



# SAFETY DATA SHEET

## BLUE CUBE OPERATIONS LLC

**Product name:** D.E.R.™ 352 Epoxy Resin

**Issue Date:** 11/15/2018

**Print Date:** 07/24/2019

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.R.™ 352 Epoxy Resin

### **Recommended use of the chemical and restrictions on use**

**Identified uses:** Used in applications such as: Adhesive. Casting. Tooling. Civil engineering. Composites. Marine and protective coatings. Photocure industrial coating. Potting and encapsulation.

### **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**

GHS classification in accordance with 29 CFR 1910.1200

Skin irritation - Category 2

Eye irritation - Category 2B

Skin sensitisation - Category 1

### **Label elements**

#### **Hazard pictograms**



Signal word: **WARNING!**

#### Hazards

Causes skin and eye irritation.  
May cause an allergic skin reaction.

#### 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.

##### 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.  
If skin irritation or rash occurs: Get medical advice/ attention.  
If eye irritation persists: 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
Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers	25085-99-8	>= 60.0 - <= 80.0 %
Reaction product: Bisphenol F-(epichlorohydrin); epoxy resin	9003-36-5	>= 15.0 - <= 40.0 %

#### Note

Liquid Epoxy Resins (LERs) are made by reacting bisphenol A and epichlorohydrin. Olin uses both CAS No. 25085-99-8 and 25068-38-6 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.

## 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. Suitable emergency safety shower facility should be available in work area.

**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.

**Ingestion:** 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) 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:** 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.

## 5. FIREFIGHTING 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.

#### Special hazards arising from the substance or mixture

**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.

**Unusual Fire and Explosion Hazards:** 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.

#### Advice for firefighters

**Fire Fighting Procedures:** 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 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:** 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. Absorb with materials such as: Sand. Polypropylene fiber products. Polyethylene fiber products. Remove residual with soap and hot water. Collect in suitable and properly labeled containers. Residual can be removed with solvent. Solvents are not recommended for clean-up unless the recommended exposure guidelines and safe handling practices for the specific solvent are followed. Consult appropriate solvent Safety Data Sheet for handling information and exposure guidelines. See Section 13, Disposal Considerations, for additional information.

## 7. HANDLING AND STORAGE

**Precautions for safe handling:** Avoid prolonged or repeated contact with skin. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Avoid use of electric band heaters. Failures of electric band heaters have been reported to cause drums of liquid epoxy resin to explode and catch fire. Application of a direct flame to a container of liquid epoxy resin can also cause explosion and/or fire. 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:** Recommended pumping and storage temperature for bulk shipments is 60°C (140°F) Additional storage and handling information on this product may be obtained by calling your sales or customer service contact. Ask for a product brochure.

**Storage stability**

**Storage temperature:**      **Shelf life: Use within**  
2 - 43 °C (36 - 109 °F)              24 Month

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Control parameters**

Exposure limits are listed below, if they exist.

Exposure limits have not been established for those substances listed in the composition, if any have been disclosed.

**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 safety glasses (with side shields).

**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"). Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl chloride ("PVC" or "vinyl"). Neoprene. 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 material is heated or sprayed, use an approved air-purifying respirator. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

**9. PHYSICAL AND CHEMICAL PROPERTIES****Appearance**

<b>Physical state</b>	Liquid.
<b>Color</b>	Colorless
<b>Odor</b>	Mild

<b>Odor Threshold</b>	No test data available
<b>pH</b>	Not applicable
<b>Melting point/range</b>	Not applicable
<b>Freezing point</b>	-15 - 5 °C ( 5 - 41 °F) <i>Literature</i>
<b>Boiling point (760 mmHg)</b>	Decomposes
<b>Flash point</b>	<b>closed cup</b> No test data available <b>open cup</b> 250 °C ( 482 °F) <i>ASTM D1310</i>
<b>Evaporation Rate (Butyl Acetate = 1)</b>	No test data available
<b>Flammability (solid, gas)</b>	Not Applicable
<b>Lower explosion limit</b>	No test data available
<b>Upper explosion limit</b>	No test data available
<b>Vapor Pressure</b>	No test data available
<b>Relative Vapor Density (air = 1)</b>	No test data available
<b>Relative Density (water = 1)</b>	1.1 - 1.18 <i>Literature</i>
<b>Water solubility</b>	Insoluble
<b>Partition coefficient: n-octanol/water</b>	No data available
<b>Auto-ignition temperature</b>	>= 300 °C (>= 572 °F) <i>Literature</i>
<b>Decomposition temperature</b>	> 320 °C (> 608 °F)
<b>Dynamic Viscosity</b>	5,700 - 7,700 mPa.s at 25 °C (77 °F) <i>ASTM D 445</i>
<b>Kinematic Viscosity</b>	No test data available
<b>Explosive properties</b>	No data available
<b>Oxidizing properties</b>	No data available
<b>Molecular weight</b>	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:** 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  
Potentially violent decomposition can occur above 350 °C  
Avoid prolonged exposure to temperatures above 250 °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.

## **11. TOXICOLOGICAL INFORMATION**

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

### **Acute toxicity**

#### **Acute oral toxicity**

Very low toxicity if swallowed. Harmful effects not anticipated from swallowing small amounts.

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. Based on information for component(s):

LD50, Rabbit, > 5,000 mg/kg Estimated.

#### **Acute inhalation toxicity**

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

The LC50 has not been determined.

### **Skin corrosion/irritation**

Brief contact may cause moderate skin irritation with local redness.

Repeated exposure may cause irritation, even a burn.

May cause more severe response if skin is abraded (scratched or cut).

### **Serious eye damage/eye irritation**

May cause eye irritation.

Corneal injury is unlikely.

### **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.

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)**

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

**Carcinogenicity**

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.

**Teratogenicity**

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.

**Reproductive toxicity**

In animal studies, resins based on the diglycidyl ether of bisphenol A (DGEbPA) have been shown not to interfere with reproduction.

**Mutagenicity**

Contains component(s) which were positive in in vitro genetic toxicity studies. Genetic toxicity studies in animals were negative for component(s) tested.

**Aspiration Hazard**

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

**COMPONENTS INFLUENCING TOXICOLOGY:****Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers****Acute inhalation toxicity**

The LC50 has not been determined.

**Reaction product: Bisphenol F-(epichlorohydrin); epoxy resin****Acute inhalation toxicity**

The LC50 has not been determined.

**12. ECOLOGICAL INFORMATION**

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

**Toxicity****Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers****Acute toxicity to fish**

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), semi-static test, 96 Hour, 2 mg/l

**Acute toxicity to aquatic invertebrates**

EC50, *Daphnia magna* (Water flea), static test, 48 Hour, 1.8 mg/l

**Acute toxicity to algae/aquatic plants**



ErC50, Scenedesmus capricornutum (fresh water algae), static test, 72 Hour, Growth rate inhibition, 11 mg/l

**Toxicity to bacteria**

IC50, Bacteria, 18 Hour, Respiration rates., > 42.6 mg/l

**Chronic toxicity to aquatic invertebrates**

NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 0.3 mg/l  
MATC (Maximum Acceptable Toxicant Level), Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 0.55 mg/l

**Reaction product: Bisphenol F-(epichlorohydrin); epoxy resin**

**Acute toxicity to fish**

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, Freshwater fish, 96 Hour, 2.54 mg/l

**Acute toxicity to aquatic invertebrates**

EC50, Daphnia magna, Static, 48 Hour, > 1,000 mg/l, OECD Test Guideline 202 or Equivalent

**Acute toxicity to algae/aquatic plants**

EC50, Selenastrum capricornutum (green algae), Static, 72 Hour, > 1.8 mg/l, OECD Test Guideline 201

**Toxicity to bacteria**

activated sludge, Static, 3 Hour, Other, > 100 mg/l

**Chronic toxicity to aquatic invertebrates**

NOEC, Daphnia magna, semi-static test, 21 d, number of offspring, 0.3 mg/l

**Persistence and degradability**

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

**Biodegradability:** 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.

10-day Window: Not applicable

**Biodegradation:** 12 %

**Exposure time:** 28 d

**Method:** OECD Test Guideline 302B or Equivalent

**Theoretical Oxygen Demand:** 2.35 mg/mg Estimated.

**Photodegradation**

**Test Type:** Half-life (indirect photolysis)

**Sensitization:** OH radicals

**Atmospheric half-life:** 1.92 Hour

**Method:** Estimated.

**Reaction product: Bisphenol F-(epichlorohydrin); epoxy resin**

**Biodegradability:** Material is not readily biodegradable according to OECD/EEC guidelines.

**Biodegradation:** 0 %

**Exposure time:** 28 d

**Bioaccumulative potential****Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers**

**Bioaccumulation:** 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 at 25 °C Estimated.

**Reaction product: Bisphenol F-(epichlorohydrin); epoxy resin**

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

**Partition coefficient: n-octanol/water(log Pow):** 3.6 OECD Guideline 117 (Partition Coefficient (n-octanol / water), HPLC Method)

**Bioconcentration factor (BCF):** 150 Estimated.

**Mobility in soil****Propane, 2,2-bis[p-(2,3-epoxypropoxy)phenyl]-, polymers**

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.

**Partition coefficient (Koc):** 1800 - 4400 Estimated.

**Reaction product: Bisphenol F-(epichlorohydrin); epoxy resin**

Potential for mobility in soil is slight (Koc between 2000 and 5000).

**Partition coefficient (Koc):** 4460 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):**

<b>Proper shipping name</b>	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.(Epoxy resin)
<b>UN number</b>	UN 3082

<b>Class</b>	9
<b>Packing group</b>	III
<b>Marine pollutant</b>	Epoxy resin
<b>Transport in bulk according to Annex I or II of MARPOL 73/78 and the IBC or IGC Code</b>	Consult IMO regulations before transporting ocean bulk

**Classification for AIR transport (IATA/ICAO):**

<b>Proper shipping name</b>	Environmentally hazardous substance, liquid, n.o.s.(Epoxy resin)
<b>UN number</b>	UN 3082
<b>Class</b>	9
<b>Packing group</b>	III

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

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

Skin corrosion or irritation  
Serious eye damage or eye irritation  
Respiratory or skin sensitisation

**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:**

To the best of our knowledge, this product does not contain chemicals at levels which require reporting under this statute.

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

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

**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

### Product Literature

Additional information on this product may be obtained by calling your sales or customer service contact. Ask for a product brochure. Additional information on this and other products may be obtained by visiting our web page.

### Hazard Rating System

#### NFPA

	Health	Flammability	Instability
<b>  </b>	2	1	0

### Revision

Identification Number: 23477 / A476 / Issue Date: 11/15/2018 / Version: 4.0

Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

### Full text of other abbreviations

AICS - Australian Inventory of Chemical Substances; 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; 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

### 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 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.

US