SAFETY DATA SHEET

D.E.H.® 502 Epoxy Curing Agent

Version	Revision Date:	SDS Number:	Date of last issue: 03-06-2020
11.1	04-27-2023	101212221	Date of first issue: 04-27-2023

BLUE CUBE OPERATIONS LLC encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

SECTION 1. IDENTIFICATION

Product name	:	D.E.H.® 502 Epoxy Curing Agent
Product code	:	000000001000000288

Manufacturer or supplier's details

Company name of supplier	:	BLUE CUBE OPERATIONS LLC
Address	:	190 CARONDELET PLAZA, SUITE 1530 CLAYTON MO 63105-3467
Telephone	:	(844) 238-3445
E-mail address	:	INFO@OLIN.COM
24-Hour Emergency Contact	:	+1 800 424 9300
Local Emergency Contact	:	1-800-424-9300
Identified uses	:	Hardener for epoxy resin.

SECTION 2. HAZARDS IDENTIFICATION

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

Acute toxicity (Oral)	:	Category 4
Acute toxicity (Inhalation)	:	Category 2
Acute toxicity (Dermal)	:	Category 4
Skin corrosion	:	Category 1B
Serious eye damage	:	Category 1
Skin sensitization	:	Category 1
Reproductive toxicity	:	Category 2
Specific target organ toxicity - single exposure	:	Category 3 (Respiratory system)
Specific target organ toxicity - repeated exposure (Inhalation)	:	Category 1 (Respiratory Tract)

GHS label elements

Hazard pictograms :

Signal Word : Danger

Hazard Statements : Harmful if swallowed or in contact with skin.
Causes severe skin burns and eye damage.
May cause an allergic skin reaction.
Fatal if inhaled.
May cause respiratory irritation.
Suspected of damaging fertility or the unborn child.
Causes damage to organs (Respiratory Tract) through prolonged or repeated exposure if inhaled.

Precautionary Statements :

Prevention:

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe mist or vapors.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing must not be allowed out of the workplace.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284 In case of inadequate ventilation wear respiratory protection.

Response:

P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310 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.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P363 Wash contaminated clothing before reuse.

Storage:

P403 + P233 Store in a well-ventilated place. Keep container

tightly closed.
P405 Store locked up.

Disposal:

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

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Components

Chemical name	CAS-No.	Concentration (% w/w)
Bisphenol A-epichlorohydrin-diethylenetriamine copolymer	31326-29-1	20 - 40
Diethylenetriamine	111-40-0	30 - 50
Bisphenol A	80-05-7	10 - 20
4-Nonylphenol, branched	84852-15-3	1 - 5
Aminoethylpiperazine	140-31-8	1 - 5

Actual concentration is withheld as a trade secret

SECTION 4. FIRST AID MEASURES

If inhaled : 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.

In case of 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.
Suitable emergency safety shower facility should be immediately available.

In case of 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.

If swallowed : 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)any additional important symptoms and effects are described in Section 11: Toxicology Information.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.
Notes to physician	:	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. Maintain adequate ventilation and oxygenation of the patient. 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).

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.
Specific hazards during fire fighting	:	Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.
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.

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

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	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. 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. Absorb with materials such as: Sand. Avoid contact with absorbent materials such as: Ground corn cobs.

Moist organic absorbents.
Peat moss.
Sawdust
Collect in suitable and properly labeled containers.
See Section 13, Disposal Considerations, for additional information.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling : Do not get in eyes, on skin, on clothing.
Avoid breathing vapor or mist.
Avoid prolonged or repeated contact with skin.
Do not swallow.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.
See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe storage : Store in a cool, dry place.
Avoid contact with metals such as:
Brass.
Bronze.
Copper.
Copper alloys.

Recommended storage temperature : 32 - 86 °F / 0 - 30 °C

Storage period : 24 Months

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Diethylenetriamine	111-40-0	TWA	1 ppm	ACGIH
		TWA	1 ppm 4 mg/m3	OSHA P0
Bisphenol A	80-05-7	(Inhalable fraction and vapor)	2 mg/m3	OLIN OEL

Engineering measures : 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.

Personal protective equipment

Respiratory protection : Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, 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.

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

Hand protection

Remarks : Use gloves chemically resistant to this material. Examples of preferred glove barrier materials include: Polyethylene. Ethyl vinyl alcohol laminate ('EVAL'). Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ('latex'). Neoprene. Nitrile/butadiene rubber ('nitrile' or 'NBR'). Polyvinyl alcohol ('PVA'). Polyvinyl chloride ('PVC' or 'vinyl'). 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.

Eye protection : Use chemical goggles.

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

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Liquid.

Color : Yellow

Odor : Amine.

Odor Threshold : No test data available

pH : Not applicable

Melting point/range	:	Not applicable
Freezing point		No test data available
Boiling point/boiling range	:	388 °F / 198 °C Method: Literature
Flash point	:	> 230 °F / > 110 °C Method: Literature, closed cup
Evaporation rate	:	No test data available
Flammability (solid, gas)	:	Not applicable to liquids
Upper explosion limit / Upper flammability limit	:	No test data available
Lower explosion limit / Lower flammability limit	:	No test data available
Vapor pressure	:	< 1 mmHg (68 °F / 20 °C) Method: Literature
Relative vapor density	:	No test data available
Relative density	:	1.08 Method: Literature
Solubility(ies)		
Water solubility	:	Slightly soluble
Partition coefficient: n-octanol/water	:	This product is a mixture. See Section 12 for individual component data.
Autoignition temperature	:	No test data available
Decomposition temperature	:	No test data available
Viscosity		
Viscosity, dynamic	:	3,000 - 4,000 cP (77 °F / 25 °C) Method: ASTM D 445
Viscosity, kinematic	:	No test data available
Explosive properties	:	No data available
Oxidizing properties	:	No data available

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

SECTION 10. STABILITY AND REACTIVITY

Chemical stability	:	Stable under recommended storage conditions. See Storage, Section 7.
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. 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: Aromatic compounds. Ammonia. Ethylenediamine. Volatile amines. Hydrocarbons. Phenolics.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute toxicity

Product:

Acute oral toxicity	:	Remarks: Low toxicity if swallowed. Swallowing may result in gastrointestinal irritation or ulceration.

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

LD50 (Rat): > 1,000 mg/kg
Method: Estimated.
Remarks: Based on information for component(s):

Acute inhalation toxicity : Remarks: 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.

Remarks: As product:
The LC50 has not been determined.

Acute dermal toxicity : Remarks: Prolonged or widespread skin contact may result in absorption of potentially harmful amounts.

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

LD50 (Rabbit): > 1,000 mg/kg
Method: Estimated.
Remarks: Based on information for component(s):

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

Acute oral toxicity : LD50 (Rat): 1,620 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 0.07 - < 0.3 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 (Rabbit): 1,090 mg/kg

Diethylenetriamine:

Acute oral toxicity : LD50 (Rat): 1,620 mg/kg

Acute inhalation toxicity : Remarks: 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.

LC50 (Rat): > 0.07 - < 0.3 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Assessment: The component/mixture is highly toxic after short term inhalation.

Acute dermal toxicity : LD50 (Rabbit): 1,045 mg/kg

Bisphenol A:

Acute oral toxicity : LD50 (Rat, male and female): > 2,000 mg/kg

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

Acute dermal toxicity : LD50 (Rabbit): 3,000 mg/kg

4-Nonylphenol, branched:

Acute oral toxicity : LD50 (Rat): > 1,000 mg/kg
Method: Estimated.

Acute inhalation toxicity : LC50 (Mouse, female): > 3.636 mg/l
Test atmosphere: vapor

Acute dermal toxicity : LD50 (Rabbit): 2,031 - 2,831 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

Aminoethylpiperazine:

Acute oral toxicity : LD50 (Rat): 2,140 mg/kg

Acute inhalation toxicity : Exposure time: 8 h
Test atmosphere: vapor
Symptoms: No deaths occurred following exposure to a saturated atmosphere.
Assessment: The substance or mixture has no acute inhalation toxicity
Remarks: The LC50 has not been determined.

Acute dermal toxicity : LD50 (Rabbit): 866 mg/kg

Skin corrosion/irritation

Product:

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

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

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

Remarks : Classified as corrosive to the skin according to DOT guidelines.

Diethylenetriamine:

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

Remarks : Classified as corrosive to the skin according to DOT guidelines.

Bisphenol A:

Result : No skin irritation
Remarks : Brief contact is essentially nonirritating to skin.
Prolonged contact may cause skin irritation with local redness.
Repeated contact may cause skin irritation with local redness.

4-Nonylphenol, branched:

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

Remarks : Classified as corrosive to the skin according to DOT guidelines.

Aminoethylpiperazine:

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

Remarks : Classified as corrosive to the skin according to DOT guidelines.

Serious eye damage/eye irritation

Product:

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

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

Result : Corrosive
Remarks : May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.
Vapor may cause eye irritation experienced as mild discomfort and redness.

Diethylenetriamine:

Result : Corrosive
Remarks : May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.
Vapor may cause eye irritation experienced as mild discomfort and redness.

Bisphenol A:

Result : Corrosive
Remarks : May cause moderate eye irritation.

May cause slight corneal injury.
May cause permanent impairment of vision.

4-Nonylphenol, branched:

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

Aminoethylpiperazine:

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

Respiratory or skin sensitization

Product:

Remarks : A component in this mixture has caused allergic skin reactions in humans.
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.
Triethylenetetramine (TETA).
Piperazine.
Tetraethylenepentamine (TEPA).
Aminoethylethanolamine (AEEA).

Remarks : For respiratory sensitization:
No relevant data found.

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

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

Remarks : For respiratory sensitization:

No relevant data found.

Diethylenetriamine:

Assessment	:	The product is a skin sensitizer, sub-category 1B.
Remarks	:	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. Has caused allergic skin reactions when tested in guinea pigs.
Remarks	:	For respiratory sensitization: No specific, relevant data available for assessment.

Bisphenol A:

Assessment	:	May cause sensitization by skin contact.
Remarks	:	Skin contact may cause an allergic skin reaction.
Remarks	:	For respiratory sensitization: No relevant data found.

4-Nonylphenol, branched:

Remarks	:	Did not cause allergic skin reactions when tested in guinea pigs.
Remarks	:	For respiratory sensitization: No relevant data found.

Aminoethylpiperazine:

Assessment	:	The product is a skin sensitizer, sub-category 1B.
Remarks	:	Skin contact may cause an allergic skin reaction. Has caused allergic skin reactions when tested in guinea pigs. 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: Triethylenetetramine (TETA). Aminoethylethanolamine (AEEA). Piperazine.
Remarks	:	For respiratory sensitization: No relevant data found.

Germ cell mutagenicity

Product:

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

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

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

Diethylenetriamine:

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

Bisphenol A:

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

4-Nonylphenol, branched:

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

Aminoethylpiperazine:

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

Carcinogenicity

Product:

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

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

Remarks : Did not cause cancer in laboratory animals.

Diethylenetriamine:

Remarks : Did not cause cancer in laboratory animals.

Bisphenol A:

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

4-Nonylphenol, branched:

Remarks : No relevant data found.

Aminoethylpiperazine:

Remarks : No relevant data found.

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

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

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

Reproductive toxicity

Product:

Effects on fertility : Remarks: In an oral gavage screening study, DETA has been toxic to the fetus in laboratory animal tests.
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.

Effects on fetal development : Remarks: Contains component(s) which have been toxic to the fetus in lab animal tests.

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

Effects on fertility : Remarks: Based on information for component(s):
In animal studies, did not interfere with fertility.

Effects on fetal development : Remarks: Based on information for component(s):
Has been toxic to the fetus in laboratory animals at doses toxic to the mother.
Did not cause birth defects in laboratory animals.

Diethylenetriamine:

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

Effects on fetal development : Remarks: Has been toxic to the fetus in laboratory animals at doses toxic to the mother.
Did not cause birth defects in laboratory animals.

Bisphenol A:

Effects on fertility : Remarks: 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.

Effects on fetal development : Remarks: Has been toxic to the fetus in laboratory animals at doses toxic to the mother.
Did not cause birth defects in laboratory animals.

Reproductive toxicity - Assessment : Suspected human reproductive toxicant

4-Nonylphenol, branched:

Effects on fertility : Remarks: 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.

Effects on fetal development : Remarks: Did not cause birth defects or other effects in the fetus even at doses which caused toxic effects in the mother.

Reproductive toxicity - Assessment : Suspected human reproductive toxicant

Aminoethylpiperazine:

Effects on fertility : Remarks: Contains component(s) which have interfered with fertility in animal studies.

Effects on fetal development : Remarks: Has been toxic to the fetus in laboratory animal tests.

Reproductive toxicity - Assessment : Suspected human reproductive toxicant

STOT-single exposure

Product:

Routes of exposure : Inhalation
Target Organs : Respiratory system
Assessment : May cause respiratory irritation.

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

Routes of exposure : Inhalation
Target Organs : Respiratory system
Assessment : May cause respiratory irritation.

Diethylenetriamine:

Routes of exposure	:	Inhalation
Target Organs	:	Respiratory system
Assessment	:	May cause respiratory irritation.

Bisphenol A:

Routes of exposure	:	Inhalation
Target Organs	:	Respiratory Tract
Assessment	:	May cause respiratory irritation.

4-Nonylphenol, branched:

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

Aminoethylpiperazine:

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

STOT-repeated exposure

Components:

Aminoethylpiperazine:

Routes of exposure	:	Inhalation
Target Organs	:	Respiratory Tract
Assessment	:	Causes damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Product:

Remarks	:	Contains component(s) which have been reported to cause effects on the following organs in animals: Liver. Respiratory tract. Liver effects and questionable kidney and bladder effects were observed in animals fed bisphenol A.

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

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

Diethylenetriamine:

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

Bisphenol A:

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

4-Nonylphenol, branched:

Remarks : In animals, effects have been reported on the following organs: Liver.
Kidney effects and/or tumors have been observed in male rats. These effects are believed to be species specific and unlikely to occur in humans.

Aminoethylpiperazine:

Remarks : In animals, effects have been reported on the following organs: Respiratory tract.

Aspiration toxicity

Product:

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

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

Aspiration into the lungs may occur during ingestion or vomiting, causing tissue damage or lung injury.

Diethylenetriamine:

No aspiration toxicity classification

Bisphenol A:

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

4-Nonylphenol, branched:

Aspiration into the lungs may occur during ingestion or vomiting, causing tissue damage or lung injury.

Aminoethylpiperazine:

Aspiration into the lungs may occur during ingestion or vomiting, causing tissue damage or lung injury.

No aspiration toxicity classification

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

Toxicity to fish	:	Remarks: Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested). LC50 (Poecilia reticulata (guppy)): 430 mg/l Exposure time: 96 h Test Type: semi-static test
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 16 mg/l Exposure time: 48 h Test Type: static test Method: DIN 38412
Toxicity to algae/aquatic plants	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): 1,164 mg/l End point: Growth rate inhibition Exposure time: 72 h Test Type: static test Method: OECD Test Guideline 201 or Equivalent
Toxicity to fish (Chronic toxicity)	:	NOEC (Fish): > 10 mg/l End point: growth Exposure time: 28 d Test Type: semi-static test
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 5.6 mg/l End point: number of offspring Exposure time: 21 d Test Type: semi-static test MATC (Maximum Acceptable Toxicant Level) (Daphnia magna (Water flea)): 7.95 mg/l End point: number of offspring Exposure time: 21 d Test Type: semi-static test

Diethylenetriamine:

Toxicity to fish	:	Remarks: Material is slightly toxic to aquatic organisms on an acute basis (LC50/EC50 between 10 and 100 mg/L in the most sensitive species tested). LC50 (Poecilia reticulata (guppy)): 430 mg/l Exposure time: 96 h Test Type: semi-static test
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 16 mg/l Exposure time: 48 h Test Type: static test Method: DIN 38412
Toxicity to algae/aquatic plants	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): 1,164 mg/l End point: Growth rate inhibition Exposure time: 72 h Test Type: static test Method: OECD Test Guideline 201 or Equivalent

Toxicity to fish (Chronic toxicity)	:	NOEC (Fish): > 10 mg/l End point: growth Exposure time: 28 d Test Type: semi-static test
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 5.6 mg/l End point: number of offspring Exposure time: 21 d Test Type: semi-static test MATC (Maximum Acceptable Toxicant Level) (Daphnia magna (Water flea)): 7.95 mg/l End point: number of offspring Exposure time: 21 d Test Type: semi-static test
Toxicity to microorganisms	:	EC50 (Bacteria): > 5,000 mg/l Exposure time: 16 h Test Type: static test
Toxicity to soil dwelling organisms	:	EC50 (Eisenia fetida (earthworms)): 979 mg/kg Exposure time: 28 d

Bisphenol A:

Toxicity to fish	:	Remarks: Material is moderately toxic to aquatic organisms on an acute basis (LC50/EC50 between 1 and 10 mg/L in the most sensitive species tested). LC50 (Fathead minnow (Pimephales promelas)): 4.6 mg/l Exposure time: 96 h LC50 (Atlantic silverside (Menidia menidia)): 9.4 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 10.2 mg/l Exposure time: 48 h EC50 (saltwater mysid Mysidopsis bahia): 1.1 mg/l Exposure time: 96 h
Toxicity to algae/aquatic plants	:	EC50 (Skeletonema costatum (marine diatom)): 1.1 mg/l End point: Growth rate inhibition Exposure time: 96 h Test Type: static test
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to fish (Chronic toxicity)	:	NOEC (Fathead minnow (Pimephales promelas)): 0.160 mg/l End point: mortality Exposure time: 164 d NOEC (Pimephales promelas (fathead minnow)): 0.016 mg/l

End point: number of offspring
Exposure time: 444 d

NOEC (Cyprinodon variegatus (sheepshead minnow)): 0.066 mg/l
End point: number of offspring
Exposure time: 116 d

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (saltwater mysid Mysidopsis bahia): 0.17 mg/l
End point: number of offspring
Exposure time: 28 d

NOEC (Marisa cornuarietis (Giant Ramshorn Snail)): 0.025 mg/l
End point: growth
Exposure time: 328 d

M-Factor (Chronic aquatic toxicity) : 10

Toxicity to microorganisms : EC50 (Bacteria): > 320 mg/l
End point: Respiration rates.
Exposure time: 96 h

Ecotoxicology Assessment

Acute aquatic toxicity : Very toxic to aquatic life.

Chronic aquatic toxicity : Very toxic to aquatic life with long lasting effects.

4-Nonylphenol, branched:

Toxicity to fish : Remarks: 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): 0.05 mg/l
Exposure time: 96 h
Test Type: static test
Method: EPA-660-75-009

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 0.0844 mg/l
Exposure time: 48 h
Test Type: semi-static test
Method: Other guidelines

Toxicity to algae/aquatic plants : EC50 (Algae (Scenedesmus subspicatus)): 0.33 mg/l
End point: Growth rate
Exposure time: 72 h
Test Type: static test
Method: Other guidelines

M-Factor (Acute aquatic toxicity) : 10

Toxicity to fish (Chronic toxicity) : NOEC (Pimephales promelas (fathead minnow)): 0.0074 mg/l
End point: survival

Exposure time: 33 d
Test Type: flow-through test
Analytical monitoring: yes
Method: Other guidelines
GLP: yes

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0.024 mg/l
End point: number of offspring
Exposure time: 21 d
Test Type: semi-static test

M-Factor (Chronic aquatic toxicity) : 10

Aminoethylpiperazine:

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

LC50 (Pimephales promelas (fathead minnow)): 2,190 mg/l
Exposure time: 96 h
Test Type: static test
Method: OECD Test Guideline 203 or Equivalent

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 58 mg/l
Exposure time: 48 h
Test Type: static test
Method: OECD Test Guideline 202 or Equivalent
GLP: yes

Toxicity to algae/aquatic plants : ErC50 (Pseudokirchneriella subcapitata (green algae)): > 1,000 mg/l
End point: Growth rate inhibition
Exposure time: 72 h
Method: OECD Test Guideline 201 or Equivalent

Persistence and degradability

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

Biodegradability : Result: Readily biodegradable.
Remarks: Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability).

aerobic
Biodegradation: > 96 %
Exposure time: 10 d
Method: OECD Test Guideline 302A or Equivalent
Remarks: 10-day Window: Not applicable

Diethylenetriamine:

Biodegradability : Result: Readily biodegradable.
Remarks: Material is ultimately biodegradable (reaches > 70% min-

eralization 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.

aerobic
Biodegradation: > 80 %
Exposure time: 30 d
Method: OECD Test Guideline 302A or Equivalent
Remarks: 10-day Window: Not applicable

Biochemical Oxygen Demand (BOD) : 23.000 %
Incubation time: 5 d

46.000 %
Incubation time: 10 d

70.000 %
Incubation time: 20 d

ThOD : 3.42 mg/mg

Photodegradation : Sensitizer: OH radicals
Concentration: 1,500,000 1/cm3
Rate constant: 1.48E-10 cm3/s
Method: Estimated.

Bisphenol A:

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

Biodegradation: 93.1 %
Exposure time: 28 d
Method: OECD Test Guideline 301F or Equivalent
Remarks: 10-day Window: Pass

Biodegradation: 87 - 95 %
Exposure time: 28 d
Method: OECD Test Guideline 302A or Equivalent
Remarks: 10-day Window: Not applicable

ThOD : 2.52 mg/mg

4-Nonylphenol, branched:

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

Biodegradation: 48.2 %
Exposure time: 35 d

Method: OECD Test Guideline 301B or Equivalent
Remarks: 10-day Window: Fail

ThOD : 3.29 mg/mg

Photodegradation : Test Type: Half-life (indirect photolysis)
Sensitizer: OH radicals
Rate constant: 5.168E-11 cm3/s
Method: Estimated.

Aminoethylpiperazine:

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

Result: Not biodegradable
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 301F or Equivalent
Remarks: 10-day Window: Fail

Chemical Oxygen Demand (COD) : 1.84 mg/mg

ThOD : 3.34 mg/mg

Photodegradation : Rate constant: 2.14E-10 cm3/s
Method: Estimated.

Bioaccumulative potential

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

Bioaccumulation : Bioconcentration factor (BCF): < 0.3
Method: Measured

Diethylenetriamine:

Bioaccumulation : Bioconcentration factor (BCF): < 0.3
Method: Measured

4-Nonylphenol, branched:

Bioaccumulation : Species: Fathead minnow (Pimephales promelas)
Bioconcentration factor (BCF): 271
Exposure time: 20 d

Partition coefficient: n-octanol/water : log Pow: 5.4 (73 °F / 23 °C)
Method: OECD Guideline 117 (Partition Coefficient (n-octanol / water), HPLC Method)
Remarks: Bioconcentration potential is high (BCF > 3000 or Log Pow between 5 and 7).

Aminoethylpiperazine:

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

Mobility in soil

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

Distribution among environmental compartments	:	Koc: 19111 Method: Estimated. Remarks: Expected to be relatively immobile in soil (Koc > 5000).

Diethylenetriamine:

Distribution among environmental compartments	:	Koc: 19111 Method: Estimated. Remarks: 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.

Bisphenol A:

Distribution among environmental compartments	:	Koc: 636 - 931 Method: Measured Remarks: Potential for mobility in soil is low (Koc between 500 and 2000).

4-Nonylphenol, branched:

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

Aminoethylpiperazine:

Distribution among environmental compartments	:	Koc: 37000 Method: Estimated. Remarks: Expected to be relatively immobile in soil (Koc > 5000).

Other adverse effects

Components:

Bisphenol A-epichlorohydrin-diethylenetriamine copolymer:

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

Diethylenetriamine:

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

Bisphenol A:

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

4-Nonylphenol, branched:

Results of PBT and vPvB assessment	:	This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).
Endocrine disrupting potential	:	The substance is identified as having endocrine disrupting properties according to Commission Regulation (EU) 2018/605 or Commission Delegated Regulation (EU) 2017/2100.

Aminoethylpiperazine:

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

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	AS YOUR SUPPLIER, WE HAVE NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION: Composition Information. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device.

SECTION 14. TRANSPORT INFORMATION

International Regulations

UNRTDG

UN number	:	UN 2735
Proper shipping name	:	AMINES, LIQUID, CORROSIVE, N.O.S. (Diethylenetriamine, Aminoethylpiperazine)

Class	:	8
Packing group	:	III
Labels	:	8

IATA-DGR

UN/ID No.	:	UN 2735
Proper shipping name	:	Amines, liquid, corrosive, n.o.s., Amines, liquid, corrosive, n.o.s. (Diethylenetriamine, Aminoethylpiperazine)
Class	:	8
Packing group	:	III
Labels	:	Corrosive
Packing instruction (cargo aircraft)	:	856
Packing instruction (passenger aircraft)	:	852

IMDG-Code

UN number	:	UN 2735
Proper shipping name	:	AMINES, LIQUID, CORROSIVE, N.O.S. (Diethylenetriamine, Aminoethylpiperazine, Bisphenol A, 4-Nonylphenol, branched)
Class	:	8
Packing group	:	III
Labels	:	8
EmS Code	:	F-A, S-B
Marine pollutant	:	yes
Remarks	:	Stowage category AAlkalis

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

Not applicable for product as supplied.

Domestic regulation

49 CFR

UN/ID/NA number	:	UN 2735
Proper shipping name	:	Amines, liquid, corrosive, n.o.s. (Diethylenetriamine, Aminoethylpiperazine)
Class	:	8
Packing group	:	III
Labels	:	CORROSIVE
ERG Code	:	153
Marine pollutant	:	no

Special precautions for user

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

SECTION 15. REGULATORY INFORMATION

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

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

SARA 311/312 Hazards	:	Acute toxicity (any route of exposure) Respiratory or skin sensitization

Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Bisphenol A	80-05-7	10 - 20 %
4-Nonylphenol, branched	84852-15-3	1 - 5 %

US State Regulations

Pennsylvania Right To Know

Diethylenetriamine	111-40-0
Bisphenol A	80-05-7
Aminoethylpiperazine	140-31-8
Ethylenediamine	107-15-3
Aminoethylethanolamine	111-41-1

California Prop. 65

WARNING: This product can expose you to chemicals including Bisphenol A, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

California List of Hazardous Substances

Diethylenetriamine	111-40-0
Bisphenol A	80-05-7
4-Nonylphenol, branched	84852-15-3

International Regulations

Montreal Protocol : Not applicable

Rotterdam Convention (Prior Informed Consent) : Not applicable

Stockholm Convention (Persistent Organic Pollutants) : Not applicable

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

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

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

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

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

ENCS : All intentional components are listed on the inventory, are

exempt, or are supplier certified.

ISHL	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
KECI	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
PICCS	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
IECSC	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
NZIoC	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
CH INV	:	All intentional components are listed on the inventory, are exempt, or are supplier certified.
TECI	:	not determined

TSCA list

The following substance(s) is/are subject to a Significant New Use Rule:

4-Nonylphenol, branched	84852-15-3

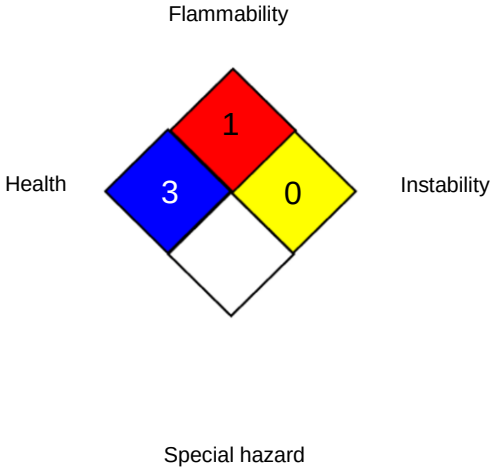
The following substance(s) is/are subject to TSCA 12(b) export notification requirements:

4-Nonylphenol, branched	84852-15-3

SECTION 16. OTHER INFORMATION

Further information

NFPA 704:



Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
OSHA P0	:	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
ACGIH / TWA	:	8-hour, time-weighted average
OSHA P0 / TWA	:	8-hour time weighted average

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

Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Revision Date : 04-27-2023

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