TED PELLA, INC.
Microscopy Products for Science and Industry

Material Safety Data Sheet
Product No. 18510 Formalin 10% Buffered Solution
Issue Date (06-15-06)
Review Date (06-01-12)

Section 1: Product and Company Identification

Product Name: Formalin 10% Buffered Solution
Synonym: Buffered Formalin Solution, Buffer Formalin, Formaldehyde 4% Solution, 10% Formalin Solution (in Phosphate Buffer)
Company Name
Ted Pella, Inc., P.O. Box 492477, Redding, CA 96049-2477
Domestic Phone (800) 237-3526 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)
International Phone (01) (530) 243-2200 (Mon-Thu. 6:00AM to 4:30PM PST; Fri 6:00AM to 4:00PM PST)
Chemtrec Emergency Number 1-800-424-9300 24 hrs a day.

Section 2: Composition / Information on Ingredients

Principle Hazardous Component(s) (chemical and common name(s)) (Cas. No)	**%**	**OSHA PEL PPM**	**ACGIH TLV PPM**	**NTP**	**IARC**	**OSHA regulated**
Water (7732-18-5)	91.9-92	None	None	No	No	No
Formaldehyde (50-00-0)	4.0	0.75	0.3	Yes	Group 2A	Yes
Methyl alcohol (67-56-1)	1.0-2.0	200 ppm 260 mg/m^3	200 ppm 260 mg/m^3	No	No	No
Sodium phosphate dibasic(7558-79-4)	0.65	ND	ND	No	No	No
Sodium phosphate, Monobasic, Monohydrate (10049-21-5)	0.4	ND	ND	No	No	No

Section 3: Hazard Identification

Emergency overview
Appearance: Clear liquid.
Immediate effects: Appearance: clear. Danger! May cause allergic skin reaction. This substance has caused adverse reproductive and fetal effects in animals. May cause central nervous system depression. Causes eye and skin irritation. Causes digestive and

respiratory tract irritation. Contains formaldehyde. Respiratory sensitizer. Potential cancer hazard.
Target Organs: Central nervous system.

Potential health effects

Primary Routes of entry: Skin, inhalation, eyes, ingestion.
Signs and Symptoms of Overexposure: ND
Eyes: Causes eye irritation. Contact may cause ulceration of the conjunctiva and cornea.
Skin: Causes skin irritation. May cause skin sensitization, an allergic reaction, which becomes evident upon re-exposure to this material.
Ingestion: Causes gastrointestinal irritation with nausea, vomiting and diarrhea. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. May cause systemic toxicity including central nervous system depression, convulsions, coma, and possible death due to respiratory failure.
Inhalation: May cause asthmatic attacks due to allergic sensitization of the respiratory tract.
Chronic Exposure: Formaldehyde has been associated with nasal and nasopharyngeal cancers. Repeated exposure may cause skin discoloration and thickening and nail decay.
Chemical Listed As Carcinogen Or Potential Carcinogen: Formaldehyde (50-00-0).
See Toxicological Information (Section11)

Potential environmental effects

See Ecological Information (Section 12)

Section 4: First Aid Measures

If accidental overexposure is suspected

Eye(s) Contact: Flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately. Do NOT allow victim to rub or keep eyes closed.
Skin Contact: Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse. Destroy contaminated shoes.
Inhalation: Get medical aid immediately. Remove from exposure to fresh air immediately. If breathing is difficult, give oxygen. DO NOT use mouth- to-mouth respiration. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.
Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water.
Never give anything by mouth to an unconscious person. Get medical aid immediately.

Note to physician

Treatment: Treat symptomatically and supportively.
Medical Conditions generally Aggravated by Exposure: ND

Section 5: Fire Fighting Measures

Flash Point: NA
Flammable Limits: NA

Auto-ignition point: NA
Fire Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol resistant foam. For large fires, use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray. Cool containers with flooding quantities of water until well after fire is out.
Special Fire Fighting Procedures: As in any fire, wear a self-contained breathing apparatus in pres sure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire exposed containers cool. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Containers may explode when heated.
Unusual Fire and Explosion Hazards: Explosion Limits, Lower: 7%. Upper: NA
Hazardous combustion products: Carbon Monoxide, irritating and toxic gases, carbon dioxide, formaldehyde.
DOT Class: None

Section 6: Accidental Release Measures
Steps to be Taken in Case Material is Released or Spilled: Use proper personal protective equipment as indicated in Section 8. Spills / Leaks: Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Provide ventilation. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.
Waste Disposal Methods: Dispose of waste according to Federal, State and Local Regulations.

Section 7: Handling and Storage
Precautions to be Taken in Handling and Storage: Handling: Wash thoroughly after handling. Use only in a well-ventilated area. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Avoid contact with heat, sparks and flame. Do not ingest or inhale. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.
Storage temperature: Room temperature.
Storage Pressure: None

Section 8: Exposure Controls / Personal Protection
Engineering Controls
Ventilation required: Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Personal Protection Equipment
Respiratory protection: Use fume hood.
Protective gloves: Wear appropriate protective gloves to prevent skin exposure.

Skin protection: Wear appropriate protective clothing to prevent skin exposure.
Eye protection: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166
Additional clothing and/or equipment: Eye wash station or bath.

Exposure Guidelines

See Composition/Information on Ingredients (Section2)
OSHA Vacated PELs: Formaldehyde: 3 ppm TWA (unless specified in 1910.1048) Methyl alcohol: 200 ppm TWA; 260 mg/m3 TWA Sodium phosphate dibasic: No OSHA Vacated PELs are listed for this chemical. Water: No OS HA Vacated PELs are listed for this chemical. Sodium phosphate, Monobasic,
Monohydrate: No OSHA Vacated PELs are listed for this chemical.

Section 9 Physical and Chemical Properties

Appearance and Physical State: Clear liquid
Odor (threshold): Strong odor – pungent order
Specific Gravity (H_2O=1): 1.10
Vapor Pressure (mm Hg): ND
Vapor Density (air=1): 1.0
Percent Volatile by volume: ND

Evaporation Rate (butyl acetate=1): > 1.0
Boiling Point: 201-212 deg F
Freezing point / melting point: 32 deg F
pH: 6.9-7.1
Solubility in Water: Soluble in water.
Molecular Weight: NA

Section 10: Stability and Reactivity

Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Ignition sources, oxidizers.
Materials to Avoid (Incompatibility): Incompatibilities with Other Materials: T his solution will polymerize and separate below 0°C and above 67°C. Formaldehyde reacts with hydrochloric acid to for a potent carcinogen, bis-chloromethyl ether. It reacts explosively with nitrogen dioxide, nitromethane, perchloric acid, aniline or peroxyformic acid. Formaldehyde reacts violently when mixed with strong oxidizers.
Hazardous Decomposition Products: Carbon monoxide, irritating and toxic gases, carbon dioxide, formaldehyde.
Hazardous Polymerization: Has not been reported.

Section 11: Toxicological Information

Results of component toxicity test performed: RTECS #: CAS # 50-00-0: LP8925000, CAS # 67-56-1: PC1400000, CAS # 7558-79-4: WC4500000, CAS # 7732-18-5: ZC0110000, CAS # 10049-21-5 unlisted.

LD50/ LC50: CAS# 50-00-0: Inhalation, mouse: LC50 = 400 mg/m3/2H; Inhalation, rat: LC50 = 203 mg/m3; Oral, mouse: LD50 = 42 mg/kg; Oral, rat: LD50 = 100 mg/kg; S kin, rabbit: LD50 = 270 mg/kg; < BR.
LD50/ LC50: CAS# 67-56-1: Inhalation, rat: LC50 = 64000 ppm/4H; Oral, mouse: LD50 = 7300 mg/kg; Oral, rabbit: LD50 = 14200 mg/kg; Oral, rat: LD50 = 5628 mg/kg; S kin, rabbit: LD50 = 15800 mg/kg; < BR.
LD50/ LC50: CAS# 7558-79-4: Oral, rat: LD50 = 17 gm/kg; < BR.
LD50/ LC50: CAS# 7732-18-5: Oral, rat: LD50 = > 90 ml/kg; < BR.
LD50/ LC50: CAS# 10049-21-5: < BR.
Carcinogenicity:
CAS# 50-00-0: ACGIH: A2 - suspected human carcinogen. California: carcinogen; initial date 1/1/88.
NIOSH: occupational carcinogen. NTP: Suspect carcinogen. OSHA: Possible Select carcinogen. IARC: Group 2A carcinogen
CAS# 67-56-1: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
CAS# 7558-79-4: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
CAS# 7732-18-5: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
CAS# 10049-21-5: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA.
Human experience: Epidemiology: Formaldehyde has been shown to increase the incidence of lung cancer in workers. In another study, there was increase in mortality from lung cancer when workers were exposed to concentrations over 2 ppm of formaldehyde.
Teratogenicity: Formaldehyde effects on Newborn: behavioral, ihl- rat TCLo= 50 ug/m3/4H; biochemical/metabolic and reduced weight gain, ihl- rat TCLo= 12 ug/m3/24H. Embryo or Fetus: cytological changes, ihl- rat TCLo= 1mg/m3/24H; stunted fetus and death, ipr -mouse TDLo= 240 mg/kg.
Specific Developmental Abnormalities: craniofacial and musculoskeletal, ipr -mouse TDLo= 240 mg/kg.
Reproductive Effects: Formaldehyde effects on Fertility: male index, itt- rat TDLo= 400 mg/kg; postimplantation mortality, ims -mouse TDLo= 259 mg/kg. Paternal Effects: spermatogenesis, or l- rat TDLo= 200 mg/kg; testes/sperm duct/epididymis, ipr - rat TDLo= 80 mg/kg.
Neurotoxicity: No information available.
Mutagenicity: Formaldehyde DNA Damage: human fibroblast 100 umol/L DNA Inhibition: human cell types 210 umol/L; Unscheduled DNA Synthesis: rat cell types 50 umol/L; Gene Mutation in Mammalian.
Cells: human lymphocyte 130 umol/L.
Other Studies: See actual entry in RTECS for complete information.
This product **does** contain compounds listed by NTP or IARC or regulated by OSHA as a carcinogen.
Formaldehyde, 50-00-0

Section 12: Ecological Information
Ecological Information: Ecotoxicity: Atlantic salmon LC50= 173 uL/L/96H; Catfish (fresh water) T Lm= 32 ppm/24H; Flounder (salt water) T Lm= 100-330 ppm/48H; Fathead minnowLC50= 10-100 uL/L/96H; Rainbow trout LC50=

168mg/L/48H; Zebra fish LC50= 41mg/L/96H; Water flea LC50= 52 mg/L/24H. LC50 (96Hr.) rainbow trout = 0.12 ml/L; flow through bioassay; LC50 (96Hr.) fathead minnow = 24.1 mg/L; flow through conditions; LC50 (96Hr.) bluegill = 0.10 mg/L; Flow- through conditions; EC50 (96Hr.) water flea = 20 mg/L; EC50 (30 min) photobacterium phosphoreum = 3.00-10.2 mg/L; Microtox.
Environmental Fate: No information found.
Chemical Fate Information: No information found.

Section 13 Disposal Considerations
RCRA 40 CFR 261 Classification: Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.
Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P -Series: None listed.
RCRA U-Series: CAS# 50-00-0: waste number U122. CAS# 67-56-1: waste number U154; (Ignitable waste).
Federal, State and local laws governing disposal of materials can differ. Ensure proper disposal compliance with proper authorities before disposal.

Section 14: Transportation Information
US DOT Information: Proper shipping name: Not regulated
IATA: Proper shipping name: Not regulated
Limitations: Formaldehyde solutions from 10% to 24.9% are regulated by IATA as: UN3334, Aviation regulated, n.o.s.(10%-24.9% Formaldehyde solution). Office of Hazardous Materials Safety Regulations and Interpretations; Refer# 01-0271. Refer to IATA for specific operator regulations.

Section 15: Regulatory Information
United States Federal Regulations
MSDS complies with OSHA's Hazard Communication Rule 29, CFR 1910.1200.
SARA: Sect ion 302 (RQ): CAS# 50-00-0: final RQ = 100 pounds (45.4 kg) CAS# 67-56-1: final RQ = 5000 pounds (2270 kg) CAS# 7558-79-4: final RQ = 5000 pounds (2270 kg)
Sect ion 302 (TPQ): CAS# 50-00-0: TPQ = 500 pounds; RQ = 100 pounds (does not meet toxicity criteria but because of high production volume and recognized toxicity is considered a chemical of concern)
SARA Codes: CAS # 50-00-0: acute, chronic. CAS # 67-56-1: acute, flammable.
SARA Title III: This material contains Formaldehyde (CAS# 50-00-0, 4 0%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373. This material contains Methyl alcohol (CAS# 67-56-1, 1.0- 2.0%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.
Clean Air Act: CAS# 50-00-0 is listed as a hazardous air pollutant (HAP). CAS# 67-56-1 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depletors. This material does not contain any Class 2 Ozone depletors. Clean Water Act: CAS# 50-00-0 is listed as a Hazardous Substance under the CWA. CAS#

7558-79-4 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA
RCRA: RCRA P -Series: None listed. RCRA U-Series: CAS# 50-00-0: waste number U122. CAS# 67-56-1: waste number U154; (Ignitable waste).
TSCA: CAS# 50-00-0 is listed on the TSCA inventory. CAS# 67-56-1 is listed on the TSCA inventory. CAS# 7558-79-4 is listed on the TSCA inventory. CAS# 7732-18-5 is listed on the TSCA inventory. CAS# 10049-21-5 is not on the TSCA Inventory. It is a hydrate and exempt from TSCA Inventory requirements (40CFR720.3 (u) (2)).
Chemical Test Rules: None of the chemicals in this product are under a Chemical Test Rule.
Section 12b: None of the chemicals are listed under TSCA Section 12b.
TSCA Significant New Use Rule: None of the chemicals in this material have a SNUR under TSCA.
CERCLA: CAS# 50-00-0: final RQ = 100 pounds (45.4 kg) CAS# 67-56-1: final RQ = 5000 pounds (2270 kg)
CAS# 7558-79-4: final RQ = 5000 pounds (2270 kg)
OSHA: CAS# 50-00-0 is considered highly hazardous by OSHA.

State Regulations

California Proposition 65: T he following statement(s) is (are) made in order to comply with the California Safe Drinking
Water Act: WARNING: This product contains Formaldehyde, a chemical known to the state of California to cause cancer. California No Significant Risk Level: CAS# 50-00-0: no significant risk level = 40 ug/day.
CAS# 50-00-0 can be found on the following state right to know lists: California, New Jersey, Florida,
Pennsylvania, Minnesota, Massachusetts.
CAS# 67-56-1 can be found on the following state right to know lists: California, New Jersey, Florida,
Pennsylvania, Minnesota, Massachusetts.
CAS# 7558-79-4 can be found on the following state right to know lists: California, New Jersey,
Pennsylvania, Massachusetts.
CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.
CAS# 10049-21-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

International Regulations

Canada WHMIS:
CAS# 50-00-0 is listed on Canada's DSL/NDSL List.
CAS# 67-56-1 is listed on Canada's DSL/NDSL List.
CAS# 7558-79-4 is listed on Canada's DSL/NDSL List.
CAS# 7732-18-5 is listed on Canada's DSL/NDSL List.
T his product has a WHMIS classification of D1B, D2A.
CAS# 50-00-0 is not listed on Canada's Ingredient Disclosure List.
CAS# 67-56-1 is not listed on Canada's Ingredient Disclosure List.
CAS# 7558-79-4 is not listed on Canada's Ingredient Disclosure List.
CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.

CAS# 10049-21-5 is not listed on Canada's Ingredient Disclosure List.
European Labeling in Accor dance with EC Directives
Hazard Symbols: Not available.
Risk Phrases: ND
Safety Phrases: ND
WGK (Water Danger / Protect ion)
CAS# 50-00-0: 2
CAS# 67-56-1: 1
CAS# 7558-79-4: 1
CAS# 7732-18-5: No information available.
CAS# 10049-21-5: 1
Exposure Limits:
CAS# 50-00-0: OEL-ARAB Republic of Egypt: TWA 2 ppm (3 mg/m3) OEL-AUSTRALIA: TWA 1 ppm (1.5 mg/m3); STEL 2 ppm (3 mg/m3); CAR OEL-BELGIUM: TWA 1 ppm (1.2 mg/m3); STEL 2 ppm (2.5 mg/m3); CAR OEL-CZECHOSLOVAKIA: TWA 0.5 mg/m3; STEL 1 mg/m3; OEL-DENMARK: STEL 0.3 ppm (0.4 mg/m3); Carcinogen OEL-FINLAND: STEL 1 ppm (1.3 mg/m3); Skin OEL-FRANCE: STEL 2 ppm (3 mg/m3); OEL-GERMANY: TWA 0.5 ppm (0.6 mg/m3); Carcinogen OEL-HUNGARY: STEL 0.6 mg/m3; Carcinogen OEL- JAPAN: TWA 0.5 ppm (0.61 mg/m3); Carcinogen OEL-THE NETHERLANDS: TWA 1 ppm (1.5 mg/m3); STEL 2 ppm (3 mg/m3) OEL THE
PHILIPPINES: TWA 5 ppm (6 mg/m3) OEL-POLAND: TWA 2 mg/m3 OEL-RUSSIA: TWA 0.5 ppm; STEL 0.5 mg/m3; Skin OEL-SWEDEN: TWA 0.5 ppm (0.6 mg/m3); STEL 1 ppm (1. mg/m3) OEL-SWITZERLAND: TWA 0.5 ppm (0.6 mg/m3); STEL 1 ppm (1.2 mg/m3) OEL-THAI LAND: TWA 3 ppm; STEL 5 ppm OEL-TURKEY: TWA 5 ppm
(6 mg/m3) OEL-UNITED KINGDOM: TWA 2 ppm (2.5 mg/m3); STEL 2 ppm (2.5 mg/m3) OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGIH TLV CAS# 67-56-1: OEL-ARAB Republic of Egypt: TWA 200 ppm (260 mg/m3); Skin OEL-AUSTRALIA: TWA 200 ppm (260 mg/m3); STEL 250 ppm; Skin OEL-BELGIUM: TWA 200 ppm (262 mg/m3); STEL 250 ppm; Skin OEL-CZECHOSLOVAKIA: TWA 100 mg/m3; STEL 500 mg/m3 OEL-DENMARK: TWA 200 ppm (260 mg/m3); Skin OEL-FINLAND: TWA 200 ppm (260 mg/m3); STEL 250 ppm; Skin OEL- FRANCE: TWA 200 ppm (260 mg/m3); STEL 1000 ppm (1300 mg/m3) OEL-GERMANY: TWA 200 ppm (260 mg/m3); Skin OEL-HUNGARY: TWA 50 mg/m3;
STEL 100 mg/m3; Skin JAN9 OEL- JAPAN: TWA 200 ppm (260 mg/m3); Skin OEL-THE NETHERLANDS : TWA 200 ppm (260 mg/m3); Skin OEL-THE PHILIPPINES : TWA 200 ppm (260 mg/m3) OEL-POLAND: TWA 100 mg/m3 OEL-RUSSIA: TWA 200 ppm; STEL 5 mg/m3; Skin OEL-SWEDEN: TWA 200 ppm (250 mg/m3); STEL 250 ppm (350 mg/m3); Skin OEL-SWITZERLAND: TWA 200 ppm (260 mg/m3); STEL 400 ppm; Skin OEL-THAILAND: TWA 200 ppm (260 mg/m3) OEL-TURKEY: TWA 200 ppm (260 mg/m3) OEL-UNITED KINGDOM: TWA 200 ppm (260 mg/m3); STEL 250 ppm; Skin OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGIH TLV
Europe EINECS/ ELINCS Numbers:

Chemical name, (CAS#): EINECS/ELINCS
Formaldehyde, (50-00-8): 200-001-9
Methyl Alcohol, (67-56-1): 200-659-6
Sodium phosphate dibasic, (7558-79-4): 231-448-7
Water, (7732-18-5): 231-791-2

Section 16: Other Information
Label Information: ND
European Risk and Safety Phrases: ND
European symbols needed: ND
Canadian WHMIS Symbols: ND
NFPA Hazard Rating: Health: **2**; Flammability: **0**; Reactivity: **0**
(0=least, 1=Slight, 2=Moderate, 3=High, 4=Extreme)
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.