Product Safety Assessment

SYNALOX™ 100-D Lubricants

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Names
• CAS No. 25322-69-4
• Poly(oxypropylene)
• Polypropylene glycol
• SYNALOX 100-D45 Lubricant
• SYNALOX 100-D95 Lubricant
• SYNALOX™ 100-D240 Lubricant
• SYNALOX 100-D280 Lubricant
• SYNALOX 100-D450 Lubricant
• SYNALOX 100-D450 NA Lubricant

Product Overview
• SYNALOX™ 100-D Lubricants are propylene glycol initiated polymers of all oxypropylene groups (propylene oxide). These products are colorless to yellow liquids with a mild odor. They have limited solubility in water.¹ For further details, see Product Description.
• SYNALOX 100-D Lubricants are used as base fluids to formulate calender and gear lubricants, mold-release agents, plasticizers, greases, chemical intermediates, and metalworking fluids.² For further details, see Product Uses.
• SYNALOX 100-D Lubricants are for commercial use. Worker exposure is possible at facilities that manufacture or formulate these products or during transport or use. Dow does not sell these products for direct consumer use, so consumer exposure is unlikely.³ For further details, see Exposure Potential.
• Eye contact may cause slight temporary eye irritation. Skin contact is essentially nonirritating. At room temperature, exposure to vapor is minimal due to low volatility. These products have very low toxicity if swallowed.⁴,⁵ For further details, see Health Information.
• SYNALOX 100-D Lubricants are non-volatile (do not evaporate) and vary from miscible to insoluble in water from the lowest to the highest molecular weight products. These products will biodegrade under environmental conditions, and will be efficiently removed during treatment in biological wastewater-treatment facilities. They are not likely to accumulate in the food chain and are practically non-toxic to aquatic organisms on an acute basis.⁶,⁷,⁸ For further details, see Environmental Information.
• SYNALOX 100-D Lubricants are stable under recommended storage and normal use conditions; however, elevated temperatures can cause these products to decompose. Avoid contact with strong acids, strong bases, and strong oxidizers.⁹ For further details, see Physical Hazard Information.

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Manufacture of Product\textsuperscript{10,11}

- **Location** – Global affiliates of The Dow Chemical Company manufacture SYNALOX™ 100-D Lubricants at facilities in Europe.
- **Process** – SYNALOX™ 100-D lubricants are polyalkylene glycol polymers formed by initiating the polymerization of propylene oxide with propylene glycol using proprietary methods and chemistries. The reaction is shown below, with propylene glycol being represented as an alcohol (in reality it is a difunctional alcohol).

\[
\text{ROH} \quad + \quad m \quad \begin{array}{c} \text{O} \\ \text{CH}_2 \text{CH} \\ \text{CH}_3 \end{array} \quad \stackrel{\text{CHOH}}{\longrightarrow} \quad \text{RO} \quad \begin{array}{c} \text{CH}_3 \\ \text{CH}_2 \text{CHOH} \quad \text{H} \quad m \\ \end{array}
\]

**Alcohol** \quad **Propylene oxide** \quad **Poly(oxypropylene)**

Product Description\textsuperscript{12}

SYNALOX™ 100-D Lubricants are colorless to yellow liquids with a mild odor. They feature high viscosity index, low pour point, clean burn properties, excellent lubricity and stability, and gas solubility. SYNALOX 100-D Lubricants vary in water solubility, with lower molecular weight products being completely soluble in water and higher molecular weight products being partly to fully insoluble in water. All SYNALOX 100-D Lubricants are miscible with hydrocarbon solvents. SYNALOX lubricants are marketed primarily in Europe.

Product Uses\textsuperscript{13}

SYNALOX™ 100-D Lubricants are used as lubricant base stocks in dozens of industries, where they contribute a variety of performance properties. For example, these products are used to formulate lubricants and fluids for the following applications:

- Calender lubricants
- Mold-release agents
- Plasticizers
- Metalworking fluids for neat oils, cutting fluids
- Gear lubricants
- Greases
- Chemical intermediates

Exposure Potential\textsuperscript{14}

SYNALOX™ 100-D Lubricants are used in industrial and commercial facilities. Based on the uses for these products, individuals could be exposed through:

- **Workplace exposure** – Exposure can occur in facilities that manufacture or formulate SYNALOX 100-D Lubricants or in the various industrial facilities that use these lubricants. They are produced, distributed, and stored in closed systems. Those working with these products in manufacturing operations could be exposed during maintenance, sampling, testing, transport 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 SYNALOX 100-D Lubricants** – SYNALOX 100-D Lubricants are commercial products for industrial use. Dow does not sell these lubricants for direct consumer use, so consumer exposure is unlikely. See Health Information.
- **Environmental releases** – Because SYNALOX 100-D Lubricants are typically used in closed systems, the potential for release to the environment is low. In the event of a spill, the focus is on containing the spill to prevent spread of contamination to soil, surface water, or...
groundwater. For small spills, SYNALOX™ 100-D Lubricants should be absorbed with materials such as sand or dirt. SYNALOX 100-D Lubricants have low volatility and vary in water solubility. When introduced to water, these products will tend to remain dissolved in, and transported with, the water in which they are dissolved. These products will biodegrade under environmental conditions, with rate of degradation generally decreasing with increased molecular weight. These substances will be efficiently removed during treatment in biological wastewater-treatment facilities. See Environmental, Health, and Physical Hazard Information.

- **Large release** – Industrial spills or releases are infrequent and generally contained. If a large spill does occur, contain the spilled product if possible. Collect recovered product in suitable and properly labeled containers. Use appropriate safety equipment. See Environmental, Health, and Physical Hazard Information.
- **In case of fire** – Keep people away. Isolate the fire and deny unnecessary entry. Fight the fire from a protected area or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Use water fog or fine spray, dry-chemical or carbon-dioxide extinguishers, or foam to fight the fire. Alcohol-resistant foams are preferred. A direct water stream may spread the fire. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Follow emergency procedures carefully. See Environmental, Health, and Physical Hazard Information.

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

**Health Information**

Health information for SYNALOX™ 100-D Lubricants is summarized on the relevant Safety Data Sheets. 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 products may also contain minor components or additives that have additional health risks. An overview of health information for these products appears below.

- **Eye contact** – Contact may cause slight temporary eye irritation. Corneal injury is unlikely. Vapor or mist may cause eye irritation.
- **Skin contact** – Skin contact is essentially nonirritating. Prolonged skin contact is unlikely to result in absorption of harmful amounts.
- **Inhalation** – At room temperature, exposure to vapor is minimal due to low volatility. A single exposure is not likely to be hazardous.
- **Ingestion** – Very low toxicity if swallowed. Swallowing small amounts incidental to handling is not likely to cause injury; however, swallowing larger amounts may cause injury. In laboratory animals, high oral doses caused central nervous system effects and irregular heartbeats.
- **Repeated exposure** – Based on available data, repeated exposure is not anticipated to cause significant adverse effects.

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

**Environmental Information**

SYNALOX™ 100-D Lubricants are non-volatile (do not evaporate) and vary from miscible to insoluble in water from the lowest to the highest molecular weight products. If released to the environment, these products will tend to remain in the water or soil compartment to which they...
were released, and will tend to move with the surface or groundwater in which they are dissolved. These polypropylene glycol substances will tend to adsorb to soil or sediment particles, with increased degree of adsorption with increased molecular weight. SYNALOX™ 100-D Lubricants are unlikely to persist in the environment. Based on stringent Organisation for Economic Co-operation and Development (OECD) test guidelines, those products having molecular weight up to approximately 2,000 g/mole are considered readily biodegradable (>65% biodegraded in 28 days per OECD 301F test), while higher molecular weight products are considered as inherently biodegradable. All polypropylene glycol products are expected to biodegrade under environmental conditions, and to be efficiently removed during treatment in biological wastewater-treatment facilities.

These products are not expected to accumulate in the food chain (low bioconcentration potential) and are practically non-toxic to aquatic organisms (LC$_{50}$/EC$_{50}$ >100 mg/L for the most sensitive species tested) on an acute basis. Thus, the SYNALOX™ 100-D Lubricants are not regarded as exhibiting persistent, bioaccumulative, and toxic (PBT) or very persistent and very bioaccumulative (vPvB) properties.

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

Physical Hazard Information

SYNALOX™ 100-D Lubricants are stable under recommended storage and normal use conditions; however, elevated temperatures can cause these products to decompose. Generation of gas during decomposition can cause pressure build-up in closed systems. Decomposition products can include but are not limited to aldehydes, alcohols, ethers, hydrocarbons, ketones, organic acids, and polymer fragments. Avoid contact with strong acids, strong bases, or strong oxidizers.

For more information, request the 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 SYNALOX™ 100-D Lubricants. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Safety Data Sheet, Technical Data Sheet, or Contact Us.

Additional Information

- Request the Safety Data Sheet from the Dow Customer Information Group (www.dow.com/assistance/dowcig.htm)
- Contact Us (www.dow.com/polyglycols/synalox/contact/contact.htm)

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For more business information about SYNALOX™ 100-D Lubricants, visit Dow’s web site for SYNALOX lubricants at www.dow.com/polyglycols/synalox/.

References

5. SYNALOX™ 100-D45 Lubricant Safety Data Sheet, The Dow Chemical Company, December 22, 2011, Toxicological Information.

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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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