Product Safety Assessment

**MOR-AD™ Solvent-Borne Industrial Laminating Adhesives**


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Names

- MOR-AD™ solvent-borne industrial adhesives
- MOR-AD solvent-borne laminating adhesives
- MOR-AD M-300 series
- MOR-AD M-400 series

Product Overview

- MOR-AD™ solvent-borne laminating adhesives are a family of moisture-curing urethane adhesives sold for industrial use only. They are formulated as red or clear-colored liquids containing polyurethane polymers dissolved in a solvent mixture. For further details, see Product Description.
- MOR-AD solvent-borne laminating adhesives are used to bond components of structural panels for buildings. Cured bonds are resistant to heat, cold, and moisture. For further details, see Product Uses.
- Those working with MOR-AD solvent-borne laminating adhesives in manufacturing operations could be exposed during maintenance, sampling, testing, application, or other procedures. Consumer exposure from contact with panels bonded with these adhesives is expected to be negligible. For further details, see Exposure Potential.
- Health information provided is for uncured products, which are intended for industrial use only. Eye contact with liquid adhesive or mist may cause moderate to severe irritation with possible temporary corneal injury. Skin contact may cause irritation. Components of some products can be harmful if absorbed through intact skin. Skin sensitization may occur even at low concentrations in susceptible individuals. These products can be harmful if inhaled or swallowed. Inhalation of isocyanates may result in respiratory sensitization, with asthma-like symptoms. Repeated or prolonged exposure to the solvents in these adhesive formulations can result in organ damage. Methylene chloride is a cancer suspect agent. For further details, see Health Information.
- The solvents used in MOR-AD solvent-borne laminating adhesives (toluene, methylene chloride, and ethyl acetate) are biodegradable, have a low tendency to bioaccumulate in the food chain, and range from toxic to practically non-toxic to aquatic organisms on an acute basis. The cured polyurethane polymer is expected to be inert in the environment. The Safety Data Sheet is the preferred source for specific environmental information. For further details, see Environmental Information.

Notes:

- Trademark of The Dow Chemical Company (“Dow”) or an affiliated company of Dow
Product Safety Assessment: MOR-AD™ Solvent-Borne Industrial Laminating Adhesives

- MOR-AD™ solvent-borne laminating adhesives are stable at typical storage and use conditions. Avoid contact with strong oxidizers, acids, peroxides, bases, amines, nitrates, and ammonia. These products should be kept away from moisture to avoid hazardous polymerization. For further details, see Physical Hazard Information.

Manufacture of Product
- **Locations** – Rohm and Haas Company, a wholly owned subsidiary of The Dow Chemical Company, produces MOR-AD™ solvent-borne laminating adhesives at facilities in Ringwood and Elk Grove Village, Illinois, USA.
- **Process** – MOR-AD solvent-borne laminating adhesives are formulated in batch operations using proprietary materials and technology.

Product Description
MOR-AD™ solvent-borne laminating adhesives are a family of moisture-curing urethane adhesives. They are formulated as red or clear-colored liquids containing polyurethane polymers dissolved in about 60% solvent. Once applied, they gradually cure (react to solidify and harden) by contact with moisture.

Product Uses
MOR-AD™ solvent-borne laminating adhesives are sold for industrial use only and used to bond components of structural panels for a variety of uses. The uncured adhesives are usually applied to the inside of panel components by spray techniques. The cured bonds are resistant to heat, cold, and moisture.

Exposure Potential
MOR-AD™ solvent-borne laminating adhesives are used in the production of industrial and consumer products. Based on the uses for these products, the public could be exposed through:
- **Workplace exposure** – Exposure can occur in a facility that manufactures MOR-AD solvent-borne laminating adhesives or in the various industrial or manufacturing facilities that use these products. They are produced, distributed, and stored in closed systems. Those working with MOR-AD solvent-borne laminating adhesives in manufacturing operations could be exposed during maintenance, sampling, testing, application, 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 MOR-AD solvent-borne laminating adhesives** – Dow does not sell MOR-AD solvent-borne laminating adhesives for direct consumer use, but they are used to fabricate a variety of structural panels. Consumer exposure to cured adhesive in structural panels produced with these materials is expected to be negligible. Cured MOR-AD laminating adhesives are not expected to present a health risk. See Health Information.
- **Environmental releases** – Due to the use pattern for these adhesives, releases to the environment are expected to be minimal. If released, toluene, methylene chloride, and ethyl acetate will tend to volatilize to air and degrade from reaction with photochemically produced...
hydroxyl radicals. Since these compounds are biodegradable, they are expected to be removed from water and soil environments, including sewage treatment plants. The cured polyurethane polymer will tend to float in water and will be removed in wastewater treatment facilities by adsorption to sludge. In the event of a spill, the focus is on containing the spill to prevent contamination of soil and surface or ground water. Respiratory protection is necessary for cleaning up spills and leaks. For small spills, MOR-AD solvent-borne laminating adhesives should be absorbed with materials such as sand, sawdust, 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, MOR-AD solvent-borne adhesives should be captured, collected, and reprocessed or disposed of according to applicable governmental requirements. Evacuate personnel to safe areas. Ventilate the area. An approved positive pressure, self-contained breathing apparatus (SCBA) with a full-face mask is recommended for emergency work. Floors may be slippery. See Environmental, Health, and Physical Hazard Information.

- **In case of fire** – Deny any unnecessary entry into the area. Use large amounts of water, carbon-dioxide or dry-chemical extinguishers, or foam to fight the fire. Do not allow water to enter containers. Firefighters should wear positive-pressure, self-contained breathing apparatus (SCBA) and protective firefighting clothing. Toxic and irritating gases may be released during a fire. Follow emergency procedures carefully. Prevent fire-water run-off from entering drains or water ways to minimize the potential for environmental damage. 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 MOR-AD™ solvent-borne laminating 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. These materials contain solvents 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 MOR-AD solvent-borne laminating adhesives appears below. Uncured MOR-AD solvent-borne laminating adhesive products are intended for industrial use only. Cured MOR-AD laminating adhesives are not expected to present a health risk.

**Eye contact** – Contact with solvents can cause severe eye irritation with conjunctivitis, pain, and temporary corneal injury.

**Skin contact** – The solvents in these adhesives can cause moderate to severe skin irritation and may cause de-fatting and drying of the skin, which leads to irritation and dermatitis. The solvents may also be harmful if absorbed through intact skin, even fatal in large amounts. Widespread contact with methylene chloride may cause an intense burning sensation followed by a cold, numb feeling, which lessens after contact ends. Skin sensitization may occur even at low concentrations in susceptible individuals.

**Inhalation** – Exposure to solvent vapors can result in headache, nausea, drowsiness, dizziness, vomiting, lack of coordination, tingling of the extremities, or irritation of the nose, throat, and lungs. Inhalation of isocyanates may result in respiratory sensitization with asthma symptoms with tightness in the chest, shortness of breath, and lung damage.

**Ingestion** – Can be harmful if swallowed, with severe irritation of the mouth, throat, and digestive tract, drowsiness, dizziness, vomiting, nausea, diarrhea, gastrointestinal irritation,
unconsciousness, or coma. If aspirated into the lungs, may cause lung injury, lung inflammation, or fluid build-up in the lungs.

**Repeated exposure** – Overexposure to some components of these products may cause organ damage, including kidney damage (ethyl acetate, methylene chloride, toluene), liver damage (ethyl acetate, methylene chloride, toluene), heart damage (ethyl acetate), cardiac sensitization (toluene), blood effects (ethyl acetate), nervous system effects (ethyl acetate), irritation of the respiratory tract (toluene), or lung damage (diisocyanates).

**Other** – In animal studies, toluene overexposure has been reported to affect the reproductive system, as well as fetal development and toxicity, *Methylene chloride* is a cancer suspect agent.

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

**Environmental Information**

Environmental information for MOR-AD™ solvent-borne laminating adhesives is summarized on the relevant Safety Data Sheets. The environmental risks associated with individual products vary based on formulation. The Safety Data Sheet is the preferred source for specific environmental information.

The solvents used in MOR-AD solvent-borne laminating adhesives (toluene, methylene chloride, and ethyl acetate) are volatile and will evaporate from the products containing them. The solvents range from slightly to moderately soluble in water and when introduced, will have a tendency to evaporate from water with minimal tendency to bind to soil and sediment. The cured polyurethane polymer is insoluble and will tend to float in water and adsorb to soil or sediment.

Toluene, methylene chloride, and ethyl acetate are unlikely to persist in the environment. In the atmosphere, the compounds will degrade by reaction with photochemically produced hydroxyl radicals. The compounds range from inherently to readily biodegradable, which suggests that they will be removed from water and soil environments, including biological wastewater treatment plants. Although the cured polyurethane polymer is essentially non-biodegradable, it will be expected to slowly degrade in the environment, including degradation by physical action or by exposure to sunlight.

Toluene, methylene chloride, and ethyl acetate are not likely to accumulate in the food chain (bioconcentration potential is low) and range from toxic to practically non-toxic to fish and other aquatic organisms on an acute basis. The cured polyurethane polymer is not expected to accumulate in the food chain due to its high molecular weight, and acute aquatic toxicity is expected to be low.

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

**Physical Hazard Information**

MOR-AD™ solvent-borne laminating adhesives are stable at typical storage and use conditions. Avoid contact with strong oxidizers, acids, peroxides, bases, amines, nitrates, heavy metals, and ammonia.
Keep these products away from water (moisture) to avoid the potential for hazardous polymerization.

Some of these products are considered combustible.

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 MOR-AD™ solvent-borne laminating 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.

### Additional Information

- Request the Safety Data Sheet from the Dow Customer Information Group ([www.dow.com/assistance/dowcig.htm](http://www.dow.com/assistance/dowcig.htm))
- Contact Us ([www.dow.com/assistance/thoughts.htm](http://www.dow.com/assistance/thoughts.htm))

For more business or technical information about MOR-AD solvent-borne industrial laminating adhesives, visit the web site for Dow Building Solutions or contact the Dow Customer Information Group.

### References


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