Product Safety Assessment

Propoxylated Ethylenediamine Polyol


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Names
- CAS No. 25214-63-5
- Alkoxylated amine
- EDA + PO
- Ethylenediamine + PO

Various VORANOL polyether polyols, including for example:
- VORANOL RA 640 polyether polyol

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Product Overview
- Propoxylated ethylenediamine polyols are viscous liquids with a mild odor. Their color varies. These materials belong to a category of materials called polyether polyols and are produced by reacting ethylenediamine with propylene oxide.¹ Dow markets these products under the trade name VORANOL™ polyether polyols. For further details, see Product Description.
- Propoxylated ethylenediamine polyol is used as a chemical building block in the manufacture of rigid polyurethane foams.² For further details, see Product Uses.
- Propoxylated ethylenediamine can cause severe eye irritation. Because of its low vapor pressure, this product is not likely to be inhaled when handled at room temperature. Vapor from heated materials may cause respiratory irritation.¹ Propoxylated ethylenediamine polyol is stable under recommended storage conditions. However, it can oxidize at elevated temperatures. Avoid contact with oxidizing materials and strong acids and bases. Avoid unintended contact with isocyanates.¹ See Health Information or Physical Hazard Information.
- Propoxylated ethylenediamine polyols are inherently biodegradable, unlikely to accumulate in the food chain (bioconcentration potential is low) and are practically nontoxic to aquatic organisms on an acute basis. See Environmental Information.
- Exposure to propoxylated ethylenediamine polyol could occur at a production facility for these polyols or at facilities that use these polyols to manufacture other products. Polyols are manufactured for industrial use, making direct consumer exposure unlikely. See Exposure Potential.

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The Dow Chemical Company
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Manufacture of Product

- **Process** – Propoxylated ethylenediamine polyol is formed by reacting ethylenediamine with propylene oxide. The ethylenediamine acts as an initiator in the formation of the polyether polyol.

\[
\text{H}_2\text{N}-\text{CH}_2\text{CH}_2-\text{NH}_2 + n\left[\text{CH}_2=\text{CH}_2\right] \rightarrow \text{R}\left[\text{CH}_3\text{CH}-\text{CH}_2\text{O}\right]_n
\]

(Ethylenediamine
(Designated as \(R\) in reaction product)

Propylene oxide

Amine-terminated polyol

Product Description\(^1,2\)

Propoxylated ethylenediamine polyols are viscous liquids with a mild odor. Their color varies from dark yellow to brown. These polyols are hygroscopic (attract water from the atmosphere and environment). The benefit of these polyols is that they retain the reactive amine end group and as a result, when blended with other polyols, they require less additional catalyst for reaction. Dowmarkets these products under the trade name VORANOL™ polyether polyols.

Product Uses\(^2,3,4\)

Propoxylated ethylenediamine polyols are reacted with isocyanates to produce polyurethane materials. They are primarily used in rigid polyurethane foam applications, such as continuous lamination, appliance insulation, rigid block production, panel production, and pipe insulation. They can also be used in polyurethane adhesive and casting applications.

Exposure Potential

Propoxylated ethylenediamine polyols are manufactured for industrial use only. Based on their uses the public could be exposed through:

- **Workplace exposure** – Exposure can occur either in a production facility for these polyols or in the various industrial or manufacturing facilities that use these polyols or products that contain them. Those working with polyols 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 unnecessary exposure. See Health Information.

- **Consumer exposure to products containing polyols** – Because these polyols are used as chemical building blocks for the manufacture of other products, direct consumer exposure is unlikely. There would be no unreacted polyols in the polyurethane products produced. See Health Information.

- **Environmental releases\(^1\)** – If released to the environment, propoxylated ethylenediamine polyols will partition to water, due to their high water solubility and low volatility. Since they are inherently biodegradable, they will likely be removed in biological wastewater treatment facilities as well as other water and soil environments. In the event of a spill, the focus is on containing the spill to prevent contamination of soil, surface, or ground water.

Spills of polyol on tile, concrete, or metal surfaces can cause slipping hazards. For small spills, polyols should be absorbed with materials such as sand or sawdust, then swept up for disposal according to governmental requirements. See Environmental, Health and Physical Hazard Information.

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- **Large release** – Industrial spills or releases are infrequent and are generally contained. If a large spill does occur, the material should be contained by creating ditches or dikes. The polyol can then be pumped into containers, such as drums or tank trucks, for disposal. The remaining spill may be absorbed with absorbent materials such as sand or dirt, cleaned up and disposed of according to governmental requirements. Personnel engaged in clean up of spills should observe proper skin and eye protection practices. Fires involving polyols can be readily extinguished with water fog, carbon dioxide, foam, or dry chemical extinguishers. Because incomplete combustion may lead to the build-up of toxic by-products, firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA). Emergency procedures should be followed carefully. See Environmental, Health and Physical Hazard Information.

For more information, see the relevant Safety Data Sheet.

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**Health Information**

Health information for Propoxylated ethylenediamine polyols is summarized on the relevant Safety Data Sheets. The Safety Data Sheet is the preferred source for specific health information. An overview of health information for Propoxylated ethylenediamine polyols appears below:

Propoxylated ethylenediamine polyols may cause severe irritation to the eyes and moderate corneal injury Brief skin exposure is unlikely to cause skin irritation. Propoxylated ethylenediamine polyols are unlikely to be absorbed through the skin in harmful amounts. Because of their low vapor pressure, these products are not likely to be inhaled when handled at room temperature. Vapor from heated materials may cause respiratory irritation. When ingested, propoxylated ethylenediamine polyols have low acute toxicity.

For more information, see the relevant Safety Data Sheet.

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**Environmental Information**

Propoxylated ethylenediamine polyols are water soluble and nonvolatile. If released to the environment, they will have a tendency to remain in water with minimal tendency to bind to soil or sediment.

Propoxylated ethylenediamine polyols are unlikely to persist in the environment. They are inherently biodegradable, which suggests that they will likely be removed in biological wastewater treatment facilities as well as in other water and soil environments.

Propoxylated ethylenediamine polyols are not likely to accumulate in the food chain (bioconcentration potential is low), due to their high water solubility and high molecular weight. Propoxylated/ethoxylated ethylenediamine polyols are practically non-toxic to fish and other aquatic organisms on an acute basis (LC50/EC50 > 100 mg/L in the most sensitive species tested).

For more information, see the relevant Safety Data Sheet.

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**Physical Hazard Information**

Propoxylated ethylenediamine polyols are stable under recommended storage conditions. However, oxidation can occur at elevated temperatures, leading to possible pressure build-up. Avoid contact with oxidizing materials (such as peroxide or hypochlorite salts), strong acids and bases. Avoid unintended contact with isocyanates. The reaction of polyols and isocyanates generates heat.

Fires involving polyols can be readily extinguished with water fog, carbon dioxide, foam, or dry chemical extinguishers. If a fire occurs, evacuate personnel and deny unnecessary entry. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Do not use direct water stream as it may spread the fire. Because incomplete combustion may lead to the build-up of toxic by-products, firefighters should wear positive-pressure, self-contained breathing apparatus.

For more information, see the relevant Safety Data Sheet.

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Regulatory Information
Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of propoxylated ethylenediamine polyols. 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
- **VORANOL™ RA 640 Polyol Safety Data Sheet**, The Dow Chemical Company
- Contact Us [http://www.dow.com/polyurethane/contact/](http://www.dow.com/polyurethane/contact/)
- **Dow VORANOL RA 640 Technical Data Sheet**, The Dow Chemical Company, Form No. 400-00101535en
- **Safe Handling Guide Voranol Polyether Polyols** [http://www.dow.com/polyurethane/resources/stewardship.htm](http://www.dow.com/polyurethane/resources/stewardship.htm)

For more business information about polyols or related products, visit Dow’s Polyurethanes web site, [http://www.dow.com/polyurethane/](http://www.dow.com/polyurethane/)

References
1. **VORANOL™ RA 640 Polyol, Material Safety Data Sheet**, The Dow Chemical Company
2. **VORANOL RA 640 Technical Data Sheet**, The Dow Chemical Company, Form No. 400-00101535en
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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