

Material Safety Data Sheet



1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

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24-Hour Emergency Phone Number: 989-636-4400

Product: DERAKANE* 510A-40 EPOXY VINYL ESTER RESIN

Product Code: 19648

Effective Date: 06/10/04 Date Printed: 06/11/04 MSD: 000426

The Dow Chemical Company, Midland, MI 48674

Customer Information Center: 800-258-2436

2. COMPOSITION/INFORMATION ON INGREDIENTS

Brominated vinyl ester resin	CAS# 068140-84-1	62%
Styrene monomer	CAS# 000100-42-5	38%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

* Amber liquid. Pungent styrene odor. Flammable liquid and vapor. *
* May cause eye irritation. May be harmful if inhaled. May cause *
* anesthetic effects. Harmful or fatal if swallowed. Can enter *
* lungs and cause damage to body systems. Vapor explosion hazard. *
* Vapors may travel a long distance; ignition and/or flash back may *
* occur. Isolate area. Keep upwind of spill. Stay out of low *
* areas. Warn public of downwind explosion hazard. Toxic fumes *
* may be released in fire situations. Highly toxic to fish and *
* other aquatic organisms. *

POTENTIAL HEALTH EFFECTS (See Section 11 for toxicological data.)

EYE: May cause slight irritation with corneal injury.
Vapor may cause eye irritation experienced as mild discomfort and redness. Vapor may cause lacrimation (tears).

SKIN: Prolonged contact is essentially nonirritating to skin.
Material may stick to skin causing irritation upon removal.
Prolonged skin contact is unlikely to result in absorption of harmful amounts.

INGESTION: Low toxicity if swallowed. Small amounts swallowed

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incidental to normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Aspiration into the lungs may occur during ingestion or vomiting, resulting in rapid absorption and injury to other body systems.

INHALATION: Vapor concentrations are attainable which could be hazardous on single exposure. Symptoms of excessive exposure may be anesthetic or narcotic effects; dizziness and drowsiness may be observed. Excessive exposure may cause irritation to upper respiratory tract (nose and throat).

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: Contains styrene, which, in animals has been reported to cause effects on the following organs: central nervous system, kidney, liver and respiratory tract. Excessive exposure may increase the blood and tissue levels of bromine. Lung effects have been observed in mice following repeated exposure to styrene. Styrene is reported to have caused hearing loss in laboratory animals upon exposure to high concentrations (>800 ppm); however, the relevance of this to humans is unknown. Some studies in humans allege that repeated exposure to styrene may result in minor subclinical decreases in the ability to discriminate between colors.

CANCER INFORMATION: This mixture contains a component(s) which are listed as potential carcinogens for hazard communication purposes under OSHA Standard 29 CFR 1910.1200. Components listed by IARC: styrene. An increased incidence of lung tumors was observed in mice from a recent inhalation study on styrene. The relevance of this finding to humans is uncertain since data from other long-term animal studies and from epidemiology studies of workers exposed to styrene do not provide a basis to conclude that styrene is carcinogenic.

TERATOLOGY: In laboratory animals, styrene did not produce birth defects but was toxic to the fetus at exposure concentrations having an adverse effect on the mother.

REPRODUCTIVE EFFECTS: Contains component(s) which did not interfere with reproduction in animal studies. The component(s) is/are: styrene.

4. FIRST AID

EYE: Flush eyes thoroughly with water for several minutes.
Remove contact lenses after initial 1-2 minutes and continue

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flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.

SKIN: Wash skin with plenty of water.

INGESTION: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

INHALATION: Move person to fresh air. If not breathing, give artificial respiration. If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

NOTE TO PHYSICIAN: Because rapid absorption may occur through the lungs if aspirated and cause systemic effects, the decision of whether to induce vomiting or not should be made by a physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. Maintain adequate ventilation and oxygenation of the patient. Consider additional thorough skin wash with mild non-abrasive soap and plenty of warm water for at least 15 minutes. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: 74-84F

METHOD USED: ASTM-D93, PMCC

AUTOIGNITION TEMPERATURE: 914F (490C)(based on styrene)

FLAMMABILITY LIMITS

LFL: 0.9% (based on styrene)

UFL: 6.8% (based on styrene)

HAZARDOUS COMBUSTION PRODUCTS: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: phenolic compounds, hydrogen bromide, carbon monoxide, carbon dioxide.

OTHER FLAMMABILITY INFORMATION: Container may rupture from polymerization. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.

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Electrically bond and ground all equipment. Flammable mixtures of this product are readily ignited, even by static discharge. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Flammable mixtures may exist within the vapor space of containers at room temperature. Flammable concentrations of vapor can accumulate at temperatures above flash point. See flash point. Dense smoke is emitted when burned without sufficient oxygen.

EXTINGUISHING MEDIA: Water fog or fine spray, dry chemical fire extinguishers, carbon dioxide fire extinguishers, foam. Do not use direct water stream. Straight or direct water streams may not be effective to extinguish fire. General purpose synthetic foams (including AFFF type) or protein foams are preferred if available. Alcohol resistant foams (ATC type) may function. Water fog, applied gently may be used as a blanket for fire extinguishment.

FIRE FIGHTING INSTRUCTIONS: Keep people away. Isolate fire area and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water may not be effective in extinguishing fire. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of re-ignition has passed. Fight fire from protected location or safe distance. Consider use of unmanned hose holder or monitor nozzles. Immediately withdraw all personnel from area in case of rising sound from venting safety device or discoloration of the container. Do not use direct water stream. May spread fire. Eliminate ignition sources. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. Water fog, applied gently may be used as a blanket for fire extinguishment. Contain fire water run-off if possible. Fire water run-off, if not contained may cause environmental damage. Review the "Accidental Release Measures" and the "Ecological Information" sections of this MSDS.

PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURES (See Section 15 for Regulatory Information)

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PROTECT PEOPLE: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Keep personnel out of low areas. Keep upwind of spill. No smoking in area. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Vapor explosion hazard, keep out of sewers. Ground and bond all containers and handling equipment. For large spills, warn public of downwind explosion hazard. Check area with combustible gas detector before re-entering area. Refer to Section 7, Handling for additional precautionary measures. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls/Personal Protection. See Section 10 for more specific information.

PROTECT THE ENVIRONMENT: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. Spills or discharge to natural waterways is likely to kill aquatic organisms.

CLEANUP: Pump with explosion-proof equipment. If available, use foam to smother or suppress. Remove residual with soap and hot water. Solvents are not recommended for cleanup unless the recommended exposure guidelines and safe handling practices for the specific solvent are followed. Consult appropriate solvent SDS for handling information and exposure guidelines. See Section 13, Disposal Considerations for additional information.

7. HANDLING AND STORAGE

HANDLING: Keep away from heat, sparks and flame. Keep container closed. Use only with adequate ventilation. Avoid contact with eyes. Avoid breathing vapor. Do not swallow. Wash thoroughly after handling. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. No smoking, open flames or sources of ignition in handling or storage area. Never use air pressure for transferring product. Electrically bond and ground all containers and equipment before transfer or use of material. Use of non-sparking or explosion proof equipment may be necessary depending upon the type of operation. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temper-

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atures possibly resulting in spontaneous combustion. See Section 8, Exposure Controls/Personal Protection.

STORAGE: Store below 24C (75F). Minimize sources of ignition, such as static buildup, heat, spark or flame. Keep containers closed. Maintain inhibitor and dissolved oxygen level. Vapors may polymerize to cause plugs in vents. See Section 10 for more specific information.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Use only with adequate ventilation.

PERSONAL PROTECTIVE EQUIPMENT

EYE/FACE PROTECTION: Use chemical goggles. If exposure causes eye discomfort, use a full-face respirator.

SKIN PROTECTION: Wear clean, long-sleeved, body-covering clothing. Use gloves chemically resistant to this material.

RESPIRATORY PROTECTION: Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required, use an approved air-purifying or positive-pressure supplied-air respirator depending on the potential airborne concentration. For emergency and other conditions where the exposure guideline may be exceeded, use an approved positive-pressure self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply.

EXPOSURE GUIDELINE(S): Styrene monomer: The Styrenics Industry, including Dow, supports a 50 ppm TWA, 100 ppm STEL, exposure limit in accord with a voluntary compliance program proposed by industry and accepted by OSHA in March, 1996. The ACGIH TLV is 20 ppm TWA, 40 ppm STEL. ACGIH classifies as A4. (OSHA continues to list the PEL in the Z-2 Table as 100 ppm TWA, 200 ppm Ceiling, with a maximum acceptable concentration of 600 ppm for 5 minutes in any 3 hours).

9. PHYSICAL AND CHEMICAL PROPERTIES

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APPEARANCE: Amber liquid.
ODOR: Styrene odor.
VAPOR PRESSURE: 4.5 mmHg @ 20C (based on styrene)
VAPOR DENSITY: 3.6 (based on styrene)
BOILING POINT: >293F (based on styrene)
SOLUBILITY IN WATER: Very slight
SPECIFIC GRAVITY: 1.17 To 1.22

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable under recommended storage conditions.
See Storage, Section 7.

CONDITIONS TO AVOID: Avoid temperatures above 50C (122F).
Exposure to elevated temperatures can cause product to decompose. Avoid static discharge. Do not blanket or purge with an inert gas to avoid depleting the oxygen concentration. Avoid direct sunlight or ultraviolet sources.

INCOMPATIBILITY WITH OTHER MATERIALS: Avoid contact with:
oxidizing materials, acids, caustic potash, caustic soda,
metal halides. Avoid unintended contact with peroxides.
Avoid contact with absorbent materials such as clay base
absorbents.

HAZARDOUS DECOMPOSITION PRODUCTS: Decomposition products depend
upon temperature, air supply and the presence of other
materials. Decomposition products can include and are not
limited to: carbon monoxide, carbon dioxide, hydrogen bromide,
phenolics.

HAZARDOUS POLYMERIZATION: Can occur. Elevated temperatures
can cause hazardous polymerization. Maintain inhibitor and
dissolved oxygen level. Do not purge containers of this
material with nitrogen. Polymerization can be catalyzed by:
free radical initiators, sunlight, ultraviolet light.
Uninhibited monomer vapors can polymerize and plug relief
devices.

11. TOXICOLOGICAL INFORMATION (See Section 3 for Potential Health Effects. For detailed toxicological data, write or call the address or non-emergency number shown in Section 1)

SKIN: The LD50 for skin absorption in rabbits is >2000 mg/kg.

INGESTION: The oral LD50 for rats is >4000 mg/kg.

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MUTAGENICITY: For styrene: In vitro genetic toxicity studies were inconclusive. Animal genetic toxicity studies were inconclusive.

12. ECOLOGICAL INFORMATION (For detailed Ecological data, write or call the address or non-emergency number shown in Section 1)

ENVIRONMENTAL FATE

MOVEMENT & PARTITIONING: Based largely or completely on information for styrene: bioconcentration potential is low (BCF less than 100 or Log Pow less than 3). Potential for mobility in soil is low (Koc between 500 and 2000).

DEGRADATION & PERSISTENCE: Based largely or completely on information for styrene: material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable. Reaches more than 70% mineralization in OECD test(s) for inherent biodegradability.

ECOTOXICITY: Based largely or completely on information for styrene: material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested).

13. DISPOSAL CONSIDERATIONS (See Section 15 for Regulatory Information)

DISPOSAL: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.

THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator or other thermal destruction device.

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As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Center at 800-258-2436 or 989-832-1556 for further details.

14. TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (D.O.T.): For D.O.T. regulatory information, if required, consult transportation regulations, product shipping papers or contact your Dow representative.

CANADIAN TDG INFORMATION: For TDG regulatory information, if required, consult transportation regulations, product shipping papers, or contact your Dow representative.

15. REGULATORY INFORMATION (Not meant to be all-inclusive--selected regulations represented)

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

U.S. REGULATIONS

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SARA 313 INFORMATION: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

CHEMICAL NAME	CAS NUMBER	CONCENTRATION
STYRENE	000100-42-5	<38 %

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the

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REGULATORY INFORMATION (CONTINUED)

Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

- An immediate health hazard
- A delayed health hazard
- A fire hazard
- A reactive hazard

TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the MSDS.

CHEMICAL NAME	CAS NUMBER	LIST
STYRENE	000100-42-5	PA1 PA3

PA1=Pennsylvania Hazardous Substance (present at greater than or equal to 1.0%).
 PA3=Pennsylvania Environmental Hazardous Substance (present at greater than or equal to 1.0%).

OSHA HAZARD COMMUNICATION STANDARD:

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

CANADIAN REGULATIONS
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WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

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REGULATORY INFORMATION (CONTINUED)

- B2 - flammable liquid with a flash point less than 37.8C
- D2A - possible, probable or known human carcinogen according to classifications by IARC or ACGIH
- D2B - eye or skin irritant
Refer elsewhere in the MSDS for specific warnings and safe handling information. Refer to the employer's workplace education program.

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CPR STATEMENT: This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

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HAZARDOUS PRODUCTS ACT INFORMATION: This product contains the following ingredients which are Controlled Products and/or on the Ingredient Disclosure List (Canadian HPA section 13 and 14):

COMPONENTS:	CAS #	AMOUNT(%w/w)
STYRENE	000100-42-5	38

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):

All substances in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16. OTHER INFORMATION

REVISION INDICATOR: Revised Sections 2-8, 10-12, 15.

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The Information Herein Is Given In Good Faith, But No Warranty, Express Or Implied, Is Made. Consult The Dow Chemical Company For Further Information.