Section 1: Product and Company Identification
Product Name: Pelco® Colloidal Silver
Synonym: Pelco® Conductive Liquid Silver, Pelco® Colloidal Silver Paint
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: GHS Classification in accordance with 29 CFR 1910.1200
Flammable Liquids: Category 2
Skin irritation: Category 2
Eye irritation: Category 2A
Reproductive toxicity: Category 2
Specific target organ systemic toxicity-single exposure: Category 3 (Central nervous system)
Specific target organ systemic toxicity-repeated exposure: Category 3 (Central nervous system)

GHS label elements
Hazard Pictograms

Signal Word: DANGER

Hazard Statements
H225: Highly flammable liquid and vapor.
H315: Causes skin irritation.
H319: Causes serious eye irritation.
H336: May cause drowsiness or dizziness.
H361d: Suspected of damaging the unborn child.
H373: May cause damage to organs (Central nervous system) through prolonged or repeated exposure.

Precautionary Statements
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/protective clothing/eye protection/face protection.
Response:
P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3 Other hazards
None known

Section 3: Composition / Information on Ingredients

<table>
<thead>
<tr>
<th>Substance/Mixture: Mixture</th>
<th>Chemical Nature: Inorganic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Name</td>
<td>CAS-No.</td>
</tr>
<tr>
<td>Silver</td>
<td>7440-22-4</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
</tr>
<tr>
<td>Ethyl acetate</td>
<td>141-78-6</td>
</tr>
<tr>
<td>Ethanol</td>
<td>64-17-5</td>
</tr>
<tr>
<td>n-Butyl acetate</td>
<td>123-86-4</td>
</tr>
<tr>
<td>Propan-2-ol</td>
<td>67-63-0</td>
</tr>
<tr>
<td>Bornan-2-on</td>
<td>76-22-2</td>
</tr>
</tbody>
</table>

Actual concentration is withheld as trade secret.

Section 4: First Aid Measures
If accidental overexposure is suspected

General advice: First aid person needs to protect himself. Move out of dangerous area. Show this Safety Data Sheet to the doctor in attendance.

If Inhaled: Move to fresh air. If breathing is irregular or stopped, administer artificial respiration. Get medical attention.

In case of Skin Contact: Take off all contaminated clothing immediately. Wash off with soap and plenty of water.

In case of Eye(s) Contact: In case of contact, remove contact lens and rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye open while rinsing. Protect unharmed eye. Call a physician immediately.

If swallowed:Immediately give large quantities of water to drink. Do not induce vomiting. Get medical attention immediately.
Most important symptoms and effects, both acute and delayed:

Causes skin irritation
Causes serious eye irritation
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

---

**Section 5: Fire Fighting Measures**

**Suitable extinguishing media**

Dry powder, alcohol-resistant foam, dry sand, carbon dioxide (CO₂)

**Unsuitable extinguishing media**

Water

**Specific hazards during fire fighting**

Exposure to decomposition products may be a hazard to health.

**Hazardous combustion products**

Silver compounds, Carbon oxides

**Further information**

Use a water spray to cool fully closed containers.
Prevent fire extinguishing water from contamination surface water or the ground water system.

**Special protective equipment for fire-fighters**

In the event of a 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 rivers, 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)

---

**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 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/Biological occupational exposure limits

<table>
<thead>
<tr>
<th>Component(s)</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control Parameters/Permissible concentrations</th>
<th>Basis</th>
<th>Biological sample/BEI</th>
<th>BEI Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>7440-22-4</td>
<td>TWA Dust and fume</td>
<td>0.01mg/m³ 0.1mg/m³</td>
<td>OSHA Z-1 ACGIH</td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA ST TWA CEIL Peak</td>
<td>20 ppm 100 ppm (375mg/m³) 150 ppm (560mg/m³) 200 ppm 300 ppm 500 ppm (10 minutes)</td>
<td>ACGIH NIOSH REL NIOSH REL OSHA Z-2 OSHA Z-2 OSHA Z-2</td>
<td>TWA ST STEL</td>
<td>NA</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>TWA ST TWA CEIL Peak</td>
<td>0.02 mg/L 0.03 mg/L o-Cresol/0.3mg/g Creatinine</td>
<td>ACGIH</td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>Ethyl acetate</td>
<td>141-78-6</td>
<td>TWA TWA TWA</td>
<td>400 ppm (1400mg/m³) 400 ppm (1400mg/m³)</td>
<td>ACGIH NIOSH REL OSHA Z-1</td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>Ethanol</td>
<td>64-17-5</td>
<td>TWA STEL TWA</td>
<td>1000 ppm(1900 mg/m³) 1000 ppm 1000 ppm (1900 mg/m³)</td>
<td>NIOSH REL ACGIH OSHA Z-1</td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>n-Butyl acetate</td>
<td>123-86-4</td>
<td>TWA TWA ST TWA STEL</td>
<td>150 ppm (710 mg/m³) 150 ppm (710 mg/m³) 200 ppm (950 mg/m³) 50 ppm 150 ppm</td>
<td>OSHA Z-1 NIOSH REL NIOSH REL ACGIH ACGIH</td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>Propan-2-ol</td>
<td>67-63-0</td>
<td>TWA STEL TWA ST TWA</td>
<td>200 ppm 400 ppm 400 ppm (980 mg/m³) 500 ppm (1225 mg/m³) 400 ppm (980 mg/m³)</td>
<td>ACGIH ACGIH NIOSH REL NIOSH REL OSHA Z-1</td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TWA STEL TWA</td>
<td>Acetone/40 mg/L</td>
<td>ACGIH</td>
<td></td>
<td>ACGIH</td>
</tr>
<tr>
<td>Bornan-2-one</td>
<td>76-22-2</td>
<td>TWA STEL TWA</td>
<td>2 mg/m³ 2 ppm 3 ppm 2 mg/m³</td>
<td>OSHA Z-1 ACGIH ACGIH NIOSH REL</td>
<td></td>
<td>NA</td>
</tr>
</tbody>
</table>

### Engineering Controls
Ventilation required: Provide sufficient air exchange and/or exhaust in work rooms.

### Personal Protection Equipment
**Respiratory protection:** Use respiratory protective unless adequate local exhaust ventilation is provided or exposure assessment demonstrates that exposures are within recommended exposure guidelines. Recommended Filter type: ABEK-P

**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.
Hand protection: 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, abrasion and the contact time. A the product is a mixture of several substances, the durability of the glove materials cannot be calculated in advance and has to be tested before use.

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.

**Exposure Guidelines**
See Composition/Information on Ingredients (Section 3)

---

**Section 9 Physical and Chemical Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Paste</td>
</tr>
<tr>
<td>Color</td>
<td>Gray</td>
</tr>
<tr>
<td>Odor</td>
<td>Aromatic</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>ND</td>
</tr>
<tr>
<td>pH</td>
<td>NA</td>
</tr>
<tr>
<td>Melting Point/Range</td>
<td>ND</td>
</tr>
<tr>
<td>Boiling Point/Range</td>
<td>167°F / 75°C (1,013 hPa)</td>
</tr>
<tr>
<td>Flash Point</td>
<td>30°F / -1°C (1,013 hPa)</td>
</tr>
<tr>
<td>Evaporation Rate</td>
<td>ND</td>
</tr>
<tr>
<td>Flammability</td>
<td>NA</td>
</tr>
<tr>
<td>Self-ignition</td>
<td>NA</td>
</tr>
<tr>
<td>Flammable/Explosive Limits: Upper</td>
<td>7.0% (V); 68°F / 20°C (1,013 hPa)</td>
</tr>
<tr>
<td>Flammable/Explosive Limits: Lowe</td>
<td>1.2% (V); 68°F / 20°C (1,013 hPa)</td>
</tr>
<tr>
<td>Vapor Pressure</td>
<td>29 hPa (122°F / 50°C)</td>
</tr>
<tr>
<td>Relative Vapor Density</td>
<td>ND</td>
</tr>
<tr>
<td>Relative Density</td>
<td>ND</td>
</tr>
<tr>
<td>Density</td>
<td>ND</td>
</tr>
<tr>
<td>Water Solubility</td>
<td>Insoluble: (68°F / 20°C, 1,013 hPa)</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>ND</td>
</tr>
<tr>
<td>Partition Coefficient: (n-octanol/water)</td>
<td>ND</td>
</tr>
<tr>
<td>Auto-ignition Temperature</td>
<td>797°F / 425°C (1,013 hPa)</td>
</tr>
<tr>
<td>Decomposition Temperature</td>
<td>ND</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>20,000 mPa/s (73°F / 23°C)</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>&gt;40 mm²/s (73°F / 23°C)</td>
</tr>
<tr>
<td></td>
<td>&gt;20.5 mm²/s (104°F / 40°C)</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>ND</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>ND</td>
</tr>
</tbody>
</table>
Section 10: Stability and Reactivity
Reactivity: No dangerous reaction known under conditions of normal use.
Chemical stability: Stable under normal conditions.
Possibility of hazardous reaction: No dangerous reaction known under conditions of normal use.
Conditions to Avoid: ND
Incompatible materials: ND
Hazardous decomposition products: ND

Section 11: Toxicological Information
Acute toxicity: Not classified based on available information.

Product:
Acute oral toxicity: Acute toxicity estimate: > 5,000 mg.kg
Method: Calculation method

Acute inhalation toxicity: Acute toxicity estimate: 64.35 mg/L
Exposure time: 4 h
Test atmosphere: vapor
Method: Calculation method

Skin corrosion/irritation: Causes skin irritation

Serious eye damage/eye irritation: Causes serious eye irritation

Respiratory or skin sensitization: Not classified based on available information

Germ cell mutagenicity: Not classified based on available information

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified is 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 identified 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.

STOT – single exposure May cause drowsiness or dizziness

STOT – repeated exposure May cause damage to organs (Central nervous system) through prolonged or repeated exposure.

Aspiration toxicity Not classified based on available information

Components:

Silver:
Acute oral toxicity: LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401
Remarks: Based on data from similar materials

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

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

Respiratory or skin sensitization: Test Type: Maximization Test
Routes of exposure: Skin contact  
Species: Guinea pig  
Method: OECD Test Guideline 406  
Result: negative  
Remarks: Based on data from similar materials

**Germ cell mutagenicity:**  
**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: Intraperitoneal injection  
Remarks: Based on data from similar materials

**Reproductive toxicity:**  
Suspected of damaging the unborn child

**Effects on fetal development:**  
Test Type: Embryo-fetal development  
Species: Rat  
Application route: Ingestion  
Result: negative  
Remarks: Based on data from similar materials

**STOT – repeated exposure**  
Assessment: No significant health effects observed in animals at concentrations on 0.2 mg/l/6h/d or less.

**Repeated dose toxicity**  
Species: Rat  
NOAEL: 30 mg/kg  
LOAEL: 125 mg/kg  
Application route: Ingestion  
Exposure time: 13 weeks  
Method: OECD Test Guideline 408

Species: Rat  
NOAEL: 0.133 mg/m³  
Application route: Inhalation (dust/mist/fume)  
Exposure time: 13 weeks  
Method: OECD Test Guideline 413

### Toluene:

**Acute oral toxicity:**  
LD₅₀ (Rat): > 5,000 mg/kg

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

**Acute dermal toxicity:**  
LD₅₀ (Rabbit): > 5,000 mg/kg

**Skin corrosion/irritation:**  
Species: Rabbit  
Result: Skin irritation

**Serious eye damage/eye irritation:**  
Species: Rabbit  
Method: OECD Test Guideline 405  
Result: No eye irritation
Respiratory or skin sensitization:

Test Type: Maximization Test  
Routes of exposure: Skin contact  
Species: Guinea pig  
Result: negative

Germ cell mutagenicity:

Genotoxicity in vitro:

Test Type: In vitro mammalian cell gene mutation test  
Result: negative

Genotoxicity in vivo:

Test Type: Bacterial reverse mutation assay (AMES)  
Result: negative

Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)  
Species: Rat  
Application Route: Intraperitoneal injection  
Remarks: negative

Test Type: Rodent dominant lethal test (germ cell) (in vivo)  
Species: Mouse  
Application Route: Inhalation (vapor)  
Method: OECD Test Guideline 478  
Remarks: negative

Reproductive toxicity:  
Suspected of damaging the unborn child

Effects on fertility:

Test Type: Two-generation reproduction toxicity study  
Species: Rat  
Application route: Inhalation (vapor)  
Method: OECD Test Guideline 416  
Result: negative

Effects on fetal development:

Test Type: Embryo-fetal development  
Species: Rat  
Application route: Inhalation (vapor)  
Result: positive

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

STOT – single exposure  
Assessment: May cause drowsiness or dizziness

STOT – repeated exposure  
Routes of exposure: Inhalation  
Target Organs: Central nervous system  
Assessment: May cause damage to organs through prolonged or repeated exposure.

Repeated dose toxicity  
Species: Rat  
LOAEL: 1.875 mg/l  
Application route: Inhalation (vapor)  
Exposure time: 6 months  
Method: OECD Test Guideline 408

Species: Rat  
NOAEL: 625 mg/kg  
Application route: Ingestion
**Exposure time:** 13 week

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

**Experience with human exposure**

**Inhalation:**

**Target Organs:** Central Nervous System  
**Symptoms:** Neurological disorders

---

**Ethyl acetate:**

**Acute oral toxicity:**

| LD50 (Rat) | > 5,000 mg/kg |

**Acute inhalation toxicity:**

| LC50 (Rat) | 22.5 mg/L |
| Exposure time | 6 h |
| Test atmosphere | Vapor |
| Assessment | The substance or mixture has no acute inhalation toxicity. |

**Acute dermal toxicity:**

| LD50 (Rabbit) | > 20,000 mg/kg |

**Skin corrosion/irritation:**

| Species | Rabbit |
| Result | No skin irritation |

**Serious eye damage/eye irritation:**

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

**Respiratory or skin sensitization:**

| Test Type | Maximization Test |
| Routes of exposure | Skin contact |
| Species | Guinea pig |
| Method | OECD Test Guideline 406 |
| Result | negative |

**Germ cell mutagenicity:**

| Test Type | Bacterial reverse mutation assay (AMES) |
| Result | negative |

**Genotoxicity in vitro:**

| 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 |

**Reproductive toxicity:**

 Suspected of damaging the unborn child

**Effects on fertility:**

| Test Type | Two-generation reproduction toxicity study |
| Species | Mouse |
| Application route | Ingestion |
| Result | negative |
| Remarks | Based on data from similar materials |

| Species | Rat |
| Application route | Inhalation (vapor) |
| Result | negative |
Effects on fetal development:

Test Type: Embryo-fetal development
Species: Rat
Application route: Inhalation
Result: negative
Remarks: Based on data from similar materials

Test Type: Embryo-fetal development
Species: Mouse
Application route: Ingestion
Result: negative
Remarks: Based on data from similar materials

STOT – single exposure

Assessment: May cause drowsiness or dizziness

Repeated dose toxicity

Species: Rat
NOAEL: 900 mg/kg
LOAEL: 3,600 mg/kg
Application route: Ingestion
Exposure time: 90 days

Species: Rat
NOAEL: 1.28 mg/l
LOAEL: 2.75 mg/kg
Application route: Inhalation (vapor)
Exposure time: 94 days

Experience with human exposure

Eye contact: Target Organs: Eye
Symptoms: Irritation

**Ethanol:**

Acute oral toxicity:

LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

Acute inhalation toxicity:

LC50 (Rat) 124.7 mg/L
Exposure time: 4 h
Test atmosphere: vapor

Skin corrosion/irritation:

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

Serious eye damage/eye irritation:

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

Respiratory or skin sensitization:

Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Result: negative

Germ cell mutagenicity:

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
Remarks: equivocal

Reproductive toxicity:
Suspected of damaging the unborn child

Effects on fertility:
Test Type: Two-generation reproduction toxicity study
Species: Mouse
Application route: Ingestion
Result: negative

Repeated dose toxicity
Species: Rat
NOAEL: 1,280 mg/kg
LOAEL: 3,156 mg/kg
Application route: Ingestion
Exposure time: 90 days

n-Butyl acetate:

Acute oral toxicity: LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity: LC50 (Rat) 21.1 mg/L
Exposure time: 4 h
Test atmosphere: vapor
Method: OECD Test Guideline 403

Acute dermal toxicity: LD50 (Rabbit): > 5,000 mg/kg

Skin corrosion/irritation:
Species: Rabbit
Result: No skin irritation
Assessment: Repeated exposure may cause skin dryness or cracking.

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

Respiratory or skin sensitization:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: negative

Germ cell mutagenicity:

Genotoxicity in vitro:
Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Reproductive toxicity:
Suspected of damaging the unborn child

Effects on fertility:
Test Type: Two-generation reproduction toxicity study
Species: Rat
Application route: Inhalation (vapor)
Method: OECD Test Guideline 416
Result: negative

Effects on fetal development:
Test Type: Embryo-fetal development
Species: Rat
**Propan-2-one:**

**Acute oral toxicity:**
LD50 (Rat): > 5,000 mg/kg

**Acute inhalation toxicity:**
LC50 (Rat) > 25 mg/L
Exposure time: 6 h
Test atmosphere: vapor

**Acute dermal toxicity:**
LD50 (Rabbit): > 5,000 mg/kg

**Skin corrosion/irritation:**
Species: Rabbit
Result: No skin irritation

**Serious eye damage/eye irritation:**
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

**Respiratory or skin sensitization:**
Test Type: Buehler Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: negative

**Germ cell mutagenicity:**

**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

**Reproductive toxicity:**
Suspected of damaging the unborn child

**Effects on fertility:**
Test Type: Two-generation reproduction toxicity study
Species: Rat
Application route: Ingestion
Result: negative

**Effects on fetal development:**
Test Type: Embryo-fetal development
Species: Rat
Application route: Ingestion
Result: negative

**STOT – single exposure**
Assessment: May cause drowsiness or dizziness

**Repeated dose toxicity**
Species: Rat
NOAEL: 12.5 mg/l
Application route: Inhalation (vapor)
Exposure time: 104 weeks

**Bornan-2-one:**

**Acute oral toxicity:**
LD50 (Mouse): 1,310 mg/kg
Acute toxicity estimate (Humans): > 50-500 mg/kg
Method: Expert judgement

**Acute inhalation toxicity:**
LC50 (Rat) > 0.5 mg/L
Exposure time: 4 h
Test atmosphere: dust/mist

**Acute dermal toxicity:**
LD50 (Rat): > 2,000 mg/kg

**Skin corrosion/irritation:**
Species: Rabbit
Result: No skin irritation

**Serious eye damage/eye irritation:**
Result: Eye irritation to eyes

**Respiratory or skin sensitization:**
Test Type: Buehler Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: negative

**Germ cell mutagenicity:**

**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
Results: negative

Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Skin contact
Result: negative

**Reproductive toxicity:**
Suspected of damaging the unborn child

**Effects on fetal development:**
Test Type: Fertility/early embryonic development
Species: Rat
Application route: Ingestion
Result: negative

**STOT – single exposure**
Assessment: May cause respiratory irritation

**Repeated dose toxicity**
Species: Rat
NOAEL: 250 mg/kg
Application route: Skin contact
Exposure time: 13 weeks
Section 12: Ecological Information
Ecotoxicity
Ingredients:

Silver:
Toxicity to fish: LL50 (Pimephales promelas (fathead minnow)): >0.1 – 1 mg/l
Exposure time: 96 h, Remarks: Based on data from similar materials. Based on transformation/dissolution testing and data from soluble metal compounds.
Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): >0.1 – 1 mg/l
Exposure time: 48 h. Remarks: Based on data from similar materials. Based on transformation/dissolution testing and data from soluble metal compounds.
Toxicity to algae/aquatic plants: EL50 (Pseudokirchneriella subcapitata (green algae)): >1 – 10 mg/l
Exposure time: 72 h. Remarks: Based on data from similar materials. Based on transformation/dissolution testing and data from soluble metal compounds.
NOELR Pseudokirchneriella subcapitata (green algae)): >0.01 – 0.1 mg/l
Exposure time: 72 h. Remarks: Based on data from similar materials. Based on transformation/dissolution testing and data from soluble metal compounds.
M-Factor (Acute aquatic toxicity): 10
Toxicity to fish (Chronic toxicity): NOEC (Oncorhynchus mykiss (rainbow trout)): >0.0001 – 0.001 mg/l
Exposure time: 60 d. Remarks: Based on data from similar materials. Based on transformation/dissolution testing and data from soluble metal compounds.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): EC10 (Daphnia magna (Water flea)): 0.00214 mg/l Exposure time: 21 d Remarks: Based on data from similar materials.
M-Factor (Chronic aquatic toxicity): 10

Toluene:
Toxicity to fish: LC50 (Oncorhynchus kisutch (coho salmon)): 5.5 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates: EC50 (Ceriodaphnia dubia (water flea)): 3.78 mg/l
Exposure time: 48 h.
Toxicity to algae/aquatic plants: NOEC (Skeletonema costatum (marine diatom)): 10 mg/l
Exposure time: 72 h.
Toxicity to fish (Chronic toxicity): NOEC (Oncorhynchus kisutch (coho salmon)): 1.39 mg/l
Exposure time: 40 d.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC (Ceriodaphnia dubia (water flea)): 0.74 mg/l, Exposure time: 7 d.
Toxicity to microorganisms: EC50 (Nitrosomonas sp.): 84 mg/l Exposure time: 24 h.

Ethyl acetate:
Toxicity to fish: LC50 (Pimephales promelas (fathead minnow)): 220 mg/l, Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): 3,090 mg/l
Exposure time: 24 h, Method: DIN 38412.
Toxicity to algae/aquatic plants: NOEC (Desmodesmus subspicatus (green algae)): > 100 mg/l Exposure time: 72 h, Method: OECD Test Guideline 201.
Toxicity to fish (Chronic toxicity): NOEC (Pimephales promelas (fathead minnow)): > 1 - 9.65 mg/l Exposure time: 32 d.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC (Daphnia magna (Water flea)): 2.4 mg/l, Exposure time: 24 d.
Toxicity to microorganisms: EC10 (Photobacterium phosphoreum): 1,650 mg/l, Exposure time: 0.25 h

Ethanol:
Toxicity to fish: LC50 (Pimephales promelas (fathead minnow)): > 1,000 mg/l, Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates: EC50 (Ceriodaphnia (water flea)): > 1,000 mg/l Exposure time: 48 h.
Toxicity to algae: ErC50 (Chlorella vulgaris (Fresh water algae)): 275 mg/l Exposure time: 72 h.
EC10 (Chlorella vulgaris (Fresh water algae)): 11.5 mg/l, Exposure time: 72 h.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC (Daphnia magna (Water flea)): 9.6 mg/l. Exposure time: 9 d.
Toxicity to microorganisms: EC50 (Pseudomonas putida): 6,500 mg/l, Exposure time: 16 h.

**n-Butyl acetate:**
Toxicity to fish: LC50 (Pimephales promelas (fathead minnow)): 18 mg/l, Exposure time: 96 h.
Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia sp. (Water flea)): 44 mg/l Exposure time: 48 h.
Toxicity to algae/aquatic plants: ErC50 (Pseudokirchneriella subcapitata (green algae)): 397 mg/l Exposure time: 72 h, Method: OECD Test Guideline 201. Remarks: Based on data from similar materials.
NOEC (Pseudokirchneriella subcapitata (green algae)): 196 mg/l, Exposure time: 72 h. Method: OECD Test Guideline 201. Remarks: Based on data from similar materials.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): NOEC (Daphnia magna (Water flea)): 23.2 mg/l, Exposure time: 21 d. Method: OECD Test Guideline 21. Remarks: Based on data from similar materials.
Toxicity to microorganisms: IC50 (Tetrahymena pyriformis): 356 mg/l, Exposure time: 40 h.

**Propan-2-ol:**
Toxicity to fish: LC50 (Pimephales promelas (fathead minnow)): 9,640 mg/l, Exposure time: 96 h.
Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): > 10,000 mg/l Exposure time: 24 h.
Toxicity to microorganisms: EC50 (Pseudomonas putida): > 1,050 mg/l Exposure time: 16 h.

**Bornan-2-one:**
Toxicity to fish: LC50 (Danio rerio (zebra fish)): 33.25 mg/l, Exposure time: 96 h.
Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates: EC50 (Daphnia magna (Water flea)): 4.23 mg/l Exposure time: 24 h. Method: OECD Test Guideline 202
Toxicity to algae/aquatic plants: ErC50 (Pseudokirchneriella subcapitata (green algae)): 1.71 mg/l Exposure time: 72 h, Method: OECD Test Guideline 201. NOEC (Pseudokirchneriella subcapitata (green algae)): 0.032 mg/l, Exposure time: 72 h. Method: OECD Test Guideline 201.
Toxicity to microorganisms: EC50: > 100 mg/l, Exposure time: 3 h. Method: OECD Test Guideline 209.

**Persistence and degradability**

**Components:**

**Toluene:**

**Ethyl acetate:**

**Ethanol:**

**n-Butyl acetate:**

**Propan-2-ol:**
Biodegradability: Result: rapidly degradable. BOD/COD: BOD: 1.19 (BOD5)COD: 2.23 BOD/COD: 53%

**Bornan-2-one:**
Bioaccumulative potential

Components:
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.

Ethanol:
Partition coefficient: n-octanol/water: log Pow: -0.35.

n-Butyl acetate:
Partition coefficient: n-octanol/water: log Pow: 2.3.

Propan-2-ol:
Partition coefficient: n-octanol/water: log Pow: 0.05.

Bornan-2-one:

Mobility in soil: No data available

Other adverse effects:
Remarks: 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).

Section 13 Disposal Considerations
Disposal methods
Waste from residues: If recycling is not practical, dispose of in compliance with local regulations.
Contaminated packaging: Dispose of as unused product.

Section 14: Transportation Information
International Regulations
UN/ID No.: UN 1993
Proper shipping name: Flammable liquids, n.o.s. (Toluene, Ethyl acetate)
Hazard Class: 3
Packaging group: II
Labels: Flammable Liquids
Packing instruction (cargo aircraft): 364
Packing instruction (passenger aircraft): 353

IMDG Code
UN number: UN 1993
Proper shipping name: Flammable liquid, n.o.s. (Toluene, Ethyl acetate, Silver)
Hazard Class: 3
Packing group: II
Labels: 3
EmS Code: F-E, S-E
Marine Pollutant: Yes
Transport in bulk according to Annex II or MARPOL 73/78 and the IBC Code.
Not applicable for product as supplied.

Domestic Regulations - DOT
UN/ID/NA No.: UN 1993
Proper shipping name: Flammable liquids, n.o.s. (Toluene, Ethyl acetate)
Hazard Class: 3
Packaging group: II
Labels: Flammable Liquids
ERG Code: 128
Marine Pollutant: Yes

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

Section 15: Regulatory Information
EPCRA - Emergency Planning and Community Right-to-Know
CERCLA Reportable Quantity

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Component RQ (lbs)</th>
<th>Calculated product RQ (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>7440-22-4</td>
<td>1000</td>
<td>1666</td>
</tr>
<tr>
<td>Silver</td>
<td>7440-22-4</td>
<td>1</td>
<td>1 (D011)</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Reporting Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>7440-22-4</td>
<td>&gt;= 50% - &lt; 70%</td>
</tr>
<tr>
<td>Toluene</td>
<td>108-88-3</td>
<td>&gt;= 10% - &lt; 20%</td>
</tr>
<tr>
<td>Propan-2-ol</td>
<td>67-63-0</td>
<td>&gt;= 1% - &lt; 5%</td>
</tr>
</tbody>
</table>
Clean Air Act:
The 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 12 (40 CFR 61):

- Toluene 108-88-3  \(\geq 10\% - < 20\%\)

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 SOCMI Intermediate or Final VOC's (40 CFR 60.489):

- Toluene, 108-88-3, \(\geq 10\% - < 20\%\)
- Ethyl acetate, 141-78-6, \(\geq 5\% - < 10\%\)
- Ethanol, 64-17-5, \(\geq 5\% - < 10\%\)
- n-Butyl acetate, 123-86-4, \(\geq 1\% - < 5\%\)
- Propan-2-ol, 67-63-0, \(\geq 1\% - < 5\%\)

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, \(\geq 10\% - < 20\%\)
- n-Butyl acetate, 123-86-4, \(\geq 1\% - < 5\%\)

The following Hazardous Chemicals are listed under the U.S. Clean Water Act, Section 311, Table 117.3:

- Toluene, 108-88-3, \(\geq 10\% - < 20\%\)
- n-Butyl acetate, 123-86-4, \(\geq 1\% - < 5\%\)

This product contains the following toxic pollutants listed under the U.S. Clean Water Act Section 307

- Silver, 7440-22-4, \(\geq 50\% - < 70\%\)
- Toluene, 108-88-3, \(\geq 10\% - < 20\%\)

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

- Toluene, 108-88-3, \(\geq 10\% - < 20\%\)

State Regulations
Massachusetts Right To Know and Pennsylvania Right To Know:
Silver 7440-22-4, Toluene 108-88-3, Ethyl acetate 141-78-6, Ethanol 64-17-5, n-Butyl acetate 123-86-4

California Proposition 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.

California List of Hazardous Substances and California Permissible Exposure Limits for Chemical Contaminants:
Silver 7440-22-4, Toluene 108-88-3, Ethyl acetate 141-78-6, Ethanol 64-17-5, n-Butyl acetate 123-86-4
The ingredients of this product are reported in the following inventories:

**TSCA:** All substances listed as active on the TSCA inventor.

**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**

Label Information: Flammable

European Risk and Safety Phrases: ND

European symbols needed: ND

Canadian WHMIS Symbols: ND

**Abbreviations used in this document**

NE= Not established
NA= Not applicable
NIF= No Information Found
ND= No Data

**Disclaimer**

Ted Pella, Inc. makes no warranty of any kind regarding the information furnished herein. Users should independently determine the suitability and completeness of information from all sources. While this data is presented in good faith and believed to be accurate, it should be considered only as a supplement to other information gathered by the user. It is the User's responsibility to assure the proper use and disposal of these materials as well as the safety and health of all personnel who may work with or otherwise come in contact with these materials.

SDS Form 0013F1V4