Product Safety Assessment

**CARBOWAX™ and CARBOWAX SENTRY™ MW 1450 – 8000 Polyethylene Glycols**


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**Names**
- CAS No. 25322-68-3
- CARBOWAX™ and CARBOWAX SENTRY™ MW 1450-8000 Polyethylene Glycols
- CARBOWAX Polyethylene Glycol 1450 through 8000 products
- CARBOWAX PEG 1450 through 8000 products
- CARBOWAX SENTRY PEG 1450 through 8000 products
- PEG-32 to PEG-180
- CARBOWAX SENTRY Polyethylene Glycol 1450 through 8000 products

**Product Overview**
- CARBOWAX™ and CARBOWAX SENTRY™ MW 1450-8000 polyethylene glycols are water-soluble polymers available in aqueous, powder, flake, granular, or molten forms. They range from 1450 to 8000 in average molecular weight. These products are colorless/white in appearance with a mild odor. For further details, see Product Description.
- CARBOWAX and CARBOWAX SENTRY MW 1450-8000 polyethylene glycols are used as lubricants, release agents, conditioning agents, chemical intermediates, excipients and pharmaceutical ingredients, as well as components in personal-care and food-product formulations. For further details, see Product Uses.
- Exposure can occur either in a facility that manufactures these products or in various industrial or manufacturing facilities that use these products. 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. 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 or ingestion of these products. For further details, see Health Information.
- CARBOWAX and CARBOWAX SENTRY MW 1450-8000 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. For further details, see Environmental Information.
CARBOWAX™ and CARBOWAX SENTRY™ MW 1450-8000 polyethylene glycols are stable under recommended storage conditions. Granular and powder forms of polyethylene glycols may form explosive air-dust mixtures. Avoid contact with strong acids, strong bases, and strong oxidizers. For further details, see Physical Hazard Information.

Manufacture of Product

- **Locations** – The Dow Chemical Company is a major global producer of polyethylene glycols. The Dow Chemical Company manufactures these products at facilities in St. Charles Operations, Louisiana, in the United States.
- **Process** – Polyethylene glycols are produced by reacting ethylene oxide with an ethylene glycol equivalent and have the structure \( \text{H-(OCH}_2\text{-CH}_2\text{)}_n\text{-OH} \), with “n” indicating the average number of oxyethylene groups.

Product Description

CARBOWAX™ and CARBOWAX SENTRY™ MW 1450-8000 polyethylene glycols are water-soluble polymers available in aqueous, powder, flake, granular, or molten forms, ranging in average molecular weight from 1450 to 8000 as shown below. These products are colorless to white in appearance with a mild odor.

- CARBOWAX Polyethylene Glycol 1450 – aqueous, flake, molten
- CARBOWAX Polyethylene Glycol 3350 – powder, flake, granular, molten
- CARBOWAX Polyethylene Glycol 4000 – aqueous, flake, granular, molten
- CARBOWAX Polyethylene Glycol 4600 – granular
- CARBOWAX Polyethylene Glycol 8000 – powder, flake, granular, molten
- CARBOWAX Polyethylene Glycol Plus Wood Treating Additive – aqueous
- CARBOWAX SENTRY Polyethylene Glycol 1450 – flake, molten
- CARBOWAX SENTRY Polyethylene Glycol 3350 – powder, flake, granular, molten
- CARBOWAX SENTRY Polyethylene Glycol 4000 – powder, flake, granular, molten
- CARBOWAX SENTRY Polyethylene Glycol 4600 – granular, molten
- CARBOWAX SENTRY Polyethylene Glycol 8000 – powder, flake, granular, molten

CARBOWAX and CARBOWAX SENTRY 1450, 3350, 4000, 4600, 8000 polyethylene glycol products are high-purity products (>99.0%). CARBOWAX Polyethylene Glycol Plus Wood Treating Additive is an aqueous solution of 50% polyethylene glycol and 50% water.

Some products are available with 100 ppm butylated hydroxytoluene (BHT) added as an antioxidant (stabilizer).

Product Uses

CARBOWAX™ and CARBOWAX SENTRY™ MW 1450-8000 polyethylene glycols are used in a wide range of industries to formulate products with enhanced solvency, lubricity, hygroscopicity, and other important functional properties.

CARBOWAX MW 1450-8000 polyethylene glycols are permitted for use under Food and Drug Administration (FDA) regulation 21 CFR as components for direct and indirect food additives. They are also permitted for use under U.S. Environmental Protection Agency (EPA) regulation 40 CFR as inert ingredients in pesticide formulations applied to growing crops, to raw agricultural commodities after harvest, or to animals.

Polyethylene glycols are used in the following applications:

- Adhesives
- Agriculture
- Antistatic agents
- Mining
- Paints and coatings
- Paper and paper products
CARBOWAX™ and CARBOWAX SENTRY™ MW 1450-8000 polyethylene glycols are used as excipients (inactive ingredients) and active pharmaceutical ingredients, as well as components 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, select European Pharmacopeia (EP) Macrogols, and International Pharmaceutical Excipients Council (IPEC) and current Good Manufacturing Practice (cGMP) guidelines for use in pharmaceutical applications. Typical applications include:

- Tablet binding and coatings
- Suppositories
- Laxatives and colonic flushing or rinsing
- Chemical intermediates in the synthesis of pharmaceuticals
- Processing aids for granulations technology
- Personal care products like cosmetics

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

Exposure Potential

CARBOWAX™ and CARBOWAX SENTRY™ MW 1450-8000 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 MW 1450-8000 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, such as lubricants, antistatic agents, pesticides, food packaging, and pharmaceuticals. These products have been evaluated and are permitted for use by the U.S. Food and Drug Administration (FDA), U.S. Environmental Protection Agency (EPA), and Cosmetic Ingredient Review (CIR) Expert Panel and deemed safe for use by consumers. Always read the product label prior to use and carefully follow instructions. See Health Information.

- **Environmental releases** – In the event of a spill, the focus is on containing the spill to prevent contamination of soil, surface water, and groundwater. These products are non-volatile, water soluble, and biodegradable. If released to the soil, they are likely to remain in place, unless water is introduced which could mobilize the products. The products will ultimately biodegrade in soil, surface water, and groundwater; and are efficiently removed in biological wastewater treatment facilities. All of these products are considered practically non-toxic to aquatic organisms. Spilled product may cause 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 product should be captured, collected, and reprocessed or disposed of according to applicable governmental requirements. Prevent from entering waterways, sewers, or groundwater. See Environmental, Health, and Physical Hazard Information.

- **In case of fire** – Keep people away. Fight the fire from a protected location or safe distance. Deny any unnecessary entry into the area and consider the use of unmanned hose holders. Use water spray or carbon-dioxide or dry-chemical extinguishers to fight the fire. Use of a direct water stream may spread the fire. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Containers may rupture from gas generation during a fire. Solid products may form explosive dust-air mixtures. Dust explosion hazard may result from forceful application of fire extinguishing agents. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.
Health Information

Health information for CARBOWAX™ and CARBOWAX SENTRY™ MW 1450-8000 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. These materials may also contain minor components or additives that have additional health risks. The Safety Data Sheet is the preferred source for specific health information. An overview of health information for these products appears below.

Eye contact – Contact may cause slight temporary irritation. Corneal injury is unlikely. Molten material may burn eyes.

Skin contact – Prolonged exposure is not likely to cause significant skin irritation and 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. Molten material may burn skin.

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

Ingestion – These products 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 dermal exposure of severely burned patients to formulations containing polyethylene glycols may present a risk. The use of topical applications containing these products may not be appropriate in severely burned patients or patients with impaired renal function. Repeated exposures of polyethylene glycols to 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™ MW 1450-8000 polyethylene glycols are biodegradable, with the products having MW (molecular weight) > 4,000 being readily biodegradable, and biodegradation rates generally decreasing with increased MW above 4,000. All of these products are non-volatile and highly soluble in water, and as such will tend to remain and move with water in which they are dissolved. If these products are released to soil, they would be expected to remain in place, but can become mobile through soil and into groundwater if dissolved. These products will ultimately biodegrade in soil, surface water, and groundwater, and will be efficiently removed from wastewater during biological wastewater treatment. Due to their large molecular size and high water solubility, these products are not expected to accumulate in the food chain (bioconcentration potential is low).

CARBOWAX and CARBOWAX SENTRY MW 1450-8000 polyethylene glycols are practically non-toxic to aquatic organisms on an acute basis (LC50 >100mg/L for the most sensitive species tested).

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

Physical Hazard Information

CARBOWAX™ and CARBOWAX SENTRY™ MW 1450-8000 polyethylene glycols are stable under recommended storage conditions, but may decompose at elevated temperatures. Gas generated during decomposition can build pressure in closed systems.

Granular and powder forms can form explosive air-dust mixtures. Do not allow dust to accumulate. Avoid static discharge when dusts are present.
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™ MW 1450-8000 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

- Safety Data Sheet (www.dow.com/webapps/msds/msdssearch.aspx)
- Contact Us (www.dow.com/polyglycols/index.htm)

For more information about CARBOWAX™ and CARBOWAX SENTRY™ MW 1450-8000 polyethylene glycols, visit the Dow Polyethylene Glycols website at www.dow.com/polyglycols/polyethylene/.

References

1. CARBOWAX™ Polyethylene Glycols: Innovation, Performance, Flexibility and Quality from the Global Leader in PEGs, The Dow Chemical Company, Form No. 118-01789-1011 AMS, October 2011, pages 1–9.
2. 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, October 2011, pages 1–10.
3. CARBOWAX SENTRY™ Polyethylene Glycol (PEG) 3350 Technical Data Sheet, The Dow Chemical Company, Form No. 118-01815-1211, page 1.
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, October 2011, pages 1–10.
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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