

# MATERIAL SAFETY DATA SHEET

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## ORP Calibration Solution for 425-475 mV

*Effective Date: 1/14/02*

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### 1. Product Identification

**Synonyms:** Light's Solution, B425

**CAS No.:** 7664-93-9, 10045-89-3, and 10138-04-2

**Chemical Formula:**  $H_2SO_4$ ,  $Fe(NH_4)_2(SO_4)_2 \cdot 6H_2O$ ,  $FeNH_4(SO_4)_2 \cdot 12H_2O$

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### 2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Sulfuric Acid	7664-93-9	5.6%	Yes
Ferrous Ammonium Sulfate	10045-89-3	3.9%	Yes
Ferric Ammonium sulfate	10138-04-2	4.8%	Yes
Deionized Water	7732-18-5	85-86%	No

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### 3. Hazards Identification

#### Emergency Overview

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**WARNING --POISON – DANGER—CORROSIVE**

**LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR CONTACTED WITH SKIN. HARMFUL IF INHALED. AFFECTS TEETH. CANCER HAZARD. STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure.**

## **Potential Health Effects**

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Information on the human health effects from exposure to this substance is limited.

### **Inhalation:**

Inhalation produces damaging effects on the mucous membranes and upper respiratory tract. Symptoms may include irritation of the nose and throat, coughing, sore throat, chest pains, and labored breathing. May cause lung edema, a medical emergency.

### **Ingestion:**

Swallowing can cause severe burns of the mouth, throat, and stomach, leading to death. Can cause sore throat, vomiting, diarrhea, and black stool. Circulatory collapse with clammy skin, weak and rapid pulse, shallow respirations, and scanty urine may follow ingestion or skin contact. Pink urine discoloration is a strong indicator of iron poisoning. Liver damage, coma, and death from iron poisoning has been recorded. Circulatory shock is often the immediate cause of death.

### **Skin Contact:**

Symptoms of redness, pain, and severe burn can occur. Circulatory collapse with clammy skin, weak and rapid pulse, shallow respirations, and scanty urine may follow skin contact or ingestion. Circulatory shock is often the immediate cause of death.

### **Eye Contact:**

Contact can cause blurred vision, redness, pain, irritation, and severe tissue burns. Can cause blindness.

### **Chronic Exposure:**

Long-term exposure to mist or vapors may cause damage to teeth. Chronic exposure to mist containing sulfuric acid is a cancer hazard.

### **Aggravation of Pre-existing Conditions:**

Persons with pre-existing skin disorders or eye problems, impaired liver, kidney or respiratory functions may be more susceptible to the effects of the substance.

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## **4. First Aid Measures**

### **Inhalation:**

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

### **Ingestion:**

**DO NOT INDUCE VOMITING.** Give several glasses of water to drink to dilute. Never give anything by mouth to an unconscious person. Get medical attention.

### **Skin Contact:**

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Excess acid on skin can be neutralized with a 2% solution of bicarbonate of soda. Get medical attention immediately.

**Eye Contact:**

Immediately flush eyes with gentle but plenty of water for at least 15 minutes, lifting upper and lower eyelids occasionally. Get medical attention immediately.

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## 5. Fire Fighting Measures

**Fire:**

Not considered to be a fire hazard. Irritating and toxic ammonia gas may form in fires.

**Explosion:**

Not considered to be an explosion hazard.

**Fire Extinguishing Media:**

Use any means suitable for extinguishing surrounding fire.

**Special Information:**

In the event of a fire, 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.

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## 6. Accidental Release Measures

Ventilate area of leak or spill. Wear appropriate personal protective equipment as specified in Section 8. Contain and recover liquid when possible. Neutralize with alkaline material (soda ash, lime), then absorb with an inert material (e.g. vermiculite, dry sand, earth), and place in a chemical waste container. Do not flush to sewer. Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal. US Regulation (CERCLA) require reporting spills and releases to soil, water, and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

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## 7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area with acid resistant floors and good drainage. Protect against physical damage. Isolate from incompatible substances. Protect from light. Do not wash out container and use it for other purposes. When diluting, always add the acid to water; never add water to acid. Containers of this material may be hazardous when empty since they retain product residues (vapor, liquids, dust, or solids); observe all warnings and precautions listed for the product.

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## 8. Exposure Controls/Personal Protection

### **Airborne Exposure Limits:**

OSHA Permissible Exposure Limit (PEL)

ACGIH Threshold Limit Value (TLV)

1 mg/m<sup>3</sup> (TWA) soluble iron salt as Fe and sulfuric acid—suspected human carcinogen for sulfuric acid contained in strong inorganic acid mist.

### **Ventilation System:**

A system of local and/or general exhaust is recommended to keep employee exposures below the airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

### **Personal Respirators (NIOSH Approved):**

If the exposure limit is exceeded, a full facepiece respirator with an acid gas cartridge and particulated filter (NIOSH type N100 filter) may be worn up to 50 times the exposure limit, or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-face positive-pressure, air-supplied respirator. **WARNING:** Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. When respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

### **Skin Protection:**

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

### **Eye Protection:**

Use chemical safety goggles and/or full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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## 9. Physical and Chemical Properties

### **Appearance:**

Yellow liquid

### **Odor:**

Odorless.

### **Solubility:**

Slowly soluble in cold water

**Specific Gravity:**

1.05

**pH:**

less than .50 pH

**% Volatiles by volume @ 21C (70F):**

5% - 6 %

**Boiling Point:**

No information found.

**Melting Point:**

No information found.

**Vapor Density (Air=1):**

No information found.

**Vapor Pressure (mm Hg):**

No information found.

**Evaporation Rate (BuAc=1):**

No information found.

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## 10. Stability and Reactivity

**Stability:**

Stable under ordinary conditions of use and storage. The aqueous solution decomposes slowly on standing.

**Hazardous Decomposition Products:**

Toxic fumes of oxides of sulfur, carbon, nitrogen, and ammonia when heated to decomposition. Reacts with carbonates to generate carbon dioxide gas, and with cyanides and sulfides to form poisonous hydrogen cyanide and hydrogen sulfide respectively.

**Hazardous Polymerization:**

Will not occur.

**Incompatibilities:**

Potassium chlorate, potassium perchlorate, potassium permanganate, sodium, lithium, bases, organic material, halogens, metal acetylides, oxides, and hydrides, metal (yields hydrogen gas), strong oxidizing and reducing agents and many other reactive substances.

**Conditions to Avoid:**

Light, heat, incompatibles.

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## 11. Toxicological Information

### Toxicological Data:

Oral mouse LD50: 2140 mg/kg; inhalation rat LC50:510 mg/m<sup>3</sup>/2H; standard Draize, eye rabbit, 250ug (sevee); investigated as a tumorigen, mutagen, reproductive effector.

### Carcinogenicity:

Cancer Status: the International Agency for Research on Cancer (IARC) has classified “strong inorganic acid mists containing sulfuric acid” as a known human carcinogen (IARC category 1). This classification applies only to mists containing sulfuric acid and not to sulfuric acid solutions.

-----\Cancer Lists\-----

Ingredient Category	---NTP Carcinogen---		IARC
	Known	Anticipated	
Ferric Ammonium Sulfate (10138-04-2)	No	No	None
Ferrous Ammonium sulfate (10045-89-3)	No	No	None
Sulfuric Acid (7664-93-9)	No	No	None
Water (7732-18-5)	No	No	None

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## 12. Ecological Information

### Environmental Fate:

When released into the soil, this material may leach into groundwater. When released into the air, this material may be removed from the atmosphere to a moderate extend by wet deposition. When released into the air, this material may be removed from the atmosphere to a moderate extend by dry deposition.

### Environmental Toxicity:

LC50 Flounder 100 to 330 mg/l/48 hr aerated water/Conditions of bioassay not specified;  
LC50 Shrimp 80 to 90 mg/l/48 hr aerated water/Conditions of bioassay not specified;  
LC50 Prawn 42.5 ppm/48 hr salt water/Conditions of bioassay not specified. This material may be toxic to aquatic life.

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## 13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be managed in an appropriate and RCRA approved waste disposal facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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## 14. Transport Information

Not regulated.

## 15. Regulatory Information

-----\Chemical Inventory Status - Part 1\-----

Ingredient	TSCA	EC	Japan	Australia
Ferric Ammonium Sulfate (10138-04-2)	Yes	Yes	No	Yes
Ferrous Ammonium sulfate (10045-89-3)	Yes	Yes	No	Yes
Sulfuric Acid (7664-93-9)	Yes	Yes	Yes	Yes
Water (7732-18-5)	Yes	Yes	Yes	Yes

-----\Chemical Inventory Status - Part 2\-----

--Canada--

Ingredient	Korea	DSL	NDSL	Phil.
Ferric Ammonium Sulfate (10138-04-2)	Yes	Yes	No	Yes
Ferrous Ammonium sulfate (10045-89-3)	Yes	Yes	No	Yes
Sulfuric Acid (7664-93-9)	Yes	Yes	No	Yes
Water (7732-18-5)	Yes	Yes	No	Yes

-----\Federal, State & International Regulations - Part 1\-----

Ingredient	-SARA 302-		-----SARA 313-----	
	RQ	TPQ	List	Chemical Catg.
Ferric Ammonium Sulfate (10138-04-2)	No	No	No	No
Ferrous Ammonium sulfate (10045-89-3)	No	No	No	No
Sulfuric Acid (7664-93-9)	1000	1000	Yes	No
Water (7732-18-5)	No	No	No	No

-----\Federal, State & International Regulations - Part 2\-----

Ingredient	CERCLA	-RCRA-	-TSCA-
		261.33	8(d)
Ferric Ammonium Sulfate (10138-04-2)	No	No	No
Ferrous Ammonium sulfate (10045-89-3)	1000	No	No
Sulfuric Acid (7664-93-9)	1000	No	No
Water (7732-18-5)	No	No	No

Chemical Weapons Convention: No      TSCA 12(b): No      CDTA: Yes  
SARA 311/312: Acute: Yes      Chronic: Yes      Fire: No      Pressure: No  
Reactivity: Yes      (Mixture/liquid)

**Australian Hazchem Code:** 2PNo information found.

**Poison Schedule:** Not allocated.

**WHMIS:**

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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## 16. Other Information

**NFPA Ratings:** Health: **3** Flammability: **0** Reactivity: **2**

**Label Hazard Warning:**

POISON! DANGER! CORROSIVE LIQUID AND MIST CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED OR CONTACTED WITH SKIN. HARMFUL IF INHALED. AFFECTS TEETH. CANCER HAZARD. STRONG INORGANIC ACID MISTS CONTAINING SULFURIC ACID CAN CAUSE CANCER. Risk of cancer depends on duration and level of exposure.

**Label Precautions:**

Avoid contact with eyes, skin and clothing.

Do not breathe mist.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

**Label First Aid:**

In all cases call for medical help immediately. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before re-use. Excess acid on skin can be neutralized with a 2% bicarbonate of soda solution. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

**Product Use:**

Instrument Calibration.

**Revision Information:**

No changes.

**Disclaimer:**

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