



# SAFETY DATA SHEET

## BLUE CUBE OPERATIONS LLC

**Product name: D.E.H.™ 611 EPOXY CURING AGENT**

**Issue Date: 08/31/2016**

**Print Date: 11/29/2016**

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.

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## 1. IDENTIFICATION

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**Product name: D.E.H.™ 611 EPOXY CURING AGENT**

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

**Identified uses:** Hardener for epoxy resin.

### COMPANY IDENTIFICATION

BLUE CUBE OPERATIONS LLC  
2030 DOW CENTER  
MIDLAND MI 48674-0000  
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

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## 2. HAZARDS IDENTIFICATION

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### Hazard classification

This material is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29CFR 1910.1200.

Flammable liquids - Category 4

Acute toxicity - Category 4 - Oral

Acute toxicity - Category 4 - Dermal

Skin corrosion - Category 1B

Serious eye damage - Category 1

Skin sensitisation - Category 1

Reproductive toxicity - Category 1B

Effects on or via lactation

Specific target organ toxicity - single exposure - Category 3

Specific target organ toxicity - repeated exposure - Category 1 - Inhalation

**Label elements**

**Hazard pictograms**



Signal word: **DANGER!**

### **Hazards**

Combustible liquid.

Harmful if swallowed or in contact with skin

Causes severe skin burns and eye damage.

May cause an allergic skin reaction.

May cause respiratory irritation.

May damage fertility or the unborn child.

May cause harm to breast-fed children.

Causes damage to organs (Respiratory Tract) through prolonged or repeated exposure if inhaled.

### **Precautionary statements**

#### **Prevention**

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Keep away from heat/sparks/open flames/hot surfaces. No smoking.

Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.

Avoid contact during pregnancy/ while nursing.

Wash skin thoroughly after handling.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

Contaminated work clothing should not be allowed out of the workplace.

Wear protective gloves/ protective clothing/ eye protection/ face protection.

#### **Response**

IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.

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 exposed or concerned: Get medical advice/ attention.

If skin irritation or rash occurs: Get medical advice/ attention.

Wash contaminated clothing before reuse.

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

#### **Storage**

Store in a well-ventilated place. Keep container tightly closed.

Store in a well-ventilated place. Keep cool.

Store locked up.

#### **Disposal**

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

**Other hazards**

No data available

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**3. COMPOSITION/INFORMATION ON INGREDIENTS**

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This product is a mixture.

<b>Component</b>	<b>CASRN</b>	<b>Concentration</b>
Aminoethylpiperazine	140-31-8	35.0 - 60.0 %
Aminoethylethanolamine	111-41-1	< 0.3 %
Diethylenetriamine	111-40-0	< 0.3 %
4-Nonylphenol, branched	84852-15-3	10.0 - 20.0 %
Dinonylphenol	1323-65-5	< 0.2 %
Bisphenol A	80-05-7	15.0 - 40.0 %
Benzyl alcohol	100-51-6	1.0 - 5.0 %
Benzyl dimethylamine	103-83-3	5.0 - 10.0 %

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**4. FIRST AID MEASURES**

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**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 not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

**Skin contact:** Immediate continued and thorough washing in flowing water for at least 30 minutes is imperative while removing contaminated clothing. Prompt medical consultation is essential. Wash clothing before reuse. Properly dispose of leather items such as shoes, belts, and watchbands. Items which cannot be decontaminated, including leather articles such as shoes, belts, and watchbands should be disposed of properly. Suitable emergency safety shower facility should be immediately available.

**Eye contact:** Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist. Suitable emergency eye wash facility should be immediately available.

**Ingestion:** Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth unless the person is fully conscious.

**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:** Maintain adequate ventilation and oxygenation of the patient. May cause asthma-like (reactive airways) symptoms. Bronchodilators, expectorants, antitussives and corticosteroids may be of help. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. Chemical eye burns may require extended irrigation. Obtain prompt consultation, preferably from an ophthalmologist. If burn is present, treat as any thermal burn, after decontamination. Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Excessive exposure may aggravate preexisting asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airways dysfunction syndrome).

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## 5. FIREFIGHTING MEASURES

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**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.

**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: Nitrogen oxides. 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 produced when product burns.

**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. Burning liquids may be extinguished by dilution with water. 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. 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.

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## 6. ACCIDENTAL RELEASE MEASURES

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**Personal precautions, protective equipment and emergency procedures:** Evacuate area. Only trained and properly protected personnel must be involved in clean-up operations. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Ground and bond all containers and handling equipment. Vapor explosion hazard. Keep out of sewers. Keep upwind of spill. Ventilate area of leak or spill. Refer to section 7, Handling, for additional precautionary measures. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

**Environmental precautions:** Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information. Spills or discharge to natural waterways is likely to kill aquatic organisms.

**Methods and materials for containment and cleaning up:** Contain spilled material if possible. Collect in suitable and properly labeled containers. Do NOT use absorbent materials such as: Ground corn cobs. Moist organic absorbents. Peat moss. Sawdust. Absorb with materials such as: Sand. See Section 13, Disposal Considerations, for additional information.

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## 7. HANDLING AND STORAGE

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**Precautions for safe handling:** Keep away from heat, sparks and flame. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. Do not get in eyes, on skin, on clothing. Avoid prolonged contact with eyes, skin and clothing. Avoid breathing vapor or mist. Do not swallow. Keep container closed. Use with adequate ventilation. Wash thoroughly after handling. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

**Conditions for safe storage:** Store in a cool, dry place. Do not store in: Copper. Copper alloys.

### Storage stability

<b>Storage temperature:</b>	<b>Shelf life: Use within</b>
0 - 30 °C (32 - 86 °F)	24 Month

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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### Control parameters

Exposure limits are listed below, if they exist.

Component	Regulation	Type of listing	Value/Notation
Aminoethylethanolamine	Dow IHG	TWA	0.05 mg/m <sup>3</sup>
	Dow IHG	TWA	SKIN, DSEN
Diethylenetriamine	ACGIH	TWA	1 ppm
	ACGIH	TWA	Absorbed via skin

Bisphenol A	Dow IHG	TWA Inhalable fraction and vapor	2 mg/m3
Benzyl alcohol	US WEEL	TWA	10 ppm
Benzyl dimethylamine	Dow IHG	TWA	1 ppm
	Dow IHG	STEL	3 ppm

\*Skin notation based upon the possibility that the vapor limit alone may not be protective for pregnant women. There is the potential for absorption of Aminoethylethanolamine from the skin at levels that may seriously affect the fetus.

### Exposure controls

**Engineering controls:** Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. 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. Chlorinated polyethylene. Neoprene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl chloride ("PVC" or "vinyl"). Styrene/butadiene rubber. Examples of acceptable glove barrier materials include: Natural rubber ("latex"). Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl alcohol ("PVA"). Viton. 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, use an approved respirator. Selection of air-purifying or positive-pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus.

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

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## 9. PHYSICAL AND CHEMICAL PROPERTIES

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### Appearance

<b>Physical state</b>	Liquid.
<b>Color</b>	yellow
<b>Odor</b>	Amine
<b>Odor Threshold</b>	No data available
<b>pH</b>	No test data available
<b>Melting point/range</b>	Not applicable

<b>Freezing point</b>	No test data available
<b>Boiling point (760 mmHg)</b>	182 °C ( 360 °F) <i>Estimated</i> . Theoretical
<b>Flash point</b>	83 °C ( 181 °F) <i>Pensky-Martens Closed Cup ASTM D 93</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>	< 2 mmHg at 25 °C (77 °F) <i>Estimated</i> .
<b>Relative Vapor Density (air = 1)</b>	No test data available
<b>Relative Density (water = 1)</b>	1.03 at 25 °C (77 °F) <i>ASTM D7042</i>
<b>Water solubility</b>	Moderately soluble
<b>Partition coefficient: n-octanol/water</b>	This product is a mixture. See Section 12 for individual component data.
<b>Auto-ignition temperature</b>	No test data available
<b>Decomposition temperature</b>	No test data available
<b>Dynamic Viscosity</b>	1,500 - 4,000 cP at 25 °C (77 °F) <i>ASTM D 445</i>
<b>Kinematic Viscosity</b>	No test data available
<b>Explosive properties</b>	No
<b>Oxidizing properties</b>	No
<b>Softening point</b>	No data available
<b>Molecular weight</b>	Not applicable
<b>Pour point</b>	No data available

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

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## 10. STABILITY AND REACTIVITY

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**Reactivity:** No data available

**Chemical stability:** Thermally stable at typical use temperatures.

**Possibility of hazardous reactions:** Polymerization will not occur.

**Conditions to avoid:** Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems. Reaction with carbon dioxide may form an amine carbamate. Smoke may be generated depending on vapor pressure of mixture. Product absorbs carbon dioxide from the air.

**Incompatible materials:** Avoid contact with oxidizing materials. Avoid contact with: Acids. Acrylates. Alcohols. Aldehydes. Halogenated hydrocarbons. Ketones. Nitrites. Avoid contact with metals such as: Brass. Bronze. Copper. Copper alloys. Avoid contact with absorbent materials such as: Ground corn cobs. Moist organic absorbents. Peat moss. Sawdust.

**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: Ammonia. Ethylenediamine. Phenol. Volatile amines. Phenolics.

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## **11. TOXICOLOGICAL INFORMATION**

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*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 or ulceration. Swallowing may result in burns of the mouth and throat.

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

Based on information for component(s):  
LD50, Rat, > 1,500 mg/kg Estimated.

#### **Acute dermal toxicity**

Prolonged or widespread skin contact may result in absorption of potentially harmful amounts.

As product: The dermal LD50 has not been determined.

Based on information for component(s):  
LD50, Rabbit, > 1,100 mg/kg Estimated.

#### **Acute inhalation toxicity**

Prolonged excessive exposure to mist may cause adverse effects. Vapor may cause severe irritation of the upper respiratory tract (nose and throat) and lungs.

As product: The LC50 has not been determined.

### **Skin corrosion/irritation**

Brief contact may cause severe skin burns. Symptoms may include pain, severe local redness and tissue damage.

### **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.

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).

Triethylenetetramine (TETA).

Piperazine.

Tetraethylenepentamine (TEPA).

Aminoethylethanolamine (AEEA).

Aminoethylpiperazine (AEP).

Has demonstrated the potential for contact allergy in mice.



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)**

Contains component(s) which are classified as specific target organ toxicant, single exposure, category 3.

**Specific Target Organ Systemic Toxicity (Repeated Exposure)**

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

Central nervous system.

Muscles.

Thymus.

Urinary tract.

Respiratory tract.

Liver effects and questionable kidney and bladder effects were observed in animals fed bisphenol A.

**Carcinogenicity**

No convincing evidence for carcinogenicity of Bisphenol A has been seen in long-term animal studies.

**Teratogenicity**

Contains component(s) which caused birth defects in laboratory animals. Contains component(s) which have been toxic to the fetus in lab animal tests.

**Reproductive toxicity**

Contains component(s) which have interfered with fertility in animal studies. In a three-generation reproduction study in rats, nonylphenol did not interfere with standard reproductive parameters. However, some additional endpoints which are considered markers of potential reproductive toxicity were affected at higher doses that produced systemic toxicity to the parent animals. Bisphenol A affected reproduction in rats and mice, but only at high exposure levels that exceeded the body's capacity to metabolize and deactivate the chemical. Maintaining exposures below appropriate workplace exposure limits should avoid these and other effects.

**Mutagenicity**

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

**Aspiration Hazard**

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

**COMPONENTS INFLUENCING TOXICOLOGY:**

**Aminoethylpiperazine**

**Acute inhalation toxicity**

The LC50 has not been determined. 8 Hour, vapour, No deaths occurred following exposure to a saturated atmosphere.

**Aminoethylethanolamine**

**Acute inhalation toxicity**

At room temperature, exposure to vapor is minimal due to low volatility; vapor from heated material may cause respiratory irritation. Based on the available data, narcotic effects were not observed.

The LC50 has not been determined.

#### **Diethylenetriamine**

##### **Acute inhalation toxicity**

LC50, Rat, 4 Hour, dust/mist, > 0.07 - < 0.3 mg/l

Prolonged exposure to aerosol/mist may cause serious adverse effects, even death.  
Excessive exposure may cause severe irritation to upper respiratory tract (nose and throat) and lungs.

#### **4-Nonylphenol, branched**

##### **Acute inhalation toxicity**

LC50, Mouse, female, vapour, > 3.636 mg/l

#### **Dinonylphenol**

##### **Acute inhalation toxicity**

The LC50 has not been determined.

#### **Bisphenol A**

##### **Acute inhalation toxicity**

The LC50 has not been determined.

#### **Benzyl alcohol**

##### **Acute inhalation toxicity**

LC50, Rat, 4 Hour, vapour, 11 mg/l

#### **Benzyl dimethylamine**

##### **Acute inhalation toxicity**

LC50, Rat, male and female, 4 Hour, vapour, 2.05 mg/l

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## **12. ECOLOGICAL INFORMATION**

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

### **Toxicity**

#### **Aminoethylpiperazine**

##### **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).

LC50, Pimephales promelas (fathead minnow), static test, 96 Hour, 2,190 mg/l, OECD Test Guideline 203 or Equivalent

##### **Acute toxicity to aquatic invertebrates**

EC50, Daphnia magna (Water flea), static test, 48 Hour, 58 mg/l, OECD Test Guideline 202 or Equivalent

##### **Acute toxicity to algae/aquatic plants**

ErC50, Pseudokirchneriella subcapitata (green algae), 72 Hour, Growth rate inhibition, > 1,000 mg/l, OECD Test Guideline 201 or Equivalent

**Aminoethylethanolamine**

**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).

LC50, Pimephales promelas (fathead minnow), 96 Hour, 640 mg/l, OECD Test Guideline 203 or Equivalent

**Acute toxicity to aquatic invertebrates**

EC50, Daphnia magna (Water flea), static test, 48 Hour, 22 mg/l, OECD Test Guideline 202 or Equivalent

**Acute toxicity to algae/aquatic plants**

ErC50, Desmodesmus subspicatus (green algae), 72 Hour, Growth rate inhibition, 353.6 mg/l, OECD Test Guideline 201 or Equivalent

**Toxicity to bacteria**

EC50, Bacteria, 16 Hour, > 5,000 mg/l

**Diethylenetriamine**

**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).

LC50, Poecilia reticulata (guppy), semi-static test, 96 Hour, 430 mg/l

**Acute toxicity to aquatic invertebrates**

EC50, Daphnia magna (Water flea), static test, 48 Hour, 16 mg/l, DIN 38412

**Acute toxicity to algae/aquatic plants**

ErC50, Pseudokirchneriella subcapitata (green algae), static test, 72 Hour, Growth rate inhibition, 1,164 mg/l, OECD Test Guideline 201 or Equivalent

**Toxicity to bacteria**

EC50, Bacteria, static test, 16 Hour, > 5,000 mg/l

**Chronic toxicity to fish**

NOEC, Fish, semi-static test, 28 d, growth, > 10 mg/l

**Chronic toxicity to aquatic invertebrates**

NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 5.6 mg/l  
MATC (Maximum Acceptable Toxicant Level), Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 7.95 mg/l

**Toxicity to soil-dwelling organisms**

EC50, Eisenia fetida (earthworms), 28 d, 979 mg/kg

**4-Nonylphenol, branched**

**Acute toxicity to fish**

Material is highly toxic to aquatic organisms on an acute basis (LC50/EC50 between 0.1 and 1 mg/L in the most sensitive species tested).

LC50, Fish, static test, 96 Hour, 0.05 mg/l, EPA-660-75-009

**Acute toxicity to aquatic invertebrates**

EC50, Daphnia magna (Water flea), semi-static test, 48 Hour, 0.0844 mg/l, Other guidelines

**Acute toxicity to algae/aquatic plants**

EC50, Algae (*Scenedesmus subspicatus*), static test, 72 Hour, Growth rate, 0.33 mg/l, Other guidelines

**Chronic toxicity to fish**

NOEC, *Pimephales promelas* (fathead minnow), flow-through test, 33 d, survival, 0.0074 mg/l

**Chronic toxicity to aquatic invertebrates**

NOEC, *Daphnia magna* (Water flea), semi-static test, 21 d, number of offspring, 0.024 mg/l

**Dinonylphenol**

**Acute toxicity to fish**

No relevant data found.

**Bisphenol A**

**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, *Fathead minnow* (*Pimephales promelas*), 96 Hour, 4.6 mg/l

LC50, *Atlantic silverside* (*Menidia menidia*), 96 Hour, 9.4 mg/l

**Acute toxicity to aquatic invertebrates**

EC50, *Daphnia magna* (Water flea), 48 Hour, 10.2 mg/l

EC50, saltwater mysid *Mysidopsis bahia*, 96 Hour, 1.1 mg/l

**Acute toxicity to algae/aquatic plants**

EC50, *Skeletonema costatum* (marine diatom), static test, 96 Hour, Growth rate inhibition, 1.1 mg/l

**Toxicity to bacteria**

EC50, Bacteria, 96 Hour, Respiration rates., > 320 mg/l

**Chronic toxicity to fish**

NOEC, *Fathead minnow* (*Pimephales promelas*), 164 d, mortality, 0.160 mg/l

NOEC, *Pimephales promelas* (fathead minnow), 444 d, number of offspring, 0.016 mg/l

NOEC, *Cyprinodon variegatus* (sheepshead minnow), 116 d, number of offspring, 0.066 mg/l

**Chronic toxicity to aquatic invertebrates**

NOEC, saltwater mysid *Mysidopsis bahia*, 28 d, number of offspring, 0.17 mg/l

NOEC, *Marisa cornuarietis* (Giant Ramshorn Snail), 328 d, growth, 0.025 mg/l

**Benzyl alcohol**

**Acute toxicity to fish**

Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested).

LC50, *Pimephales promelas* (fathead minnow), Static, 96 Hour, 460 mg/l, Method Not Specified.

**Acute toxicity to aquatic invertebrates**

EC50, *Daphnia magna* (Water flea), 48 Hour, 230 mg/l, OECD Test Guideline 202

**Acute toxicity to algae/aquatic plants**

EC50, Pseudokirchneriella subcapitata (green algae), Static, 72 Hour, Growth rate, 770 mg/l, OECD Test Guideline 201

**Toxicity to bacteria**

EC50, activated sludge, Respiration inhibition, 49 Hour, Respiration rates., 2,100 mg/l, OECD 209 Test

**Chronic toxicity to aquatic invertebrates**

NOEC, Daphnia magna, semi-static test, 21 d, 51 mg/l

**Benzyl dimethylamine**

**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).

May increase pH of aquatic systems to > pH 10 which may be toxic to aquatic organisms.

LC50, Pimephales promelas (fathead minnow), flow-through test, 96 Hour, 37.8 mg/l, OECD Test Guideline 203 or Equivalent

**Acute toxicity to aquatic invertebrates**

EC50, Daphnia magna (Water flea), static test, 48 Hour, > 100 mg/l, OECD Test Guideline 202 or Equivalent

**Acute toxicity to algae/aquatic plants**

ErC50, Desmodesmus subspicatus (green algae), static test, 72 Hour, Growth rate inhibition, 1.34 mg/l

**Toxicity to bacteria**

EC50, Pseudomonas putida, Growth inhibition, 17 Hour, Growth inhibition, 534 mg/l, DIN 38412

**Chronic toxicity to aquatic invertebrates**

NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 0.789 mg/l

LOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, 2.622 mg/l

**Persistence and degradability**

**Aminoethylpiperazine**

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

10-day Window: Fail

**Biodegradation:** 0 %

**Exposure time:** 28 d

**Method:** OECD Test Guideline 301F or Equivalent

**Theoretical Oxygen Demand:** 3.34 mg/mg

**Chemical Oxygen Demand:** 1.84 mg/mg

**Photodegradation**

**Atmospheric half-life:** 0.05 d

**Method:** Estimated.

**Aminoethylethanolamine**

**Biodegradability:** Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Pass

**Biodegradation:** > 97 %

**Exposure time:** 28 d

**Method:** OECD Test Guideline 301F or Equivalent

**Theoretical Oxygen Demand:** 2.77 mg/mg

**Chemical Oxygen Demand:** 1,070 mg/g

#### Diethylenetriamine

**Biodegradability:** Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent 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:** > 80 %

**Exposure time:** 30 d

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

**Theoretical Oxygen Demand:** 3.42 mg/mg

#### **Biological oxygen demand (BOD)**

Incubation Time	BOD
5 d	23.000 %
10 d	46.000 %
20 d	70.000 %

#### **Photodegradation**

**Sensitizer:** OH radicals

**Atmospheric half-life:** 0.87 Hour

**Method:** Estimated.

#### 4-Nonylphenol, branched

**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: Fail

**Biodegradation:** 48.2 %

**Exposure time:** 35 d

**Method:** OECD Test Guideline 301B or Equivalent

**Theoretical Oxygen Demand:** 3.29 mg/mg

#### **Photodegradation**

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

**Sensitizer:** OH radicals

**Atmospheric half-life:** 0.207 d

**Method:** Estimated.

**Dinonylphenol**

**Biodegradability:** No relevant data found.

**Bisphenol A**

**Biodegradability:** Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Pass

**Biodegradation:** 93.1 %

**Exposure time:** 28 d

**Method:** OECD Test Guideline 301F or Equivalent

10-day Window: Not applicable

**Biodegradation:** 87 - 95 %

**Exposure time:** 28 d

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

**Theoretical Oxygen Demand:** 2.52 mg/mg

**Photodegradation**

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

**Method:** Measured

**Benzyl alcohol**

**Biodegradability:** Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

10-day Window: Not applicable

**Biodegradation:** 92 - 96 %

**Exposure time:** 14 d

**Method:** OECD Test Guideline 301C or Equivalent

**Theoretical Oxygen Demand:** 2.52 mg/mg

**Photodegradation**

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

**Sensitizer:** OH radicals

**Atmospheric half-life:** 1.296 d

**Method:** Estimated.

**Benzyl dimethylamine**

**Biodegradability:** Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability. Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability).

10-day Window: Not applicable

**Biodegradation:** 0 - 2 %

**Exposure time:** 28 d

**Method:** OECD Test Guideline 301C or Equivalent

10-day Window: Not applicable

**Biodegradation:** 90 - 100 %

**Exposure time:** 13 d

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

**Theoretical Oxygen Demand:** 3.20 mg/mg

**Photodegradation**

**Test Type:** Half-life (indirect photolysis)  
**Sensitizer:** OH radicals  
**Atmospheric half-life:** 0.130 d  
**Method:** Estimated.

#### Bioaccumulative potential

##### Aminoethylpiperazine

**Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).  
**Partition coefficient: n-octanol/water(log Pow):** -1.48 Measured

##### Aminoethylethanolamine

**Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).  
**Partition coefficient: n-octanol/water(log Pow):** -1.46 Measured  
**Bioconcentration factor (BCF):** < 3.7 Cyprinus carpio (Carp) 42 d Measured

##### Diethylenetriamine

**Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).  
**Partition coefficient: n-octanol/water(log Pow):** -1.58 at 20 °C Estimated.  
**Bioconcentration factor (BCF):** < 0.3 Measured

##### 4-Nonylphenol, branched

**Bioaccumulation:** Bioconcentration potential is high (BCF > 3000 or Log Pow between 5 and 7).  
**Partition coefficient: n-octanol/water(log Pow):** 5.4 at 23 °C OECD Guideline 117 (Partition Coefficient (n-octanol / water), HPLC Method)  
**Bioconcentration factor (BCF):** 271 Pimephales promelas (fathead minnow) 20 d Measured

##### Dinonylphenol

**Bioaccumulation:** No relevant data found.

##### Bisphenol A

**Bioaccumulation:** Bioconcentration potential is low (BCF less than 100 or log Pow greater than 7).  
**Partition coefficient: n-octanol/water(log Pow):** 3.4 at 21.5 °C OECD Test Guideline 107 or Equivalent  
**Bioconcentration factor (BCF):** 5.1 - 13.3 Cyprinus carpio (Carp) 42 d

##### Benzyl alcohol

**Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).  
**Partition coefficient: n-octanol/water(log Pow):** 1.10 Measured

##### Benzyl dimethylamine

**Bioaccumulation:** Bioconcentration potential is low (BCF < 100 or Log Pow < 3).  
**Partition coefficient: n-octanol/water(log Pow):** 1.98 Measured  
**Bioconcentration factor (BCF):** <= 22 Cyprinus carpio (Carp) 42 d Measured

#### Mobility in soil

##### Aminoethylpiperazine

Expected to be relatively immobile in soil (Koc > 5000).  
**Partition coefficient (Koc):** 37000 Estimated.



**Aminoethylethanolamine**

Potential for mobility in soil is very high (Koc between 0 and 50).

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):** 3.5 Estimated.

**Diethylenetriamine**

Expected to be relatively immobile in soil (Koc > 5000).

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):** 19111 Estimated.

**4-Nonylphenol, branched**

Expected to be relatively immobile in soil (Koc > 5000).

**Partition coefficient (Koc):** > 5000 Estimated.

**Dinonylphenol**

No relevant data found.

**Bisphenol A**

Potential for mobility in soil is low (Koc between 500 and 2000).

**Partition coefficient (Koc):** 636 - 931 Measured

**Benzyl alcohol**

Potential for mobility in soil is very high (Koc between 0 and 50).

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):** 16 Estimated.

**Benzyl dimethylamine**

Potential for mobility in soil is low (Koc between 500 and 2000).

**Partition coefficient (Koc):** 630 Estimated.

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**13. DISPOSAL CONSIDERATIONS**

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**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.

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**14. TRANSPORT INFORMATION**

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**DOT**

**Proper shipping name** Amines, liquid, corrosive, n.o.s.(N-Aminoethylpiperazine,

	Benzyldimethylamine)
<b>UN number</b>	UN 2735
<b>Class</b>	8
<b>Packing group</b>	II
<b>Marine pollutant</b>	4-Nonylphenol, branched

**Classification for SEA transport (IMO-IMDG):**

<b>Proper shipping name</b>	AMINES, LIQUID, CORROSIVE, N.O.S.(N-Aminoethylpiperazine, Benzyldimethylamine)
<b>UN number</b>	UN 2735
<b>Class</b>	8
<b>Packing group</b>	II
<b>Marine pollutant</b>	4-Nonylphenol, branched, Bisphenol A
<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>	Amines, liquid, corrosive, n.o.s.(N-Aminoethylpiperazine, Benzyldimethylamine)
<b>UN number</b>	UN 2735
<b>Class</b>	8
<b>Packing group</b>	II

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.

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**15. REGULATORY INFORMATION**

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**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**

Fire Hazard  
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 product contains the following substances which are subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and which are listed in 40 CFR 372.

**Components**

Bisphenol A

**CASRN**

80-05-7

**Pennsylvania Worker and Community Right-To-Know Act:**

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

**Components**

Aminoethylpiperazine

**CASRN**

140-31-8

**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**

Bisphenol A

**CASRN**

80-05-7

**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.

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**16. OTHER INFORMATION**

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**Hazard Rating System****NFPA**

Health	Fire	Reactivity
3	2	0

**Revision**

Identification Number: 10000000338 / A476 / Issue Date: 08/31/2016 / Version: 6.0

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. ACGIH Threshold Limit Values (TLV)
Dow IHG	Dow Industrial Hygiene Guideline
SKIN, DSEN	Absorbed via Skin, Skin Sensitizer
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 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.