

SAFETY DATA SHEET

BLUE CUBE OPERATIONS LLC

Product name: D.E.H.™ 810 Epoxy Curing Agent

Issue Date: 09/09/2016 Print Date: 03/20/2020

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.

1. IDENTIFICATION

Product name: D.E.H.™ 810 Epoxy Curing Agent

Recommended use of the chemical and restrictions on use Identified uses: Hardener for epoxy resin. Corrosion inhibitor.

COMPANY IDENTIFICATION

BLUE CUBE OPERATIONS LLC 190 CARONDELET PLAZA, SUITE 1530 CLAYTON MO 63105-3467 UNITED STATES

Customer Information Number:

+1 844-238-3445 INFO@OLINBC.com

EMERGENCY TELEPHONE NUMBER

24-Hour Emergency Contact: 1 800 424 9300 Local Emergency Contact: 1 800-424-9300

2. HAZARDS IDENTIFICATION

Hazard classification

This material is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200. Skin irritation - Category 2 Serious eye damage - Category 1 Skin sensitisation - Category 1

Label elements Hazard pictograms



Signal word: DANGER!

Hazards

Causes skin irritation. May cause an allergic skin reaction. Causes serious eye damage.

Precautionary statements

Prevention

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray. Wash skin thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. Wear protective gloves/ eye protection/ face protection.

Response

IF ON SKIN: Wash with plenty of soap and water. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor. If skin irritation or rash occurs: Get medical advice/ attention. Take off contaminated clothing and wash before reuse.

Disposal

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

Other hazards

No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a mixture.

Component	CASRN	Concentration
Triethylenetetramine, ethylene oxide, epichlorohydrin, diethylenetriamine, phenol, formaldehyde, propylene oxide, C12-C14 alkyl alcohol, amine functional co- polymer	1263064-50-1	>= 50.0 - < 75.0 %
Water	7732-18-5	>= 30.0 - < 60.0 %
Triethylenetetramine mixture	112-24-3	< 5.0 %
Acetic acid	64-19-7	>= 1.0 - < 2.5 %

4. FIRST AID MEASURES

Description of first aid measures

General advice: 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.

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

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.

Eye contact: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

Most important symptoms and effects, both acute and delayed: Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed Notes to physician: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIREFIGHTING MEASURES

Suitable extinguishing media: To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam. 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.

Unsuitable extinguishing media: No data available

Special hazards arising from the substance or mixture

Hazardous combustion products: Under fire conditions some components of this product may decompose. The smoke may contain unidentified toxic and/or irritating compounds. Combustion products may include and are not limited to: Nitrogen oxides. Carbon monoxide. Carbon dioxide.

Unusual Fire and Explosion Hazards: This material will not burn until the water has evaporated. Residue can burn.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Burning liquids may be extinguished by dilution with water. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage. To extinguish combustible residues of this product use water fog, carbon dioxide, dry chemical or foam.

Special protective equipment for firefighters: 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.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Evacuate area. Only trained and properly protected personnel must be involved in clean-up operations. Keep upwind of spill. Ventilate area of leak or spill. 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. Absorb with materials such as: Sand. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

7. HANDLING AND STORAGE

Precautions for safe handling: Do not get in eyes. Avoid contact with skin and clothing. Wash thoroughly after handling. Avoid prolonged or repeated contact with skin. Avoid breathing vapor. Do not swallow. Use with adequate ventilation. Keep container closed. 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 AND PERSONAL PROTECTION.

Conditions for safe storage: Store in a cool, dry place.

Storage stability

Storage temperature:	Shelf life: Use within
5 - 30 °C (41 - 86 °F)	12 Month

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value/Notation
Triethylenetetramine mixture	US WEEL	TWA	1 ppm
	US WEEL	TWA	Absorbed via skin
Acetic acid	ACGIH	TWA	10 ppm
	ACGIH	STEL	15 ppm
	OSHA Z-1	TWA	25 mg/m3 10 ppm
	OSHA P0	TWA	25 mg/m3 10 ppm
	CAL PEL	PEL	25 mg/m3 10 ppm
	CAL PEL	STEL	37 mg/m3 15 ppm
	CAL PEL	С	40 ppm

Exposure controls

Engineering controls: 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.

Individual protection measures

Eye/face protection: Use chemical goggles.

Skin protection

Hand protection: Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Butyl rubber. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Nitrile/butadiene rubber ("nitrile" or "NBR"). 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, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Other 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.

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 discomfort is experienced, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state	Liquid.
Color	Yellow
Odor	Characteristic
Odor Threshold	No test data available
рН	8 - 11 Calculated.
Melting point/range	Not applicable
Freezing point	No test data available
Boiling point (760 mmHg)	> 100 °C (> 212 °F) <i>Literature</i>
Flash point	closed cup > 100 °C (> 212 °F) Literature
Evaporation Rate (Butyl Acetate = 1)	No test data available
Flammability (solid, gas)	Not Applicable
Lower explosion limit	No test data available
Upper explosion limit	No test data available
Vapor Pressure	< 5 hPa at 50 °C (122 °F) <i>Literature</i>
Relative Vapor Density (air = 1)	No test data available
Relative Density (water = 1)	0.9 - 1.2 at 20 °C (68 °F) Calculated.

Water solubility	Disperses in water
Partition coefficient: n- octanol/water	No data available
Auto-ignition temperature	No test data available
Decomposition temperature	No test data available
Dynamic Viscosity	4,000 mPa.s at 20 °C (68 °F) Calculated.
Kinematic Viscosity	No test data available
Explosive properties	No data available
Oxidizing properties	No data available
Molecular weight	No data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

10. STABILITY AND REACTIVITY

Reactivity: No data available

Chemical stability: Stable under recommended storage conditions. See Storage, Section 7.

Possibility of hazardous reactions: Polymerization will not occur.

Conditions to avoid: Active ingredient decomposes at elevated temperatures.

Incompatible materials: Avoid contact with: Acids. Halogenated hydrocarbons. Oxidizers.

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: Aromatic compounds. Amines. Hydrocarbons. Phenolics.

11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Acute toxicity

Acute oral toxicity

Low toxicity if swallowed. Swallowing may result in gastrointestinal irritation.

As product: Single dose oral LD50 has not been determined. Based on information for component(s): LD50, Rat, > 5,000 mg/kg Estimated.

Acute dermal toxicity

Prolonged skin contact is unlikely to result in absorption of harmful amounts.

As product: The dermal LD50 has not been determined. LD50, Rabbit, > 5,000 mg/kg Estimated.

Acute inhalation toxicity

Excessive exposure may cause irritation to upper respiratory tract (nose and throat). As product: The LC50 has not been determined.

Skin corrosion/irritation

Brief contact may cause severe skin irritation with pain and local redness.

Serious eye damage/eye irritation

May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.

Sensitization

A component in this mixture has caused allergic skin reactions in humans. Contains component(s) which have caused allergic skin sensitization in guinea pigs. Contains component(s) which have demonstrated the potential for contact allergy in mice. Individuals having an allergic skin reaction to this product may have an allergic skin reaction to similar material(s). The similar material(s) is/are:

Ethylenediamine (EDA). Diethylenetriamine. Piperazine. Aminoethylethanolamine (AEEA).

For respiratory sensitization: No relevant data found.

Specific Target Organ Systemic Toxicity (Single Exposure)

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

Specific Target Organ Systemic Toxicity (Repeated Exposure)

Contains component(s) which have been reported to cause effects on the following organs in humans: Respiratory tract. Gastrointestinal tract.

Contains component(s) which have been reported to cause effects on the following organs in animals: Lung.

Carcinogenicity

Contains component(s) which did not cause cancer in laboratory animals.

Teratogenicity

Laboratory animals that were fed exaggerated doses of Triethylenetetraamine(TETA) showed adverse fetal effects that were believed to be associated with an observed copper deficiency. Exposures having no effect on the mother should have no effect on the fetus.

Reproductive toxicity

No relevant data found.

Mutagenicity

Contains component(s) which were negative in some in vitro genetic toxicity studies and positive in others.

Aspiration Hazard

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

COMPONENTS INFLUENCING TOXICOLOGY:

Triethylenetetramine, ethylene oxide, epichlorohydrin, diethylenetriamine, phenol, formaldehyde, propylene oxide,

C12-C14 alkyl alcohol, amine functional co-polymer Acute inhalation toxicity

The LC50 has not been determined.

Triethylenetetramine mixture

Acute inhalation toxicity The LC50 has not been determined.

Acetic acid

Acute inhalation toxicity LC50, Rat, 4 Hour, vapour, 11.4 mg/l

12. ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

Toxicity

Triethylenetetramine, ethylene oxide, epichlorohydrin, diethylenetriamine, phenol, formaldehyde, propylene oxide,

C12-C14 alkyl alcohol, amine functional co-polymer

Acute toxicity to fish

No relevant data found.

Triethylenetetramine mixture

Acute toxicity to fish

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).

May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms. LC50, Pimephales promelas (fathead minnow), static test, 96 Hour, 330 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

EC50, Daphnia magna (Water flea), static test, 48 Hour, 31.1 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

EC50, Pseudokirchneriella subcapitata (green algae), semi-static test, 72 Hour, Growth rate inhibition, 20 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria

EC50, Bacteria, 16 Hour, 680 mg/l

Chronic toxicity to aquatic invertebrates

NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 1.9 mg/l

Acetic acid

Acute toxicity to fish

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).

May decrease pH of aquatic systems to < pH 5 which may be toxic to aquatic organisms. LC50, Lepomis macrochirus (Bluegill sunfish), Static, 96 Hour, 75 mg/l

Acute toxicity to aquatic invertebrates

LC50, Daphnia magna (Water flea), static test, 24 Hour, 47 - 52.9 mg/l, Method Not Specified.

Acute toxicity to algae/aquatic plants

ErC50, blue-green alga Anabaena flos-aquae, Static, 72 Hour, Growth rate, 55.22 mg/l, OECD Test Guideline 201 EbC50, blue-green alga Anabaena flos-aquae, Static, 72 Hour, Biomass, 29.23 mg/l, OECD Test Guideline 201

Toxicity to bacteria

NOEC, Pseudomonas putida, Static, 16 Hour, 1,150 mg/l

Persistence and degradability

Triethylenetetramine, ethylene oxide, epichlorohydrin, diethylenetriamine, phenol, formaldehyde, propylene oxide,

C12-C14 alkyl alcohol, amine functional co-polymer **Biodegradability:** No relevant data found.

Triethylenetetramine mixture

Biodegradability: Biodegradation under aerobic static laboratory conditions is moderate (BOD20 or BOD28/ThOD between 10 and 40%). 10-day Window: Fail **Biodegradation:** 0 % **Exposure time:** 20 d

Method: OECD Test Guideline 301D or Equivalent

Theoretical Oxygen Demand: 3.40 mg/mg

Chemical Oxygen Demand: 1.94 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	5.000 %
20 d	2.5 - 11 %

Acetic acid

Biodegradability:

Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD > 40%).

Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability). Biodegradation: 95 % Exposure time: 5 d

Method: OECD Test Guideline 302B

Theoretical Oxygen Demand: 1.06 mg/mg

Biological oxygen demand (BOD)

Incubation Time	BOD
5 d	64.100 %
10 d	67.900 %
20 d	86.700 %

Photodegradation

Test Type: Half-life (indirect photolysis) Sensitizer: OH radicals Atmospheric half-life: 17.196 d Method: Estimated.

Bioaccumulative potential

Triethylenetetramine, ethylene oxide, epichlorohydrin, diethylenetriamine, phenol, formaldehyde, propylene oxide,

C12-C14 alkyl alcohol, amine functional co-polymer Bioaccumulation: No relevant data found.

Triethylenetetramine mixture

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3). **Partition coefficient:** n-octanol/water(log Pow): -2.65 Estimated.

Acetic acid

Bioaccumulation: Bioconcentration potential is low (BCF < 100 or Log Pow < 3). **Partition coefficient:** n-octanol/water(log Pow): -0.17 Measured **Bioconcentration factor (BCF):** 3 Fish Estimated.

Mobility in soil

Triethylenetetramine, ethylene oxide, epichlorohydrin, diethylenetriamine, phenol, formaldehyde, propylene oxide,

C12-C14 alkyl alcohol, amine functional co-polymer No relevant data found.

Triethylenetetramine mixture

Potential for mobility in soil is very high (Koc between 0 and 50). **Partition coefficient (Koc):** 4.1 - 310 Estimated.

Acetic acid

Potential for mobility in soil is very high (Koc between 0 and 50). **Partition coefficient (Koc):** < 1 Estimated.

13. DISPOSAL CONSIDERATIONS

Disposal methods: 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.

14. TRANSPORT INFORMATION

DOT

Not regulated for transport

Classification for SEA transport (IMO-IMDG):

Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code Not regulated for transport Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

Not regulated for transport

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

15. REGULATORY INFORMATION

OSHA Hazard Communication Standard

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

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Sections 311 and 312

Acute Health Hazard Chronic Health Hazard

Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Community Right-to-Know Act of 1986) Section 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.

Pennsylvania Worker and Community Right-To-Know Act:

The following chemicals are listed because of the additional requirements of Pennsylvania law:

Components	CASRN
Triethylenetetramine mixture	112-24-3

California Proposition 65 (Safe Drinking Water and Toxic Enforcement Act of 1986)

WARNING: This product contains a chemical(s) known to the State of California to cause birth defects or other reproductive harm.

Components	CASRN
Methanol	67-56-1

United States TSCA Inventory (TSCA)

All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.

16. OTHER INFORMATION

Hazard Rating System

NFPA

Health	Fire	Reactivity
3	1	0

Revision

Identification Number: 101212829 / A476 / Issue Date: 09/09/2016 / Version: 3.0 Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

Absorbed via skin	Absorbed via skin
ACGIH	USA. American Conference of Governmental Industrial Hygienists (ACGIH)
	Threshold Limit Values (TLV)
С	Ceiling
CAL PEL	California permissible exposure limits for chemical contaminants (Title 8, Article
	107)
OSHA P0	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
OSHA Z-1	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air
	Contaminants
PEL	Permissible exposure limit
STEL	Short-term exposure limit
TWA	8-hour time weighted average
US WEEL	USA. Workplace Environmental Exposure Levels (WEEL)

Information Source and References

This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

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 manufacturerspecific (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.