MATERIAL SAFETY DATA SHEET

Revision Date: 1/06/2012

Section 1 – Chemical Product and Company Information

MSDS Name: Copper (II) Sulfate, **Gen II Leak Stop Gel**,
Synonyms: Anti-Freeze Solution; Leak Stop Gel Anti-freeze Solution; MCM# 18010 & 18020
Company Identification: M. C. Miller Co., Inc. Telephone: 1-772-794-9448
11640 U.S. Hwy 1 Fax: 1-772-589-9072
Sebastian, Florida 32958 E-mail: sales@mcmiller.com

Emergency Numbers: M. C. Miller Co. 1-772-794-9448
Chemtrec – 800-424-9300 (US) Chemtrec – 703-527-3887 (International)
Chemical Family: Mixture
Product Use: Gelled Anti-freeze solution for copper sulfate reference electrodes

Section 2 – Composition, Information on Ingredients

CAS#	Chemical Name	%	EINECS/ELINCS
56-81-5	Glycerin	25-75	NA
7758-99-8	Copper Sulfate Pentahydrate	5-25	NA
7732-18-5	Water	10-25	NA
NA	Gelling Agent	>1-3	NA

Section 3 – Hazards Identification

Emergency Overview

CERCLA RATINGS (SCALE 0-3): Health=3, Fire=1, Reactivity=0, Persistence=3
NFPA RATINGS (SCALE 0-4): Health=3, Fire=1, Reactivity=0

Odorless, Light Blue Gel. Harmful if swallowed. Cause severe burns to mucous membranes. Causes eye irritation, possibly severe. Causes respiratory tract and skin irritation. Do not get into eyes, on skin, or on clothing. Avoid breathing vapor or mist. Keep container tightly closed. Wash thoroughly after handling. Use only with adequate ventilation. Handle with caution.

Potential Heath Effects

- **Eye:** Short Term Effects: May cause irritation, possibly severe. Additional effects may include tearing and eye damage. Long Term Effects: Same effects as from short-term exposure
- **Skin:** Short Term Effects: May cause irritation. Additional effects may include burns, itching and blood disorders. Long Term Effects: Same effects as from short-term exposure.
- **Ingestion:** Short Term Effects: May cause burns. Additional effects may include sore throat, metallic taste, fever, yellowing of the skin and eyes, digestive disorders, bloody vomit, blood in the urine, blood in the stool, inability to urinate, low blood pressure, headache, dizziness, twitching, bluish skin color, blood disorders, kidney damage, paralysis, convulsions, shock and coma. Long Term Effects: Same effects as from short-term exposure.
- **Inhalation:** Short Term Effects: May cause irritation. Additional effects may include burns, metallic taste, chills, digestive disorders, chest pain, and difficulty breathing. Long Term Effects: In addition to effects from short-term exposure, perforation of the nose, fever, and anemia may occur.

Carcinogen Status: OSHA: N NTP: N IARC: N

Section 4 – First Aid Measures

- **Eyes:** Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains (at least 15-20 minutes). Get medical attention.

- **Skin:** Remove contaminated clothing and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention.
- **Ingestion:** Treat symptomatically and supportively. Induce vomiting. Get medical attention immediately.
- **Inhalation:** Remove from exposure area to fresh air immediately. Perform artificial respiration if necessary. Keep person warm and at rest. Treat symptomatically and supportively. Get medical attention immediately.

Section 5 – Fire Fighting Measures

- **Fire and Explosion Hazard:** Slight fire hazard when exposed to heat or flame.
- **Extinguishing Media:** Dry chemical, carbon dioxide, water spray or regular foam (1993 Emergency Response Guidebook, RSPA P 5800.6). For larger fires, use water spray, fog, or regular foam (1993 Emergency Response Guidebook, RSPA P 5800.6).
- **Firefighting:** Move the container from fire area if you can do so without risk. Do not scatter spilled material with high-pressure water streams. Dike fire-control water for later disposal (1993 Emergency Response Guidebook, RSPA P 5800.6, Guide Page 31). Use agents suitable for type of surrounding fire. Avoid breathing hazardous vapors, keep upwind. Flash Point, Lower Flammable Limit, and Auto Ignition: No Data Available.
- **Hazardous Combustion Products:** Thermal decomposition may release toxic and/or hazardous gases.

Section 6 – Accidental Release Measures

- **Occupational Spill:** Stop the leak if you can without risk. For small spills, take up with sand or other absorbent material and place into clean, dry containers for later disposal. Keep unnecessary people away. Isolate hazard area and deny entry.
- **Reportable Quantity (RQ):** The Superfund Amendments and Reauthorization Act (SARA) Section 304 requires that a release equal to or greater than the reportable quantity established for that 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, the National Response Center must be notified immediately at (800) 424-8802 or (202) 426-2675 in the metropolitan Washington D.C. area (40 CFR 302.6).

Section 7 – Handling and Storage

- **Handling:** Observe all federal, state, and local regulations when storing this substance. Store away from incompatible substances.

Section 8 – Exposure Controls, Personal Protection

- **Exposure Limits:** Glycerin (Mist): 5mg/m3 OSHA TWA (respiratory fraction); 10mg/m3 OSHA TWA (total mist); 10mg/m3 ACGIH TWA. *Note: OSHA revoked the final rule limits of January 19, 1989 in response to the 11th Circuit Court of Appeals decision (AFL-CIO v. OSHA) effective June 30, 1993. See 29 CFR 1910.1000 (58 FR 35338).*
- **Copper Dust and Mist (AS CU):** 1mg/m3 OSHA TWA 1mg/m3 ACGIH TWA 1mg/m3 NIOSH recommended TWA 1mg/m3 DFG MAK TWA (total dust) 2mg/m3 DFG MAK 30 minute peak, average value, 4 times/shift. Measurement method: Particulate filter; acid; atomic absorption spectrometry; (NIOSH Vol. III #7029).
- **Cupric Sulfate**: 10 pounds CERCLA Section 103 Reportable Quantity Subject to SARA Section 313 Annual Toxic Chemical Release Reporting.
- **Ventilation:** Provide local exhaust ventilation system to meet published exposure limits.
- **Personal Protective Equipment**
  - **Eyes:** The use of chemical splash goggles is recommended. Emergency Eye Wash: Where there is any possibility that an employee's eye(s) may be exposed to this substance, the employer should provide an eye wash fountain within the immediate work area for emergency use.
  - **Gloves:** Employee must wear appropriate protective gloves to prevent contact with this substance.
  - **Clothing:** Employee must wear appropriate protective (impervious) clothing and equipment to prevent repeated or prolonged skin contact with this substance.
  - **Respirators:** Based on the components present and/or information in physical data, health effects or toxicity sections, no respirator would be required under normal conditions of use. However, air contamination monitoring should be carried out to assure that the employees are not exposed to harmful concentrations of any of the above-mentioned components. If respiratory protection is required, it must be based on the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration (NIOSH-MSHA).
  - **For Firefighting and Other Immediately Dangerous to Life or Health Conditions**: Any self-contained respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. Any supply-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.

Section 9 – Physical and Chemical Properties

Odor:	Odorless	**Odor Threshold:**	No Data Available
Appearance:	Light Blue Gel	**Volatility**:	0%
pH:	5.0	**Vapor Pressure:**	No Data Available
Vapor Density:	No Data Available	**Evaporation Rate**:	No Data Available
Boiling Point:	212°F (100°C)	**Freezing Point:**	No Data Available
Specific Gravity:	1.0	**Water Solubility:**	miscible

Section 10 – Stability and Reactivity

- **Reactivity:** Stable under normal temperatures and pressures.
- **Conditions to Avoid:** May burn, but does not ignite readily. Avoid contact with strong oxidizers, excessive heat, sparks, or open flame.
- **Incompatibilities:**
    - **Glycerin:**
        - **Acetic Anhydride**: Violent reaction catalyzed by phosphorus oxychloride
        - **Acids (Strong):** Incompatible
        - **Bases (Strong):** Incompatible
        - **Calcium Hypochlorite:** May ignite spontaneously on mixing
        - **Chlorine (Liquid):** Explosive reaction
        - **Chromium (III) Oxide:** Explosive reaction
        - **Chromium Trioxide:** Violent reaction
        - **Hydrofluoric Acid, Nitric Acid:** Unstable mixture
        - **Hydrogen Peroxide:** Explosive hazard
        - **Lead Oxide, Perchloric Acid:** Explosive hazard
        - **Nitric Acid, Sulfuric Acid:** Explosive hazard
        - **Oxidizers (Strong):** Explosive reaction
        - **Potassium Chlorate:** Explosive reaction
        - **Potassium Permanganate:** Explosive reaction on contact
        - **Potassium Peroxide:** Fire and explosion hazard
        - **Sodium Hydride:** Intense exothermic reaction
        - **Silver Perchlorate:** Formation of shock-sensitive solvated salt
        - **Sodium Peroxide:** Fire and explosion hazard
    - **Cupric Sulfate (Copper Sulfate):**
        - **Hydroxylamine:** May ignite
        - **Magnesium:** Produces hydrogen
        - **Metals:** Corrosive
        - **Oxidizers (Strong):** Incompatible
        - **Reducing Agents:** Reacts vigorously
        - **Sodium Hypobromite:** Solutions of sodium hypobromite are decomposed by powerful catalytic action of cupric ions
    - **Copper Salts**:
        - **Acetylene:** May form explosive acetylides
        - **Hydrazine:** Decomposes
        - **Nitromethane:** Forms explosive mixtures
    - **Hazardous Decomposition**: Thermal decomposition may release toxic and/or hazardous gases
    - **Polymerization:** Hazardous polymerization has not been reported to occur under normal temperature and pressures

Section 11 – Toxicological Information

- **Glycerin:**
    - **Irritation Data:** 500 mg/24 hours skin-rabbit mild; 126 mg eye-rabbit mild; 500 mg/24 hours eye-rabbit mild
    - **Toxicity Data:** 1428 mg/kg oral-human TDLo; 12600 mg/kg oral-rat LD50; 4090 mg/kg oral-mouse LD50; 27 gm/kg oral-rabbit LD50; 7750 mg/kg oral-guinea pig LD50; 100 mg/kg subcutaneous-rat LD50; 91 mg/kg subcutaneous-mouse LD50; 5566 mg/kg intravenous-rat LD50; 4250 mg/kg intravenous-mouse LD50; 53 gm/kg intravenous-rabbit LD50; 4420 mg/kg Intraperitoneal-rat LD50; 8700 mg/kg Intraperitoneal-mouse LD50; mutagenic data (RTECS); reproductive effects data (RTECS)
    - **Carcinogen Status:** None

- **Acute Toxicity Level:** Slightly toxic by ingestion
- **Target Effects:** Poisoning may affect the kidneys and central nervous system

- **Cupric Sulfate (Copper Sulfate):**
  - 300 mg/kg oral-rat LD50; 3 gm/kg/8 weeks continuous oral-mouse LDLo; 2 gm/kg/3 weeks continuous oral-mouse LDLo; 43 mg/kg subcutaneous-rat LD50; 500 ug/kg subcutaneous-mouse LDLo; 10 mg/kg intravenous-rabbit LD50; 50 gm/kg intravenous-mouse LDLo; 2 mg/kg intravenous-guinea pig LDLo; 18 mg/kg intraperitoneal-mouse LD50; 520 mg/kg unreported-rat LD50; mutagenic data (RTECS); reproductive effects data (RTECS); tumorigenic data (RTECS)
  - **Monohydrate**: No data available
  - **Pentahydrate**: 1088 mg/kg oral-human TDLo; 272 mg/kg oral-human LDLo; 300 mg/kg oral-rat LD50; 60 mg/kg oral-dog LDLo; 5 gm/kg oral-animal LDLo; 62 gm/kg subcultaneous-guinea pig LDLo; 18700 ug/kg intraperitoneal-rat LD50; 33 mg/kg intraperitoneal-mouse LD50; 7500 ug/kg intraperitoneal-mammal LD50; 221 mg/kg unreported-man LDLo; mutagenic data (RTECS)
  - **Carcinogen Status**: None
  - **Local Affects**: Corrosive-eyes and ingestion; inhalation and skin
  - **Acute Toxicity Level**: Toxic by ingestion
  - **Target Effects**: Poisoning may affect the liver, kidneys, and blood
  - **At Increase Risk from Exposure**: Persons with pre-existing respiratory, liver, kidney, skin, or Wilson's disease, or hematopoietic disorders (based on general information on copper salts)
  - **Additional Data**: May be excreted in breast milk

- **Health Effects:**
  - **Inhalation:**
    - **Glycerin:**
      - **Acute Exposure**: Due to its low vapor pressure, glycerin is not considered likely to be an inhalation hazard at normal room temperatures. Vapor or mist in sufficient concentrations may interfere with respiratory function. At elevated temperatures, the fume may cause irritation and dehydration of the mucous membranes. Symptoms may include coughing and difficulty breathing.
      - **Chronic Exposure:** No Data Available
    - **Cupric Sulfate (Copper Sulfate):**
      - **Irritant:** See information on copper salts. In addition to the effects described in copper salts, copper sulfate may cause sore throat, coughing, shortness of breath, and can be corrosive to mucous membranes. Chronic exposure can also cause sloughing of nasal mucosa. Workers exposed over the years to bordeaux mixture, containing copper sulfate as the principle toxic agent, have developed copper containing nodules and greenish tumors in the liver and lungs.
    - **Copper Salts:**
      - **Acute Exposure:** Mists of copper salts may cause irritation of the upper respiratory tract or an illness similar to the common cold with chills and stuffiness of the head. Chest pain, dyspnea, a metallic taste, and gastrointestinal disturbances may occur.
      - **Chronic Exposure:** Repeated or prolonged exposure to dusts or mists of copper salts may cause irritation of the upper respiratory tract, rhinitis, sneezing, coughing, fever, metallic taste, and digestive disorders. Ulceration and perforation of the nasal septum has been reported on occasion. Congestion and atrophic changes in nasal mucosa have been reported from long-term exposure. Mild anemia, possibly hemolytic, has been observed in workers exposed to copper in the air. Greenish discoloration of the skin, hair, and teeth has occurred. In animals, inhalation of copper salts has caused injury to the lungs and liver with hemochromatosis.
  - **Skin Contact;**
    - **Glycerin:**
      - **Acute Exposure:** Application of concentrated glycerin may cause effects ranging from mild irritation to dehydration of the skin with subsequent irritation and redness. Allergic reactions are rare, but may occur in sensitive individuals.
      - **Chronic Exposure:** Repeated or prolonged exposure to concentrated solutions may result in dermatitis.
    - **Cupric Sulfate (Copper Sulfate):**
      - **Irritant:** See information on copper salts. In addition to the effects described in copper salts, copper sulfate may cause redness, pain, and itching papulovesicular and eczematoid lesions. Strong solutions of copper sulfate can be corrosive. Rarely, sensitization may occur. Hemolytic anemia has been observed when the crystals were applied to burned skin.
    - **Copper Salts:**

- **Acute Exposure:** Direct contact with copper salts may cause irritation, eythema, and dermatitis, and some have been reported to cause an itching eczema; continued contact may cause some degree of necrosis. Absorption through burned or eczematous skin has occurred with some salts. Systemic effects may be possible.
- **Chronic Exposure:** Repeated and prolonged contact with some copper salts has resulted in irritation, necrosis, and greenish skin color discoloration. Allergic dermatitis, although rare, has been reported.

o **Eye Contact:**
  - **Glycerin:**
    - **Acute Exposure:** Application the the human eye may cause a strong stinging and burning sensation, with reflex tearing and dilation of the conjunctival vessels, but no injury. Instillation into the anterior chamber resulted in an inflammation reaction and edema of the cornea with wrinkling of the posterior surface and damage of endothelial cells.
    - **Chronic Exposure:** Not Available.
  - **Cupric Sulfate (Copper Sulfate):**
    - **Corrosive.** See information on copper salts. In addition to the effects described in copper salts, copper sulfate may cause skin irritation, redness, pain, and blurred vision. Copper sulfate solutions can be corrosive to the eye. Repeated application of copper sulfate to the eye has caused temporary inflammation and a purulent reaction with discoloration of the cornea. If a partial of copper sulfateis left in the conjunctival sac, it can cause local inflammation and necrosis, corneal opacity and symblepharon.
  - **Copper Salts:**
    - **Acute Exposure:** Some copper salts have been reported to cause conjunctivitis, corneal ulcerations and turbidity, and possibly palpebral edema. Copper partials embedded in the eye may result in a pronounced foreign-body response with characteristic discoloration of ocular tissue.
    - **Chronic Exposure:** Prolonged or repeated exposure to copper salts may cause irritation and conjunctivitis.

o **Ingestion:**
  - **Glycerin:**
    - **Acute Exposure:** Ingestion of 100ml resulted in headache, nausea, and vomiting. Other symptoms may include digestive tract irritation, insomnia, dizziness, diarrhea, and fever. Large doses may cause hemolysis, hemogobinuria, hyperglycemia, glycosuria, renal failure, convulsions, and paralysis. Glycerin acts as an osmotic diuretic and as such may lower intraocular pressure and cause hypovolemia. In rodents, it may also cause restlessness, mild cyanosis, drop in blood pressure, increased rate and magnitude of respiration, followed by debility, diuresis, tremors, decreased respiration, collapse, clonic convulsions and coma. Reproductive effects have been reported in animals.
    - **Chronic Exposure:** Ingestion of 30 ml for 50 days by human volunteers resulted in increased thirst and a feeling of warmth.
  - **Cupric Sulfate (Copper Sulfate):**
    - **Toxic/Corrosive:** See information on copper salts. In addition to the effects described in copper salts, copper sulfate, if not removed immediately can be corrosive. Copper sulfate can also cause sore throat gastroenteric pain, blue discoloration of gums and tongue, prostration, loss of consciousness, and convulsions. Other reported effects include: hematemesis, melena, hematuria, an increase in white blood cells, sulphaemoglobinaemia, and septicemia. A study using mice exposed to copper sulfate in their drinking water resulted in dose dependent impairment of the immune response.
  - **Copper Salts:**
    - **Acute Exposure:** May cause immediate metallic taste, salivation, nausea, epigastric burning, violent vomiting which may be bluish-green, and diarrhea with bloody stools, colic, ulceration, and hemorrhagictritis. If sufficient vomiting does not occur, some copper salts may cause systemic poisoning with severe headache. Cold sweat weak pulse, hypotension, and other symptoms of shock. Jaundice may appear in a few days due to liver injury and/or hemolytic crisis; anemia may also develop. Oliguria, anuria, and other signs of renal injury may occur. Diffuse myalgias, rhabdomyolysis, methemoglobinenia, metabolic acidosis, and pancreatits have also been reported. In fatal cases, death may be preceded by convulsions, paralysis, and coma. Early death is usually associated with shock; later it is likely caused by hepatorenal failure.
    - **Chronic Exposure:** Repeated ingestion of copper salts has produced hemolytic anemia, hemochromatosis, impaired immune response, liver, kidney, lung, and spleen damage and death in animals.

Section 12 – Ecological Information

- **Environmental Impact Rating (0-4):** No Data Available
- **Acute Aquatic Toxicity:** No Data Available
- **Degradability:** No Data Available
- **Log Bioconcentration Factor (BCF):** No Data Available
- **Log Octanol/water Partition Coefficient:** No Data Available

Section 13 – Disposal Considerations

Observe all federal, state, and local regulations when disposing of this substance.

Section 14 – Transport Information

	US DOT	IATI	RID/ADR	IMO	Canada TDG
Shipping Name:	Environmentally Hazardous Substance, Solid n.o.s. **Technical Shipping Name:** Copper Sulphate	Environmentally Hazardous Substance Solid, n.o.s	Environmentally Hazardous Substance Solid, n.o.s	Environmentally Hazardous Substance Solid, n.o.s	CUPRIC SULFATE
Hazard Class:	9	9	9	9	9.2
UN Number:	3077	3077	3077	3077	3077
Packing Group:	III	III	III	III	II
Packing Group:	WHMIS CLASSIFICATION D2B – OTHER REGULATORY REQUIREMENT none	--	--	--	REGULATED LIMIT 5 KG

Section 15 – Regulatory Information

- **TSCA** Status: Yes
- **CERCLA Section 103:** Yes
  - **Cupric Sulfate 10 pounds RQ**
- **SARA Section 302 (40 CFR 355.30):** No
- **SARA Section 304 (40 CFR 355.40):** No
- **SARA Section 313 (40 CFR 372.65):** Yes
  - Copper Dust and Mist (AS CU)
  - Cupric Sulfate
- **OSHA Process Safety (29 CFR 1910.119):** No
- **California Proposition 65:** No
- **SARA Hazard Categories, SARA Sections 311/312 (40 CFR 370.21)**
- **Acute Hazard:** Yes
- **Chronic Hazard:** Yes
- **Fire Hazard:** No
- **Reactivity Hazard:** No
- **Sudden Release Hazard:** No

Section 16 – Additional Information

MSDS Creation Date: 01/06/2012 Revision #1 Date: 01/06/2012

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