

TRITON X-100 Detergent, Hydrogenated

sc-281181



The Power is Question

Material Safety Data Sheet

Hazard Alert Code Key:

EXTREME

HIGH

MODERATE

LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

TRITON X-100 Detergent, Hydrogenated

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

Company: Santa Cruz Biotechnology, Inc.

Address:

2145 Delaware Ave

Santa Cruz, CA 95060

Telephone: 800.457.3801 or 831.457.3800

Emergency Tel: CHEMWATCH: From within the US and Canada:
877-715-9305

Emergency Tel: From outside the US and Canada: +800 2436 2255
(1-800-CHEMCALL) or call +613 9573 3112

PRODUCT USE

Non-ionic surfactant.

SYNONYMS

"polyethylene glycol p-octylphenyl ether", "polyethylene glycol p-octylphenyl ether", "polyethylene glycol mono-p-octylphenyl ether, reduced", "polyethylene glycol mono-p-octylphenyl ether, reduced", "Triton X-100, reduced"

Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Irritating to eyes, respiratory system and skin.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

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SWALLOWED

- Accidental ingestion of the material may be damaging to the health of the individual.
- Nonionic surfactants may produce localized irritation of the oral or gastrointestinal lining and induce vomiting and mild diarrhea.

EYE

- This material can cause eye irritation and damage in some persons.
- Non-ionic surfactants can cause numbing of the cornea, which masks discomfort normally caused by other agents and leads to corneal injury. Irritation varies depending on the duration of contact, the nature and concentration of the surfactant.

SKIN

- This material can cause inflammation of the skin on contact in some persons.
- The material may accentuate any pre-existing dermatitis condition.
- Skin contact is not thought to have harmful health effects, however the material may still produce health damage following entry through wounds, lesions or abrasions.
- Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

- The material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage.

CHRONIC HEALTH EFFECTS

- Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems. Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
- Prolonged or repeated skin contact may cause degreasing with drying, cracking and dermatitis following.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

HAZARD RATINGS

	Min	Max
Flammability:	1	
Toxicity:	2	
Body Contact:	2	
Reactivity:	1	
Chronic:	2	

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4



NAME	CAS RN	%
mono-p-octylphenyl ether, reduced, ethoxylated	101013-07-4	>99
Head space of drum may contain traces of ethylene oxide	75-21-8	

Section 4 - FIRST AID MEASURES

SWALLOWED

-
- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

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EYE

- If this product comes in contact with the eyes:
 - Wash out immediately with fresh running water.
 - Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
 - If pain persists or recurs seek medical attention.
 - Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

- If skin contact occurs:
 - Immediately remove all contaminated clothing, including footwear
 - Flush skin and hair with running water (and soap if available).
 - Seek medical attention in event of irritation.

INHALED

- - If fumes or combustion products are inhaled remove from contaminated area.
 - Lay patient down. Keep warm and rested.
 - Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
 - Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
 - Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN

- Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible
Upper Explosive Limit (%):	Not applicable
Specific Gravity (water=1):	1.029
Lower Explosive Limit (%):	>110

EXTINGUISHING MEDIA

- - Alcohol stable foam.
 - Dry chemical powder.
 - BCF (where regulations permit).
 - Carbon dioxide.
 - Water spray or fog - Large fires only.

FIRE FIGHTING

- - Alert Emergency Responders and tell them location and nature of hazard.
 - Wear full body protective clothing with breathing apparatus.
 - Prevent, by any means available, spillage from entering drains or water course.
 - Use water delivered as a fine spray to control fire and cool adjacent area.
 - Avoid spraying water onto liquid pools.
 - Do not approach containers suspected to be hot.
 - Cool fire exposed containers with water spray from a protected location.
 - If safe to do so, remove containers from path of fire.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- - Combustible.
 - Slight fire hazard when exposed to heat or flame.
 - Heating may cause expansion or decomposition leading to violent rupture of containers.
 - On combustion, may emit toxic fumes of carbon monoxide (CO).
 - May emit acrid smoke.

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- Mists containing combustible materials may be explosive.

Combustion products include: carbon dioxide (CO₂), other pyrolysis products typical of burning organic material.

May emit poisonous fumes.

May emit corrosive fumes.

FIRE INCOMPATIBILITY

- Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:

Chemical goggles.

Gloves:

Respirator:

Type AX-P Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Slippery when spilt.
- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapors and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb spill with sand, earth, inert material or vermiculite.
- Wipe up.
- Place in a suitable labeled container for waste disposal.

MAJOR SPILLS

- Slippery when spilt.
- Moderate hazard.
- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.
- Prevent, by any means available, spillage from entering drains or water course.
- No smoking, naked lights or ignition sources. Increase ventilation.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labeled containers for recycling.
- Absorb remaining product with sand, earth or vermiculite.
- Collect solid residues and seal in labeled drums for disposal.
- Wash area and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

ACUTE EXPOSURE GUIDELINE LEVELS (AEG) (in ppm)

AEG 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.

AEG 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

AEG 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Section 7 - HANDLING AND STORAGE

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PROCEDURE FOR HANDLING

-
- DO NOT allow clothing wet with material to stay in contact with skin
- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- Avoid smoking, naked lights or ignition sources.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

RECOMMENDED STORAGE METHODS

- Glass container.
- Metal can or drum
- Packing as recommended by manufacturer.
- Check all containers are clearly labeled and free from leaks.

STORAGE REQUIREMENTS

-
- Store in original containers.
- Keep containers securely sealed.
- No smoking, naked lights or ignition sources.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



X: Must not be stored together
 O: May be stored together with specific preventions
 +: May be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m ³	STEL ppm	STEL mg/m ³	Peak ppm	Peak mg/m ³	TWA F/CC	Notes
Canada - Alberta Occupational Exposure Limits	ethylene oxide (Ethylene oxide)	1	1.8						

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Canada - British Columbia Occupational Exposure Limits	ethylene oxide (Ethylene oxide)	0.1		1			A2, 1; R
US OSHA Permissible Exposure Levels (PELs) - Table Z1	ethylene oxide (Ethylene oxide; see 1910.1047)	1		5			(STEL (Excursion limit)(as averaged over a sampling period of 15 minutes))
US ACGIH Threshold Limit Values (TLV)	ethylene oxide (Ethylene oxide)	1					TLV Basis: cancer; central nervous system impairment
US NIOSH Recommended Exposure Limits (RELs)	ethylene oxide (Ethylene oxide)	<0.1	0.18		5	9	
US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)	ethylene oxide (ETHYLENE OXIDE)	0.09					
US - California Permissible Exposure Limits for Chemical Contaminants	ethylene oxide (Ethylene oxide; see Section 5220)	1	2	5			
US - Hawaii Air Contaminant Limits	ethylene oxide (Ethylene oxide)	1					See 12-202-35
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	ethylene oxide (Ethylene oxide)	50	90	75	135		
US - Washington Permissible exposure limits of air contaminants	ethylene oxide (Ethylene oxide (see chapter 296-855 WAC))	1		5			
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	ethylene oxide (Ethylene oxide)	1		2			T20
US - Michigan Exposure Limits for Air Contaminants	ethylene oxide (Ethylene oxide; see R 325.51151 et seq.F)	1	1.8	5	9.0		
Canada - Prince Edward Island Occupational Exposure Limits	ethylene oxide (Ethylene oxide)	1					TLV Basis: cancer; central nervous system impairment
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	ethylene oxide (Ethylene oxide; see 1910.1047)	1					
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	ethylene oxide (Ethylene oxide)	1	1.8				
US - Oregon Permissible Exposure Limits (Z1)	ethylene oxide (Ethylene oxide)	1					(TWA (See 1910.1047))
Canada - Northwest Territories Occupational Exposure Limits (English)	ethylene oxide (Ethylene oxide)	10	20	50	100		
Canada - Nova Scotia Occupational Exposure Limits	ethylene oxide (Ethylene oxide)	1					TLV Basis: cancer; central nervous system impairment

The following materials had no OELs on our records

- mono-p-octylphenyl ether, reduced, ethoxylated: CAS:101013-07-4 CAS:92046-34-9

EMERGENCY EXPOSURE LIMITS

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Material	Revised IDLH Value (mg/m3)	Revised IDLH Value (ppm)
ethylene oxide		800 [Unch]

MATERIAL DATA

ETHYLENE OXIDE:

MONO-P-OCTYLPHENYL ETHER, REDUCED, ETHOXYLATED:

■ for ethylene oxide:

Odour Threshold Value: 257-690 ppm (detection), 493 ppm (recognition)

NOTE: Detector tubes for ethylene oxide, measuring in excess of 1 ppm, are available commercially.

Exposure at or below the TLV-TWA is thought reduce the potential oncogenic risk and the risk from potential, non-neoplastic adverse effects non lungs, liver, kidneys, endocrine system, blood forming elements and the central nervous system. OSHA recognised that ethylene oxide exposures at 1 ppm still might produce significant health risks. A quantitative risk assessment shows an excess cancer mortality risk of 12 to 23 deaths per 10,000 workers at this level. It must be stated that risk assessment models are fraught with much uncertainty.

Odour Safety Factor(OSF)

OSF=0.0023 (ETHYLENE OXIDE).

MONO-P-OCTYLPHENYL ETHER, REDUCED, ETHOXYLATED:

■ No exposure limits set by NOHSC or ACGIH.

PERSONAL PROTECTION



Consult your EHS staff for recommendations

EYE

-
- Safety glasses with side shields.
- Chemical goggles.
- Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. DO NOT wear contact lenses.

HANDS/FEET

■ Wear chemical protective gloves, eg. PVC.

Wear safety footwear or safety gumboots, eg. Rubber.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

OTHER

-
- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of

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exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

■ General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in special circumstances. If risk of overexposure exists, wear an approved respirator. An approved respirator (supplied air type) may be required in special circumstances. Correct fit is essential to ensure adequate protection. Provide adequate ventilation in warehouses and enclosed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapors, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion)	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favorable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid.
Does not mix with water.
Sinks in water.

State	Liquid	Molecular Weight	Not applicable.
Melting Range (°F)	Not available	Viscosity	Not available
Boiling Range (°F)	Not available	Solubility in water (g/L)	Partly miscible
Flash Point (°F)	Not available	pH (1% solution)	Not available
Decomposition Temp (°F)	Not available.	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available.	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not applicable	Specific Gravity (water=1)	1.029
Lower Explosive Limit (%)	>110	Relative Vapor Density (air=1)	>1
Volatile Component (%vol)	Negligible	Evaporation Rate	Not available

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APPEARANCE

Family of products which vary in their physical properties as a result of variations in production. Data presented here is for typical family member. Viscous colourless liquid; does not mix well with water.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerization will not occur.

STORAGE INCOMPATIBILITY

- Avoid oxidizing agents, acids, acid chlorides, acid anhydrides.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

mono-p-octylphenyl ether, reduced, ethoxylated

TOXICITY AND IRRITATION

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

No significant acute toxicological data identified in literature search.

CARCINOGEN

Ethylene oxide (NB: Overall evaluation upgraded from 2A to 1 based on mechanistic and other relevant data)	International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs	Group	1
Ethylene oxide	US ACGIH Threshold Limit Values (TLV) - Carcinogens	Carcinogen Category	A2
ETHYLENE OXIDE	US Environmental Defense Scorecard Recognized Carcinogens	Reference(s)	P65
ETHYLENE OXIDE	US Environmental Defense Scorecard Suspected Carcinogens	Reference(s)	P65
Ethylene oxide	US Air Toxics Hot Spots TSD for Describing Available Cancer Potency Factors	IARC Class	1
Ethyleneoxide	US NIOSH Recommended Exposure Limits (RELs) - Carcinogens	Carcinogen	Ca

REPROTOXIN

ethylene oxide	ILO Chemicals in the electronics industry that have toxic effects on reproduction	Reduced fertility or sterility	A
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Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:

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ETHYLENE OXIDE:

MONO-P-OCTYLPHENYL ETHER, REDUCED, ETHOXYLATED:

■ DO NOT discharge into sewer or waterways.

MONO-P-OCTYLPHENYL ETHER, REDUCED, ETHOXYLATED:

■ Octanol/ water partition coefficients cannot easily be determined for surfactants because one part of the molecule is hydrophilic and the other part is hydrophobic. Consequently they tend to accumulate at the interface and are not extracted into one or other of the liquid phases. As a result surfactants are expected to transfer slowly, for example, from water into the flesh of fish. During this process, readily biodegradable surfactants are expected to be metabolized rapidly during the process of bioaccumulation. This was emphasized by the OECD Expert Group stating that chemicals are not to be considered to show bioaccumulation potential if they are readily biodegradable. Several anionic and nonionic surfactants have been investigated to evaluate their potential to bioconcentrate in fish. BCF values (BCF - bioconcentration factor) ranging from 1 to 350 were found. These are absolute maximum values resulting from the radio labeling technique used. In all these studies, substantial oxidative metabolism was found resulting in the highest radioactivity in the gall bladder. This indicates liver transformation of the parent compound and biliary excretion of the metabolized compounds, so that "real" bioconcentration is overstated. After correction it can be expected that "real" parent BCF values are one order of magnitude less than those indicated above, i.e. "real" BCF is <100. Therefore the usual data used for classification by EU Directives to determine whether a substance is "Dangerous to the Environment" has little bearing on whether the use of the surfactant is environmentally acceptable.

ETHYLENE OXIDE:

■ Hazardous Air Pollutant:	Yes
■ Fish LC50 (96hr.) (mg/l):	90 (24hr)
■ log Kow (Sangster 1997):	- 0.3
■ BOD5:	0.06
■ COD:	1.74
■ Half- life Soil - High (hours):	285
■ Half- life Soil - Low (hours):	251
■ Half- life Air - High (hours):	9167
■ Half- life Air - Low (hours):	917
■ Half- life Surface water - High (hours):	285
■ Half- life Surface water - Low (hours):	251
■ Half- life Ground water - High (hours):	285
■ Half- life Ground water - Low (hours):	251
■ Aqueous biodegradation - Aerobic - High (hours):	4320
■ Aqueous biodegradation - Aerobic - Low (hours):	672
■ Aqueous biodegradation - Anaerobic - High (hours):	17280
■ Aqueous biodegradation - Anaerobic - Low (hours):	2688
■ Photooxidation half- life air - High (hours):	9167
■ Photooxidation half- life air - Low (hours):	917
■ First order hydrolysis half- life (hours):	285
■ Base rate constant [MOH]- HR]- 1:	1.0E- 04 M-

■ for ethylene oxide:

log Kow : -0.3

Koc : 16

Half-life (hr) air : 2880

Half-life (hr) H2O surface water : 216-336

Henry's atm m3 /mol: 1.20E-04

BOD 5: 0.06

COD : 1.74

Ethylene oxide is not expected to bioaccumulate in the environment. Fish are the most susceptible aquatic organisms. An LC50 of 90 mg/litre was observed for goldfish exposed for 24 h. 2-Chloroethanol, a degradation product in saline water, is equally toxic but, 1,2-ethanediol, a major degradation product, is much less toxic.

In the atmosphere, ethylene oxide degrades slowly by reacting with hydroxy-radicals; the estimated half-life is 100-200 days. In water it is removed by volatilisation, hydrolysis and to a lesser extent, biodegradation.

Volatilisation half-lives for a model river and lake are estimated to be 5.9 hours and 38 days respectively.

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Ethylene oxide is not strongly adsorbed to soil and is not expected to bioconcentrate in the food chain

Environmental fate:

The main pathway of entry of ethylene oxide into the environment is through its escape into the atmosphere due to evaporation and with vented gases during production, handling, storage, transport, and use. Most of the ethylene oxide applied as a sterilant or fumigant will enter the atmosphere

At ambient levels, ethylene oxide will be removed from the atmosphere via oxidation by hydroxyl radicals. On the basis of a theoretical rate constant for this reaction, the atmospheric residence time of ethylene oxide was estimated to be 5.8 days. However, experimental data have shown the residence time to be 100 - 215 days, depending on the hydroxyl radical concentration and the ambient temperature (US EPA, 1985). Because of its high water solubility, ethylene oxide levels in air will also be reduced through washout by rain. The photochemical reactivity of ethylene oxide, in terms of its ozone-forming ability, is low. Evaporation from water is a significant removal process. Under specific conditions, a half-life of 1 h for the evaporation of ethylene oxide from water has been calculated. In the environment, chemical degradation in water through ionic reactions appears to be comparatively slow. In neutral, fresh water at 25 C, ethylene oxide is broken down to form 1,2-ethanediol with a half-life of 14 days. At 0 C, the half-life is 309 days. The reaction is acid- and base-catalysed. In the presence of halide ions, 2-haloethanol will also be formed. In neutral water of 3% salinity, at 25 C, 77% of ethylene oxide was found to react to form 1,2-ethanediol and 23%, to form 2-chloroethanol with a half-life of 9 days.

Ethylene oxide and its possible metabolites can be biodegraded slowly by aerobic microorganisms. Biological oxygen demands of 3 - 5% and 52% of the theoretical oxygen demand were determined for ethylene oxide after 5 and 20 days, respectively, using a domestic sewage seed.

Ecotoxicity:

LC50s of ethylene oxide for aquatic species have been reported to range from 90 mg/litre (goldfish, 24-h exposure) to 745 mg/litre (brine shrimp, 48-h exposure). Microorganisms in activated sludge showed 50% inhibition at concentrations between 10 and 100 mg/litre. Hydrolysis to 1,2-ethanediol results in detoxification. The toxicity of 2-chloroethanol for aquatic organisms resembles that of ethylene oxide, though 2-chloroethanol seems to be more toxic for Daphnia magna. Nevertheless, under environmental conditions, the conversion of ethylene oxide to 2-chloroethanol or 1,2-ethanediol will be slow.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
ethylene oxide	LOW	HIGH	LOW	HIGH

Section 13 - DISPOSAL CONSIDERATIONS

US EPA Waste Number & Descriptions

B. Component Waste Numbers

When ethylene oxide is present as a solid waste as a discarded commercial chemical product, off-specification species, as a container residue, or a spill residue, use EPA waste number U115 (waste code I,T).

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible or consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.
- Bury or incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorized landfill.

Section 14 - TRANSPORTATION INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

TRITON X-100 Detergent, Hydrogenated

sc-281181

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The Power is Question

Hazard Alert Code Key: **EXTREME** **HIGH** **MODERATE** **LOW**

Section 15 - REGULATORY INFORMATION

Regulations for ingredients

ethylene oxide (CAS: 75-21-8) is found on the following regulatory lists;

"Canada - Alberta Ambient Air Quality Objectives", "Canada - Alberta Occupational Exposure Limits", "Canada - British Columbia Occupational Exposure Limits", "Canada - Northwest Territories Occupational Exposure Limits (English)", "Canada - Nova Scotia Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)", "Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada - Saskatchewan Occupational Health and Safety Regulations - Designated Chemical Substances", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada ARET (Accelerated Reduction / Elimination of Toxics) Substance List", "Canada Domestic Substances List (DSL)", "Canada Environmental Protection Act (CEPA) 1999 - Schedule 1 Toxic Substances List", "Canada Environmental Protection Act (CEPA) 1999 - Schedule 3 Export Control List - Part 2 Substances Subject to Notification or Consent", "Canada Ingredient Disclosure List (SOR/88-64)", "Canada National Pollutant Release Inventory (NPRI)", "Canada Priority Substances List (PSL1, PSL 2)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (English)", "Canada Toxicological Index Service - Workplace Hazardous Materials Information System - WHMIS (French)", "GESAMP/EHS Composite List - GESAMP Hazard Profiles", "International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs", "International Chemical Secretariat (ChemSec) REACH SIN* List (*Substitute It Now!) 1.0", "International Council of Chemical Associations (ICCA) - High Production Volume List", "OECD Representative List of High Production Volume (HPV) Chemicals", "United Nations List of Prior Informed Consent Chemicals (English)", "US - Alaska Limits for Air Contaminants", "US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - California Proposition 65 - Carcinogens", "US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity", "US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens", "US - California Proposition 65 - Reproductive Toxicity", "US - California Toxic Air Contaminant List Category II", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "US - Idaho - Limits for Air Contaminants", "US - Maine Chemicals of High Concern List", "US - Massachusetts Oil & Hazardous Material List", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Hazardous Substance List", "US - Minnesota Permissible Exposure Limits (PELs)", "US - New Jersey Right to Know Hazardous Substances", "US - Oregon Hazardous Materials", "US - Oregon Permissible Exposure Limits (Z1)", "US - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Hazardous Constituents", "US - Vermont Hazardous wastes which are Discarded Commercial Chemical Products or Off-Specification Batches of Commercial Chemical Products or Spill Residues of Either", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Class A toxic air pollutants: Known and Probable Carcinogens", "US - Washington Dangerous waste constituents list", "US - Washington Discarded Chemical Products List - ""U"" Chemical Products", "US - Washington Permissible exposure limits of air contaminants", "US - Wyoming List of Highly Hazardous Chemicals, Toxics and Reactives", "US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants", "US ACGIH Threshold Limit Values (TLV)", "US ACGIH Threshold Limit Values (TLV) - Carcinogens", "US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)", "US CAA (Clean Air Act) - HON Rule - Organic HAPs (Hazardous Air Pollutants)", "US Clean Air Act - Hazardous Air Pollutants", "US Department of Homeland Security Chemical Facility Anti-Terrorism Standards - Chemicals of Interest", "US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides", "US DOE Temporary Emergency Exposure Limits (TEELs)", "US EPA Acute Exposure Guideline Levels (AEGLs) - Interim", "US EPA High Production Volume Program Chemical List", "US EPCRA Section 313 Chemical List", "US Food Additive Database", "US List of Lists - Consolidated List of Chemicals Subject to the Emergency Planning and Community Right-to-Know Act (EPCRA) and Section 112(r) of the Clean Air Act", "US National Toxicology Program (NTP) 11th Report Part A Known to be Human Carcinogens", "US NFPA 45 Fire Protection for Laboratories Using Chemicals - Flammability Characteristics of Common Compressed and Liquefied Gases", "US NIOSH Recommended Exposure Limits (RELs)", "US OSHA Carcinogens Listing", "US OSHA List of Highly Hazardous Chemicals, Toxics and Reactives", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US RCRA (Resource Conservation & Recovery Act) - Hazardous Constituents - Appendix VIII to 40 CFR 261", "US RCRA (Resource Conservation & Recovery Act) - List of Hazardous Wastes", "US RCRA (Resource Conservation & Recovery Act) - Phase 4 LDR Rule - Universal Treatment Standards", "US SARA Section 302 Extremely Hazardous Substances", "US Toxic Substances Control Act (TSCA) - Inventory", "US TSCA Section 8 (d) - Health and Safety Data Reporting", "USA: Chemical Facility Anti-Terrorism Standards - List Appendix A - 6CFR 27"

No data for mono-p-octylphenyl ether, reduced, ethoxylated (CAS: , 101013-07-4, 92046-34-9)

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Ingestion may produce health damage*.
- Cumulative effects may result following exposure*.
- Repeated exposure potentially causes skin dryness and cracking*.

* (limited evidence).

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Ingredients with multiple CAS Nos

Ingredient Name	CAS
mono-p-octylphenyl ether, reduced, ethoxylated	101013-07-4, 92046-34-9

REPRODUCTIVE HEALTH GUIDELINES

■ Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

Ingredient	ORG	UF	Endpoint	CR	Adeq TLV
ethylene oxide	1.8 mg/m ³	NA	D	600	Yes

■ These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise. CR = Cancer Risk/10000; UF = Uncertainty factor: TLV believed to be adequate to protect reproductive health: LOD: Limit of detection Toxic endpoints have also been identified as: D = Developmental; R = Reproductive; TC = Transplacental carcinogen Jankovic J., Drake F.: A Screening Method for Occupational Reproductive Health Risk: American Industrial Hygiene Association Journal 57: 641-649 (1996).

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■ Classification of the mixture and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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