

MATERIAL SAFETY DATA SHEET

 **FORMALDEHYDE
SOLUTION**

Manufacturer/Supplier Information
MSDS prepared by PERK Scientific for
Exclusive distribution by:
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1. SUBSTANCE IDENTIFICATION

SUBSTANCE: **FORMALDEHYDE 36.5% SOLUTION**

CATALOG NUMBERS: BDH0500-20L, BDH0500-4LP, BDH0500-1LP

TRADE NAMES/SYNONYMS: Formalin; Formol; Formaldehyde (37% Solution); Formaldehyde Solution; Formalith; Formic Aldehyde Solution; Formalin, stabilized; Formaldehyde

CHEMICAL FAMILY: Aldehyde, Aliphatic

MIXTURE, AQUEOUS

MOLECULAR FORMULA: HCHO

MOLECULAR WEIGHT: 30.03

2. COMPOSITION AND INGREDIENTS INFORMATION

Formaldehyde	CAS# 50-00-0	36% - 36.9%
Methanol	CAS# 67-56-1	10% - 15%
Water	CAS# 7732-18-5	48% - 53%
Buffers	NA	NA

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4):	Health=3	Fire=2	Reactivity=0
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Danger: Poisonous
 Vapor harmful
 May be fatal or cause blindness if swallowed
 Cannot be made nonpoisonous
 Combustible liquid

Warning: Irritant

Formaldehyde solution is a watery liquid, colorless, with a strong pungent irritating odor. It is combustible as a 37% solution. It is toxic by ingestion due to the methanol stabilizer. Formaldehyde is a known human carcinogen (IARC & NTP). Toxic by inhalation, toxic if swallowed, may be fatal if swallowed, causes eye burns, may cause blindness, strong sensitizer, causes irritation to skin, eyes and respiratory tract. Repeated or prolonged exposure increases the cancer risk.

Primary routes of Exposure: Inhalation, ingestion, skin and eye contact.

Acute Effects: Ingestion may cause burning of the mouth, throat and stomach. Degenerative changes of the liver, heart, brain, and damage of the spleen, pancreas, central nervous system and kidneys. Death can occur in hours or days. Acute effects of methanol can cause blindness and central nervous system deprivation. Acute effects due to inhalation and skin and eye contact range from irritation of eyes, skin, and mucous membranes to burning, difficulty breathing, respiratory tract injury, discoloration of skin, roughness and first degree burns. Aggravated sensitization response (extreme difficulty breathing, extreme rash and irritation is also noted.)

Chronic Effects: Repeated ingestion of small quantities may cause gastrointestinal irritation, visual impairment, blindness and other systemic effects. Repeated exposure increases the cancer risk, and can also lead to conjunctivitis, dermatitis, metabolic acidosis, second-degree burns, numbness, a persistent itching rash, headaches, stomachaches, serious respiratory impairment, kidney injury, and pulmonary sensitization. Neuropsychological effects may include sleep disorders, irritability, altered sense of balance, memory deficits, loss of concentration and mood alterations. Menstrual disorders and secondary sterility have occurred in women.

Potential Health Effects:

- Inhalation is highly toxic sensitizer, may cause difficulty in breathing, a burning sensation in the nose and throat, and coughing. Very high concentrations may be fatal.
- Eye contact may cause severe eye burns.
- Skin contact may cause irritation, rash or burning sensation.
- Ingestion causes burning of the mouth, throats and stomach. May cause vomiting and diarrhea, unconsciousness and even death.

4. FIRST-AID PROCEDURES

Inhalation: Remove from exposure area immediately. If breathing has stopped, give artificial respiration, if breathing is difficult, give oxygen. Get medical attention immediately.

Eye contact: Flush eyes immediately with large amounts of water, occasionally lifting upper and lower lids for at least 30 minutes. Get medical attention immediately.

Skin contact: Quickly removes contaminated clothing. Immediately wash area with large amounts of water. Get medical attention immediately.

Ingestion: If swallowed, induce vomiting by giving two glasses of water or milk and sticking fingers down throat. Never give anything by mouth to an unconscious person. Call a physician immediately. **ANTIDOTE:** (Ingestion) Unless unconscious or convulsing, give large amounts of water or milk to induce vomiting. **NOTE TO PHYSICIAN:** When plasma methanol concentrations exceed 20 mg/dl and when there is evidence of acidosis or visual abnormalities, a 10% solution of ethanol in 5% dextrose administered intravenously is a safe, effective antidote.

5. FIRE FIGHTING PROCEDURES

FIRE AND EXPLOSION HAZARD:

MODERATE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL A CONSIDERABLE DISTANCE TO A SOURCE OF IGNITION AND FLASH BACK.

VAPOR-AIR MIXTURES ARE EXPLOSIVE. TOXIC VAPORS ARE GENERATED DURING DECOMPOSITION IN FIRE (FORMIC ACID).

FLASH POINT: 140°F (60°C) (CC)
LOWER EXPLOSIVE LIMIT: 7%
AUTOIGNITION TEMP: 806°F

UPPER EXPLOSIVE LIMIT: 73%
FLAMMABILITY CLASS (OSHA): CLASS IIIA

FIRE FIGHTING MEDIA: Dry chemical, carbon dioxide, water spray or regular foam (1993 Emergency Response Guidebook, Dot P 5800.5). For larger fires, use water spray, fog or regular foam (1993 Emergency Response Guidebook, Dot P 5800.5).

FIRE RESPONSE PROCEDURES: Move container from fire area if you can do it without risk. Apply cooling water to sides of containers that are exposed to flames until well after fire is out. Extinguish only if flow can be stopped. Use flooding amounts of water as a fog, solid streams may be ineffective. Cool containers with flooding amounts of water, apply from as far a distance as possible. Avoid breathing vapors, keep upwind. Fire fighters should wear full protective clothing and NIOSH approved self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode. Water spray can be used to extinguish fires and cool fire-exposed containers. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Vapors are explosive and extremely toxic. Formaldehyde decomposes in heat of fire releasing toxic formic acid.

6. ACCIDENTAL RELEASE PROCEDURES

SMALL SPILL: Shut off ignition sources. Do not touch spilled material. Stop leak if you can do it without risk. Don respirator. Ventilate the area of spill or leak. Use water spray to reduce vapors. For small spills, take up with sand or other absorbent material and place into sealed containers for disposal.

LARGE SPILLS: Restrict persons not wearing protective equipment from area of spill or leak until clean up is complete. Remove all ignition sources. Take up spills with sand or other absorbent material and place into sealed containers for disposal. Ventilate area of spill or leak after clean up is complete. For a very large spill, call fire department immediately.

REPORTABLE QUANTITY: (RQ) 1000 LBS (Formaldehyde)

The Superfund Amendments and Reauthorization Act (SARA) Section 304 requires that a release equal to or greater than the reportable quantity for this substance be immediately reported to the local emergency planning committee and the state emergency response commission (40 CFR 355.40). If the release of this substance is reportable under CERCLA Section 103 (which formaldehyde is), then the national response center must also be notified immediately at 800-424-8882 or 202-426-2675 in the metropolitan Washington, D.C. area (40 CFR 302.6).

7. HANDLING AND STORAGE

General handling: Do not get in eyes. Avoid contact with skin and clothing. Avoid breathing mist or vapor. For one gallon containers, keep containers tightly closed and in an upright position to prevent leakage. For five-gallon container, after installation, do not remove spigot. Store with spigot in down position. Keep away from heat, sparks and flame. Use only with adequate ventilation. Wash thoroughly after handling. Avoid contact with eyes. Avoid prolonged or repeated breathing of vapor. Avoid prolonged or repeated contact with skin.

Observe all federal, state and local regulations when storing or disposing of this substance. For assistance, contact the district director of the Environmental Protection Agency.

STORE IN ACCORDANCE WITH 29 CFR 1910.106.

Formaldehyde 37% is a class II combustible liquid. Store in accordance with pile heights in the NFPA manual or BOCA codes.

STORE AWAY FROM INCOMPATIBLE SUBSTANCES

Store in a well-ventilated place, away from sources of ignition and direct sunlight. Store at 59°F to 86°F (15°C to 30°C). AVOID CONTACT WITH HEAT, SPARKS, FLAMES, OR OTHER SOURCES OF IGNITION. VAPORS MAY BE EXPLOSIVE. AVOID OVERHEATING OF CONTAINERS; CONTAINERS MAY VIOLENTLY RUPTURE IN HEAT OF FIRE. AVOID CONTAMINATION OF WATER SOURCES.

8. EXPOSURE CONTROL (PERSONAL PROTECTIVE EQUIPMENT)

VENTILATION: Provide local exhausts or process enclosure ventilation to meet the published exposure limits. Ventilation equipment must be explosion-proof and should meet the requirements in 29 CFR 1910.1048 (f).

RESPIRATOR: The following respirators are the minimum legal requirements as set forth by the Occupational Safety and Health Administration found in 29 CFR 1910, Subpart z.

UP TO 10 ppm- Full facepiece with cartridges or canisters specifically approved for protection against formaldehyde. A half-mask respirator with cartridges specifically approved for protection against formaldehyde can be substituted for the full facepiece respirator providing that effective gas-proof goggles are provided and used in combination with the half-mask respirator.

UP TO 100 ppm- Full-face mask, chest or back mounted type, with industrial size canister specifically approved for protection against formaldehyde. Type C supplied air respirator, demand type, with full-face piece, hood, or helmet.

ABOVE 100 ppm OR UNKNOWN-

EMERGENCIES- Self-contained breathing apparatus with positive pressure full facepiece. Combination supplied-air full facepiece positive pressure respirator with auxiliary self-contained air supply.

FIRE FIGHTING- Self-contained breathing apparatus with positive pressure in full facepiece.

ESCAPE- Self-contained breathing apparatus in demand or pressure demand mode.

Full-face mask, front or back mounted type with industrial size canister specifically approved for protection against formaldehyde.

The following respirators and maximum use concentrations are recommendations by the U.S. Department of Health and Human Services, NIOSH Pocket Guide to Chemical Hazards, or NIOSH criteria documents.

The specific respirator selected must be based on contamination levels found in the work place, must not exceed the working limits of the respirator and be jointly approved by the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH-MSHA).

AT ANY DETECTABLE CONCENTRATION:

Any self-contained breathing apparatus that has a full face piece and is operated in a pressure- demand or other positive-pressure mode.

Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

FORMALDEHYDE: Protective clothing should meet the requirements for personal protective equipment in 29 CFR 1910.1048(H).

CLOTHING: Employee must wear appropriate protective (impervious) clothing and equipment to prevent any possibility of skin contact with this substance.

GLOVES: Employee must wear appropriate protective gloves to prevent contact with this substance.

EYE PROTECTION: Employee must wear splash-proof or dust-resistant safety goggles and a faceshield to prevent contact with this substance.

EMERGENCY WASH FACILITIES: Where there is any possibility that an employee's eyes and/or skin may be exposed to this substance, the employer should provide an eye wash fountain and quick drench shower within the immediate work area for emergency use.

EXPOSURE LIMITS:

FORMALDEHYDE:

- 0.75 ppm OSHA TWA
- 2 ppm OSHA 15 minute STEL
- 0.75 ppm ACGIH TWA
- 2 ppm ACGIH STEL (Notice of Intended Changes 1989-1990) ACGIH A2-suspected human carcinogen.
- 0.016 ppm NIOSH recommended TWA
- 0.1 ppm NIOSH recommended 15 min. ceiling
- 0.5 ppm (0.6 mg/m³) DFG MAK TWA;
- 1 ppm (1.2 mg/m³) DFG MAK 5 minute peak, momentary value, 8 times/shift

Measurement method: Particulate filter/impinger (2); visible spectrophotometry; (NIOSH Vol. III #3500).
Also: XAD-2(R) tube; toluene; gas chromatography with flame ionization detection; (NIOSH Vol. III #2541).

METHYL ALCOHOL (METHANOL):

- 200 ppm (260 mg/m³) OSHA TWA (SKIN); 250 ppm (328 mg/m³) OSHA STEL
- 200 ppm (260 mg/m³) ACGIH TWA (SKIN); 250 ppm (328 mg/m³) ACGIH STEL
- 200 ppm (260 mg/m³) NIOSH recommended TWA (SKIN);
- 250 ppm (325 mg/m³) NIOSH recommended STEL
- 200 ppm (262 mg/m³) DFG MAK TWA (SKIN);
- 400 ppm (524 mg/m³) DFG MAK 30 minute peak average value, 4 times/shift

Measurement method: Silica gel tube; water; gas chromatography with flame ionization detection (NIOSH VOL. III #2000, Methanol).

9. PHYSICAL AND CHEMICAL PROPERTIES

DESCRIPTION: Colorless liquid with a pungent odor.
VAPOR DENSITY: 1.01
M.W.: 30.03
FLASH POINT: 60°C (140°F) (CC)
SPECIFIC GRAVITY: 1.0749-1.2020
VAPOR PRESSURE: 67-68 mmHg @ 20°C

BOILING POINT: 205°F- 214°F (96°C -101°C)
pH: 2.8-4.0
BOILING POINT: 96°C
VOLATILITY: 100%
SOLUBILITY IN WATER: Complete

10. STABILITY AND REACTIVITY INFORMATION

REACTIVITY: Formaldehyde solutions are stable in closed containers under normal temperatures and pressures; may oxidize slowly on exposure to air.

FORMALDEHYDE INCOMPATIBILITIES: Strong Bases, metals and metal oxides.

May react violently with perchloric acid + aniline; performic acid; nitromethane; magnesium carbonate; H₂O₂. May form explosive reaction with NO_x, furfuryl alcohol, Ti(NO₃)₃ • H₂O, P₂O₅.

METHYL ALCOHOL (METHANOL) INCOMPATIBILITIES:

Explosive in the form of vapor when exposed to heat or flame. Explosive reaction with chloroform + sodium methoxide; diethyl zinc. Violent reaction with alkyl aluminum salts; acetyl bromide; chloroform + sodium hydroxide; CrO₃; cyanuric chloride; (I + ethanol + HgO); Pb(ClO₄)₂; HClO₄; P₂O₃; (KOH + CHCl₃); nitric acid. Incompatible with beryllium dihydride; metals (e.g., potassium; magnesium); oxidants (e.g. barium perchlorate; bromine; sodium hypochlorate; chlorine; hydrogen peroxide); potassium tert-butoxide; carbon tetrachloride + metals (e.g., aluminum; magnesium; zinc); dichloromethane. Can react vigorously with oxidizing materials.

DECOMPOSITION: When heated to decomposition formaldehyde emits acrid smoke and fumes.

POLYMERIZATION: May undergo a non-hazardous self-polymerization to form para-formaldehyde, which precipitates out of solution. Will polymerize with active organic materials such as phenol with sudden pressure development.

11. TOXICOLOGICAL INFORMATION

100% FORMALDEHYDE: skn-hmn 150µg/3D-I MLD
 eye-hmn 4ppm/5M
 eye-hmn 1ppm/6M nse MLD
 inh-hmn TClO: 17mg/m³/30M,EYE,PUL
 orl-wmn LDLo: 108mg/kg
 orl-rat LD50:800 mg/kg

100% METHYL ALCOHOL (METHANOL): skn-rbt 500mg/24H MOD
 eye-rbt 40mg MOD
 orl-rat LD50:5627mg/kg
 inh-rat LC50:64000ppm/4H
 orl-man TDLo:3429mg/kg: EYE
 orl-hmn LDLo:428mg/kg: EYE,PUL
 orl-hmn LDLo:4g/kg: EYE, PUL, GIT

CARCINOGEN STATUS: OSHA carcinogen; anticipated human carcinogen (NTP); human limited evidence, animal sufficient evidence (IARC group-2A). Epidemiological studies and case reports indicate an excess occurrence of a number of cancers, but evidence for involvement of formaldehyde is strongest for nasal and nasopharyngeal cancer. A significant incidence of squamous cell carcinoma of the nasal cavity was induced in rats exposed to formaldehyde gas.

12. ECOLOGICAL INFORMATION

Formaldehyde has high acute toxicity to aquatic life. Insufficient data are available to evaluate or predict the short-term effects of formaldehyde to plants, birds, or land animals.

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure to a toxic chemical. (AQUIRE Database, ERL-Duluth, U.S. EPA.,Phytotox).

13. DISPOSAL GUIDELINES

Any waste containing formaldehyde must be disposed of in accordance with applicable local, state, and Federal law and in a manner that minimizes exposure of employees at the site and of the clean-up crew. (29 CFR 1910.1048)

RCRA: The unused product is a RCRA hazardous waste if discarded. The RCRA ID number is: D001 for flammability. If the waste is a spent solvent, the appropriate spent solvent code should be used.

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262

OTHER DISPOSAL CONSIDERATIONS: The waste material should be treated and/or disposed of at site authorized to handle hazardous chemical waste. Appropriate Federal, State and Local Regulatory Authorities should be contacted before discharge, treatment or disposal of waste material. The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

Proper shipping name: FORMALDEHYDE SOLUTIONS

Hazard class or Division: 3

Identification Numbers: UN1198

Packing Group: III

Label(s) required (if not excepted): Flammable Liquid, Corrosive. Exception 1 gallon or less (LTD. QTY.)

Packaging authorizations: Exceptions: 173.150; for small quantities of flammable liquids

Non-bulk packaging: 173.203: for liquid hazardous material in packing group II

Bulk-packaging: 173.242: for liquid hazardous material

Quantity Limitations: Passenger aircraft or railcar: 60 L Cargo aircraft only: 220 L

15. REGULATORY INFORMATION

SARA TITLE III (Superfund Amendment and Reauthorization Act)

SECTION 302 AND 304: Extremely Hazardous Substance List (40 CFR 355)- Listed

SECTION 311: Hazard Categorization (40 CFR 370)- Acute, Chronic, and Fire

SECTION 313: Toxic Chemicals Listing (40 CFR 372.65)- Listed as a toxic chemical

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act)

SECTION 102(A) Hazardous Substances (40 CFR 302.4)- Listed

Reportable Quantity - 1,000 lbs

SECTION 101(14) Reportable Quantity: 1,000 lbs

RCRA (Resource Conservation and Recovery Act.)

40 CFR 261.33 Hazardous Waste Number: U122

NJ-RTK (New Jersey- State Right To Know)

Environmental Hazardous Substance List: Listed, Substance # 0946

TSCA (Toxic Substance Control Act)

Formaldehyde is listed on the TSCA Inventory.

OTHER REGULATORY INFORMATION

500 POUNDS SARA SECTION 302 THRESHOLD PLANNING QUANTITY

1000 POUNDS SARA SECTION 304 REPORTABLE QUANTITY

100 POUNDS CERCLA SECTION 103 REPORTABLE QUANTITY

SUBJECT TO SARA SECTION 313 ANNUAL TOXIC CHEMICAL RELEASE REPORTING

SUBJECT TO CALIFORNIA PROPOSITION 65 CANCER AND/OR REPRODUCTIVE TOXICITY WARNING AND RELEASE REQUIREMENTS- (JANUARY, 1988)

15.2 CANADIAN REGULATORY INFORMATION

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 99.3°C (200°F)

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC)

CLASS D-2A: Material causing other toxic effects (VERY TOXIC)

CLASS E: Corrosive liquid

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

All reportable chemical substances are listed on the Domestic Substances List (DSL) or otherwise comply with CEPA new substance notification requirements.

NATIONAL POLLUTANT RELEASE INVENTORY (NPRI)

This product contains the following chemical(s) subject to the reporting requirements of the Canadian Environmental Protection Act (CEPA) subsection 16(1), National Pollutant Release Inventory.

Methanol	67-56-1	12.5%
Formaldehyde	50-00-0	36.5%

16. OTHER INFORMATION:

Formaldehyde 36.5% Solution, as manufactured by Perk Scientific, is intended for legal use in laboratories and manufacturing environments.