
# Ground Water Quality Standard for 1,2,4-Trimethylbenzene CASRN# 95-63-6

October 2015

NJDEP

**Summary of Decision:** In accordance with the New Jersey Ground Water Quality Standards rules at N.J.A.C. 7:9C-1.7, the Department of Environmental Protection (Department) has determined that insufficient information is available to develop a specific or interim specific ground water quality criterion for 1,2,4-trimethylbenzene at this time. Since 1,2,4-trimethylbenzene is a synthetic organic chemical not listed in Appendix Table 1, and there is no evidence of carcinogenicity found in the literature, **the applicable constituent standard is the interim generic ground water quality criterion of 100 µg/L.** The basis for this criterion and PQL are discussed below.

**1,2,4-Trimethylbenzene**  
**Molecular Formula: C<sub>9</sub>H<sub>12</sub>**  
**Molecular Structure:**



**Background:** 1,2,4-Trimethylbenzene (TMB) is found in the C9 aromatic fraction (aromatic hydrocarbons with nine carbons) that is produced during petroleum refining. The C9 aromatic fraction contains about 40% 1,2,4-TMB (USEPA, 2012). Vehicle emissions are a source of TMBs in the environment, due to the widespread use of the C9 fraction in gasoline (USEPA, 2012). TMBs are also used as solvents, dyestuff intermediates, paint thinners, and as a UV oxidation stabilizer for plastics (USEPA, 2012).

**Literature Search:** An online search of the published literature was conducted using the PubMed.gov database of the U.S. National Library of Medicine, of the National Institutes of Health, and the Hazardous Substances Data Bank of the Toxicology Data Network of the U.S. National Library of Medicine. Additionally, relevant peer-reviewed publications and non-peer reviewed reports cited in the USEPA 1,2,4-Trimethylbenzene Provisional Peer Reviewed Toxicity Value document (USEPA, 2007) and the USEPA IRIS Toxicological Review of Trimethylbenzenes External Review Draft (USEPA, 2012; USEPA 2013) and the USEPA Science Advisory Board (2015) draft review of the draft IRIS assessment were reviewed.

**Reference Dose:** There are no oral data that can be used to derive a reference dose (RfD) for 1,2,4-TMB. Available data suggest that systemic toxicity of TMBs is similar for oral and inhalation exposures. USEPA (2013) states that the confidence in the proposed RfD is low to medium. USEPA must consider and address the comments of the USEPA Science Advisory Board (2015) before finalizing the IRIS assessment for 1,2,4-TMB. The

health-based ground water concentration based on the RfD of  $2 \times 10^{-2}$  mg/kg/day that is proposed in the most recent draft IRIS assessment (USEPA, 2013), using default exposure assumptions of 70 kg body weight, 2 L/day water consumption, and 0.2 Relative Source Contribution factor, would be 140 µg/L. When rounded to one significant figure, this would result in the same value as the Interim Generic Ground Water Criterion of 100 µg/L when considered in the context of the high level of uncertainty associated with its derivation. Although the final RfD could be higher or lower than the RfD presented in USEPA (2013), the fact that the draft RfD-based (140 µg/L) value rounds to the generic value (100 µg/L) supports the conclusion that the Interim Generic Criterion is sufficiently health protective and is not overly stringent.

**Derivation of Ground Water Quality Criterion:** The Department has determined that insufficient information is currently available to develop a specific or interim specific health-based ground water quality criterion for 1,2,4-TMB. The Ground Water Quality Standards at N.J.A.C. 7:9C-1.7(c)6 establish that for synthetic organic chemicals (SOC) not listed in Appendix Table 1, the interim generic ground water quality criterion of 5 µg/L applies to SOCs defined as carcinogens at N.J.A.C. 7:9C-1.4 (generally, chemicals categorized by USEPA carcinogen risk assessment as Group A, B, or C (USEPA, 1986) or their equivalent descriptors under the updated USEPA (2005) carcinogen risk assessment guidelines, and the interim generic ground water quality criterion of 100 µg/L applies to SOCs defined as non-carcinogens at N.J.A.C. 7:9C-1.4. No evidence of carcinogenicity has been found, therefore, the interim generic ground water quality criterion of 100 µg/L applies to this constituent.

**Derivation of PQL:** The method detection limit (MDL) and the practical quantitation level (PQL) are performance measures used to estimate the limits of performance of analytical chemistry methods for measuring contaminants. The MDL is defined as "the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero" (40 CFR Part 136 Appendix B). USEPA recommends that the MDL be multiplied by a factor of five or 10 to account for the variability and uncertainty that can occur at the MDL. The Department uses a value of five as the median upper boundary of the inter-laboratory MDL distribution from the New Jersey certified laboratory community and multiplies the MDL by five to derive the PQL. Establishing the PQL at a level that is five times the MDL provides a reliable quantitation level that most laboratories can be expected to meet during day-to-day operations.

1,2,4-Trimethylbenzene appears as a listed parameter in a published USEPA method "524.3, Purgeable Organic Compounds in Water by GCMS". The limit of detection in the method is 0.015 ppb. The practical quantification level (PQL) calculated from the MDL X 5 is 0.08 ppb, **therefore the PQL is 0.08 ppb.**

**Conclusion:** Based on the information provided above (and cited below), the Department has determined that insufficient information is available to develop a specific or an interim specific ground water quality criterion for 1,2,4-trimethylbenzene at this time; therefore, **the applicable constituent standard is the interim generic ground water quality criterion of 100 µg/L.**

**Technical Support Documents:** *Interim Specific Ground Water Quality Criterion Recommendation Report for 1,2,4-Trimethylbenzene*, Gloria B. Post, Ph.D. DABT, NJDEP, March 20, 2013; *Procedure for Describing Process for Development of Analytical Practical Quantitation Levels (PQLs) for 1,2,4-Trimethylbenzene*, R. Lee Lippincott, Ph.D., NJDEP, March 13, 2014.

**References:**

USEPA (1986). United States Environmental Protection Agency. *The Risk Assessment Guidelines of 1986*. Washington, DC. EPA/600/8-87/045. August 1987.

USEPA (2005). United States Environmental Protection Agency. *Guidelines for Carcinogen Risk Assessment. Risk Assessment Forum*, USEPA, Washington, DC. EPA/630.P-03/001F, March 2005.

USEPA (2007). *Provisional Peer Reviewed Toxicity Values for 1,2,4-Trimethylbenzene (CASRN 95-63-6)*. Superfund Health Risk Technical Support Center, National Center for Environmental Assessment, Cincinnati, OH. 6/11/07.

USEPA (2012). United States Environmental Protection Agency. *Toxicological Review of Trimethylbenzenes (CAS No. 25551-13-7, 95-63-6, 526-73-8, and 108-67-8) In Support of Summary Information on the Integrated Risk Information System (IRIS)*, External Review Draft. EPA/635/R-11/012Aa. June 2012.

USEPA, 2013. *Toxicological Review of Trimethylbenzenes, In support of Summary Information on the Integrated Risk Information Systems (IRIS)*. August. [http://ofmpub.epa.gov/eims/eimscomm.getfile?p\\_download\\_id=515350](http://ofmpub.epa.gov/eims/eimscomm.getfile?p_download_id=515350)

USEPA Science Advisory Board (SAB), 2015. *Chemical Assessment Advisory Committee Augmented for Review of the Draft IRIS Trimethylbenzene Assessment*. May 1. [http://yosemite.epa.gov/sab/sabproduct.nsf/ebBOARD/70A1F3B6E73CB94985257E3E0065F17A/\\$File/TMB+Report+20150501+QR+.pdf](http://yosemite.epa.gov/sab/sabproduct.nsf/ebBOARD/70A1F3B6E73CB94985257E3E0065F17A/$File/TMB+Report+20150501+QR+.pdf)



New Jersey Department of Environmental Protection  
Water Monitoring and Standards  
Bureau of Environmental Analysis, Standards and Restoration  
[www.state.nj.us/dep/wms/bears/](http://www.state.nj.us/dep/wms/bears/)  
(609) 633-1441

