Product Safety Assessment

ADCOTE™ Single-Component Polyurethane Adhesives


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Names
Trade names and grades for these products include, but are not limited to, the following:

- ADCOTE™ Single-Component Polyurethane Adhesives
- ADCOTE 331 Laminating Adhesive
- ADCOTE 333 Laminating Adhesive

Product Overview

- ADCOTE™ Single-Component Polyurethane Adhesives are isocyanate terminated, polyether urethane adhesives that require moisture to cure. These products are supplied as yellow liquids with a solvent odor.\(^1\)\(^2\) For further details, see Product Description.
- ADCOTE Single-Component Polyurethane Adhesives are used in snack-food packaging, bottle-label laminations, meat and cheese packaging, dry-food packaging, and nonfoil condiment packaging applications.\(^1\) For further details, see Product Uses.
- Exposure can occur either in facilities that manufacture these products or in the various industrial or manufacturing facilities that use these products. These products are not sold directly to consumers, but are used in products with which consumers may come into contact, such as food or medical packaging. Products used for food-contact or medical applications should comply with applicable standards for exposure.\(^1\) For further details, see Exposure Potential.
- The following effects refer to exposure to the individual components in the uncured product. Eye contact may cause moderate irritation, burning sensation, tearing, and reddening. Skin contact may cause moderate irritation, burning sensation, reddening, and itching. Inhalation of vapor or mist may cause coughing, tightness in the chest, sensitization, shortness of breath, irritation of the nose, throat, and lungs, as well as severe allergic respiratory reaction. Ingestion of these products may cause nausea, vomiting, and abdominal pain, as well as severe irritation of the mouth, throat, and digestive tract.\(^2\) For further details, see Health Information and the relevant Safety Data Sheet.
- The cured polyurethane resins in ADCOTE Single-Component Polyurethane Adhesives are expected to degrade slowly in the environment. Due to their high molecular weight, the resins are not expected to accumulate in the food chain and they are not expected to be toxic to fish or other aquatic organisms. The solvents used in the products are readily biodegradable, have a low tendency to accumulate in the food chain, and range from slightly toxic to practically nontoxic to aquatic organisms on an acute basis.\(^2\) For further details, see Environmental Information.

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- ADCOTE™ Single-Component Polyurethane Adhesives are flammable and require strict adherence to recommended storage and handling procedures. Both liquid and vapor are flammable. Keep these products away from heat, flames, and sparks. Avoid exposure to moisture, water vapor, and strong oxidizing agents. For further details, see Physical Hazard Information.

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Manufacture of Product
- **Location** – ADCOTE™ Single-Component Polyurethane Adhesives are manufactured in various global locations by Rohm and Haas Company, a wholly owned subsidiary of The Dow Chemical Company, and its global affiliates.
- **Process** – ADCOTE Single-Component Polyurethane Adhesives are produced using proprietary processes and materials.

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Product Description
ADCOTE™ Single-Component Polyurethane Adhesives are isocyanate terminated, polyether urethane laminating adhesives that require moisture to cure. These products are typically supplied as yellow liquids with a solvent odor, and composed of 75% solids.

ADCOTE Single-Component Polyurethane Adhesives typically contain polyurethane resin which is made by reacting methylenebis (4-phenylisocyanate) (CAS No. 101-68-8), propylene oxide (CAS No. 75-56-9), ethyl acetate (CAS No. 141-78-6), and methyl ethyl ketone (CAS No. 78-93-3).

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Product Uses
ADCOTE™ Single-Component Polyurethane Adhesives adhere to a wide variety of substrates, providing good optical clarity, high bond strength, and a high level of heat and chemical resistance. These products are used in snack-food packaging, bottle-label laminations, meat and cheese packaging, dry-food packaging, and nonfoil condiment packaging applications.

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Exposure Potential
ADCOTE™ Single-Component Polyurethane Adhesives 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 ADCOTE Single-Component Polyurethane Adhesives or in the various industrial or manufacturing facilities that use them. These products are produced, distributed, and stored in closed systems. Those working with ADCOTE Single-Component Polyurethane Adhesives 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, ventilation, and safety equipment in place to limit exposure. See Health Information.

- **Consumer exposure to products containing ADCOTE Single-Component Polyurethane Adhesives** – Dow does not sell these products for direct consumer use, but they are used in products with which consumers may come into contact, such as food and medical packaging. Products used for food-contact or medical applications should comply with applicable standards set by the U.S. Food and Drug Administration (FDA) and European Union (EU) Directives concerning food contact. In the dried and cured form, these products are not considered to present a risk to consumers. 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, or groundwater. Spilled material may pose a slipping hazard. For small spills, these products should be absorbed with materials such as sand. Respiratory protection is necessary for cleaning up spills and leaks. Eliminate all sources of ignition immediately. If released, the cured polyurethane resins will tend to float in water and will be removed in biological wastewater treatment facilities by adsorption to biosolids. The solvents will exhibit low tendencies to volatilize from water. (In a subsequent section, it is stated that the solvents are moderately volatile – there should be consistency in these sections – please verify). Since the solvents are readily biodegradable, they are expected to be removed from water and soil environments, including biological wastewater treatment plants. See Environmental, Health, and Physical Hazard Information.

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- **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. An approved respirator is recommended for emergency work. Eliminate all sources of ignition. See Environmental, Health, and Physical Hazard Information.

- **In case of fire** – Deny any unnecessary entry into the area and fight the fire from a protected location. Use carbon-dioxide or dry-chemical extinguishers or foam to fight the fire. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Vapors are heavier than air and may travel a long distance and accumulate in low-lying areas. Keep vapors out of sewers. Keep fire water out of waterways and sewers to minimize the potential for environmental damage. Follow emergency procedures carefully. Follow emergency procedures outlined in the Safety Data Sheet 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 Information**

Health information for ADCOTE™ Single-Component Polyurethane Adhesives 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 Sheets are 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 moderate to severe eye irritation, burning sensation, tearing, and reddening.

**Skin contact** – Contact may cause skin sensitization, moderate skin irritation, burning sensation, reddening, and itching.

**Inhalation** – Inhalation of vapor or mist may cause coughing, tightness in the chest, shortness of breath, and irritation of the nose, throat, and lungs. Inhalation may also cause a severe allergic respiratory reaction and sensitization. Overexposure to the solvents in this material can cause drowsiness, headache, nausea, dizziness, and unconsciousness.

**Ingestion** – Swallowing may cause severe irritation of the mouth, throat, and digestive tract, as well as diarrhea, nausea, vomiting, and abdominal pain. Overexposure to the solvents in this material can cause drowsiness, headache, nausea, dizziness, and unconsciousness.

**Repeated exposure** – Long-term exposure to diisocyanates may cause lung damage, including reduced lung function, which may be permanent. Prolonged or repeated overexposure to the solvents in these products may cause heart damage, blood changes, central nervous system effects, kidney damage, liver damage, and lung damage.

**Other** – Some of these products contain propylene oxide, which is listed by the IARC and USNTP as a possible human carcinogen. This component is also listed by the ACGIH as a confirmed animal carcinogen with unknown relevance to humans.

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

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**Environmental Information**

Environmental information for ADCOTE™ Single-Component Polyurethane Adhesives is summarized on the relevant Safety Data Sheets. It is important to note that environmental risks associated with individual products may vary based on their formulation and/or intended use. The Safety Data Sheets are the preferred source for specific environmental information.

The cured high molecular weight polyurethane resins in ADCOTE Single-Component Polyurethane Adhesives are insoluble in water and nonvolatile. If released, the resins would likely float in water and eventually bind to soil, suspended solids, or sediment. Although the resins are essentially nonbiodegradable, they would be expected to degrade slowly in the environment, including degradation by physical action or by exposure to sunlight. The resins would likely be removed in biological wastewater treatment facilities by adsorption to biosolids. These resins are not likely to accumulate in the food chain due to their high molecular weight and they are not expected to be toxic to fish or other aquatic organisms on an acute basis.

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The solvents in ADCOTE™ Single-Component Polyurethane Adhesives have moderate volatility and range from moderately soluble to very soluble in water. If released to the environment, the solvents will have a low tendency to evaporate from water with minimal tendency to bind to soil and sediment. These solvents are unlikely to persist in the environment. They are readily biodegradable, which suggests that they will be removed from water and soil environments, including biological wastewater treatment plants. These solvents are not expected to accumulate in the food chain and range from practically nontoxic (EC50/LC50 > 100 mg/L) to slightly toxic (EC50/LC50 between 10 and 100 mg/L) to aquatic organisms on an acute basis.

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

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Physical Hazard Information
ADCOTE™ Single-Component Polyurethane Adhesives contain solvents that require strict adherence to recommended storage, handling, and firefighting procedures. These products are flammable. Keep containers tightly closed in a well-ventilated area away from sources of heat and ignition. Provide sufficient air ventilation when handling. Vapors may be released when products are heated during processing operations. Residual vapors in empty containers may explode on ignition. Vapors are heavier than air and may travel to a source of ignition and flash back. Heated material may form flammable or explosive mixtures with air. Closed containers may rupture via pressure build-up when exposed to fire or extreme heat.

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

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Regulatory Information
Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of ADCOTE™ Single-Component Polyurethane Adhesives. 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.

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Additional Information
- Request Safety Data Sheets and Technical Data Sheets from the Dow Customer Information Group (www.dow.com/assistance/dowcig.htm)
- Contact Us (www.dow.com/assistance/dowcig.htm)
- ADCOTE™ 331 Laminating Adhesive (Technical Data Sheet), Packaging and Building Materials, Rohm and Haas Company. ADCOTE™ 333 Laminating Adhesive (Technical Data Sheet), Packaging and Converting, Rohm and Haas Company.


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References
1 Rohm and Haas Company, Packaging and Building Materials. ADCOTE™ 331 Laminating Adhesive (Technical Data Sheet).
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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