

**SAFETY DATA SHEET**

**Product No. 16032, 16032-20 PELCO® Colloidal Silver Paste, Conductive**

**Issue Date (03/04/14)**

**Review Date (01/11/2023) Rev. 04**

**Section 1: Product and Company Identification**

**Product Name: PELCO® Colloidal Silver Paste, Conductive**

Synonym: Air Dry Silver Paste

**Company Name**

**Ted Pella, Inc., P.O. Box 492477, Redding, CA 96049-2477**

Inside USA and Canada 1-800-237-3526 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)

Outside USA and Canada 1-530-243-2200 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)

**CHEMTREC USA and Canada Emergency Contact Number 1-800-424-9300 24 hours a day**

**CHEMTREC Outside USA and Canada Emergency Contact Number +1-703-741-5970 24 hours a day**

**Section 2: Hazard Identification**

**Classification of the substance or mixture.**

**Signal Word: DANGER**

**GHS Categories:**

GHS02 - Flammable	Flammable Liquid:	Category 2
GHS07 – Irritant	Skin Irritant:	Category 2
	Skin Sensitization:	Category 1
GHS08 - Health hazard	Reproductive toxicity:	Category 2
	Specific target organ toxicity:	Category 3 (Central nervous system)
	· single exposure	
	Specific target organ toxicity:	Category 2 (Central nervous system)
	· repeated exposure	

**Label elements**

GHS Pictograms:



GHS02



GHS07



GHS08

**Hazard Statements**

H225	Highly flammable liquid and vapor.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H336	May cause drowsiness or dizziness.
H361d	Suspected of damaging the unborn child
H373	Causes damage to organs through prolonged or repeated exposure

**Precautionary Statements**

**Prevention:**

P210	Keep away from heat, sparks, open flames, hot surfaces - no smoking.
P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P280	Wear protective gloves, eye protection, and face protection.

**Response:**

P303+P361+P353	If on skin (or hair): Take off immediately all contaminated clothing. Rinse SKIN with water (or shower)).
P304+P340+P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison control center or physician if you feel unwell.
P308+P313	If exposed or concerned: Get medical advice/attention.

Classification complies with OSHA Hazard Communication Standard (29 CFR 1910.1200) and is consistent with the provisions of the United Nations Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

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**Section 3: Composition / Information on Ingredients**

Substance/Mixture: Mixture  
Chemical nature: Inorganic

<b>Hazardous Component(s)</b>	<b>CAS Number</b>	<b>% w/w*</b>
Silver	7440-22-4	>= 50 - <70
Toluene	108-88-3	>= 10 - <20
Ethyl acetate	141-78-6	>= 5 - <10
(R)-p-mentha-1,8-diene	5989-27-5	>= 5 - <10
Ethanol	64-17-5	>= 1 - <5
Propan-2-ol	67-63-0	>= 1 - <5
Bornan-2-one	76-22-2	>= 1 - <5

\* Actual concentration is withheld as a trade secret.  
Concentration range is provided to assist users in providing appropriate protections.

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**Section 4: First Aid Measures**

**General advice:** First aider needs to protect himself. Move out of dangerous area.  
Show this safety data sheet to the physician in attendance

**Inhalation:** Move to fresh air. If breathing is irregular or stopped, administer artificial respiration.  
Get medical advice.

**Skin Contact:** Take off all contaminated clothing immediately. Obtain medical attention.

**Eye(s) Contact:** Remove contact lens and rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Protect unharmed eye.  
Immediately flush eyes with water for at least 15 minutes, while holding eyelids open.  
Call a physician immediately.

**Ingestion:** Immediate give large quantities of water to drink.  
DO NOT induce vomiting.  
Get medical attention.

**Symptoms:** Acute and Delayed – Causes skin irritation. May cause an allergic reaction. May cause drowsiness or dizziness. Suspected of damaging the unborn child. May cause damage to organs through prolonged or repeated exposure.

**Note to physician:** Treat symptomatically

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**Section 5: Fire Fighting Measures**

**Suitable extinguishing media:** Dry powder. Alcohol-resistant foam. Carbon dioxide (CO<sub>2</sub>). Dry sand.

**Unsuitable extinguishing media:** Water.

**Specific hazards during firefighting:** Exposure to decomposition products may be a hazard to health.

**Hazardous Combustion Products:** Silver compounds, Carbon and Nitrogen oxides.

**Further information:** Use a water spray to cool fully enclosed containers.  
Prevent fire extinguishing water from contaminating surface water or the ground water system.

**Special protective equipment for fire fighters:**

In the event of fire, wear self-contained breathing apparatus.  
Use personal protective equipment.

**Section 6: Accidental Release Measures**Personal precautions, protective equipment and emergency procedures:

- Follow safe handling advice and personal protective equipment recommendations
- Ensure adequate ventilation
- Evacuate personnel to safe areas.
- Refer to protective measures listed in sections 7 and 8.

Environmental precautions:

- Do not allow contact with soil, surface or ground water.
- Do not let product enter drains. If the product contaminates river and lakes or drains, inform respective authorities.

Methods and materials for containment and cleaning up:

- Contain spillage, soak up with non-combustible absorbent material (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local/national regulations (see section 13).
- Sweep up or vacuum up spillage and collect in suitable container for disposal.

**Section 7: Handling and Storage****Advice on safe handling:**

Take precautionary measures against static discharges  
Provide sufficient air exchange and/or exhaust in work rooms.  
Wear personal protective equipment  
Keep away from heat and sources of ignition  
Avoid inhalation, ingestion and contact with skin and eyes.  
Smoking, eating and drinking should be prohibited in the application area.

**Conditions for safe storage:**

Keep tightly closed in a dry, cool and well-ventilated place.  
Keep locked up or in an area accessible only to qualified or authorized persons.

**Section 8: Exposure Controls / Personal Protection**

INGREDIENTS WITH WORKPLACE CONTROL PARAMETERS				
Components	CAS No.	Value type: (Form of exposure)	Control parameter Permissible concentration	Basis
Silver	7440-22-4	TWA	0.01 mg/m <sup>3</sup>	OSHA Z-1
		TWA (Dust & fume)	0.1 mg/m <sup>3</sup>	ACGIH
Toluene	108-88-3	TWA	20 ppm	ACGIH
		TWA	100 ppm	NIOSH REL
			375 mg/m <sup>3</sup>	
		ST	150 ppm	NIOSH REL
			560 mg/m <sup>3</sup>	
		TWA	200 ppm	OSHA Z-2
	CEIL	300 ppm	OSHA Z-2	
	Peak	500 ppm (10 minutes)	OSHA Z-2	
Ethyl acetate	141-78-6	TWA	400 ppm	ACGIH
		TWA	400 ppm	NIOSH REL
			1,400 mg/m <sup>3</sup>	
		TWA	400 ppm	OSHA Z-1
		1,400 mg/m <sup>3</sup>		

Components	CAS No.	Value type: (Form of exposure)	Control parameter Permissible concentration	Basis
(R)-p-mentha-1,8 diene	5989-27-5	TWA	30 ppm	US WEEL
Ethanol	64-17-5	TWA	1,000 ppm 1,900 mg/m <sup>3</sup>	NIOSH REL
		STEL	1,000 ppm	ACGIH
		TWA	1,000 ppm 1,900 mg/m <sup>3</sup>	OSHA Z-1
Propan-2-ol	67-63-0	TWA	200 ppm	ACGIH
		STEL	400 ppm	ACGIH
		TWA	400 ppm 980 mg/m <sup>3</sup>	NIOSH REL
		ST	500 ppm 1,225 mg/m <sup>3</sup>	NIOSH REL
		TWA	400 ppm 980 mg/m <sup>3</sup>	OSHA Z-1
Bornan-2-one	76-22-2	TWA	2 mg/m <sup>3</sup>	OSHA Z-1
		TWA	2 ppm	ACGIH
		STEL	3 ppm	ACGIH
		TWA	2 mg/m <sup>3</sup>	NIOSH REL

#### BIOLOGICAL OCCUPATIONAL EXPOSURE LIMITS

Components	CAS No.	Control parameters	Biological specimen	Sampling Time	Permissible concentration	Basis
Toluene	108-88-3	Toluene	In blood	Prior to last shift of work-week	0.02mg/L	ACGIH BEI
		Toluene	Urine	End of shift (as soon as possible after exposure ceases)	0.03mg/L	ACGIH BEI
		o-Cresol	Urine	End of shift (as soon as possible after exposure ceases)	0.03mg/L Creatinine	ACGIH BEI
Propan-2-ol	67-63-0	Acetone	Urine	End of shift at end of work-week	40mg/L	ACGIH BEI

#### Engineering measures

Provide sufficient air exchange and/or exhaust in work rooms.

#### Personal protection equipment

Respiratory protection:

Use respiratory protection unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended guidelines.

Recommended filter type:

ABEK-P

Hand protection remarks:

Before removing gloves, clean them with soap and water. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasions, and the contact time. As the product is a mixture of several substances, the durability of the glove material cannot be calculated in advance and has to be tested before use.

Eye protection:

Safety glasses with side-shields.

Skin and body protection:

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures: Keep away from food and drink.  
Wash hands before breaks and at the end of workday.  
Keep working clothes separately.  
Remove and wash contaminated clothing and gloves, including the inside, before re-use.

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## Section 9 Physical and Chemical Properties

Appearance	paste
Color	gray
Odor	mild
Odor threshold	No data available
pH	Not applicable
Melting point/range	No data available
Boiling point/range	167°F / 75°C (1,013 hPa)
Flash point	30°F / -1°C (1,013 hPa)
Evaporation rate	No data available
Flammability (solid, gas)	Not applicable
Self-ignition	Not applicable
Upper explosion/flammability limit	No data available
Lower explosion/flammability limit	No data available
Vapor pressure	<= 1,100 hPa (122°F / 50°C)
Relative vapor density	No data available
Relative density	No data available
Density	No data available
Solubility in H <sub>2</sub> O	Insoluble 68°F / 20°C (1,013 hPa)
Solubility in other solvents	No data available
Partition coefficient (n-octanol/water)	No data available
Auto-ignition temperature	No data available
Decomposition temperature	No data available
Viscosity, dynamic	50,000 mPa.s (73°F / 23°C)
Viscosity, kinematic	>40 mm <sup>2</sup> /s (73°F / 23°C) >20.5 mm <sup>2</sup> /s (104°F / 40°C)
Explosive properties	No data available
Oxidizing properties	No data available

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## Section 10: Stability and Reactivity

Reactivity:	No dangerous reaction known under conditions of normal use.
Chemical stability:	Stable under normal conditions.
Possibility of hazardous reactions:	No dangerous reaction known under conditions of normal use.
Conditions to avoid:	No data available
Incompatible materials:	No data available
Hazardous decomposition products:	No data available

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## Section 11: Toxicological Information

<b>Acute toxicity:</b>	<b>Not classified based on available information</b>	
<u>Product:</u>	<u>Acute toxicity estimate:</u>	<u>Method:</u>
Acute oral toxicity	>5,000 mg/kg	Calculation Method
Acute inhalation toxicity	84.02 mg/L	Calculation Method
	Exposure time: 4h	
	Test atmosphere: vapor	

**Silver**

Acute oral toxicity: LD50 (Rat) >5,000 mg/kg  
Remarks: Based on data from similar materials

**Method:**

OECD Test Guideline 401

**Toluene**

Acute oral toxicity: LD50 (Rat) >5,000 mg/kg  
Acute inhalation toxicity: LC50 (Rat) 28.1 mg/L  
Exposure time: 4h  
Test atmosphere: vapor  
Acute dermal toxicity: LD50 (Rabbit) >5,000 mg/kg

**Ethyl acetate**

Acute oral toxicity: LD50 (Rat) >5,000 mg/kg  
Acute inhalation toxicity: LC50 (Rat) >22.5 mg/L  
Exposure time: 6h  
Test atmosphere: vapor  
Assessment: The substance or mixture has no acute inhalation toxicity.  
Acute dermal toxicity: LD50 (Rabbit) >20,000 mg/kg

**(R)-p-mentha-1,8-diene**

Acute oral toxicity: LD50 (Rat) >2,000 mg/kg  
Remarks: Based on data from similar materials  
Acute dermal toxicity: LD50 (Rabbit) >5,000 mg/kg  
Remarks: Based on data from similar materials

**Method:**

OECD Test Guideline 423

**Ethanol**

Acute oral toxicity: LD50 (Rat) >5,000 mg/kg  
Acute inhalation toxicity: LC50 (Rat) 124.7 mg/L  
Exposure time: 4h  
Test atmosphere: vapor

**Propan-2-ol**

Acute oral toxicity: LD50 (Rat) >5,000 mg/kg  
Acute inhalation toxicity: LC50 (Rat) >25 mg/L  
Exposure time: 6h  
Test atmosphere: vapor  
Acute dermal toxicity: LD50 (Rabbit) >5,000 mg/kg

**Bornan-2-one**

Acute oral toxicity: LD50 (Mouse) >1,310 mg/kg  
Acute toxicity estimate: (Humans): >50-500 mg/kg  
Acute inhalation toxicity: LC50 (Rat) >0.5 mg/L  
Exposure time: 4h  
Test atmosphere: dust/mist  
Acute dermal toxicity: LD50 (Rabbit) >2,000 mg/kg

**Method:**

Expert judgement

**Skin corrosion/irritation: Causes skin irritation****Silver**

Species: Rabbit  
Method: OECD Test Guideline 404  
Result: No skin irritation

**Toluene**

Species Rabbit  
Method: Directive 67/548/EEC, Annex V, B.4.  
Result: Skin irritation

**Ethyl acetate**

Species Rabbit  
Result: No skin irritation  
Assessment: Repeated exposure may cause skin dryness or cracking

**(R)-p-mentha-1,8-diene**

Species Rabbit  
Method: OECD Test Guideline 404  
Result: Skin irritation

**Ethanol**

Species Rabbit  
Method: OECD Test Guideline 404  
Result: No skin irritation

**Propan-2-ol**

Species Rabbit  
Result: No skin irritation

**Bornan-2-one**

Species Rabbit  
Result: No skin irritation

**Serious eye damage/irritation: Not classified based on available information**

**Silver**

Species Rabbit  
Result: No eye irritation  
Method: OECD Test Guideline 405

**Toluene**

Species Rabbit  
Result: No eye irritation  
Method: OECD Test Guideline 405

**Ethyl acetate**

Species Rabbit  
Result: No eye irritation  
Method: OECD Test Guideline 405

**(R)-p-mentha-1,8-diene**

Species Rabbit  
Result: No eye irritation  
Method: OECD Test Guideline 405

**Ethanol**

Species Rabbit  
Result: Irritation to eyes, reversing within 21 days  
Method: OECD Test Guideline 405

**Propan-2-ol**

Species Rabbit  
Result: Irritation to eyes, reversing within 21 days

**Bornan-2-one**

Result: Eye irritation

**Skin sensitization:****May cause an allergic skin reaction****Respiratory sensitization:****Not classified based on available data****Silver**

Test type: Maximization Test  
Routes of exposure: Skin contact  
Species: Guinea pig  
Method: OECD Test Guideline 406  
Results: Negative  
Remarks: Based on data from similar materials

**Toluene**

Test type: Maximization Test  
Routes of exposure: Skin contact  
Species: Guinea pig  
Method: Directive 67/548/EEC, Annex V, B.4.  
Results: Negative

**Ethyl acetate**

Test type: Maximization Test  
Routes of exposure: Skin contact  
Species: Guinea pig  
Method: OECD Test Guideline 406  
Results: Negative

**(R)-p-mentha-1,8-diene**

Test type: Local lymph node assay (LLNA)  
Routes of exposure: Skin contact  
Species: Mouse  
Method: OECD Test Guideline 429  
Results: Positive  
Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

**Ethanol**

Test type: Local lymph node assay (LLNA)  
Routes of exposure: Skin contact  
Species: Mouse  
Method: OECD Test Guideline 429  
Results: Negative

**Propan-2-ol**

Test type: Buehler Test  
Routes of exposure: Skin contact  
Species: Guinea pig  
Method: OECD Test Guideline 406  
Results: Negative

**Bornan-2-one**

Test type: Buehler Test  
Routes of exposure: Skin contact  
Species: Guinea pig  
Method: OECD Test Guideline 406  
Results: Negative

**Germ cell mutagenicity:****Not classified based on available data****Silver****Genotoxicity in vitro**

Test type:

Chromosome aberration test in vitro

Result:

Negative

Remarks:

Based on data from similar materials

**Genotoxicity in vivo**

Test type:

Mammalian erythrocyte micronucleus test  
(in vivo cytogenetic assay)

Species:

Rat

Application route:

Ingestion

Result:

Negative

**Toluene****Genotoxicity in vitro**

Test type:

In vitro mammalian cell gene mutation test

Result:

Negative

Test type:

Bacterial reverse mutation assay (AMES)

Result:

Negative

**Genotoxicity in vivo**

Test type:

Mutagenicity (in vivo mammalian bone-marrow  
cytogenetic test, chromosomal analysis)

Species:

Rat

Application route:

Intraperitoneal injection

Result:

Negative

**Ethyl acetate****Genotoxicity in vitro**

Test type:

Bacterial reverse mutation assay (AMES)

Result:

Negative

Test type:

Chromosome aberration test in vitro

Result:

Negative

Test type:

In vitro mammalian cell gene mutation test

Result:

Negative

Remarks:

Based on data from similar materials

**Genotoxicity in vivo**

Test type:

Mammalian erythrocyte micronucleus test  
(in vivo cytogenetic assay)

Species:

Hamster

Application route:

Ingestion

Result:

Negative

**Ethanol****Genotoxicity in vitro**

Test type:

In vitro mammalian cell gene mutation test

Result:

Negative

Test type:

Bacterial reverse mutation assay (AMES)

Result:

Negative

### Genotoxicity in vivo

Test type: Rodent dominant lethal test (germ cell in vivo)  
Species: Mouse  
Application route: Ingestion  
Result: Equivocal

### **Propan-2-ol**

#### Genotoxicity in vitro

Test type: Bacterial reverse mutation assay (AMES)  
Result: Negative  
Test type: In vitro mammalian cell gene mutation test  
Result: Negative

### Genotoxicity in vivo

Test type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Application route: Intraperitoneal injection  
Result: Negative

### **Bornan-2-one**

#### Genotoxicity in vitro

Test type: Bacterial reverse mutation assay (AMES)  
Result: Negative  
Test type: In vitro mammalian cell gene mutation test  
Method: OECD Test Guideline 476  
Result: Negative

### Genotoxicity in vivo

Test type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)  
Species: Mouse  
Application route: Ingestion  
Result: Negative  
Test type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)  
Species: Mouse  
Application route: Skin contact  
Result: Negative

### **Carcinogenicity:**

**Not classified based on available data**

### **Toluene**

Species: Rat  
Application route: Inhalation (vapor)  
Exposure time: 103 weeks  
Result: Negative

Species: Mouse  
Application route: Ingestion  
Exposure time: 24 months  
Result: Negative

### **(R)-p-mentha-1,8-diene**

Species: Mouse  
Application route: Ingestion  
Exposure time: 103 weeks  
Result: Negative

### **Propan-2-ol**

Species: Rat  
Application route: Inhalation (vapor)  
Exposure time: 104 weeks  
Method: OECD Test Guideline 451  
Result: Negative

**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:** Suspected of damaging the unborn child

### **Silver**

#### Effects on fetal development:

Test type: Embryo-fetal development  
Species: Rat  
Application route: Ingestion  
Results: Negative  
Remarks: Based on data from similar materials

### **Toluene**

#### Effects on fertility

Test type: Two-generation reproduction toxicity study  
Species: Rat  
Application route: Inhalation (vapor)  
Method: OECD Test Guideline 416  
Remarks: Based on data from similar materials

#### Effects on fetal development:

Test type: Embryo-fetal development  
Species: Rat  
Application route: Inhalation (vapor)  
Results: Positive

Reproductive toxicity: Some evidence of adverse effects on development, based on animal experiments

### **Ethyl acetate**

#### Effects on fertility

Test type: Two-generation reproduction toxicity study  
Species: Mouse  
Application route: Ingestion  
Results: Negative  
Remarks: Based on data from similar materials

Species: Rat  
Application route: Inhalation (vapor)  
Results: Negative

Effects on fetal development:

Test type: Embryo-fetal development  
Species: Rat  
Application route: Inhalation  
Results: Negative  
Remarks: Based on data from similar materials

Test type: Embryo-fetal development  
Species: Mouse  
Application route: Ingestion  
Results: Negative  
Remarks: Based on data from similar materials

**(R)-p-mentha-1,8-diene**

Effects on fetal development:

Test type: Embryo-fetal development  
Species: Rat  
Application route: Ingestion  
Results: Negative

**Ethanol**

Effects on fertility

Test type: Two-generation reproduction toxicity study  
Species: Mouse  
Application route: Ingestion  
Results: Negative

**Propan-2-ol**

Effects on fertility

Test type: Two-generation reproduction toxicity study  
Species: Rat  
Application route: Ingestion  
Results: Negative

Effects on fetal development:

Test type: Embryo-fetal development  
Species: Rat  
Application route: Ingestion  
Results: Negative

**Bornan-2-one**

Effects on fetal development:

Test type: Fertility/early embryonic development  
Species: Rat  
Application route: Ingestion  
Results: Negative

**STOT-single exposure: May cause drowsiness or dizziness**

**Toluene**

Assessment: May cause drowsiness or dizziness

**Ethyl acetate**

Assessment: May cause drowsiness or dizziness

**Propan-2-ol**

Assessment: May cause drowsiness or dizziness

### **Bornan-2-one**

Assessment: May cause drowsiness or dizziness

**STOT-repeated exposure: May cause damage to organs (Central nervous system) through prolonged or repeated exposure**

### **Silver**

Routes of exposure

Inhalation (dust/mist/fume)

Assessment:

No significant health effects observed in animals at concentrations of 0.2 mg/L/6h/d or less.

### **Toluene**

Routes of exposure

Inhalation

Target organs:

Central nervous system

Assessment:

May cause damage to organs through prolonged or repeated exposure.

### **(R)-p-mentha-1,8-diene**

Assessment:

No significant health effects observed in animals at concentrations of 100 mg/kg bw or less.

### **Repeated dose toxicity:**

#### **Silver**

Species:

Rat

Rat

NOAEL:

30 mg/kg

0.133 mg/m<sup>3</sup>

LOAEL:

125 mg/kg

Application route:

Ingestion

Inhalation (dust/mist/fume)

Exposure time:

13 weeks

13 weeks

Method:

OECD Test Guideline 408

OECD Test Guideline 413

#### **Toluene**

Species:

Rat

Rat

NOAEL:

625 mg/kg

LOAEL:

1.875 mg/L

Application route:

Inhalation (vapor)

Ingestion

Exposure time:

6 months

13 weeks

#### **Ethyl acetate**

Species:

Rat

Rat

NOAEL:

900 mg/kg

1.28 mg/L

LOAEL:

3,600 mg/kg

2.75 mg/kg

Application route:

Ingestion

Inhalation (vapor)

Exposure time:

90 days

94 days

#### **(R)-p-mentha-1,8-diene**

Species:

Rat, male

NOAEL:

5 mg/kg

LOAEL:

30 mg/kg

Application route:

Ingestion

Exposure time:

13 weeks

#### **Ethanol**

Species:

Rat

NOAEL:

1,280 mg/kg

LOAEL:

3,156 mg/kg

Application route:

Ingestion

Exposure time:

90 days

### **Propan-2-ol**

Species: Rat  
NOAEL: 12.5 mg/L  
Application route: Inhalation (vapor)  
Exposure time: 104 weeks

### **Bornan-2-one**

Species: Rat  
NOAEL: 250 mg/kg  
Application route: Skin contact  
Exposure time: 13 weeks

**Aspiration toxicity:** **Not classified based on available information.**

**Toluene:** The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

**(R)-p-mentha-1,8-diene:** The substance or mixture is known to cause human aspiration toxicity hazards or has to be regarded as if it causes a human aspiration toxicity hazard.

### **Experience with human exposure:**

#### **Toluene - Inhalation**

Target organs: Central nervous system  
Symptoms: Neurological disorders

#### **Ethyl acetate - Eye contact**

Target organs: Eye  
Symptoms: Irritation

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## **Section 12: Ecological Information**

### **Silver**

#### **Toxicity to fish**

Species: LL50 (Pimephales promelas-fathead minnow)  
Result: >0.01 – 0.1 mg/L  
Exposure time: 48 hours  
Remarks: Based on data from similar materials and on transformation/dissolution testing and data from soluble metal compounds.

#### **Toxicity to daphnia and other aquatic invertebrates**

Species: EL50 (Daphni magna – water flea)  
Result: >0.01 – 0.1 mg/L  
Exposure time: 48 hours  
Remarks: Based on data from similar materials and on transformation/dissolution testing and data from soluble metal compounds.

#### **Toxicity to algae/aquatic plants**

Species: EL50 (Pseudokirchneriella subcapitata – green algae)  
Result: >1 – 10 mg/L  
Exposure time: 72 hours  
Remarks: Based on data from similar materials and on transformation/dissolution testing and data from soluble metal compounds.

Species: (NOELR) Pseudokirchneriella subcapitata – green algae  
Result: >0.01 – 0.1 mg/L  
Exposure time: 72 hours  
Remarks: Based on data from similar materials and on transformation/dissolution testing and data from soluble metal compounds.

**M-Factor (Acute aquatic toxicity)** Result = 10

#### Toxicity to fish (Chronic toxicity)

Species: (NOELR) Oncorhynchus mykiss – rainbow trout  
Result: >0.0001 – 0.001 mg/L  
Exposure time: 60 days  
Remarks: Based on data from similar materials and on transformation/dissolution testing and data from soluble metal compounds.

#### Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

Species: EC10 (Daphni magna – water flea)  
Result: >0.00214 mg/L  
Exposure time: 21 days  
Remarks: Based on data from similar materials.

M-Factor (Chronic aquatic toxicity) Result = 10

### **Toluene**

#### Toxicity to fish

Species: LC50 (Oncorhynchus kisutch – coho salmon)  
Result: 5.5 mg/L  
Exposure time: 96 hours

#### Toxicity to daphnia and other aquatic invertebrates

Species: EC50 (Ceriodaphnia dubia – water flea)  
Result: 3.78 mg/L  
Exposure time: 48 hours

#### Toxicity to algae/aquatic plants

Species: NOEC (Skeletonema costatum – marine diatom)  
Result: 10 mg/L  
Exposure time: 72 hours

#### Toxicity to fish (Chronic toxicity)

Species: NOEC (Oncorhynchus kisutch – coho salmon)  
Result: 1.39 mg/L  
Exposure time: 40 days

#### Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

Species: NOEC (Ceriodaphnia dubia – water flea)  
Result: >0.74 mg/L  
Exposure time: 7 days

#### Toxicity to microorganisms

Species: EC50 (Nitrosomonas)  
Result: 84 mg/L  
Exposure time: 24 hours

### **Ethyl acetate**

#### Toxicity to fish

Species: LC50 (Pimephales promelas-fathead minnow)  
Result: 220 mg/L  
Exposure time: 96 hours

#### Toxicity to daphnia and other aquatic invertebrates

Species: EC50 (Daphni magna – water flea)  
Result: 3,090 mg/L  
Exposure time: 48 hours  
Method: DIN 38412

#### Toxicity to algae/aquatic plants

Species: NOEC (Desmodesmus subspicatus – green algae)  
Result: 100 mg/L  
Exposure time: 72 hours  
Method: OECD Test Guideline 201

#### Toxicity to fish (Chronic toxicity)

Species: NOEC (Pimephales promelas-fathead minnow)  
Result: 1 – 9.65 mg/L  
Exposure time: 32 days

#### Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

Species: NOEC (Daphni magna – water flea)  
Result: 2.4 mg/L  
Exposure time: 24 days

#### Toxicity to microorganisms

Species: EC10 (Photobacterium phosphoreum)  
Result: 1,650 mg/L  
Exposure time: 0.25 hours

#### **(R)-p-mentha-1,8-diene:**

##### Toxicity to fish

Species: LC50 (Pimephales promelas-fathead minnow)  
Result: 702 ug/L  
Exposure time: 96 hours

##### Toxicity to daphnia and other aquatic invertebrates

Species: EC50 (Daphni magna – water flea)  
Result: 307 ug/L  
Exposure time: 48 hours  
Method: OECD Test Guideline 202

#### Toxicity to algae/aquatic plants

Species: ErC50 (Pseudokirchneriella subcapitata – green algae)  
Result: 0.32 mg/L  
Exposure time: 72 hours  
Method: OECD Test Guideline 201  
Species: EC10 (Pseudokirchneriella subcapitata – green algae)  
Result: 0.174 mg/L  
Exposure time: 72 hours  
Method: OECD Test Guideline 201

##### Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

Species: EC10 (Daphni magna – water flea)  
Result: 153 ug/L  
Exposure time: 24 days  
Method: OECD Test Guideline 211

##### Toxicity to microorganisms

Species: EC50  
Result: >100 mg/L  
Exposure time: 3 hours  
Method: OECD Test Guideline 209  
Remarks: Based on data from similar materials.

## **Ethanol**

### Toxicity to fish

Species: LC50 (Pimephales promelas-fathead minnow)  
Result: >1,000 mg/L  
Exposure time: 96 hours

### Toxicity to daphnia and other aquatic invertebrates

Species: EC50 (Ceriodaphnia – water flea)  
Result: >1,000 mg/L  
Exposure time: 48 hours

### Toxicity to algae/aquatic plants

Species: ErC50 (Chlorella vulgaris – Fresh water algae)  
Result: 275 mg/L  
Exposure time: 72 hours

Species: EC10 (Chlorella vulgaris – Fresh water algae)  
Result: 11.5 mg/L  
Exposure time: 72 hours

### Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

Species: EC10 (Daphni magna – water flea)  
Result: 9.6 mg/L  
Exposure time: 9 days

### Toxicity to microorganisms

Species: EC50 (Pseudomonas putida)  
Result: 6,500 mg/L  
Exposure time: 16 hours

## **Propan-2-ol**

### Toxicity to fish

Species: LC50 (Pimephales promelas-fathead minnow)  
Result: 9,640 mg/L  
Exposure time: 96 hours

### Toxicity to daphnia and other aquatic invertebrates

Species: EC50 (Daphni magna – water flea)  
Result: >10,000 mg/L  
Exposure time: 48 hours

### Toxicity to microorganisms

Species: EC50 (Pseudomonas putida)  
Result: >1,050 mg/L  
Exposure time: 16 hours

## **Bornan-2-one**

### Toxicity to fish

Species: LC50 (Danio rerio – zebra fish)  
Result: >1,000 mg/L  
Exposure time: 96 hours

### Toxicity to daphnia and other aquatic invertebrates

Species: EC50 (Daphni magna – water flea)  
Result: 4.23 mg/L  
Exposure time: 48 hours  
Method: OECD Test Guideline 202

### Toxicity to algae/aquatic plants

Species:	ErC50 (Pseudokirchneriella subcapitata – green algae)
Result:	1.71 mg/L
Exposure time:	72 hours
Method:	OECD Test Guideline 201
Species:	NOEC (Pseudokirchneriella subcapitata – green algae)
Result:	0.032 mg/L
Exposure time:	72 hours
Method:	OECD Test Guideline 201

### Toxicity to microorganisms

Species:	EC5
Result:	>100 mg/L
Exposure time:	3 hours
Method:	OECD Test Guideline 209

### **Persistence and degradability**

#### **Toluene**

##### Biodegradability

Result:	Readily biodegradable
Bio-gradation:	80%
Exposure time:	20 days

#### **Ethyl acetate**

##### Biodegradability

Result:	Readily biodegradable
Bio-gradation:	69%
Exposure time:	20 days

#### **(R)-p-mentha-1,8-diene:**

##### Biodegradability

Result:	Readily biodegradable
Bio-gradation:	71.4%
Exposure time:	28 days
Method:	OECD Test Guideline 301B

#### **Ethanol**

##### Biodegradability

Result:	Readily biodegradable
Bio-gradation:	84%
Exposure time:	20 days

#### **Propan-2-ol**

##### Biodegradability

Result:	Rapidly degradable
BOD/COD:	BOD: 1.19 (BOD5)COD: 2.23 BOD/COD: 53%

#### **Bornan-2-one**

##### Biodegradability

Result:	Readily biodegradable
Bio-gradation:	77%
Exposure time:	28 days
Method:	OECD Test Guideline 301F

## Bioaccumulative potential

### **Silver**

#### Bioaccumulation

Species: Cyprinus carpio (Carp)  
Bioconcentration factor (BCF): <500  
Remarks: Based on data from similar materials.

### **Toluene**

#### Bioaccumulation

Species: Leuciscus idus (Golden orfe)  
Bioconcentration factor (BCF): 90  
Partition coefficient (n-octanol/water) Log Pow: 2.73

### **Ethyl acetate**

#### Bioaccumulation

Species: Leuciscus idus (Golden orfe)  
Bioconcentration factor (BCF): 30  
Partition coefficient (n-octanol/water) Log Pow: 0.68

### **(R)-p-mentha-1,8-diene:**

#### Bioaccumulation

Partition coefficient (n-octanol/water) Log Pow: 4.38

### **Ethanol**

#### Bioaccumulation

Partition coefficient (n-octanol/water) Log Pow: -0.35

### **Propan-2-ol**

#### Bioaccumulation

Partition coefficient (n-octanol/water) Log Pow: 0.05

### **Bornan-2-one**

#### Bioaccumulation

Partition coefficient (n-octanol/water) Log Pow: 2.414  
Method: OECD Test Guideline 107

**Mobility in soil:** No data available

### **Other adverse effects:**

#### Ozone-Depletion Potential:

40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone – CAA Section 602 Class I Substances  
This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App. A+B).

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## Section 13 Disposal Considerations

### Disposal Methods:

Waste from residues: If recycling is not practical, dispose on in compliance with local regulations.  
Contaminated packaging: Dispose of as unused product.

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## Section 14: Transportation Information

### International Regulations

#### IATA-DGR

UN identification number	UN 1993
Proper shipping name	Flammable liquids, n.o.s. (Toluene, Ethyl acetate)
Class	3
Packing group	II
Labels	Flammable Liquids
Packing instruction (cargo aircraft)	364
Packing instruction (passenger aircraft)	353

#### IMDG-Code

UN identification number	UN 1993
Proper shipping name	Flammable liquids, N.O.S. (Toluene, Ethyl acetate, Silver, (R)-p-mentha-1,8-diene)
Class	3
Packing group	II
Labels	3
EmS Code	F-E, <u>S-E</u>
Marine pollutant	Yes

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

Not applicable for product as supplied.

### Domestic Regulations

#### DOT

UN identification number	UN 1993
Proper shipping name	Flammable liquids, n.o.s. (Toluene, Ethyl acetate)
Class	3
Packing group	II
Labels	Flammable Liquids
ERG Code	128
Marine pollutant	Yes (Silver, (R)-p-mentha-1,8-diene)

### Special precautions for user

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

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## Section 15: Regulatory Information

### EPCRA – Emergency Planning and Community Right-to-know

#### **CERCLA – Reportable Quantity**

<u>Components</u>	<u>CAS No:</u>	<u>Component RQ (lbs)</u>	<u>Calculated Product RQ (lbs)</u>
Silver	7440-22-4	1,000	1,666
Silver	7440-22-4	1	1 (D011)

#### **SARA 304 – Extremely Hazardous Substances Reportable Quantity**

This material does not contain any components with a section 304 EHS RQ.

#### **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:**

Flammable (gases, aerosols, liquids, or solids)  
Respiratory or skin sensitization  
Reproductive toxicity  
Specific target organ toxicity (single or repeated exposure)  
Skin corrosion or irritation

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

Silver	7440-44-2	>= 50 - < 70%
Toluene	108-88-3	>= 10 - < 20%
Propan-2-ol	67-63-0	>= 1 - < 5%

**Clean Air Act:** This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App. A+B).

The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 112 (40 CFR 61)

Toluene	108-88-3	>= 10 - < 20%
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This product does not contain any chemicals listed under the U.S. Clean Air Act, Section 112(r) for Accidental Release Prevention (40 CFR 68, 130, Subpart F)

The following chemical(s) are listed under the U.S. Clean Air Act, Section 111 SXCMI Intermediate or Final VOC's (40 CFR 60.489)

Toluene	108-88-3	>= 10 - < 20%
Ethyl acetate	141-78-6	>= 5 - < 10%
Ethanol	64-17-5	>= 1 - < 5%
Propan-2-ol	67-63-0	>= 1 - < 5%

**Clean Water Act:**

The following Hazardous Substances are listed under the U.S. Clean Water Act, Section 311, Table 116.4A:

Toluene	108-88-3	>= 10 - < 20%
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The following Hazardous Substances are listed under the U.S. Clean Water Act, Section 311, Table 117.3:

Toluene	108-88-3	>= 10 - < 20%
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This product contains the following toxic pollutants listed under the U.S. Clean Water Act, Section 307:

Silver	7440-44-2	>= 50 - < 70%
Toluene	108-88-3	>= 10 - < 20%

This product contains the following priority pollutants related to the U.S. Clean Water Act:

Toluene	108-88-3	>= 10 - < 20%
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**U.S. State Regulations:**

**Massachusetts Right-to-Know**

Silver	7440-22-4
Toluene	108-88-3
Ethyl acetate	141-78-6
Ethanol	64-17-5
Cellulose nitrate	9004-70-0
Propan-2-ol	67-63-0
Bornan-2-one	76-22-2

**Pennsylvania Right-to-Know**

Silver	7440-22-4
Toluene	108-88-3
Ethyl acetate	141-78-6
(R)-p-mentha-1,8-diene	5989-27-5
Ethanol	64-17-5
Cellulose nitrate	9004-70-0
Propan-2-ol	67-63-0
Bornan-2-one	76-22-2

**Maine Chemicals of High Concern:**

Toluene	108-88-3
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**Vermont Chemicals of High Concern:**

Toluene	108-88-3
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**Washington Chemicals of High Concern:**

Toluene	108-88-3
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**California Prop. 65**

WARNING: This product can expose you to chemicals including Toluene, 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](http://www.P65Warnings.ca.gov)

**California List of Hazardous Substances**

Silver	7440-22-4
Toluene	108-88-3
Ethyl acetate	141-78-6
Ethanol	64-17-5
Propan-2-ol	67-63-0
Bornan-2-one	76-22-2

**California Permissible Exposure limits for Chemical Contaminants**

Silver	7440-22-4
Toluene	108-88-3
Ethyl acetate	141-78-6
Ethanol	64-17-5
Propan-2-ol	67-63-0
Bornan-2-one	76-22-2

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

TSCA: All substances listed as "active" on the TSCA Inventory

TSCA List: No substances are subject to a Significant New Use Rule.  
No substances are subject to TSCA 12(b) export notification requirements.

Other regulations: Storage class (TRGS 510):3: Flammable liquids

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**Section 16: Other Information**

**Full text of other abbreviations**

ACGIH: USA. ACGIH Threshold Limit Values (TLV)  
ACGIH BEI: ACGIH - Biological Exposure Indices (BEI)  
NIOSH REL: USA. NIOSH Recommended Exposure Limits  
OSHA Z-1: USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants  
OSHA Z-2: USA. Occupational Exposure Limits (OSHA) - Table Z-2  
US WEEL: USA. Workplace Environmental Exposure Levels (WEEL)  
ACGIH / TWA: 8-hour, time-weighted average  
ACGIH / STEL: Short-term exposure limit  
NIOSH REL/TWA: Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek  
NIOSH REL/ST: STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday  
OSHA Z-1 / TWA: 8-hour time weighted average  
OSHA Z-2/TWA: 8-hour time weighted average  
OSHA Z-2/CEIL: Acceptable ceiling concentration  
OSHA Z-2/Peak: Acceptable maximum peak above the acceptable ceiling concentration for an 8-hr shift  
US WEEL/TWA: 8-hr TWA

AICS - Australian Inventory of Chemical Substances;  
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 Standardization;  
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 Organization 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, Authorization 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;  
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

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