**** MATERIAL SAFETY DATA SHEET ****

Buffer Solution pH 4.0

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: Buffer Solution pH 4.0
Catalog Numbers: 07629, 6879M991G, S988 1, S988 10, S988 20, S988 500, S989 1, S989 20, S989 500, XS89910L
Names:
Company Name: Fisher Scientific
1 Reagent Lane
Fairlawn, NJ 07410
For information, call: 201-789-4990
Emergency Number: 201-789-7100
For CHEMTREK assistance, call: 500-424-9300
For International CHEMTREK assistance, call: 703-527-3867

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

<table>
<thead>
<tr>
<th>CAS#</th>
<th>Chemical Name</th>
<th>% EINECS</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-00-0</td>
<td>Formaldehyde</td>
<td>0.05</td>
</tr>
<tr>
<td>67-56-1</td>
<td>Methyl alcohol</td>
<td>0.02</td>
</tr>
<tr>
<td>877-24-7</td>
<td>Potassium Hydrogen Phthalate</td>
<td>1.0</td>
</tr>
<tr>
<td>7732-18-5</td>
<td>Water Balance</td>
<td>251-791-2</td>
</tr>
</tbody>
</table>

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Appearance: clear, colorless
Caution! May cause eye and skin irritation. May cause respiratory and digestive tract irritation. May cause cancer based on animal studies. Contains formaldehyde.

Target Organ: None

Health Effects
Eye: May cause eye irritation. Skin: May cause mild skin irritation. Low hazard for usual industrial handling. Ingestion: May cause gastrointestinal disturbances and electrolyte imbalance. Inhalation: May cause allergic respiratory reaction. May cause respiratory tract irritation. Low hazard for usual industrial handling. Chronic: May cause cancer according to animal studies.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes: Get medical aid. Gently lift eyelids and flush continuously with water.
Skin: Get medical aid if irritation develops or persists. Wash clothing before reuse. Flush skin with plenty of soap and water.
Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cups of milk or water. Never give anything by mouth to an unconscious person. Get medical aid.
Inhalation: Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Not to Physician: Treat symptomatically and antidote: None reported.

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:
As in any fire, wear a self-contained breathing apparatus in pressure demand. MSC/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. Use extinguishing media appropriate to the surrounding fire. Substance is nonflammable.

Containers may explode when heated.
Extinguishing Media: Water
Substance is nonflammable; use agent most appropriate to extinguish surrounding fire.
Autoignition Temperature: Not available.
Flash Point: Not available.
NFPA Rating: Not published.
Explosion Limits: Lower: Not available.
Upper: Not available.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g., dry sand or earth). Do not allow to enter drains, sewers, or ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Provide ventilation.

**** SECTION 7 - HANDLING AND STORAGE ****

Handling: Wash thoroughly after handling. Use with adequate ventilation. Avoid contact with eyes. Keep container tightly closed. Wash clothing before reuse.
Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Keep container tightly closed.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls: Good general ventilation should be sufficient to control airborne levels.

Exposure Limits

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>ACGIH</th>
<th>NIOSH</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formaldehyde</td>
<td>0.3 ppm</td>
<td>0.37 ppm TWA</td>
<td>0.018 ppm TWA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.007 ppm</td>
<td>0.15 ppm TWA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NIOSH Potential</td>
<td>STEL: 2 ppm STEL</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Occupational Carcinogen: see Appendix A</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Potential NIOSH Carcinogen</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Cancer hazard (28 CFR 1910.1048)</td>
<td></td>
</tr>
<tr>
<td>Methyl alcohol</td>
<td>200 ppm</td>
<td>262 ppm</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>260 ppm</td>
<td>200 ppm TWA</td>
<td>260 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>260 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
<tr>
<td></td>
<td>200 ppm</td>
<td>200 ppm TWA</td>
<td>200 ppm TWA</td>
</tr>
</tbody>
</table>

OSHA Vacated PELs:
- Formaldehyde: 3 ppm TWA (unless specified in 1910.1048)
- Methyl alcohol: 200 ppm TWA, 200 ppm TWA
- Potassium Hydrogen Phthalate: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: 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.
Skin: Wear appropriate protective clothing to prevent skin exposure.
Respirator: Use appropriate protective clothing to minimize contact with skin.

OSHA Respirator regulations found in 29 CFR
1910.124 or European Standard EN 149. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

**SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**

Physical State: Liquid
Appearance: clear, colorless
Odor: odorless
pH: Not available
Vapor Pressure: Not available.
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: Not available.
Freezing/Melting Point: Not available.
Decomposition Temperature: Not available.
Solubility: soluble
Specific Gravity/Density: Not available.
Molecular Formula: Not available.
Molecular Weight: Not available.

**SECTION 10 - STABILITY AND REACTIVITY**

Chemical Stability: Stable
Conditions to Avoid: None reported
Incompatibilities with Other Materials: None reported.
Hazardous Decomposition Products:
Formaldehyde
Hazardous Polymerization: Has not been reported.

**SECTION 11 - TOXICOLOGICAL INFORMATION**

RTSCA:
CAS®: 50-00-0. LP925000
CAS®: 67-58-1. PC1400000
CAS®: 877-24-7 unlisted.

LD50/LC50:
CAS®: 50-00-0. Inhalation, mouse: LC50 = 400 mg/m3/2H; Oral, rat: LD50 = 42 mg/kg; Oral, rat: LD50 = 100 mg/kg.
CAS®: 877-24-7 unlisted.

LD50:
CAS®: 7732-18-5. ZC0110000

Carcinogenicity:
California: carcinogen - initial date 1/1/88
NIOSH: occupational carcinogen
IARC: Group A2 carcinogen

Methyl alcohol: Not listed by ACIG, IARC, NIOSH, NTP, or OSHA.
Potassium Hydroxide Phthalate: Not listed by ACIG, IARC, NIOSH, NTP, or OSHA.
Water: Not listed by ACIG, IARC, NIOSH, NTP, or OSHA.

Epidemiology:
Methanol has been shown to produce toxicity in the embryo or fetus in laboratory animals. Specific developmental abnormalities include musculoskeletal, urogenital and cardiovascular systems.

Teratogenicity:
Effects on the newborn by exposure to formaldehyde have been reported in rats by inhalation, such as behavioral effects, biochemical and metabolic effects and reduced weight gain. Cytological changes were also noted. Specific developmental abnormalities were reported by the intraperitoneal route of exposure in mice.

Reproductive Effects:
Fetal effects were reported in male rats by inhalation, oral ingestion and intraperitoneal injection of formaldehyde. Organs affected included the prostate, seminal vesicles, urethra, testes, sperm duct and epididymis. Spematogenesis was also affected.

Neurotoxicity:
No information available.

Mutagenicity:
No information available.

Other Studies:
No data available.

**SECTION 12 - ECOLOGICAL INFORMATION**

Ecotoxicity:
Not available.

Environmental Fate:
No information reported.
Physical Chemical:
No information available.
Others:
None.

**SECTION 13 - DISPOSAL CONSIDERATIONS**

Dispose of in a manner consistent with federal, state, and local regulations.

RCSA P-Serial unlisted.

**SECTION 14 - TRANSPORTATION INFORMATION**

US DOT:
No information available.
IMO:
No information available.
IATA:
No information available.
RID/ADR:
No information available.

**SECTION 15 - REGULATORY INFORMATION**

US FEDERAL
TSCA:
CAS®: 50-00-0 is listed on the TSCA inventory.
CAS®: 67-56-1 is listed on the TSCA inventory.
CAS®: 877-24-7 is listed on the TSCA inventory.
CAS®: 7732-18-5 is listed on the TSCA inventory.
None of the chemicals are on the Health & Safety Reporting List.
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.

SARA
Section 302 (RD):
CAS®: 67-56-1. Final RG = 100 pounds (45.4 kg).
CAS®: 7732-18-5. Final RG = 5000 pounds (2270 kg).

Section 302 (TPQ):
CAS®: 50-00-0. TPQ = 500 pounds; RG = 100 pounds (does not meet toxicity criteria but because of high product volume and recognized toxicity is considered a chemical of concern).

SARA Code:
CAS®: 50-00-0. acute, chronic.
CAS®: 67-56-1. acute, flammable.
CAS®: 877-24-7. acute.

Section 313:
This material contains Formaldehyde (CAS® 50-00-0, 0.05%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.

This chemical is not at a high enough concentration to be reportable under Section 313.

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 I ozone depleters.

Clean Water Act:
CAS®: 50-00-0 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:
CAS®: 50-00-0 is considered highly hazardous by OSHA.

STATE
Formaldehyde can be found on the following state right to know lists:
California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

Methyl alcohol can be found on the following state right to know lists:
California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

Potassium Hydroxide Phthalate is not present on state lists from CA, PA, MN, MA, FL, or NJ.

Water is not present on state lists from CA, PA, MN, MA, FL, or NJ.

The following statement(s) (s) 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
European/International Regulations
European Labeling in Accordance with EC Directives
Risk Phrases:
Safety Phrases:
WGK Water: 2/3B: Avoid contact with skin and eyes.
CAS# 50-00-0: 2
CAS# 50-00-0: 2
CAS# 87-56-1: 1
CAS# 87-34-7: No information available.
CAS# 7732-18-5: No information available.
Canada
CAS# 50-00-0 is listed on Canada's DSEL/DSL List.
CAS# 87-56-1 is listed on Canada's DSEL/DSL List.
CAS# 87-34-7 is listed on Canada's DSEL/DSL List.
This product has a WRMRS classification of Not controlled.
CAS# 50-00-0 is not listed on Canada's Ingredient Disclosure List.
CAS# 87-56-1 is not listed on Canada's Ingredient Disclosure List.
CAS# 87-34-7 is not listed on Canada's Ingredient Disclosure List.
CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.
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 (1.5 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 (0.8 mg/m3); Carcinogen
OEL-HUNGARY: STEL 0.5 mg/m3; Carcinogen
OEL-JAPAN: TWA 0.5 ppm (0.8 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 (8 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 (0.5 mg/m3); STEL 1 ppm (1.0 mg/m3)
OEL-SWITZERLAND: TWA 0.5 ppm (0.6 mg/m3); STEL 1 ppm (1.2 mg/m3)
OEL-THAILAND: 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)
OE I N BULGARIA, COLOMBIA, JORDAN, KOREA, check ADDI TLV
OE I N NEW ZEALAND, SINGAPORE, VIETNAM, check ADDI TLV
CAS# 87-56-1: OEL-ARAB Republic of Egypt: TWA 200 ppm (260 mg/m3); Skin

**** SECTION 16 - ADDITIONAL INFORMATION ****

MSDS Creation Date: 2/13/1995 Revision #: Date: 2/24/1999

The information above is believed to be accurate and represents the best
information currently available to us. However, we make no warranty of
merchantability or any other warranty, express or implied, with respect to
such information, and we assume no liability resulting from its use. Users
should make their own investigations to determine the suitability of the
information for their particular purposes. In no way shall the company be
liable for any claims, losses, or damages of any kind or for any
prolific or any special, indirect, incidental, consequential or exemplary
damages, regardless arising, even if the company has been advised of
the possibility of such damages.