SAFETY DATA SHEET

DLVE - 52 Epoxy Resin

Version	Revision Date:	SDS Number:	Date of last issue: 03-23-2021
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BLUE CUBE OPERATIONS LLC encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

SECTION 1. IDENTIFICATION

Product name : DLVE - 52 Epoxy Resin
Product code : 000000001000002055

Manufacturer or supplier's details

Company name of supplier : BLUE CUBE OPERATIONS LLC

Address : 190 CARONDELET PLAZA, SUITE 1530
CLAYTON MO 63105-3467
Telephone : (844) 238-3445
E-mail address : INFO@OLIN.COM
24-Hour Emergency Contact : +1 800 424 9300

Local Emergency Contact : 1-800-424-9300
Identified uses : Coatings.

SECTION 2. HAZARDS IDENTIFICATION

GHS classification in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin irritation : Category 2

Eye irritation : Category 2B

Skin sensitization : Category 1

GHS label elements

Hazard pictograms :

Signal Word : Warning

Hazard Statements : Causes skin and eye irritation.
May cause an allergic skin reaction.

Precautionary Statements :

Prevention:

P261 Avoid breathing mist or vapors.
P264 Wash skin thoroughly after handling.
P272 Contaminated work clothing must not be allowed out of the workplace.
P280 Wear protective gloves.

Response:

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P362 Take off contaminated clothing and wash before reuse.

Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Components

Chemical name	CAS-No.	Concentration (% w/w)
Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers	25085-99-8	60 - 70
Oxirane, 2,2'-[1,4-cyclohex-anediylbis(methyleneoxymethylene)]bis-	14228-73-0	20 - 30
Alkyl(C12-14) glycidyl ether	68609-97-2	1 - 10
1,4-Cyclohexanedimethanol, polymer with 2-(chloromethyl)oxirane	71463-68-8	1 - 5
Monoglycidyl Ether	46354-03-4	1 - 5

Actual concentration is withheld as a trade secret, Liquid Epoxy Resins (LERs) are made by reacting bisphenol A and epichlorohydrin. Olin uses both CAS No. 25085-99-8 and 1675-54-3 for its LERs. Other manufacturers use CAS No. 25068-38-6 for their LERs. Accordingly, LER manufacturers consider that derivatives of LERs may be described using either CAS number as a starting material.

SECTION 4. FIRST AID MEASURES

If inhaled : Move person to fresh air; if effects occur, consult a physician.

In case of skin contact : Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse.
Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands.
Suitable emergency safety shower facility should be available

in work area.

In case of eye contact	:	Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1-2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist. Suitable emergency eye wash facility should be available in work area.
If swallowed	:	No emergency medical treatment necessary.
Most important symptoms and effects, both acute and delayed	:	Aside from the information found under Description of first aid measures(above)any additional important symptoms and effects are described in Section 11: Toxicology Information.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.
Notes to physician	:	If burn is present, treat as any thermal burn, after decontamination. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective. Water fog, applied gently may be used as a blanket for fire extinguishment.
Unsuitable extinguishing media	:	Do not use direct water stream. May spread fire.
Specific hazards during fire fighting	:	Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids. Dense smoke is emitted when burned without sufficient oxygen.
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: Phenolics. Carbon monoxide. Carbon dioxide.

Further information	:	Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Do not use direct water stream. May spread fire. 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 (M)SDS.
Special protective equipment for fire-fighters	:	Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Isolate area. Keep unnecessary and unprotected personnel from entering the area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection. Refer to section 7, Handling, for additional precautionary measures.
Environmental precautions	:	Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.
Methods and materials for containment and cleaning up	:	Contain spilled material if possible. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling. Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion. See SECTION 8, Exposure Controls/Personal Protection, prior to handling.
Conditions for safe storage	:	Keep in a dry, cool place.
Recommended storage temperature	:	32 - 109 °F / 0 - 43 °C
Storage period	:	24 Months

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Contains no substances with occupational exposure limit values.

Engineering measures : Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations.
Local exhaust ventilation may be necessary for some operations.

Personal protective equipment

Respiratory protection : Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed, use an approved air-purifying respirator.

Filter type : The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

Hand protection

Remarks : Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Butyl rubber. Ethyl vinyl alcohol laminate ('EVAL'). Nitrile/butadiene rubber ('nitrile' or 'NBR'). Neoprene. Polyvinyl chloride ('PVC' or 'vinyl'). NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physi-

cal requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Eye protection : Use chemical goggles.

Skin and body protection : Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	Liquid.
Color	:	transparent
Odor	:	characteristic
Odor Threshold	:	No data available
pH	:	Not applicable
Freezing point	:	No test data available
Melting point/range		Not applicable
Boiling point/boiling range	:	520 °F / 271 °C Method: Estimated. (based on similar material)
Flash point	:	367 °F / 186 °C Method: Estimated., closed cup
Evaporation rate	:	No test data available
Flammability (solid, gas)	:	Not applicable to liquids
Upper explosion limit / Upper flammability limit	:	No test data available
Lower explosion limit / Lower flammability limit	:	No test data available
Vapor pressure	:	< 0.0000001 Pa (77 °F / 25 °C) Method: Literature (based on major component)
Relative vapor density	:	No test data available

Relative density	:	1.11 (77 °F / 25 °C) Method: ASTM D1475
Solubility(ies)		
Water solubility	:	insoluble
Partition coefficient: n-octanol/water	:	No data available for this product.
Autoignition temperature	:	No test data available
Decomposition temperature	:	> 608 °F / > 320 °C
Viscosity		
Viscosity, dynamic	:	No data available
Viscosity, kinematic	:	500 - 700 cSt (77 °F / 25 °C) Method: ASTM D 445
Explosive properties	:	No
Oxidizing properties	:	No
Molecular weight	:	No test data available

Note: These are the Reference Points for these Physical Properties listed above, unless otherwise noted in their respective Physical Property value information: Boiling Point at 760 mmHg; Evaporation Rate Butyl Acetate = 1; Relative Vapor Density Air = 1; and Relative Density Water = 1.
NOTE: The physical data presented above are typical values and should not be construed as a specification.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No specific data available.
Chemical stability	:	Stable under recommended storage conditions. See Storage, Section 7.
Possibility of hazardous reactions	:	Will not occur by itself. Masses of more than one pound (0.5 kg) of product plus an aliphatic amine will cause irreversible polymerization with considerable heat build-up.
Conditions to avoid	:	Avoid short term exposures to temperatures above 300 °C Avoid prolonged exposure to temperatures above 250 °C Potentially violent decomposition can occur above 350 °C Generation of gas during decomposition can cause pressure in closed systems. Pressure build-up can be rapid.
Incompatible materials	:	Avoid contact with oxidizing materials.

Avoid contact with:
Acids.
Bases.
Avoid unintended contact with amines.

Hazardous decomposition products : Decomposition products depend upon temperature, air supply and the presence of other materials.
Gases are released during decomposition.
Uncontrolled exothermic reaction of epoxy resins release phenolics, carbon monoxide, and water.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Product:

Acute oral toxicity : Remarks: Very low toxicity if swallowed.
Harmful effects not anticipated from swallowing small amounts.

Remarks: As product:
Single dose oral LD50 has not been determined.

LD50 (Rat): > 5,000 mg/kg
Method: Estimated.
Remarks: Based on information for component(s):

Acute inhalation toxicity : Remarks: At room temperature, exposure to vapor is minimal due to low volatility. Vapor from heated material, mist or aerosols may cause respiratory irritation.

Remarks: The LC50 has not been determined.

Acute dermal toxicity : Remarks: Prolonged skin contact is unlikely to result in absorption of harmful amounts.

Remarks: As product:
The dermal LD50 has not been determined.

LD50 (Rabbit): > 5,000 mg/kg
Method: Estimated.
Remarks: Based on information for component(s):

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Acute oral toxicity : LD50 (Rat): > 15,000 mg/kg

Acute inhalation toxicity : Remarks: The LC50 has not been determined.

Acute dermal toxicity : LD50 (Rabbit): 23,000 mg/kg

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Acute oral toxicity	:	LD50 (Rat): 1,098 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): > 5.9 mg/l Exposure time: 4 h Test atmosphere: dust/mist Symptoms: No deaths occurred at this concentration. Assessment: The substance or mixture has no acute inhalation toxicity
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg Symptoms: No deaths occurred at this concentration. Assessment: The substance or mixture has no acute dermal toxicity

Alkyl(C12-14) glycidyl ether:

Acute oral toxicity	:	LD50 (Rat): 26,000 mg/kg
Acute inhalation toxicity	:	Remarks: Excessive exposure may cause irritation to upper respiratory tract (nose and throat). For narcotic effects: No relevant data found. LC50 (Rat): 0.206 mg/l Exposure time: 4 h Test atmosphere: dust/mist Symptoms: No deaths occurred following exposure to a saturated atmosphere. Assessment: The substance or mixture has no acute inhalation toxicity
Acute dermal toxicity	:	Remarks: The dermal LD50 has not been determined.

1,4-Cyclohexanedimethanol, polymer with 2-(chloromethyl)oxirane:

Acute oral toxicity	:	Remarks: Single dose oral LD50 has not been determined.
Acute inhalation toxicity	:	Remarks: The LC50 has not been determined.
Acute dermal toxicity	:	Remarks: The dermal LD50 has not been determined.

Monoglycidyl Ether:

Acute oral toxicity	:	Remarks: Single dose oral LD50 has not been determined.
Acute inhalation toxicity	:	Remarks: The LC50 has not been determined.
Acute dermal toxicity	:	Remarks: The dermal LD50 has not been determined.

Skin corrosion/irritation

Product:

Remarks	:	Brief contact may cause moderate skin irritation with local redness.

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Result : Skin irritation
Remarks : Prolonged contact may cause skin irritation with local redness.
Repeated contact may cause skin irritation with local redness.

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Result : Skin irritation
Remarks : Brief contact may cause skin irritation with local redness.

Alkyl(C12-14) glycidyl ether:

Result : Skin irritation
Remarks : Prolonged contact may cause skin irritation with local redness.
Repeated contact may cause skin burns. Symptoms may include pain, severe local redness, swelling, and tissue damage.

Serious eye damage/eye irritation

Product:

Remarks : May cause eye irritation.
Corneal injury is unlikely.

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Result : Mild eye irritation
Remarks : May cause eye irritation.
Corneal injury is unlikely.

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Remarks : May cause eye irritation.

Alkyl(C12-14) glycidyl ether:

Result : No eye irritation
Remarks : May cause slight temporary eye irritation.
Corneal injury is unlikely.
Vapor may cause eye irritation experienced as mild discomfort and redness.

Respiratory or skin sensitization

Product:

Remarks : A component in this mixture has caused allergic skin reactions in humans.

Remarks : For respiratory sensitization:
No relevant data found.

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Assessment : The product is a skin sensitizer, sub-category 1B.
Remarks : Has caused allergic skin reactions in humans.
Has demonstrated the potential for contact allergy in mice.

Remarks : For respiratory sensitization:
No relevant data found.

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Assessment : May cause sensitization by skin contact.
Remarks : Has caused allergic skin reactions when tested in guinea pigs.
Did not demonstrate the potential for contact allergy in mice.

Remarks : For respiratory sensitization:
No relevant data found.

Alkyl(C12-14) glycidyl ether:

Assessment : The product is a skin sensitizer, sub-category 1B.
Remarks : Has caused allergic skin reactions when tested in guinea pigs.

Remarks : For respiratory sensitization:
No relevant data found.

Germ cell mutagenicity

Product:

Genotoxicity in vitro : Remarks: Contains component(s) which were negative in some in vitro genetic toxicity studies and positive in others.
Genetic toxicity studies in animals were negative for component(s) tested.

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Genotoxicity in vitro : Remarks: In vitro genetic toxicity studies were negative in some cases and positive in other cases.
Animal genetic toxicity studies were negative.

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Genotoxicity in vitro : Remarks: In vitro genetic toxicity studies were positive.
Animal genetic toxicity studies were negative.

Alkyl(C12-14) glycidyl ether:

Genotoxicity in vitro : Remarks: In vitro genetic toxicity studies were negative in some cases and positive in other cases.
Animal genetic toxicity studies were negative.

Carcinogenicity

Product:

Remarks : Many studies have been conducted to assess the potential carcinogenicity of diglycidyl ether of bisphenol A (DGEBPA). Indeed, the most recent review of the available data by the International Agency for Research on Cancer (IARC) has concluded that DGEBPA is not classified as a carcinogen. Although some weak evidence of carcinogenicity has been reported in animals, when all of the data are considered, the weight of evidence does not show that DGEBPA is carcinogenic.

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Remarks : Many studies have been conducted to assess the potential carcinogenicity of diglycidyl ether of bisphenol A (DGEBPA). Indeed, the most recent review of the available data by the International Agency for Research on Cancer (IARC) has concluded that DGEBPA is not classified as a carcinogen. Although some weak evidence of carcinogenicity has been reported in animals, when all of the data are considered, the weight of evidence does not show that DGEBPA is carcinogenic.

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Remarks : No relevant data found.

Alkyl(C12-14) glycidyl ether:

Remarks : No relevant data found.

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Product:

Effects on fertility : Remarks: Contains component(s) which did not interfere with reproduction in animal studies.

Effects on fetal development : Remarks: Resins based on the diglycidyl ether of bisphenol A (DGEBPA) did not cause birth defects or other adverse effects on the fetus when pregnant rabbits were exposed by skin contact, the most likely route of exposure, or when pregnant rats or rabbits were exposed orally.

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Effects on fertility : Remarks: In animal studies, did not interfere with reproduction.

Effects on fetal development : Remarks: Resins based on the diglycidyl ether of bisphenol A (DGEBPA) did not cause birth defects or other adverse effects on the fetus when pregnant rabbits were exposed by skin contact, the most likely route of exposure, or when pregnant rats or rabbits were exposed orally.

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Effects on fertility : Remarks: In animal studies, did not interfere with reproduction.

Effects on fetal development : Remarks: No relevant data found.

Alkyl(C12-14) glycidyl ether:

Effects on fertility : Remarks: No relevant data found.

Effects on fetal development : Remarks: Did not cause birth defects or any other fetal effects in laboratory animals.

STOT-single exposure

Product:

Assessment : Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Assessment : Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Assessment : Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Alkyl(C12-14) glycidyl ether:

Assessment : Evaluation of available data suggests that this material is not an STOT-SE toxicant.

Repeated dose toxicity

Product:

Remarks : Based on available data, repeated exposures to small amounts are not anticipated to cause significant adverse effects.
Based on information for component(s):
Except for skin sensitization, repeated exposures to low molecular weight epoxy resins of this type are not anticipated to cause any

significant adverse effects.

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Remarks : Except for skin sensitization, repeated exposures to low molecular weight epoxy resins of this type are not anticipated to cause any significant adverse effects.

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Remarks : Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

Alkyl(C12-14) glycidyl ether:

Remarks : Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Aspiration toxicity

Product:

Based on physical properties, not likely to be an aspiration hazard.

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Based on physical properties, not likely to be an aspiration hazard.

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Based on physical properties, not likely to be an aspiration hazard.

Alkyl(C12-14) glycidyl ether:

May be harmful if swallowed and enters airways.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Toxicity to fish : Remarks: Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested).

LC50 (Oncorhynchus mykiss (rainbow trout)): 2 mg/l
Exposure time: 96 h
Test Type: semi-static test

Toxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): 1.8 mg/l

aquatic invertebrates

Exposure time: 48 h
Test Type: static test

Toxicity to algae/aquatic plants : ErC50 (Scenedesmus capricornutum (fresh water algae)): 11 mg/l
End point: Growth rate inhibition
Exposure time: 72 h
Test Type: static test

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0.3 mg/l
End point: number of offspring
Exposure time: 21 d
Test Type: semi-static test

MATC (Maximum Acceptable Toxicant Level) (Daphnia magna (Water flea)): 0.55 mg/l
End point: number of offspring
Exposure time: 21 d
Test Type: semi-static test

Toxicity to microorganisms : IC50 (Bacteria): > 42.6 mg/l
End point: Respiration rates.
Exposure time: 18 h

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Toxicity to fish : Remarks: Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).

LC50 (Fish): 13 mg/l
Exposure time: 96 h

Ecotoxicology Assessment

Acute aquatic toxicity : Harmful to aquatic life.

Chronic aquatic toxicity : Harmful to aquatic life with long lasting effects.

Alkyl(C12-14) glycidyl ether:

Toxicity to fish : Remarks: Not expected to be acutely toxic, but material in pellet or bead form may mechanically cause adverse effects if ingested by waterfowl or aquatic life.

LC50 (Oncorhynchus mykiss (rainbow trout)): > 5,000 mg/l
Exposure time: 96 h
Test Type: static test

LC50 (Lepomis macrochirus (Bluegill sunfish)): 1,800 mg/l
Exposure time: 96 h
Test Type: static test
Analytical monitoring: No
Method: Other guidelines

Toxicity to algae/aquatic plants : EbC50 (Pseudokirchneriella subcapitata (green algae)): 843 mg/l
End point: Growth inhibition (cell density reduction)

Exposure time: 72 h

NOEC (Pseudokirchneriella subcapitata (green algae)): 500 mg/l
End point: Growth inhibition (cell density reduction)
Exposure time: 72 h

Toxicity to microorganisms : EC50 (activated sludge): > 100 mg/l
End point: Respiration rates.
Exposure time: 3 h
Test Type: static test

1,4-Cyclohexanedimethanol, polymer with 2-(chloromethyl)oxirane:

Toxicity to fish : Remarks: No relevant data found.

Monoglycidyl Ether:

Toxicity to fish : Remarks: For similar material(s):
Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested).

Remarks: No relevant data found.

Persistence and degradability

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Biodegradability : Result: Not biodegradable
Remarks: Based on stringent OECD test guidelines, this material cannot be considered as readily biodegradable; however, these results do not necessarily mean that the material is not biodegradable under environmental conditions.

aerobic
Biodegradation: 12 %
Exposure time: 28 d
Method: OECD Test Guideline 302B or Equivalent
Remarks: 10-day Window: Not applicable

ThOD : 2.35 mg/mg
Method: Estimated.

Photodegradation : Test Type: Half-life (indirect photolysis)
Sensitizer: OH radicals
Rate constant: 6.69E-11 cm3/s
Method: Estimated.

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Biodegradability : Remarks: Relevant data not available.

Alkyl(C12-14) glycidyl ether:

Biodegradability : Result: Readily biodegradable.

Remarks: Biodegradation under aerobic static laboratory conditions is moderate (BOD20 or BOD28/ThOD between 10 and 40%).

Biodegradation: 87 %
Exposure time: 28 d
Method: OECD Test Guideline 301F or Equivalent
Remarks: 10-day Window: Pass

Chemical Oxygen Demand (COD) : 2.09 mg/mg

1,4-Cyclohexanedimethanol, polymer with 2-(chloromethyl)oxirane:

Biodegradability : Remarks: No relevant data found.

Monoglycidyl Ether:

Biodegradability : Remarks: Relevant data not available.

Bioaccumulative potential

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Bioaccumulation : Remarks: Bioconcentration potential is moderate (BCF between 100 and 3000 or Log Pow between 3 and 5).

Partition coefficient: n-octanol/water : log Pow: 3.242 (77 °F / 25 °C)
pH: 7.1
Method: Estimated.
GLP: yes

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Partition coefficient: n-octanol/water : Remarks: No relevant data found.

Alkyl(C12-14) glycidyl ether:

Bioaccumulation : Species: Fish
Bioconcentration factor (BCF): 160
Method: Estimated.

Partition coefficient: n-octanol/water : Remarks: No relevant data found.

1,4-Cyclohexanedimethanol, polymer with 2-(chloromethyl)oxirane:

Partition coefficient: n-octanol/water : Remarks: No relevant data found.

Monoglycidyl Ether:

Partition coefficient: n-octanol/water : Remarks: No data available for this product.

Mobility in soil

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Distribution among environmental compartments : Koc: 1800 - 4400
Method: Estimated.
Remarks: Potential for mobility in soil is low (Koc between 500 and 2000).
Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Distribution among environmental compartments : Remarks: No relevant data found.

Alkyl(C12-14) glycidyl ether:

Distribution among environmental compartments : Koc: > 5000
Method: OECD 121: HPLC Method
Remarks: Expected to be relatively immobile in soil (Koc > 5000).

1,4-Cyclohexanedimethanol, polymer with 2-(chloromethyl)oxirane:

Distribution among environmental compartments : Remarks: No relevant data found.

Monoglycidyl Ether:

Distribution among environmental compartments : Remarks: No data available.

Other adverse effects

Components:

Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers:

Results of PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Oxirane, 2,2'-[1,4-cyclohexanediylbis(methyleneoxymethylene)]bis-:

Results of PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Alkyl(C12-14) glycidyl ether:

Results of PBT and vPvB assessment : This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

1,4-Cyclohexanedimethanol, polymer with 2-(chloromethyl)oxirane:

Results of PBT and vPvB assessment	:	Remarks: No data available

Monoglycidyl Ether:

Results of PBT and vPvB assessment	:	This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	AS YOUR SUPPLIER, WE HAVE 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: Composition Information. All disposal practices 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. DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Epoxy resin)
Class	:	9
Subsidiary risk	:	ENVIRONM.
Packing group	:	III
Labels	:	9 (ENVIRONM.)

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (Epoxy resin)
Class	:	9
Packing group	:	III
Labels	:	Miscellaneous
Packing instruction (cargo aircraft)	:	964

Packing instruction (passenger aircraft) : 964

IMDG-Code

UN number : UN 3082
Proper shipping name : ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
(Epoxy resin)
Class : 9
Packing group : III
Labels : 9
EmS Code : F-A, S-F
Marine pollutant : yes
Remarks : Stowage category A

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

Domestic regulation

49 CFR

Not regulated as a dangerous good

Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

SECTION 15. REGULATORY INFORMATION

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Respiratory or skin sensitization
Skin corrosion or irritation
Serious eye damage or eye irritation

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

International Regulations

Montreal Protocol : Not applicable

Rotterdam Convention (Prior Informed Consent) : Not applicable

Stockholm Convention (Persistent Organic Pollutants) : Not applicable

The ingredients of this product are reported in the following inventories:

TCSI : All intentional components are listed on the inventory, are exempt, or are supplier certified.

TSCA : All substances listed as active on the TSCA Inventory or are not required to be listed.

AIIC	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
DSL	:	All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.
ENCS	:	not determined
ISHL	:	not determined
KECI	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
PICCS	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
IECSC	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
NZIoC	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
CH INV	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
TECI	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.

TSCA list

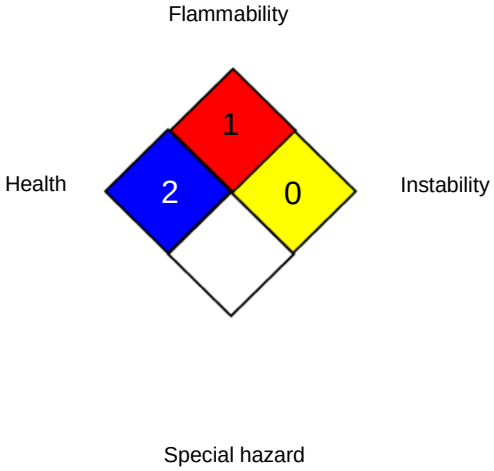
No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16. OTHER INFORMATION

Further information

NFPA 704:



Full text of other abbreviations

AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Revision Date : 09-01-2023

BLUE CUBE OPERATIONS LLC urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided 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 between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.

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