

TRIETHYLENE GLYCOL Safety Data Sheet

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Version: #2

SECTION 1: Identification	
1.1. Identification	
Product name	: Triethylene Glycol
EC number	: 203-953-2
CAS-No.	: 112-27-6
Formula	: HO(C2H4O)3H
1.2. Recommended use and restrictions of	on use
Identified uses	: For industrial use only. Gas treating. It is recommended that you use this product in a manner consistent with the recommended use. If your intended use is not consistent with the recommended use, please contact our Customer Information Group (telephone number in Section 1 of this document).
1.3. Supplier	
FARSA Group Ltd	
Sales@farsagroup.az	
1.4.Emergency contacts	
Emergency number	÷ +994512707856
SECTION 2: Hazard(s) identification	
2.1. Classification of the substance or mixture	
Hazard classification	: GHS classification in accordance with 29 CFR 1910.1200 Not a hazardous substance or mixture.

Other hazards

: No data available

SECTION 3: Composition/information on ingredients

nonyms : 2,2'-(ethylenedioxy)diethanol		
Component	CASRN	Concentration
Triethylene glycol	112-27-6	>= 98.0 %
Diethylene glycol	111-46-6	<= 1.0 %

SECTION 4: First-aid measures	
4.1. Description of first aid measures	
General advice	First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.
Inhalation	: Move person to fresh air and keep comfortable for breathing; consult a physician.
Skin contact	: Immediately flush skin with water while removing contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Destroy contaminated leather items such as shoes, belts, and watchbands. Suitable emergency safety shower facility should be immediately available.
Eye contact	Flush eyes thoroughly with water for several minutes. Remove contact lenses after the initial 1- 2 minutes and continue flushing for several additional minutes. If effects occur, consult a physician, preferably an ophthalmologist.
Ingestion	: Do not induce vomiting. Seek medical attention immediately. If person is fully conscious give 1 cup or 8 ounces (240 ml) of water. If medical advice is delayed and if an adult has swallowed several ounces of chemical, then give 3-4 ounces (1/3-1/2 Cup) (90-120 ml) of hard liquor such as 80 proof whiskey. For children, give proportionally less liquor at a dose of

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0.3-ounce (1 1/2 tsp.) (8 ml) liquor for each 10 pounds of body weight, or 2 ml per kg body weight [e.g., 1.2 ounce (2 1/3 tbsp.) for a 40-pound child or 36 ml for an 18 kg child].

4.2. Most important symptoms and effects

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

4.3. Indication of any immediate medical attention and special treatment needed

Notes to physician Due to structural analogy and clinical data, this material may have a mechanism of intoxication similar to ethylene glycol. On that basis, treatment similar to ethylene glycol intoxication may be of benefit. In cases where several ounces (60 - 100 ml) have been ingested, consider the use of ethanol and hemodialysis in the treatment. Consult standard literature for details of treatment. If ethanol is used, a therapeutically effective blood concentration in the range of 100 - 150 mg/dl may be achieved by a rapid loading dose followed by a continuous intravenous infusion. Consult standard literature for details of treatment. 4-Methyl pyrazole (Antizol®) is an effective blocker of alcohol dehydrogenase and should be used in the treatment of ethylene glycol (EG), di- or triethylene glycol (DEG, TEG), ethylene glycol butyl ether (EGBE), or methanol intoxication if available. Fomepizole protocol (Brent, J. et al., New England Journal of Medicine, Feb. 8, 2001, 344:6, p. 424-9): loading dose 15 mg/kg intravenously, follow by bolus dose of 10 mg/kg every 12 hours; after 48 hours, increase bolus dose to 15 mg/kg every 12 hours. Continue fomepizole until serum methanol, EG, DEG, TEG or EGBE are undetectable. The signs and symptoms of poisoning include anion gap metabolic acidosis, CNS depression, renal tubular injury, and possible late stage cranial nerve involvement. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. In severe poisoning, respiratory support with mechanical ventilation and positive end expiratory pressure may be required. Maintain adequate ventilation and oxygenation of the patient. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. If burn is present, treat as any thermal burn, after decontamination. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

SECTION 5: 5. Firefighting measures	
5.1. Firefighting measures	
Suitable extinguishing media	 Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.
Unsuitable extinguishing media	: Do not use direct water stream. May spread fire.
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: Carbon monoxide. Carbon dioxide.
Unusual Fire and Explosion Hazards	: Container may rupture from gas generation in a fire situation. Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.
Fire Fighting Procedures	: Keep people away. Isolate fire and deny unnecessary entry. Use water spray to cool fire exposed containers and fire affected zone until fire is out and danger of reignition has passed. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Immediately withdraw all personnel from the area in case of rising sound from venting safety device or discoloration of the container. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Move container from fire area if this is possible without hazard. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.
Special protective equipment for firefighters	 Wear positive-pressure self-contained breathing apparatus (SCBA) and protective firefighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Keep unnecessary and unprotected personnel from entering the area. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

6.2. Environmental precautions

Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

6.3. Methods and materials for containment and cleaning up

Contain spilled material if possible. Collect in suitable and properly labeled containers. Small spills: Absorb with materials such as: Dirt. Sand. Sawdust. Vermiculite. Perlite. Zorb-all®. Oil-Dri or equivalent filler. Large spills: Dike area to contain spill. Pump into suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

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SECTION 7: Handling and storage

7.1. Precautions for safe handling

Avoid contact with skin and clothing. Do not swallow. 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. Glycols are generally considered to be stable, noncorrosive chemicals with high flash points. Under ordinary conditions this material can be stored in mild steel vessels. A nitrogen blanket can be used to exclude atmospheric moisture and air. Blanketing with nitrogen will also minimize low-level oxidation, if necessary for the desired application. The inert gas prevents air oxidation in order to maintain product within acidity specifications.

7.2. Conditions for safe storage

Do not store near food, foodstuffs, drugs or potable water supplies. Additional storage and handling information on this product may be obtained by calling your sales or customer service contact. Ask for a product brochure.

7.3.	Storage stability	
Shelf lif	e: Use within	
Bulk		: 2 year
Packag	jed	: 5 year

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Component	Regulation	Type of listing	Value
Triethylene glycol	Dow IHG	TWA Total	100 mg/m3
Diethylene glycol	US WEEL	TWA	10 mg/m3

8.2. Exposure controls

Engineering controls	: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.
8.3. Individual protection measures	
Engineering controls	: Use engineering controls to maintain airborne level below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations.
Eye/face protection	: Use safety glasses (with side shields). If there is a potential for exposure to particles which could cause eye discomfort, wear chemical goggles.
Hand protection	: Use gloves chemically resistant to this material when prolonged or frequently repeated contact could occur. Use gloves with insulation for thermal protection, when needed. If hands are cut or scratched, use gloves chemically resistant to this material even for brief exposures. Examples of preferred glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Polyvinyl alcohol ("PVA"). Polyvinyl condition and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.
Other protection	: When prolonged or frequently repeated contact could occur, 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. When handling hot material, protect skin from thermal burns as well as from skin absorption.
Respiratory protection	: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, use an approved respirator. Selection of air-purifying or positive- pressure supplied-air will depend on the specific operation and the potential airborne concentration of the material. For emergency conditions, use an approved positive-pressure self-contained breathing apparatus. The following should be effective types of air-purifying respirators: Organic vapor cartridge with a particulate pre-filter.

SECTION 9: Physical and chemical properties

9.1. Appearance

	Physical state	liquid	Boiling point (760 mmHg)	286.5 °C (547.7 °F) Literature Decomposes
	Color	colorless	Flash point (closed cup)	176 °C (349 °F) ASTM D 93
	Odor	Odorless to mild	Evaporation Rate (Butyl Acetate	<0.01 Literature
			= 1)	
	Odor Threshold	No test data available	Flammability (solid, gas)	Not Applicable
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рН	No test data available	Flammability (liquids)	Not expected to be a static-accumulating
_			flammable liquid.
Melting Point/Range	-7 °C (19 °F) Literature	Lower explosion limit	0.9 % vol Calculated.
Freezing point	-7 °C (19 °F) Literature	Upper explosion limit	9.2 % vol Estimated.
Freezing point		opper exprosion limit	9.2 % voi Estimated.

Vapor Pressure	0.000655 hPa at 24.7 °C (76.5 °F) Literature	Decomposition temperature	No test data available
Relative Vapor Density (air = 1)	5.2 Literature	Kinematic Viscosity	47.8 mm2/s at 20 °C (68 °F) Literature
Relative Density (water = 1)	1.13 at 15 °C (59 °F) Literature	Explosive properties	Not explosive
Water solubility	100 % Literature	Oxidizing properties	No
Partition coefficient: n- octanol/water	log Pow: -1.75 Estimated.	Molecular weight	150.18 g/mol Literature
Auto-ignition temperature	347 °C (657 °F) Literature	Molecular formula	HO(C2H4O)3H

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

SECTION 10: Stability and reactivity	
10.1. Stability and reactivity	
Reactivity	: No data available
Chemical stability	: Stable under recommended storage conditions. See Storage, Section 7.
Possibility of hazardous reactions	: Polymerization will not occur.
Conditions to avoid	: Exposure to elevated temperatures can cause product to decompose. Generation of gas during decomposition can cause pressure in closed systems.
Incompatible materials	: Avoid contact with: Strong acids. Strong bases. Strong oxidizers.
Hazardous decomposition products	 Decomposition products depend upon temperature, air supply and the presence of other materials. Decomposition products can include and are not limited to: Aldehydes. Ketones. Organic acids.

SECTION 11: Toxicological information		
11.1. Acute Toxicity		
Toxicological information appears in this section when such data is available.		
Information on likely routes of exposure	: Ingestion, inhalation, skin contact, eye contact.	
Acute oral toxicity	: Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. Oral toxicity is expected to be greater in humans due to triethylene glycol even though tests in animals show a lower degree of toxicity. May cause nausea and vomiting. May cause abdominal discomfort or diarrhea. May cause dizziness and drowsiness.	
Information for component:	Based on testing for product(s) in this family of materials: LD50, Rat, male and female, > 2,000 mg/kg	
Triethylene glycol	: Oral toxicity is expected to be greater in humans due to triethylene glycol even though tests in animals show a lower degree of toxicity. May cause nausea and vomiting.	
	May cause abdominal discomfort or diarrhea. May cause dizziness and drowsiness. LD50, Rat, male and female, > 2,000 mg/kg	
Diethylene glycol	: Lethal Dose, Human, adult, 2 Ounces Estimated.	
	Oral toxicity is expected to be moderate in humans due to diethylene glycol even though tests with animals show a lower degree of toxicity. Ingestion of quantities (approximately 65 mL (2 oz.) for diethylene glycol or 100 mL (3 oz.) for ethylene glycol) has caused death in humans. Small amounts swallowed incidentally as a result of normal handling operations are not likely to cause injury; however, swallowing larger amounts may cause injury. May cause nausea and vomiting. May cause abdominal discomfort or diarrhea. Excessive exposure may cause central nervous system effects, cardiopulmonary effects (metabolic acidosis), and kidney failure.	
Acute dermal toxicity	 Prolonged skin contact is unlikely to result in absorption of harmful amounts. Massive contact with damaged skin or of material sufficiently hot to burn skin may result in absorption of potentially lethal amounts. 	

Based on testing for product(s) in this family of materials:

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	LD50, Rabbit, > 18,016 mg/kg		
Information for components:			
Triethylene glycol	: LD50, Rabbit, > 18,016 mg/kg		
Diethylene glycol	: LD50, Rabbit, 13,330 mg/kg		
Acute inhalation toxicity	 At room temperature, exposure to vapor is minimal due to low volatility. Mist may cause irritation of upper respiratory tract (nose and throat). Vapor from heated material may cause adverse effects. Based on testing for product(s) in this family of materials: LC50, Rat, male and female, 4 Hour, dust/mist, > 5.2 mg/l No deaths occurred at this concentration. Based on testing for product(s) in this family of materials: 		
Information for components:	Rat, 4 Hour, dust/mist, > 4.5 mg/l No deaths occurred at this concentration.		
Triethylene glycol	 LC50, Rat, male and female, 4 Hour, dust/mist, > 5.2 mg/l No deaths occurred at this concentration. Maximum attainable concentration. LC50, Rat, 4 Hour, dust/mist, > 4.5 mg/l No deaths occurred at this concentration. 		
Diethylene glycol	 this concentration. LC50, Rat, 4 Hour, dust/mist, > 4.6 mg/l The LC50 value is greater than the Maximum Attainable Concentration. No deaths occurred at this concentration. 		
Skin corrosion/irritation	 Based on testing for product(s) in this family of materials: Prolonged contact may cause skin irritat with local redness. 		
Information for components:	May cause more severe response if skin is abraded (scratched or cut).		
Information for components: Triethylene glycol	: Prolonged contact may cause skin irritation with local redness.		
	May cause more severe response if skin is abraded (scratched or cut).		
Diethylene glycol	: Prolonged contact is essentially nonirritating to skin.		
Serious eye damage/eye irritation	: Based on testing for product(s) in this family of materials: May cause slight temporary eye irritation. Mist may cause eye irritation.		
Information for components:	· · · · · · · · · · · · · · · · · · ·		
Triethylene glycol	: May cause slight temporary eye irritation. Mist may cause eye irritation.		
Diethylene glycol	: May cause slight temporary eye irritation. Corneal injury is unlikely.		
Sensitization	: For skin sensitization: No relevant data found. For respiratory sensitization: No relevant data found.		
Information for components:			
Triethylene glycol	: For skin sensitization: No relevant data found.		
Diethylene glycol	For respiratory sensitization: No relevant data found.Did not cause allergic skin reactions when tested in humans. Did not cause allergic skin reactions when tested in guinea pigs.		
Specific Target Organ Systemic Toxicity (Single Exposure)	: Evaluation of available data suggests that this material is not an STOT-SE toxicant.		
Information for components: Triethylene glycol	: Evaluation of available data suggests that this material is not an STOT-SE toxicant.		
Diethylene glycol	 Evaluation of available data suggests that this material is not an STOT-SE toxicant. Evaluation of available data suggests that this material is not an STOT-SE toxicant. 		
Aspiration Hazard Information for components:	: Based on physical properties, not likely to be an aspiration hazard.		
11.2. Chronic toxicity			
Triethylene glycol	: Based on physical properties, not likely to be an aspiration hazard.		
Diethylene glycol	: Based on physical properties, not likely to be an aspiration hazard.		
Specific Target Organ Systemic Toxicity	: Based on available data, repeated exposures are not expected to cause significant adverse effects		
(Repeated Exposure)	except at very high aerosol concentrations. Repeated excessive aerosol exposures may cause respiratory tract irritation and even death.		
Information for components:			
Triethylene glycol	: Based on available data, repeated exposures are not expected to cause significant adverse effects except at very high aerosol concentrations. Repeated excessive aerosol exposures may cause respiratory tract irritation and even death.		
Diethylene glycol	: In humans, effects have been reported on the following organs: Kidney. Gastrointestinal tract.		
	In humans, symptoms may include: Headache. Nausea and/or vomiting. Abdominal discomfort.		
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	In animals, effects have been reported on the following organs: Liver.				
Carcinogenicity	: Did not cause cancer in laboratory animals.				
Information for components:					
Triethylene glycol	: Did not cause cancer in laboratory animals.				
Diethylene glycol	: Diethylene glycol has been tested for carcinogenicity in animal studies and is not believed to pose a carcinogenic risk to man.				
Teratogenicity	: Triethylene glycol did not cause birth defects in animals; delayed developmental effects occurred only at high doses which were toxic to the mother.				
Information for components:	only at high doses which were toxic to the mother.				
Triethylene glycol	: Triethylene glycol did not cause birth defects in animals; delayed developmental effects occurred				
	only at high doses which were toxic to the mother.				
Diethylene glycol	: Diethylene glycol has caused toxicity to the fetus and some birth defects at maternally toxic, high doses in animals. Other animal studies have not reproduced birth defects even at much higher dose that caused severe maternal toxicity.				
Reproductive toxicity	: In animal studies, did not interfere with reproduction.				
Information for components:	La animal studios, did not interfere with reproduction				
Triethylene glycol	: In animal studies, did not interfere with reproduction.				
Diethylene glycol	: Diethylene glycol did not interfere with reproduction in animal studies except at very high doses.				
Mutagenicity	: In vitro genetic toxicity studies were negative.				
Information for components: Triethylene glycol					
Diethylene glycol	: In vitro genetic toxicity studies were negative.				
	: In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.				
SECTION 12: Ecological information	ion				
12.1. Toxicity					
Acute toxicity to fish	 Material is practically non-toxic to aquatic organisms on an acute basis (LC50/EC50/EL50/LL50 >100 mg/L in the most sensitive species tested). 				
	LC50, Lepomis macrochirus (Bluegill sunfish), static test, 96 Hour, > 10,000 mg/l, Method Not Specified.				
	LC50, Pimephales promelas (fathead minnow), flow-through test, 96 Hour, 69,800 mg/l, OECD Test				
Acute toxicity to aquatic invertebrates	Guideline 203 or Equivalent : EC50, Daphnia magna (Water flea), static test, 48 Hour, > 10,000 mg/l, DIN 38412				
Toxicity to bacteria	: EC50, Bacteria, 16 Hour, > 10,000 mg/l				
Long-term (chronic) aquatic hazard	: NOEC, Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, > 15,000 mg/l				
Chronic toxicity to aquatic invertebrates	ChV (Chronic Value), Daphnia magna (Water flea), semi-static test, 21 d, number of offspring, > 15,000 mg/l				
12.2. Persistence and degradability					
Biodegradability	 Material has inherent, ultimate biodegradability according to OECD test (s) guidelines (reaches > 60 or 70% biodegradation in OECD test(s). Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. 10-day Window: Pass 				
Biodegradation	: 90 - 100 %				
Exposure time	: 10 d				
Method	: OECD Test Guideline 301A or Equivalent 10-day Window: Not applicable				
Biodegradation	: >70 %				
Exposure time	: 2 - 14 d				
Method	: OECD Test Guideline 302B or Equivalent 10-day Window: Not applicable				
Biodegradation	: 63 %				
Exposure time	: 28 d				
Method	: OECD Test Guideline 306				
Theoretical Oxygen Demand	: 1.60 mg/mg				
	Incubation Time BOD				
	5 d 12 - 32 %				
	10 d 15 - 64 %				
	20 d 17 - 86 %				

Photodegradation				
Test Type	: Half-life (indirect photolysis)			
Sensitization	: OH radicals			
Atmospheric half-life	: 10.6 Hour			
Method	: Estimated.			
12.3. Bioaccumulative potential				
Bioaccumulation	: Bioconcentration potential is low (BCF < 100 or Log Pow < 3).			
Partition coefficient: n-octanol/water	: -1.75 Estimated.			
(log Pow)				
12.4. Mobility in soil				
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.				
Potential for mobility in soil is very high (Koc b	,			
Potential for mobility in soil is very high (Koc b Partition coefficient (Koc)	etween 0 and 50). : 10 Estimated.			
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Partition coefficient (Koc)	: 10 Estimated.			
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14.2. No regulated for transport.

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

: Consult IMO regulations before transporting ocean bulk

IGC Code

14.3. Classification for AIR transport (IATA/ICAO) Not regulated for transport.

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

SECTION 15: Regulatory info	rmation					
Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Communi Right-to-Know Act of 1986) Sections and 312						
Superfund Amendments and Reauthorization Act of 1986 Title III (Emergency Planning and Communi Right-to-Know Act of 1986) Section	threshold (De Minim ty	: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.				
Pennsylvania Worker and Communi Right-To-Know Act	ty : The following chemi	icals are listed because of the	additional requirements of Pennsylvania law			
	Components	CASRN				
	Triethylene glycol	112-27-6				
California Prop. 65	is/are known to the	: WARNING: This product can expose you to chemicals including Formaldehyde, Acetaldehyde, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.				
United States TSCA Inventory (TSC/		: All components of this product are in compliance with the inventory listing requirements of the U.S. Toxic Substances Control Act (TSCA) Chemical Substance Inventory.				