Product Safety Assessment

CARBOWAX™ and CARBOWAX SENTRY™ MW 200 – 1000 Polyethylene Glycols


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Names
- CAS No. 25322-68-3
- CARBOWAX™ Polyethylene Glycol 200 through 1000 products
- CARBOWAX SENTRY™ Polyethylene Glycol 300 through 1000 products
- CARBOWAX PEG 200 through 1000 products
- CARBOWAX SENTRY PEG 300 through 1000 products
- PEG-4 through PEG-20

Product Overview
- CARBOWAX™ and CARBOWAX SENTRY™ MW 200-1000 polyethylene glycols are water-soluble liquid or solid polymers, colorless/white in appearance, with a mild odor.1,2,3 For further details, see Product Description.
- CARBOWAX and CARBOWAX SENTRY MW 200-1000 polyethylene glycols are used in applications for adhesives, agriculture, ceramics, chemical intermediates, household products, lubricants, paints and coatings, personal care, printing and inks, textiles, and wood treatment.4,5 For further details, see Product Uses.
- Exposure can occur either in a facility that manufactures these products or in the various industrial or manufacturing facilities that use these products. Dow does not sell these products for direct consumer use, but they are used to make a wide variety of industrial and consumer products.4,5 For further details, see Exposure Potential.
- Eye contact may cause slight, temporary irritation. Contact with undamaged skin may cause slight irritation with redness. No adverse effects are expected from inhalation of these products. They have very low toxicity if swallowed.2,3,6 For further details, see Health Information.
- CARBOWAX and CARBOWAX SENTRY polyethylene glycols are not expected to accumulate in the food chain. These products biodegrade quickly, do not persist in the environment, and are practically nontoxic to aquatic organisms.1,2,3 For further details, see Environmental Information.
- CARBOWAX and CARBOWAX SENTRY polyethylene glycols are stable under recommended storage conditions. Avoid contact with strong acids, strong bases, and strong oxidizers.2 For further details, see Physical Hazard Information.
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Manufacture of Product

- **Capacity** – The Dow Chemical Company is a major global producer of polyethylene glycols. The Dow Chemical Company and its global affiliates produce these products at facilities in Plaquemine, Louisiana, in the United States and in Europe.
- **Process** – Polyethylene glycols are produced by reacting ethylene oxide with an ethylene glycol equivalent and has the structure of \( H-(OCH_2-CH_2)_n-OH \), with “n” indicating the average number of oxyethylene groups.

Product Description

CARBOWAX™ and CARBOWAX SENTRY™ polyethylene glycols are water-soluble polymers available in liquid or solid forms. CARBOWAX Polyethylene Glycol 200, 200E, 300, 300E, 400, 400E and CARBOWAX SENTRY 300, 300E, 400, 400E polyethylene glycols are colorless/white liquids with a mild odor. CARBOWAX and CARBOWAX SENTRY Polyethylene Glycol 600, 600E are semisolids with a mild odor. CARBOWAX and CARBOWAX SENTRY Polyethylene Glycol 540 Blend and 1000 are colorless to white solid polymers with a mild odor.

CARBOWAX and CARBOWAX SENTRY 300, 300E, 400, 400E, 600, 600E, and 1000 polyethylene glycol products are high-purity products (>99%). CARBOWAX Polyethylene Glycol 200 and 200E contain more than 96% polyethylene glycol with small amounts of diethylene glycol (CAS No. 111-46-6) and ethylene glycol (CAS No. 107-21-1).

CARBOWAX Polyethylene Glycol 540 Blend and CARBOWAX SENTRY Polyethylene Glycol 540 Blend are blends of two different polyethylene glycols.

CARBOWAX Polyethylene Glycol 200 and 200E are only available as non-SENTRY materials.

Product Uses

CARBOWAX™ and CARBOWAX SENTRY™ polyethylene glycols are used in a wide range of industries to formulate products with enhanced solvency, lubricity, hygroscopicity, and other important functional properties.

CARBOWAX polyethylene glycols are permitted for use under Food and Drug Administration (FDA) regulation 21 CFR as components for direct and indirect food additives and for use under Environmental Protection Agency (EPA) regulation 40 CFR as inert ingredients in pesticide formulations applied to growing crops or to raw agricultural commodities after harvest, or applied to animals.

Polyethylene glycols are used in the following applications:

- Adhesives
- Agriculture
- Antistatic agents
- Ceramics
- Chemical intermediates
- Dye carriers
- Humectants
- Inks
- Lubricants
- Mining
- Paints and coatings
- Paper and paper products
- Plasticizers
- Textiles
- Wood treatment

CARBOWAX SENTRY polyethylene glycols are used as excipient ingredients and in personal-care and food-product formulations. These products conform to the National Formulary (NF) and the Food Chemicals Codex (FCC) monographs for polyethylene glycols and select European Pharmacopeia (EP) Macrogols and IPEC excipient cGMP guidelines for use in pharmaceutical applications.

Typical applications include:

- Pharmaceutical
- Food processing and packaging
- Chemical intermediates
- Personal care

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Exposure Potential1,2,4,5
CARBOWAX™ and CARBOWAX SENTRY™ polyethylene glycols are used in the production of industrial and consumer products. Based on the uses for these products, individuals could be exposed through:

- **Workplace exposure** – Exposure can occur either in a facility that manufactures these products or in the various industrial or manufacturing facilities that use them. Those working with these products in manufacturing operations could be exposed during maintenance, sampling, testing, or other procedures. Each manufacturing facility should have a thorough training program for employees and appropriate work processes and safety equipment in place to limit exposure. See Health Information.
- **Consumer exposure to products containing CARBOWAX and CARBOWAX SENTRY polyethylene glycols** – Dow does not sell these products for direct consumer use, but they can be used to make a wide variety of industrial and consumer products. These products have been evaluated and permitted for use by the FDA, EPA, and Cosmetic Ingredient Review (CIR) Expert Panel and deemed safe for use by consumers. Always read and follow product label instructions before use. See Health Information.
- **Environmental releases** – In the event of a spill, the focus is on containing the spill to prevent extended contamination of soil, surface water and groundwater. If released to the soil, these products are likely to remain in place at the soil surface, where extended time or addition of water/rainfall could result in migration to deeper soil and groundwater. If released to water, these products would be expected to quickly sink through the receiving water body, and dissolve quickly. Any bulk or dissolved material recovered from spillage should be disposed according to local regulations. Any residual product remaining after recovery of spilled bulk or dissolved material in soil or water will be gradually biodegraded to harmless end-products. These products are readily biodegradable and are considered practically nontoxic to aquatic organisms. Spills may result in a slipping hazard. Small spills should be absorbed with sand or soil. See Environmental, Health, and Physical Hazard Information.
- **Large release** – Industrial spills or releases are infrequent and generally contained. If a large spill does occur, the material should be captured, collected, and reprocessed or disposed of according to applicable governmental requirements. See Environmental, Health, and Physical Hazard Information.
- **In case of fire** – Deny any unnecessary entry into the area and consider the use of unmanned hose holders. Use water spray or fog, carbon-dioxide or dry-chemical extinguishers, or foam to fight the fire. ATC-type foams are preferred. Use of a direct water stream may spread the fire. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Some products may form explosive dust-air mixtures. Dust can be ignited by static charge. Reduce the potential for dust explosions by electrically bonding and grounding all equipment. Do not allow dust to accumulate. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

For more information, request the relevant Safety Data Sheet from the Dow Customer Information Group.

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Health Information1,2,3,6
Health information for CARBOWAX™ and CARBOWAX SENTRY™ polyethylene glycols is summarized on the relevant Safety Data Sheet. It is important to note that health risks associated with individual products may vary based on their formulation or intended use. The Safety Data Sheet is the preferred source for specific health information. These materials may also contain minor components or additives that have additional health risks. An overview of health information for CARBOWAX and CARBOWAX SENTRY polyethylene glycols appears below.

**Eye contact** – Contact may cause slight temporary irritation. Corneal injury is unlikely.

**Skin contact** – Prolonged contact may cause slight irritation with local redness, but is unlikely to result in absorption of harmful amounts. However, prolonged or repeated exposure to abraded or damaged skin (as in burn patients) may result in absorption of toxic amounts or allergy.

**Inhalation** – These materials have low volatility. No adverse effects are expected from a single exposure to polyethylene glycol mist.

**Ingestion** – Polyethylene glycols have very low toxicity if swallowed.

**Repeated exposure** – Repeated exposures are not expected to cause significant adverse effects. However, older clinical findings indicated that repeated exposure of severely burned patients to polyethylene glycols may present a risk. The use of topical applications...
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containing these products may not be appropriate in severely burned patients or patients with impaired renal function. Repeated exposure to polyethylene glycols on intact skin produced no evidence of toxicity.

*Other* – In laboratory testing, polyethylene glycols were not shown to cause cancer or birth defects. *In vitro* and animal genetic toxicity studies showed no effect from exposure to polyethylene glycols.

For more information, request the relevant Safety Data Sheet from the Dow Customer Information Group.

Environmental Information

The CARBOWAX™ and CARBOWAX SENTRY™ polyethylene glycols are very soluble in water, have densities greater than water, and have very low vapor pressure. If released to water, the substances will remain dissolved in, and transported with, the associated water body and will not be evaporated to surrounding air. If released to soil, these substances are expected to initially remain in place, but with time and addition of rain/water could eventually migrate into deeper soil and groundwater.

The products having molecular weight ranging from 200 – 1000 are readily biodegradable, and will be rapidly and ultimately biodegraded in water and soil, and during treatment in a wastewater treatment plant. The substances are shown to be practically non-toxic to aquatic and terrestrial organisms, and are not expected to bioconcentrate (accumulate in the food chain) because of their high molecular weight and high water solubility. As such, the CARBOWAX and CARBOWAX SENTRY polyethylene glycols can be considered as not persistent, bioaccumulative, and toxic (PBT) and not Very Persistent and Very Bioaccumulative (vPvB) substances, according to current criteria for categorization of substances.

For more information, request the relevant Safety Data Sheet from the Dow Customer Information Group.

Physical Hazard Information

CARBOWAX™ and CARBOWAX SENTRY™ polyethylene glycols are stable under recommended storage conditions, but may decompose at elevated temperatures and generate gas during decomposition.

Avoid contact with strong acids, strong bases, and strong oxidizers.

For more information, request the relevant Safety Data Sheet from the Dow Customer Information Group.

Regulatory Information

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of CARBOWAX™ and CARBOWAX SENTRY™ polyethylene glycols. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Safety Data Sheet or Contact Us.

Additional Information

- Contact Us ([www.dow.com/polyglycols/polyethylene/contact/index.htm](http://www.dow.com/polyglycols/polyethylene/contact/index.htm))
- “Polyethylene glycol: CASRN: 25322-68-3,” Hazardous Substances Data Bank (HSDB), U.S. National Library of Medicine, TOXNET ([http://toxnet.nlm.nih.gov/cgi-bin/sis/search/r?dbs+hsdb@term+@na+Polyethylene+glycol](http://toxnet.nlm.nih.gov/cgi-bin/sis/search/r?dbs+hsdb@term+@na+Polyethylene+glycol))

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For more information about CARBOWAX™ and CARBOWAX SENTRY™ polyethylene glycols, visit the Dow Polyethylene Glycols website at www.dow.com/polyglycols/polyethylene/.

References
1. CARBOWAX™ Polyethylene Glycol 200 Material Safety Data Sheet, The Dow Chemical Company.
2. CARBOWAX SENTRY™ Polyethylene Glycol 540 Blend Material Safety Data Sheet, The Dow Chemical Company
3. CARBOWAX SENTRY™ Polyethylene Glycol 1000 Material Safety Data Sheet, The Dow Chemical Company
4. CARBOWAX™ Polyethylene Glycols: Innovation, Performance, Flexibility and Quality from the Global Leader in PEGs, The Dow Chemical Company, Form No. 118-01789-1011 AMS
5. CARBOWAX SENTRY™ Polyethylene Glycols: Innovation, Performance, Flexibility and Quality from the Global Leader in PEGs, The Dow Chemical Company, Form No. 118-01790-1011 AMS
6. CARBOWAX™ Polyethylene Glycol 200E Material Safety Data Sheet, The Dow Chemical Company

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NOTICES

As part of its 2015 Sustainability Goals, Dow has committed to make publicly available safety assessments for its products globally. This product safety assessment 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 relevant Safety Data Sheet, which should be consulted before use of the chemical. This product safety assessment does not replace required communication documents such as the Safety Data Sheet.

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