

Methyl Ethyl Ketone (MEK) and Water

Methyl Ethyl Ketone (MEK or 2-butanone) is an industrial chemical often used as a solvent. It also occurs naturally at small levels in trees, fruits and vegetables. MEK is a colorless, flammable liquid with a distinct sweet odor at room temperature. Commercially, the largest industrial use of MEK is as a solvent for vinyl plastic used in coatings and molded products. MEK is also a component of paints, lacquers, paint removers, adhesives, inks, and metal degreasers. It has additional uses as a sterilizing agent for medical supplies (e.g., needles, metal instruments) and in lipid extraction.

The Minnesota Department of Health (MDH) Risk Assessment Unit evaluates health risks for contaminants in drinking water and develops health-based guidance values for groundwater. The toxicological summary for MEK can be found at the MDH Human Health-Based Water Guidance Table website.¹ MDH works in collaboration with the Minnesota Pollution Control Agency (MPCA) and the Minnesota Department of Agriculture (MDA) to understand the occurrence and environmental effects of these contaminants.

MEK in Minnesota Waters

Methyl ethyl ketone has been detected in Minnesota groundwater for more than 30 years. In Minnesota public drinking water systems, MEK has been found occasionally (0.4% of samples) but consistently from 1993 to the present. Out of 35,000 samples collected since 1993, four exceeded the 2025 MDH guidance value for MEK. According to the MPCA, MEK was detected in groundwater at 15% of closed landfill sites where it was analyzed, with a maximum concentration in groundwater of 140,000 µg/L at these sites. It has also been detected in groundwater in at least 84 sites in MPCA's Superfund, Resource Conservation and Recovery Act (RCRA), and Voluntary Investigation and Cleanup (VIC) programs. At these sites, a maximum concentration in groundwater of 310,000 µg/L was measured. One microgram per liter (µg/L) is the same as one part per billion (ppb).

MDH Guidance Value

Based on available information, MDH developed a guidance value of 400 µg/L or ppb for MEK in drinking water. MDH does not use health-based guidance values to regulate water quality, but they may be useful for situations in which federal regulations do not exist. MDH develops guidance values to protect people who are most highly exposed and people who are most sensitive to the potentially harmful effects of a contaminant, including pregnant people, fetuses, infants, and children. A person drinking water at or below the guidance value would be at little or no risk for harmful health effects.

Potential Health Effects

In animal studies, exposure to a compound closely related to MEK, 2-butanol, in drinking water has been associated with developmental toxicity, such as decreased birth weight, as well as chronic kidney effects.² People with questions about their personal risk of health impacts from MEK exposure should consult with their physician.

Information on MEK toxicity in humans is limited and primarily focused on inhalation in occupational settings. The available data suggest neurological effects may result from acute inhalation exposures to MEK in humans. Virtually no human-based data are available on the effects of MEK following ingestion.³

Potential Exposure to MEK

Almost everyone is exposed to small amounts of MEK. For most Minnesotans, the majority of MEK exposure comes from non-drinking water sources.² These may include many foods, where MEK occurs naturally at very low levels, and exposure through inhalation of and skin contact with MEK. People may also be exposed to MEK when using consumer products that contain MEK, such as adhesives, paints, and varnishes.

MEK in the Environment

MEK continues to be manufactured and used in a wide variety of products, so releases to the environment are ongoing. In surface water, MEK typically breaks down over a time span of days to weeks and will easily migrate from water to the air. In groundwater, MEK is highly mobile and does not break down or migrate to air as easily as in surface water. MEK is not expected to build up inside the bodies of animals or humans.²

References

1. Minnesota Department of Health (MDH). (January 2025). Human Health-Based Water Guidance Table. "Toxicological Summary for: MEK."
<https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/mek.pdf>.
2. U.S. Environmental Protection Agency (EPA). (2003). Toxicological review of methyl ethyl ketone. Washington, D.C. Retrieved from
https://cfpub.epa.gov/ncea/iris/iris_documents/documents/toxreviews/0071tr.pdf.
3. Agency for Toxic Substances and Disease Registry (ATSDR). (October 2020). ToxGuide for 2-Butanone. <https://www.atsdr.cdc.gov/toxguides/toxguide-29.pdf>.

Minnesota Department of Health
Health Risk Assessment Unit
PO Box 64975, St. Paul MN 55164
651-201-4899
health.risk@state.mn.us
www.health.state.mn.us



February 2025

To obtain this information in a different format, call: 651-201-4899.