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# Air Toxicological Summary for: Diethylene Glycol Monobutyl Ether (DEGBE)

CAS: 112-34-5

## Air Exposure Durations

- Acute<sub>1hr</sub> = 1 hour
- Acute<sub>24hr</sub> = 24 hours
- Intermediate = greater than 24 hours to 1 year
- Chronic = greater than 1 year to a lifetime
- Cancer = 0 to 70 years (lifetime)

**Acute<sub>1hr</sub> Non-Cancer Health Based Value (HBV<sub>Acute1hr</sub>) = Not Derived (insufficient data)**

**Acute<sub>24hr</sub> Non-Cancer Health Based Value (HBV<sub>Acute24hr</sub>) = Not Derived (insufficient data)**

**Intermediate Non-Cancer Health Based Value (HBV<sub>inter</sub>) = 1 µg/m<sup>3</sup>**

$$= \frac{\text{POD}_{\text{HEC}} \text{ mg/m}^3}{\text{UF}}$$

$$= \frac{0.32 \text{ mg/m}^3}{300}$$

$$= 0.001 \text{ mg/m}^3 = 1 \text{ µg/m}^3$$

Reference Concentration:  $\text{POD}_{\text{HEC}}/\text{Total UF} = 0.001 \text{ mg/m}^3$  (rodent study)

Source of toxicity value: EPA PPRTV 2009

Point of Departure (POD) and Critical Effect:  $\text{BMCL}_{10} = 0.32 \text{ mg/m}^3$ ; hepatocyte vacuolization in female rats

Human Equivalent Concentration (HEC):  $\text{BMCL}_{10\text{HEC}} = 0.32 \text{ mg/m}^3$ , DAF = 1

Total uncertainty factor (UF): 300

Uncertainty factor allocation: An uncertainty factor of 3 is applied for interspecies extrapolation to account for potential pharmacodynamic differences between rats and humans.

An uncertainty factor of 10 for intraspecies differences is used to account for sensitive subpopulation among humans.

An uncertainty factor of 10 is applied to account for deficiencies in the database. The database includes only one 5-week study, lacks developmental toxicity studies and a multigeneration reproduction study.

**Chronic Non-Cancer Health Based Value (HBV<sub>chronic</sub>) = 0.1 µg/m<sup>3</sup>**

$$= \frac{\text{POD}_{\text{HEC}} \text{ mg/m}^3}{\text{UF}}$$

$$= \frac{0.32 \text{ mg/m}^3}{3000}$$

$$= 0.0001 \text{ mg/m}^3 = 0.1 \text{ µg/m}^3$$

Reference Concentration:  $\text{POD}_{\text{HEC}}/\text{Total UF} = 0.0001 \text{ mg/m}^3$  (rodent study)

Source of toxicity value: EPA PPRTV 2009

POD and Critical Effect:  $\text{BMDL}_{10} = 0.32 \text{ mg/m}^3$ ; hepatocyte vacuolization in female rats

Human Equivalent Concentration:  $\text{BMDL}_{10\text{HEC}} = 0.32 \text{ mg/m}^3$ , DAF = 1

Total uncertainty factor: 3000

Uncertainty factor allocation: An uncertainty factor of 3 is applied for interspecies extrapolation to account for potential pharmacodynamic differences between rats and humans.

An uncertainty factor of 10 for intraspecies differences is used to account for sensitive subpopulation among humans.

An uncertainty factor of 10 is applied to account for deficiencies in the database. The database includes only one 5-week study; it lacks developmental toxicity studies and a multigeneration reproduction study.

An uncertainty factor of 10 was used for subchronic to chronic duration.

**Cancer Health Based Value = Not Derived (insufficient data)**

Cancer classification: Inadequate information to assess carcinogenic potential; EPA PPRTV 2009

**Volatile:** Yes – average Henry’s Law =  $7.2E^{-9}$  atm-m<sup>3</sup>/mol; EPA CompTox Dashboard v2.7.0 accessed Feb 2026

## Summary of Guidance Value History

MDH had no previously published air guidance values for diethylene glycol monobutyl ether.

### Summary of toxicity testing for health effects identified in the Health Standards Statute (144.0751):

Even if testing for a specific health effect was not conducted for this chemical, information about that effect might be available from studies conducted for other purposes. MDH has considered the following information in developing health protective guidance.

	Endocrine	Immunotoxicity	Development	Reproductive	Neurotoxicity	Respiratory
Tested for specific effect?	No	No	Yes-oral	Yes-oral	Yes-dermal	Yes
Effects observed?	-- <sup>1</sup>	-- <sup>2</sup>	No <sup>3</sup>	Yes <sup>4</sup>	Yes <sup>5</sup>	Yes <sup>6</sup>

#### Comments on extent of testing or effects:

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<sup>3</sup> EC 2006; Wistar rats, groups of 14 – 16 females were given 0, 25, 115, and 633 mg/kg bw/d (gavage) during day 0 – 20 of gestation. According to the authors, reduction in body weight gain was observed at all dose levels and was the only sign of maternal toxicity. No effect on developmental toxicity or teratogenic effects were observed.

<sup>4</sup> Health Canada, 2025; In a reproductive toxicity study, female mice (50 per dose) were orally administered a dose of 500 milligrams of DEGBE per kilogram of body weight per day (mg/kg-bw/day) for 8 days beginning on day 7 of gestation. No significant effects were observed for pup counts (live and dead), litter weights, pup weights or offspring viability ratios. In a repeat-dose toxicity study, rats were orally administered a dose of 0, 50, 250 or 1,000 mg/kg-bw/day of DEGBE for 13 weeks (5 per sex per dose) in the main study, or a dose of 0, 1,000, 1,500 or 2,000 mg/kg-bw/day of DEGBE for 2 weeks (10 rats per sex per dose) in a preliminary study. No adverse effects were observed on sperm parameters or testicular histopathology in male rats. In a fertility study, DEGBE was orally administered to male and female rats (25 per sex per dose) from 60 or 14 days before mating, respectively, at a dose of 0, 250, 500 or 1,000 mg/kg-bw/day. No adverse effects on fertility, embryos, fetuses, or neonates were found at any dose tested. However, the mean pup weights were slightly reduced during the later stages of lactation among the offspring of the high-dose female rats group (1,000 mg/kg-bw/day). In a teratology study by the same authors, dermal application of a dose of 0, 100, 300 or 1,000 mg/kg-bw/day of DEGBE on pregnant rabbits (20 per group) from gestation days 7-18 did not result in fetal malformations or adverse effects on intrauterine survival. In an OECD Test Guideline 415-compliant study, rats (8-10 per sex per dose) were gavaged with DEGBE at a dose of 0, 250, 500 or 1,000 mg/kg-bw/day for 9-10 weeks. No adverse effects on

menstrual cycle, estrous cycle, fertility or viability of offspring were reported. In another study, rats (25 per sex) were dermally exposed to a dose of 2,000 mg/kg-bw/day of DEGBE under occlusive conditions for 6 hours per day, 5 days per week for 13 weeks. Rats were then mated and continued to be treated daily during mating and gestation. No adverse effects on mating indices, pregnancy rates, male fertility indices, parturition data, pup body weights or pup viability were reported.

- <sup>5</sup> ECETOC 2005; Male and female Sprague Dawley rats treated dermally for 13 weeks with up to 2,000 mg/kg bw/day of the chemical showed no neurotoxic effects. Neuro effects have not been systematically examined for all glycol ethers. For some glycol ethers, not specifically DEGBE, sublethal levels reversible CNS depression can be observed in humans.
- <sup>6</sup> Histopathological changes in the lungs were noted in rats exposed to vapor (concentration 100 mg/m<sup>3</sup>) and aerosol (> 350 mg/m<sup>3</sup>) of the chemical for a period of two weeks. The effects appeared reversible. Subchronic repeated exposure to DEGBE resulted, at mid and high concentrations, multifocal perivascular and peribronchial accumulation of granulocytes (EC 2006).

## Resources Consulted During Review

1. ACGIH (American Conference of Governmental Industrial Hygienists). 2013. Diethylene Glycol Monobutyl Ether.
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3. Government of Canada (Health Canada). Last updated 2025. Hazardous substance assessment – Diethylene glycol monobutyl ether (DGBE).
4. EPA PPRTV. 2009. Provisional Peer-Reviewed Toxicity Values for Diethylene Glycol Monobutyl Ether (DGBE, CASRN 112-34-5). Superfund Health Risk Technical Support Center, National Center for Environmental Assessment, Office of Research and Development. Cincinnati, OH 45268.
5. European Centre for Ecotoxicity and Toxicology of Chemicals (ECETOC). 2005. ECETOC Technical Report No. 95 The Toxicity of Glycol Ethers and its Relevance to Man. ISSN-0773-8072-95 Brussels.
6. European Commission (EC). 2006. Health and Consumer Protection. OPINION ON DIETHYLENE GLYCOL MONOBUTYL ETHER (DEGBE). SCCP/1043/06.
7. Gushow, T.S., R.R. Miller and B.L. Yano. 1984. Dowanol DB: A 5-week repeated vapor inhalation study in rats. Dow Chemical USA, Midland, MI. Submitted to U.S. EPA under TSCA Section 4, Fiche No. OTS0512379. (unpublished)