Product Safety Assessment

BETAMATE™ Low Energy Substrate Adhesives (LESA)

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Names
- BETAMATE™ LESA
- BETAMATE LESA black adhesive
- BETAMATE LESA curative
- BETAMATE Low Energy Substrate Adhesive
- BETAMATE LESA 74401 black kit
- BETAMATE™ LESA 74430 kit

Product Overview
- BETAMATE™ low energy substrate adhesives (LESA) are two-component, high-strength, acrylic-based adhesives designed for structural applications in automotive manufacturing. BETAMATE LESAs are marketed by Dow Automotive, a business unit of The Dow Chemical Company.¹ ² For further details, see Product Description.
- BETAMATE LESAs are used primarily in automotive manufacturing during vehicle assembly. These adhesives replace or supplement traditional mechanical welds and fasteners and are used to bond plastics, composites, glass, hardware, and trim to improve vehicle stiffness and acoustics and reduce weight and costs.² For further details, see Product Uses.
- Eye contact with wet (uncured) adhesives or their curatives may cause severe irritation and corneal injury. Vapor may cause eye irritation experienced as mild discomfort or redness. Skin contact may cause irritation with local redness. Prolonged or widespread skin contact may result in absorption of harmful amounts. A component in these products has caused allergic skin reactions in humans. Vapor concentrations are attainable that could be hazardous on single exposure. Swallowing may result in irritation of the mouth, throat, and gastrointestinal tract.³ ⁴ For further details, see Health Information or Physical Hazard Information.
- BETAMATE LESAs are for industrial use only. Worker exposure is possible in a manufacturing facility BETAMATE™ LESAs or at assembly plants using these adhesives. Worker exposure could occur during mixing of the wet adhesive and curative and subsequent vehicle application. Exposure is minimized through engineering controls and the use of personal protective equipment. Based on their widespread use in vehicle production, it is possible that consumers might operate a vehicle manufactured with these adhesives.³ For further details, see Exposure Potential.
- BETAMATE LESAs are hazardous chemicals and must be handled only by those trained in their use. Uncured BETAMATE LESAs and LESA curatives are flammable. These products are vapor explosion hazards; vapors are heavier than air and can travel long distances accumulating in low-lying areas. Ignition or flashback could occur. Avoid static discharge. Do

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not store these materials in direct sunlight. Exposure to temperatures above 20°C (68°F) can cause these adhesives to react with themselves. Avoid contact with alcohols, aldehydes, amines, free-radical initiators, halides, mineral acids, peroxides, strong acids, strong inorganic bases, and strong oxidizers. Avoid contact with clay-based absorbent materials. LESA curatives react with water generating heat. For further details, see Physical Hazard Information.

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Manufacture of Product

- **Capacity** – BETAMATE™ LESAs are manufactured in Durham, North Carolina (USA).
- **Process** – BETAMATE LESAs are formulated using proprietary Dow Automotive materials and technology.

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Product Description

BETAMATE™ LESAs are two-component, high-strength, acrylic-based adhesives designed for structural applications in automotive manufacturing. BETAMATE LESAs are sold as kits containing the acrylic adhesive and its acrylic/amine curative or as bulk materials. The adhesives are white or black pastes. The acrylic/amine curatives are white pastes. The adhesive and curative are pumped from bulk containers and mixed in a 1:1 ratio immediately prior to application or mixed together in a specially-designed 400-ml cartridge for smaller applications. BETAMATE LESAs are applied either manually or robotically. The adhesive is applied and cured (hardened) at room temperature (15–35°C or 60–95°F) for two to six hours. Once cured, BETAMATE LESAs form a permanent bond.

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Product Uses

BETAMATE™ LESAs are used primarily in automotive manufacturing during vehicle assembly. These adhesives replace or supplement traditional mechanical welds and fasteners (nuts and bolts), and are used to bond plastics, composites, glass, hardware, and trim to improve vehicle structure and acoustics. Specific applications include front-end carriers, tailgates, seats, door modules, roof systems, hood systems, floor systems, and instrument panels.

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Exposure Potential

BETAMATE™ LESAs are used primarily in the production of vehicles. Based on the uses for these adhesives, the public could be exposed through:

- **Workplace exposure** – Exposure can occur in a BETAMATE LESA manufacturing facility. Those working with these adhesives in manufacturing operations could be exposed during maintenance, sampling, testing, or other procedures. Worker exposure is also possible at automotive assembly plants using these adhesives. Worker exposure could occur during mixing of the wet adhesive and curative and subsequent vehicle application. Exposure is minimized through engineering controls and the use of personal protective equipment. 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.

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• **Consumer exposure to products containing BETAMATE™ LESAs** – Dow Automotive does not sell these adhesives for home use. Based on their widespread use in vehicle production, it is possible that consumers might operate a vehicle manufactured with them. By the time the vehicle reaches the consumer, the adhesive has fully cured (hardened) and exposure risks are very low. See [Health Information](#).

• **Environmental releases** – 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. Eliminate all sources of ignition immediately. Use non-sparking tools during cleanup operations. For small spills, BETAMATE LESAs should be absorbed with materials such as sand or sawdust. Do not use clay-based absorbents. Spilled curative should be diluted with large quantities of water. See [Environmental, Health, and Physical Hazard Information](#).

• **Large release** – Industrial spills or releases are infrequent and generally contained. If a large spill does occur, the material should be captured, collected, and reprocessed or disposed of according to applicable governmental requirements. If available, use foam to smother or suppress vapor. Check the area with a combustible-gas detector before reentry. Positive-pressure, self-contained breathing apparatus (SCBA) with a full-face mask approved by NIOSH is recommended for emergency work. Eliminate all sources of ignition immediately. Use only explosion-proof equipment; ground and bond all containers and handling equipment. See [Environmental, Health, and Physical Hazard Information](#).

• **In case of fire** – Deny any unnecessary entry into the area. Use water fog or fine spray, carbon-dioxide or dry-chemical fire extinguishers, or foam. Alcohol-resistant foams are preferred. Use of a direct water stream may spread the fire. The public should be warned of downwind vapor explosion hazards. Vapors are heavier than air and may travel a long distance and accumulate in low-lying areas. Keep vapors out of sewers. Follow emergency procedures carefully. See [Environmental, Health, and Physical Hazard Information](#).

For more information, see the relevant [Safety Data Sheet](#).

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**Health Information**

**Eye and skin contact** – Eye contact with wet (uncured) adhesives or their curatives may cause severe irritation and severe corneal injury. Vapor may cause eye irritation, experienced as mild discomfort or redness. Skin contact may cause irritation with local redness. The response may be more severe if skin is abraded (scratched or cut). Prolonged or widespread skin contact may result in absorption of harmful amounts. For the major component(s): Although data from animal studies indicate a low potential for absorption through the skin in harmful amounts, there have been a few case reports that suggest that neurological effects may result from skin contact. A component in these products has caused allergic skin reactions in humans.

**Inhalation** – For uncured products and their curatives: Vapor concentrations are attainable that could be hazardous on single exposure. Excessive inhalation may cause irritation to the nose, throat, and lungs and may cause central nervous system effects. Symptoms may include headache, dizziness, and drowsiness, progressing to lack of coordination and unconsciousness.

**Ingestion** – Low toxicity if swallowed. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Swallowing may result in irritation of the mouth, throat, and gastrointestinal tract.

**Repeated exposure** – Components of these adhesives have been reported to affect the upper respiratory system and central nervous system in humans.

For more information, see the relevant [Safety Data Sheet](#).
Environmental Information\textsuperscript{3,4}

These adhesives and curatives are blends of components. This is an overview of the environmental impact of major components. Specific product information is available on the Safety Data Sheet.

\textit{Methyl methacrylate} – Methyl methacrylate is readily biodegradable and is not expected to accumulate in the food chain (bioaccumulation potential is low). This material is slightly toxic to fish and other aquatic organisms on an acute basis (single exposure to a high concentration).

\textit{Acrylic acid} – Acrylic acid is readily biodegradable and is not expected to accumulate in the food chain.

\textit{Styrene/methyl methacrylate/butadiene polymer} – This material is not biodegradable and is not expected to accumulate in the food chain due to its high molecular weight. It is not expected to be acutely toxic to aquatic organisms.

\textit{Boron, tributyl(3-methoxy-1-propa\textsuperscript{n}–kN\textsuperscript{'})-(T-4)} – This material is readily biodegradable. It is moderately toxic to fish and other aquatic organism on an acute basis (single exposure to a high concentration).

For more information, see the relevant Safety Data Sheet.

Physical Hazard Information\textsuperscript{3,4}

Uncured adhesives, their curatives, and their vapors are flammable. Uncured (wet) products are vapor explosion hazards; vapors are heavier than air and can travel long distances accumulating in low-lying areas. Ignition or flashback could occur. Store these products in tightly closed containers, indoors, in a dry place. Electrically ground and bond all containers, personnel, and equipment before transfer or use. Minimize sources of ignition, such as static build-up, heat, spark, or flame. Adhesives must be protected from atmospheric moisture. Exposure to elevated temperatures can cause these products to decompose. Adhesives can react with themselves at temperatures above 20°C (68°F). Hazardous polymerization can occur. Ensure these products are stored with the proper inhibitor.

These materials are highly reactive. Avoid contact with alcohols, aldehydes, amines, free-radical initiators, halides, mineral acids and other acids, oxidizers, peroxides, strong inorganic bases, and clay-based absorbents. LESA curatives react with water generating heat.

For more information, see the relevant Safety Data Sheet.

Regulatory Information

Regulations may exist that govern the manufacture, sale, transportation, use, and/or disposal of BETAMATE\textsuperscript{TM} LESAs. These regulations may vary by city, state, country, or geographic region. Information may be found by consulting the relevant Safety Data Sheet, the Dow Customer Information Group or Dow Automotive.

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Additional Information

- Safety Data Sheet (http://www.dow.com/assistance/dowcig.htm)
- Contact Dow Automotive: (http://automotive.dow.com/automotive/after/contact/index.htm)
- Dow Customer Information Group (http://www.dow.com/assistance/dowcig.htm)


For more business information about BETAMATE LESAs, visit the Dow Automotive website at http://automotive.dow.com/, or Dow's Customer Information Group website at http://www.dow.com/assistance/dowcig.htm.

References

1 BETAMATE™ LESA Low Energy Substrate Adhesive: 74036, adhesive, 74033 curative, 74402 & 74502 cartridge kits, Technical Data Sheet, Dow Automotive, Form No. 299-51177
3 BETAMATE LESA 74036 Black Adhesive Material Safety Data Sheet, The Dow Chemical Company, ID No. 1006495/0000
4 BETAMATE™ LESA 74033 Curative Material Safety Data Sheet, The Dow Chemical Company, ID No. 1008086/0000
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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