

trans-p-Menthane-3,8-diol

sc-296587



The Power to Question

Material Safety Data Sheet

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

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

trans-p-Menthane-3,8-diol

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA



SUPPLIER

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EMERGENCY:

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SYNONYMS

C10-H20-O2, "cyclohexanemethanol, 2-hydroxy-alpha, alpha-trimethyl-, ", "(1alpha, 2beta, 4beta)-menthoglycol", "(-)-trans-p-menthane-3, 8-diol", PMD, "insect repellent"

Section 2 - HAZARDS IDENTIFICATION

CHEMWATCH HAZARD RATINGS

	Min	Max
Flammability:	1	
Toxicity:	0	
Body Contact:	3	
Reactivity:	1	
Chronic:	2	

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



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW

RISK

Risk of serious damage to eyes.
Irritating to respiratory system and skin.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

■ Although ingestion is not thought to produce harmful effects, the material may still be damaging to the health of the individual following ingestion, especially where pre-existing organ (e.g.

EYE

■ If applied to the eyes, this material causes severe eye damage.

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.
- 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.
- Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

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. Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
p-menthane-3,8-diol	3564-98-5	>98

Section 4 - FIRST AID MEASURES

SWALLOWED

· Immediately give a glass of water. · First aid is not generally required. If in doubt, contact a Poisons Information Center or a doctor.

EYE

■ If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with 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.

SKIN

■ If skin contact occurs: · Immediately remove all contaminated clothing, including footwear · Flush skin and hair with running water (and soap if available).

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN

■ Treat symptomatically.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg):	13.576 x 10 ⁻⁴
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	0.989
Lower Explosive Limit (%):	Not available

EXTINGUISHING MEDIA

- Foam.
- Dry chemical powder.

FIRE FIGHTING

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

- Combustible solid which burns but propagates flame with difficulty.
 - Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
- Combustion products include: carbon monoxide (CO), 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:
Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- Clean up all spills immediately.
- Avoid breathing dust and contact with skin and eyes.

MAJOR SPILLS

- Moderate hazard.
- CAUTION: Advise personnel in area.
- Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
 - Wear protective clothing when risk of exposure occurs.
- Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.
- Do NOT cut, drill, grind or weld such containers.
 - In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

- Polyethylene or polypropylene container.
- Check all containers are clearly labelled and free from leaks.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.

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 - Ontario Occupational Exposure Limits	p-menthane-3,8-diol (Particles (Insoluble or Poorly Soluble) Not Otherwise)		10 (I)						
Canada - British Columbia Occupational Exposure Limits	p-menthane-3,8-diol (Particles (Insoluble or Poorly Soluble) Not Otherwise Classified (PNOC))		10 (N)						
Canada - Ontario Occupational Exposure Limits	p-menthane-3,8-diol (Specified (PNOS) / Particules (insolubles ou peu solubles) non précisées par ailleurs)		3 (R)						
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	p-menthane-3,8-diol (Particulates not otherwise regulated Respirable fraction)		5						
US - California Permissible Exposure Limits for Chemical Contaminants	p-menthane-3,8-diol (Particulates not otherwise regulated Respirable fraction)		5						(n)
US - Oregon Permissible Exposure Limits (Z-1)	p-menthane-3,8-diol (Particulates not otherwise regulated (PNOR) (f) Total Dust)	-	10						Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means "particles not otherwise regulated."
US - Michigan Exposure Limits for Air Contaminants	p-menthane-3,8-diol (Particulates not otherwise regulated, Respirable dust)		5						
US - Oregon Permissible Exposure Limits (Z-1)	p-menthane-3,8-diol (Particulates not otherwise regulated)	-	5						Bold print identifies substances for which the Oregon

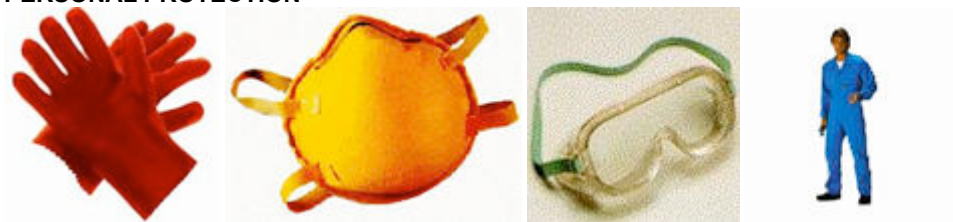
Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means "particles not otherwise regulated."

(PNOR) (f)
Respirable
Fraction)

US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	p-menthane-3,8-diol (Particulates not otherwise regulated (PNOR)(f)-Respirable fraction)	5	
Canada - Prince Edward Island Occupational Exposure Limits	p-menthane-3,8-diol (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles)	10	See Appendix B current TLV/BEI Book

ENDOELTABLE

PERSONAL PROTECTION



RESPIRATOR

- particulate.

EYE

- Safety glasses with side shields.
- Chemical goggles.

HANDS/FEET

■ 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.

Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocautchouc
- polyvinyl chloride

Gloves should be examined for wear and/ or degradation constantly.

OTHER

- Overalls.
- P.V.C. apron.
- Barrier cream.

- Skin cleansing cream.
- Eye wash unit.

ENGINEERING CONTROLS

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.

Does not mix with water.

Floats on water.

State	Divided solid	Molecular Weight	172.27
Melting Range (°F)	144- 149(cis); 67-70	Viscosity	55.5 (60 C) cSt@40°C
Boiling Range (°F)	Not available	Solubility in water (g/L)	Partly miscible
Flash Point (°F)	284	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not available.	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapor Pressure (mmHg)	13.576 x 10 ⁻⁴
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	0.989
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	Not Applicable
Volatile Component (%vol)	Negligible	Evaporation Rate	Not applicable

APPEARANCE

White powder; does not mix well with water (0.29 g/l) Stable to sunlight, heat (54 deg. C), metal (iron, aluminum), and metal ions (iron II acetate, aluminum acetate)

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.

STORAGE INCOMPATIBILITY

- Avoid reaction with oxidizing agents.

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

Section 11 - TOXICOLOGICAL INFORMATION

p-menthane-3,8-diol

TOXICITY AND IRRITATION

P-MENTHANE-3,8-DIOL:

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

TOXICITY	IRRITATION
Subcutaneous (mouse) LD50: 1240 mg/kg	Eye (rabbit): Corrosive *
Oral (Rat) LD50: >5000 mg/kg *	Eye (rabbit): SEVERE *
Dermal (Rabbit) LD50: >5000 mg/kg *	Skin: rabbit): slight *
Inhalation (Rat) LC50: >2170 mg/m ³ *	

■ 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.

for trans form: Convulsions recorded.

In an acute oral toxicity study, 5 groups of 5 female rats were dosed with 500, 875, 1250, 2000 and 5000 mg/kg body weight, and 1 group of 5 male rats was dosed at 5000 mg/kg body weight. The primary clinical signs of toxicity were decreased activity in 1 female (500 mg/kg group) and in all 5 females in the 1250 mg/kg group, and reduced/no feces were observed in 2 rats in this dose group. Wobbly gait was observed in 5 female rats at 1250 mg/kg. Other clinical effects noted in the 3 other dose groups included breathing abnormalities, prostration, apparent hypothermia, hunched posture, urine stain, ocular discharge, decreased food consumption, and/or dark material around the facial area. All rats had normal body weight gains except 1 female in the 1250 mg/kg group. Two females in the 2000 mg/kg group and 2 females in the 5000 mg/kg group died by day 3 of the study; none of the male rats died during the study. The timing of these observations was not specified, so it cannot be determined if these were immediate or delayed effects. In addition, at necropsy, the only notable effects were observed in the animals that died early in the study, and included: abnormal contents in the digestive tract, reddened mucosa of the stomach, dilated pelvis of the kidney, pale liver, blackish-purple spleen, distended ureters, and dark red thymus.

Dermal toxicity: 5 Male and 5 female NZW rabbits were tested at 5000 mg/kg. All rats survived and gained weight. Transient dark material around the mouth was observed in one animal. Significant dermal irritation was noted at the site of test material application, which included erythema, edema, dermal lesions, eschar, necrosis, desquamation and blanching, to varying degrees in all animals tested. No significant changes were observed at necropsy. Three incidences of cysts on the oviducts were observed; however, these findings were not considered to be related to the test material application, as they are "commonly found in rabbits of this strain," according to the study author

Eye Irritation: Nine male NZW rabbits (5 males, 4 females) were treated with 0.1 mL of p-Menthane-3,8-diol. The treated eyes of 3 (1 male, 2 females) of the animals were rinsed with physiological saline approximately 30 seconds after instillation of the test material. All rabbits exhibited corneal opacity, iritis, and conjunctival irritation 1 hour after test material instillation, which persisted through 72 hours. In the group with unwashed eyes, corneal opacity persisted in 4 rabbits through day 7, and in 1 rabbit until the study was terminated at 28 days post instillation. In the rabbits with the washed eyes, corneal opacity and iritis were cleared by day 7. Conjunctival redness above normal level was observed in 2 animals until day 10. The persistence of significant corneal damage in the unwashed group for 28 days places the test substance in toxicity category I (corrosive) for eye irritation.

PMD is not a skin sensitiser. The no-observed-adverse-effect level (NOAEL) from a 90-day dermal toxicity study in rats was established at a limit dose of 1000 mg/kg/day. The NOAEL for immune suppression, as determined in a 28-day dermal study, via a primary antibody response to sheep red blood cells/plaque forming cell assay was > 3000 mg/kg/day in mice. The NOAEL for maternal and developmental toxicity was established in rabbits at 3000 mg/kg/day by the dermal route. Mutagenicity studies evaluated p-menthane-3,8-diol for its potential to cause point mutations in bacteria and mammalian cells, chromosomal aberrations in mammalian cells, and induction of micronuclei in polychromatic erythrocytes from mouse bone marrow, and found no genotoxicity at the doses tested, with and without metabolic activation.

* p-Menthane-3,8-diol (011550) Biopesticide Registration Eligibility Document (US EPA)

Section 12 - ECOLOGICAL INFORMATION

No data

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
p-menthane-3,8-diol	LOW	No Data Available	LOW	HIGH

Section 13 - DISPOSAL CONSIDERATIONS

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. 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.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

Section 14 - TRANSPORTATION INFORMATION

Section 15 - REGULATORY INFORMATION

p-menthane-3,8-diol (CAS: 91739-72-9) is found on the following regulatory lists;

"Canada Non-Domestic Substances List (NDSL)", "International Fragrance Association (IFRA) Survey: Transparency List", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

■ Cumulative effects may result following exposure*.

* (limited evidence).

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■ Classification of the preparation 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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