TED PELLA, INC.
Microscopy Products for Science and Industry

Material Safety Data Sheet
Product No. 18501 Paraformaldehyde, EM Grade, Prill Purified
Issue Date (06-15-06)
Review Date (06-01-12)

Section 1: Product and Company Identification

Product Name: Paraformaldehyde, EM Grade, Prill Purified
Synonym: Paraform, paraform polyoxymethylene, polyoxymethylene glycols
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 mg/m3	ACGIH TLV mg/m3	NTP	IARC	OSHA regulated
Formaldehyde (50-00-0)	*	15	10	Yes	2A	Yes
Paraformaldehyde (30525-89-4)	95 – 97	NE	NE	ND	ND	ND
Water (7732-18-5)	5	NE	NE	No	No	No

* Paraformaldehyde will give off-gas formaldehyde
Immediately Dangerous to Life or Health (IDLH) level: Formaldehyde = 20 ppm

Section 3: Hazard Identification

Emergency overview
Appearance: White, free-flowing solid
Immediate effects: CAUTION! Combustible-Dust from this product can form an explosive organic dust cloud.
Potential health effects**
Primary Routes of entry: Skin, eyes, inhalation, ingestion
Signs and Symptoms of Overexposure: ND
Eyes: Can cause irreversible chemical burns.
Skin: Can cause severe injury, reddening and swelling. Sensitizer (allergic reaction possible). Dust can cause drying, cracking and scaling. May cause severe irritation.
Ingestion: Causes severe irritation and inflammation of mouth, throat and stomach. Severe stomach pains follow with possible loss of consciousness.

Inhalation: Highly irritating to nasal passages. Can cause inflammation of lining of nose, throat and lungs. Can cause pneumonia and pulmonary edema (accumulation of fluid in the lungs). Signs and symptoms of pulmonary edema can be delayed for several hours. May cause sensitization of the respiratory system (allergic reaction possible).
Chronic Exposure: Exposure to high vapor concentrations, or to dust, causes irritation and tearing in the eyes. Repeated or prolonged contact causes hardening (tanning) on the skin.
Chemical Listed As Carcinogen Or Potential Carcinogen: Formaldehyde (50-00-0)
See Toxicological Information (Section11)

Potential environmental effects

See Ecological Information (Section 12)
** Information is for Paraformaldehyde unless otherwise noted.

Section 4: First Aid Measures

If accidental overexposure is suspected

Eye(s) Contact: Flush eyes with water for at least 15 minutes. Call a physician.
Skin Contact: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before re-use. Destroy contaminated shoes.
Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.
Ingestion: If large quantities of this material are swallowed, call a physician immediately. Do not induce vomiting unless directed to do so by a physician. Never give anything by mouth to an unconscious person. Get medical attention.

Note to physician

Treatment: Observe for latent pulmonary edema.
Medical Conditions generally Aggravated by Exposure: Significant exposure to this chemical may adversely affect people with chronic disease of the respiratory system, skin and/or eyes.

Section 5: Fire Fighting Measures

Flash Point: 180 °F (82 °C)
Flammable Limits: (At atmospheric pressure): Formaldehyde: LEL = 7% UFL = 73 %. Methanol (@ 25 °C): LEL = 5.5 % UFL = 36.5%.
Auto-ignition point: (At atmospheric pressure): Formaldehyde: 572 °F (300 °C). Methanol: 725 °F (385 °C)
Fire Extinguishing Media: Large fires: alcohol type aqueous film forming foam. Small fires: Use CO2 or dry chemical.
Special Fire Fighting Procedures: If potential for exposure to vapors or products of combustion exists, wear full fire fighting turnout gear and NIOSH approved self-contained breathing apparatus. Water spray should be used to cool fire-exposed structures and vessels. Water spray can be used to reduce the intensity of flames and to dilute spills to a nonflammable mixture. Keep personal removed from and upwind of fire. Thoroughly decontaminate bunker gear and other fire-fighting equipment before re-use. Contaminated leather goods should be discarded.

Unusual Fire and Explosion Hazards: Oxidizing chemicals may accelerate the burning rate in a fire situation.
Hazardous combustion products: Formaldehyde: Carbon monoxide. Formaldehyde vapor: CO, CO2.
DOT Class: 4.1, Flammable Solid

Section 6: Accidental Release Measures
Steps to be Taken in Case Material is Released or Spilled: Stay upwind and keep out of low areas. Contain spill with dikes of soil or nonflammable absorbent to minimize contaminated area. Avoid run-off into storm sewers and ditches leading to water ways. If required, notify state and local authorities. Place leaking containers in well-ventilated area. Clean up spills by sweeping.
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: Flexible intermediate bulk containers can build static electrical charge while contents are being emptied or filled. Do not allow contents to free fall in areas where potential flammable air-vapor or air-dust mixtures exist. Use proper grounding procedures when transferring. Keep containers closed when not in use. Avoid breathing dust and vapor. Avoid generation of excess dust. Avoid contact with eyes, skin or clothing. Decontaminate soiled clothing thoroughly before re-use. Destroy contaminated leather clothing. Use precautions against formaldehyde vapor when opening containers or entering a poorly ventilated storage area. Dust from this material can form an explosive organic dust cloud. If compressed air is used to transfer this material, special safety design considerations and procedures must be utilized to prevent potential fires and explosions. Avoid allowing particles to free fall. . Electrical equipment and circuits in all storage and handling areas must conform to requirements of National Electrical Code (articles 500 and 501) for hazardous location. Keep all containers tightly closed when not in use. Store out of direct sunlight and on an impermeable floor.
Storage temperature: ND
Storage Pressure: ND

Section 8: Exposure Controls / Personal Protection
Engineering Controls
Ventilation required: General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred.
Personal Protection Equipment
Respiratory protection: Based on workplace contaminate level and working limits of the respirator, use a respirator approved by NIOSH/MSHA. For formaldehyde concentrations >= 1 and <= 10 times the occupational exposure level: Use air-purifying respirator with full face piece and HEPA particulate filters with either cartridge(s) or canister specifically approved for protection against formaldehyde, or a full face piece powered air-purifying respirator fitted with HEPA particulate filters and with either cartridge (s) or canister specifically approved for protection against formaldehyde. For formaldehyde

concentrations >10 and < 100 times the occupational exposure level: Use Type C full face piece supplied-air pressure-demand or continuous-flow respirator. For formaldehyde concentrations >= 100 times the occupational exposure level or unknown concentration (such as in emergencies): Use positive-pressure self-contained breathing apparatus with full face piece. Type C positive-pressure full face piece supplied-air respirator with an auxiliary positive-pressure self-contained breathing apparatus escape system.
Protective gloves: Wear impervious gloves according to the manufacturer's recommendation or use butyl rubber.
Skin protection: Wear impervious clothing.
Eye protection: Wear chemical goggles.
Additional clothing and/or equipment: Eye wash station.

Exposure Guidelines

See Composition/Information on Ingredients (Section2)

Section 9 Physical and Chemical Properties

Appearance and Physical State: White free-flowing solid prill.
Odor (threshold): Strong, pungent formaldehyde odor
Specific Gravity (H_2O=1): 0.81 – 0.84 gm/cm3 @ 20 °c (68 °F)
Vapor Pressure (mm Hg): 5.0 mm HgA
Vapor Density (air=1): (Calculated values): Formaldehyde = 1.04 Water = 0.62 Methanol = 1.11.
Percent Volatile by volume: ND

Evaporation Rate (butyl acetate=1): ND
Boiling Point: Does not boil. Gives off formaldehyde gas when heated.
Freezing point / melting point: 120 – 170 °C (248 – 338 °F)
pH: 6.9 (1% solution in water @ 25 °C)
Solubility in Water: Slowly in cold water @ 20 °C
Molecular Weight: Formaldehyde = 38. Water = 18. Methanol = 32.

Section 10: Stability and Reactivity

Stability: Stable
Conditions to Avoid: Temperatures above 100 °F (38 °C), sparks, flame.
Materials to Avoid (Incompatibility): Caustic soda, lime and other strong alkalis; sodium, potassium and other alkali metals, hydrochloric, sulfuric and other strong inorganic acids, nitrogen oxides, amines and oxidizing agents such as peroxides, nitric acid, perchloric acid, chromium trioxide, phenols or urea.
Hazardous Decomposition Products: Formaldehyde: Carbon monoxide. Formaldehyde vapor: CO, CO2.
Hazardous Polymerization: Will not occur.

Section 11: Toxicological Information

Results of component toxicity test performed: Acute Exposure: (Oral, Rat): LD50 = 680mg/kg; slightly toxic to animals. (Inhalation, Rat): LC50: 1070mg/m3 (4 hrs., dust); slightly toxic to animals. Skin: Severely irritating with necrosis to rabbit skin with a 24 hr. exposure period; slightly toxic to animals (LD50, Rabbits: >2000mg/kg). Eye:

Severely irritating with ulceration/necrosis in rabbit eyes. Repeated Exposure: An inhalation exposure study was conducted in rats (6hrs. /day; 5 days/week; 2 weeks) with paraformaldehyde as a respirable dust at concentrations of 23, 55 or 150 mg/m3. Formaldehyde was also present at concentrations of 3.5, 4.7 and 18 mg/m3, respectively. Exposure was stopped during the first week for the middle and high dose groups due to high mortality. Inflammation of upper respiratory tract tissue was noted in these groups. No treatment-related effects were observed at the low dose. A 6-week oral exposure study was conducted in rats with paraformaldehyde in drinking water at concentrations equivalent to 5, 25 or 125mg/kg/day. Other than decreases in growth and food & water intake in the high dose, no significant effects were noted. Mutagenicity: Positive in the in vitro mouse lymphoma forward gene mutation system. Produced sister chromatid exchanges, but not chromosomal aberrations in the mouse lymphoma in vitro system. No in vivo information. Paraformaldehyde breaks down in water to product formaldehyde. Acute Exposure (Formaldehyde): (Oral, Rats): LD50 = 800mg/kg; slightly toxic to animals. (Inhalation, Rats) LC50 = 474ppm (4 hrs.); moderately toxic to animals. Skin: Severely irritating/corrosive to rabbit skin depending on exposure duration and concentration; moderately toxic to animals (LD50, Rabbits: 270mg/kg); causes skin sensitization in humans and guinea pigs. Eye: Severely irritating to rabbit eyes. Repeated Exposure: Inhalation exposure (6hrs. /day; 5 days/week; 13 weeks) of rats resulted in nasal tissue irritation at 10 or 20ppm, but not at 2ppm. Monkeys exposed for 26 weeks (22hrs. /day; 7 days/week had nasal irritation at 3ppm but not at 1ppm. Oral exposure of rats to formaldehyde in the drinking water at a dose equivalent to 82-109 mg/kg/day over a lifetime resulted in stomach tissue irritation while a dose of 15-21 mg/kg/day was without effect.

Mutagenicity: Genotoxic potential was noted in a variety of in vitro systems. Results in vivo have been mixed probably due to the presence of metabolic processes for detoxifying formaldehyde. Carcinogenicity: Oral-Formaldehyde was not carcinogenic in a well-conducted lifetime drinking water study in rats at concentrations equivalent to 82-109 mg/kg/day. Dermal-Topical application on mice has not indicated carcinogenic potential. Inhalation-Rats and mice were exposed to 2.0, to 5.6 or 14.3ppm formaldehyde for 6hrs. /day, 5 days/week for 24 months. In rats no treatment-related tumors were seen at 2ppm while at 5.6ppm 1% had nasal tumors and at 14.3ppm.

Reproductive/Developmental Effects: In a developmental toxicity study with mice dosed orally by average at 74, 148 or 185 mg/kg/day, no fetotoxic or teratogenic effects were seen. In a developmental toxicity study with rats exposed via inhalation to 2, 5 or 10ppm formaldehyde, treat-related developmental effects were not observed. In a reproduction study, dogs received the equivalent of 9.4 mg/kg/day of formaldehyde in feed during days 4-56 after mating without adverse reproductive effects.

Human experience: Causes skin sensitization in humans

This product **does** contain compounds listed by NTP or IARC or regulated by OSHA as a carcinogen.

Section 12: Ecological Information

Ecological Information: Aquatic toxicity studies with paraformaldehyde in fish indicate slight acute toxicity: (Rainbow trout) 96-hr. LC50 = 60ppm; (Catfish) 24-hr.TLm = 32ppm; (Flounder) 48-hr. TLm = 100-300ppm. Paraformaldehyde breaks down in water

to formaldehyde. Ecological information on formaldehyde is listed next. Formaldehyde exhibits slight acute toxicity to various fish species. The 24-, 48-and 96-hr. LC50 values (bluegill sunfish, trout, bass, salmon, catfish, carp, golden orfe) are in the range 10-1000ppm. Algae and some invertebrates appear more susceptible; e.g., acute toxicity occurs in green algae at 0.3-0.5ppm and in the water flea (daphnids) at 2-52ppm (24/48-hr. EC50). Formaldehyde has bactericidal properties at low levels. (EC50, E. coli=1ppm). Chemical Fate Information: Formaldehyde: The short atmospheric half-life, the low n-octanol/water partition coefficient and the ability of animals & microorganisms to rapidly biodegrade formaldehyde are expected to lead to its ready removal if released into the environment. Degradation: Formaldehyde in aqueous effluent is degraded by activated sludge and sewage in 48-72 hrs. In a die-away test with lake water, degradation was complete in 30 hrs under aerobic conditions and 48 hrs under anaerobic conditions. Atmospheric photochemical degradation is rapid with estimated half-lives of 19hrs or less. Bioaccumulation: The log n-octanol/water partition coefficient is 0.35. This suggests that formaldehyde has relatively low potential to bioaccumulate.

Section 13 Disposal Considerations

RCRA 40 CFR 261 Classification: U122. This information applies to the material as manufactured; processing, use, or contamination may make this information inappropriate, inaccurate, or incomplete. This handling and disposal information may also apply to empty containers, liners and rinsate.
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: Paraformaldehyde
Hazard Class: 4.1
Packaging group: III
UN Number: UN2213
IATA: Proper shipping name: Paraformaldehyde
Hazard Class: 4.1
Packing group: III
UN Number: UN2213
IMO: Proper shipping name: Paraformaldehyde
Class: 4.1
UN Number: UN2133
Packing group: III
EMS: 133
MFAG: BD
Marine Pollutant: Not listed
Canadian TDG: Proper shipping name: Paraformaldehyde
IMDG Page: ND
Limitations: ND

Section 15: Regulatory Information
United States Federal Regulations

MSDS complies with OSHA's Hazard Communication Rule 29, CFR 1910.1200.
SARA: Section 302/304: Formaldehyde (50-00-0)
SARA Title III: Section 311: Acute: Yes. Chronic: Yes. Fire: No. Sudden release of pressure: No. Reactive: No
RCRA: Classified in U-series.
TSCA: TSCA 12b export notification is not required.
CERCLA: RQ = 1000lbs (454 kg).

State Regulations

California Proposition 65: Formaldehyde (50-00-0) is known by the state of California to cause cancer.
The following chemicals associated with the product are subject to the right-to-know regulations in these states: Formaldehyde (50-00-0): CA, CT, FL, IL, LA, MA, MI, NJ, NY, PA, RI. Paraformaldehyde (30525-89-4): CT, FL, IL, LA, MA, NJ, NY, PA, RI.

International Regulations

Canada WHMIS: This product has been classified in accordance with the hazard criteria of the CPR and MSDS contains all the information required by the CPR. Classification: Class B, Division 4; Class D, Division 1, Subdivision B.
Europe EINECS Numbers: Formaldehyde (50-00-0): EINECS#: 200-001-8.

Section 16: Other Information

Label Information: Harmful
European Risk and Safety Phrases: 20/22-37/38-40-41-43. Risk Phrases: Harmful by inhalation and if swallowed. Irritating to respiratory system and skin. Limited evidence of a carcinogenic effect. Risk of serious damage to eyes. May cause sensitization by skin contact. S: 26-36/37/39-45. Safety Phrases: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
European symbols needed: Xn
Canadian WHMIS Symbols: ND
Hazard Rating: Health: **3**; Fire: **1**; Reactivity: **2**
(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

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