Product Safety Assessment

ROBOND™ Polyvinyl Acetate Emulsions and Polyurethane Dispersions


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Names
Trade names and grades for these products include, but are not limited to, the following:
- ROBOND™ Polyvinyl Acetate Emulsions and Polyurethane Dispersions
- ROBOND HS 71-122 Heat-Seal Coating
- ROBOND HS 85-104 Heat-Seal Coating
- ROBOND L 73-133 laminating adhesive
- ROBOND L-2150

Product Overview
- ROBOND™ Polyvinyl Acetate Emulsions and Polyurethane Dispersions are waterborne laminating adhesives and heat-seal coatings supplied as white, opaque liquids with little or no odor. For further details, see Product Description.
- ROBOND Polyvinyl Acetate Emulsions and Polyurethane Dispersions are designed for use as laminating adhesives and heat-seal coatings for various applications, such as lamination of films for credit or security cards or as coatings for various substrates. 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 they are used in credit cards and paper applications with which consumers may come into contact. Exposure to cured and/or dried product is not considered to present a risk to consumers. For further details, see Exposure Potential.
- In the industrial setting, eye contact may be corrosive to the eyes, resulting in possible pain, tearing, permanent eye injury, and blindness. Skin contact may be corrosive to the skin, resulting in possible burns, permanent skin damage, and allergic sensitization. These products may be harmful or fatal if swallowed in large amounts. Inhalation of vapor or mist may cause severe irritation of the nose, throat, and lungs, pulmonary edema, nausea, vomiting, bronchial spasm, or death. For further details, see Health Information.

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The polymer components in ROBOND™ Polyvinyl Acetate Emulsions and Polyurethane Dispersions are expected to degrade slowly in the environment. Due to their high molecular weight, the polymers are not expected to accumulate in the food chain, and they are not expected to be toxic to fish or other aquatic organisms. Triethylamine and methyl pyrrolidone, minor components of these products, range from inherently biodegradable to readily biodegradable, have a low tendency to accumulate in the food chain (bioconcentration potential is low), and range from practically nontoxic to slightly toxic to aquatic organisms on an acute basis.¹ For further details, see Environmental Information.

ROBOND Polyvinyl Acetate Emulsions and Polyurethane Dispersions are corrosive materials. These products are stable under recommended storage and normal use conditions. Keep these products from freezing.¹ For further details, see Physical Hazard Information.

Manufacture of Product

- **Locations** – ROBOND™ Polyvinyl Acetate Emulsions and Polyurethane Dispersions 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** – ROBOND Polyvinyl Acetate Emulsions and Polyurethane Dispersions are produced using proprietary processes and materials.

Product Description¹,²,³

ROBOND™ Polyvinyl Acetate Emulsions and Polyurethane Dispersions are water-borne adhesives and heat seal coatings that are supplied as white, opaque liquids with little or no odor. These products range from 34 to 60% solids, and may contain small amounts of methyl pyrrolidone (CAS No. 872-50-4) and/or triethylamine (CAS No. 121-44-8).

Product Uses²

ROBOND™ Polyvinyl Acetate Emulsions and Polyurethane Dispersions are designed for use as laminating adhesives and heat-seal coatings for various substrates and applications, including:

- Laminating of films for credit cards and security cards
- Overprint varnish for paper and films
- Formulating base for functional coatings
- Sealant formulations for polyester, PVC, aluminum foil, and plain or coated paper

Exposure Potential¹

ROBOND™ Polyvinyl Acetate Emulsions and Polyurethane Dispersions 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 facilities that manufacture ROBOND Polyvinyl Acetate Emulsions and Polyurethane Dispersions or in the various industrial or manufacturing facilities that use them. These products are produced, distributed, and stored in closed systems. Those working with ROBOND Polyvinyl Acetate Emulsions and Polyurethane Dispersions 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 ROBOND Polyvinyl Acetate Emulsions and Polyurethane Dispersions** – Dow does not sell these products for direct consumer use. However, they are used as laminating adhesives and coatings for various applications such as credit cards or security cards, so consumers may come into contact with them. Exposure to cured and/or dried product is 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. Small spills should be absorbed with materials such as sand. Respiratory protection is necessary for cleaning up spills and leaks. If released to the environment, the polymer components will tend to float in water and will be removed in biological wastewater-treatment facilities by adsorption to biosolids. The triethylamine

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and methyl pyrrolidone components in the products will tend to remain in water. Since these two compounds range from inherently biodegradable to readily biodegradable, they are expected to be removed from water and soil environments, including 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, these products 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** – These products are not combustible until evaporated to dryness. The residue may be combustible. Use extinguishing media suitable for the surrounding fire. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Keep fire water out of waterways and sewers to minimize the potential for environmental damage. 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.

**Health Information**

Health information for ROBOND™ Polyvinyl Acetate Emulsions and Polyurethane Dispersions 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 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 be corrosive to the eyes, resulting in possible pain, tearing, permanent eye injury, and blindness.

**Skin contact** – Contact may be corrosive to the skin, resulting in possible burns, permanent skin damage, and allergic sensitization.

**Inhalation** – Inhalation of vapor or mist may cause severe irritation of the nose, throat, and lungs, pulmonary edema (fluid in lung tissue and air spaces), nausea, vomiting, bronchial spasm, and possible death. Shouldn’t respiratory sensitization also be mentioned here as isocyanates are both skin and respiratory sensitizers?

**Ingestion** – Swallowing large amounts may cause burning and severe swelling of the mouth, throat, and digestive tract, diarrhea, vomiting, and death.

**Repeated exposure** – Prolonged or repeated exposure to methyl pyrrolidone may result in adverse developmental effects, central nervous system effects, and liver effects.

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

**Environmental Information**

Environmental information for ROBOND™ Polyvinyl Acetate Emulsions and Polyurethane Dispersions 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 Sheet is the preferred source for specific environmental information.

The high molecular weight polymer components in ROBOND Polyvinyl Acetate Emulsions and Polyurethane Dispersions are nonvolatile and are not soluble in water. If released to the environment, the polymers would likely float in water and bind to soil, suspended solids, or sediment. Although the polymers are essentially not biodegradable, they would be expected to degrade slowly in the environment, including degradation by physical action or by exposure to sunlight. The polymers would likely be removed in biological wastewater-treatment facilities by adsorption to biosolids. The polymers are not expected 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.

These products may contain low levels (0.5 to 3%) of triethylamine and/or methyl pyrrolidone. These two compounds have moderate volatility and range from moderately soluble to very soluble in water. When introduced, the compounds have a low tendency to volatilize...
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from water and minimal tendency to bind to soil and sediment. These two compounds are unlikely to persist in the environment. They range from inherently biodegradable to readily biodegradable, which suggests that they will be removed from water and soil environments, including biological wastewater-treatment facilities. These two compounds are not expected to accumulate in the food chain (bioconcentration potential is low) and range from slightly toxic (LC$_{50}$/EC$_{50}$ between 10 to 100mg/L) to practically nontoxic (LC$_{50}$/EC$_{50}$ >100mg/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$^{1,4}$
ROBOND™ Polyvinyl Acetate Emulsions and Polyurethane Dispersions are stable under recommended storage and normal use conditions. These products are corrosive. Spilled material may pose a slipping hazard.

Avoid temperature extremes during storage and keep these products from freezing, as product stability may be affected. Containers may be hazardous when empty.

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 ROBOND™ Polyvinyl Acetate Emulsions and Polyurethane Dispersions. 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)
- ROBOND™ HS 85-104 Heat-Seal Coating (Technical Data Sheet), Packaging and Converting, Rohm and Haas Company, July 2011
- ROBOND™ L 73-133 Laminating Adhesive (Technical Data Sheet), Packaging and Building Materials, Rohm and Haas Company, December 2008

For more business information about ROBOND™ products, visit the Dow Packaging Products website at www.dow.com/packaging/solutions/robond_waterborne_adhesives.htm.

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Reference
2 ROBOND™ HS 85-104 Heat-Seal Coating (Technical Data Sheet), Packaging and Converting, Rohm and Haas Company
3 ROBOND™ L 73-133 Laminating Adhesive (Technical Data Sheet), Packaging and Building Materials, Rohm and Haas 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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