Material Safety Data Sheet

ORP Calibration Solution, + 465 ± 15 mV

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1. Product and Company Identification

Synonyms: Light's Solution, ORP standard
Product Codes:
ECD P/N 2010170
Manufacture By:
Electro-Chemical Devices, Inc.
1681 Kettering
Irvine, CA 92614
Phone: (800) 729-1333

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2. Composition/Information on Ingredients

Ingredient	CAS No	Percent
Ferric Ammonium sulfate, Dodecahydrate	7783-83-7	>2%
Ferrous Ammonium Sulfate, Hexahydrate	7783-85-9	>3%
Sulfuric Acid	7664-93-9	>5%
Water	7732-18-5	Balance

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3. Hazards Identification

Emergency Overview: Corrosive liquid. May irritate eyes and skin. Wash areas of contact with plenty of water for at least 15 minutes. If ingested, dilute with large quantity of water. Do not induce vomiting. Call a physician.

Target Organs: eyes, skin, respiratory system, teeth, liver, and mucous membranes

Eye Contact: May cause irritation, redness, pain, and tearing.

Inhalation: May cause irritation.

Skin Contact: May cause irritation, redness, and pain.

Ingestion: May cause throat irritation, vomiting and diarrhea. May cause liver damage from iron poisoning

Chronic Effects/Carcinogenicity: None

Reproductive Information: Reproductive effects cited in 'Registry of Toxic Effects of Chemical Substances' for Sulfuric Acid. Reproductive effects cited in 'Registry of Toxic Effects of Chemical Substances' for Sulfuric Acid.

Teratology (Birth Defect) Information: Mutation data cited in 'Registry of Toxic Effects of Chemical Substances' for Ferric Ammonium Sulfate Dodecahydrate. Mutation data cited in 'Registry of Toxic Effects of Chemical Substances' for Ferrous Ammonium Sulfate Hexahydrate. Mutation data cited

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4. First Aid Measures

Eye Contact: Irrigate immediately with large quantity of water for at least 15 minutes. Call a physician if irritation develops.

Inhalation: Remove to fresh air. Give artificial respiration if necessary. If breathing is difficult, give oxygen.

Skin Contact: Flush with plenty of water for at least 15 minutes. Call a physician if irritation develops.

Ingestion: Do NOT induce vomiting. Get medical aid at once. Give conscious victim large quantities of water to dilute acid. Give oxygen if respiration is depressed.

Note to Physician:
The use of Deferoxamine as a chelating agent should be determined only by qualified medical personnel. Monitor arterial blood gases, chest x-ray, and pulmonary function tests. Treat dermal irritation or burns with standard topical therapy. Effects may be delayed. Do not use sodium bicarbonate in an attempt to neutralize the acid.

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5. Fire Fighting Measures

General Information:
Negligible fire and explosion hazard when exposed to heat or flame. Move container if possible, cool with fog or spray. Do not scatter contents with excess water. Contact with metals may evolve flammable hydrogen gas. Combustion may produce toxic vapors.

Extinguishing Media:
For small fires, use dry chemical, carbon dioxide, or alcohol-resistant foam.

Auto ignition Temperature:
No information found.

Flash Point:
No information found.

NFPA Rating:
CAS# 7783-83-7: H-1, F-0, R-0.
CAS# 7783-85-9: H-2, F-0, R-0.
CAS# 7664-93-9: H-3, F-0, R-2.
CAS# 7732-18-5: Not published

Explosion Limits:
Lower: N/A Upper: N/A

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6. Accidental Release Measures

General Information:
Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks:
Absorb spills with absorbent (vermiculite, sand, fuller's earth) and place in plastic bags for later disposal.

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7. Handling and Storage

Handling:
Wash thoroughly after handling. Avoid contact with skin, eyes, and clothing. Keep tightly closed. Avoid ingestion or inhalation.

Storage:
Store capped at room temperature, protected from light and air. Do not store near combustible materials.

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8. Exposure Controls/Personal Protection
Engineering Controls:
Facilities using this material should be equipped with an eyewash facility and safety shower. Local exhaust ventilation may be necessary to control any air contaminants to within their TLVs during the use of this product. Use a corrosion-resistant ventilation system.

OSHA, NIOSH & ACGIH THRESHOLD LIMIT:

Chemical Name	ACGIH	NIOSH	OSHA
Ferric Ammonium Sulfate, Dodecahydrate	1 mg/m3	1mg/m3	None
Ferrous Ammonium Sulfate, Hexahydrate	1 mg/m3	1mg/m3	None
Sulfuric Acid	0.2 mg/m3 TWA	1 mg/m3 TWA	1 mg/m3 TWA

Personal Respirators (NIOSH Approved):
Use the following when exposure limits are exceeded: Sulfuric acid-- 50 mg/M3 - gas mask with acid gas canister and high efficiency particulate filter. Self contained breathing apparatus with full face piece. 100 mg/M3 - Type C supplied-air respirator with full face piece, helmet or hood operated in continuous-flow mode.
Skin Protection:
Wear protective gloves and clean body-covering clothing.
Eye Protection:
Use chemical safety goggles and/or a 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

Physical State: Clear liquid
Color: Dull yellow
Odor: Very slight sulfurous odor
pH: Acidic
Vapor Pressure: No information found.
Vapor Density: No information found.
Evaporation Rate: >1 (ether=1)
Viscosity: No information found.
Boiling Point: > 100°C (> 212.00°F)
Freezing/Melting Point: < 0°C (< 32.00°F)
Decomposition Temperature: No information found.
Solubility in water: Soluble.
Specific Gravity/Density: No information found.
Molecular Formula: No information found.
Molecular Weight: No information found.

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10. Stability and Reactivity

Chemical Stability:
Stable in closed containers under normal temperatures and pressures

Conditions to Avoid:
Incompatible materials, light exposure to air, excess heat.

Incompatibilities with Other Materials:
Metals, strong oxidizing agents, alkalis, permanganates, reducing agents, oxidizing agents, acrylonitrile, chlorates, finely powdered metals, nitrate, perchlorates, aniline, carbides, epichlorohydrin, fulminates, picrates, organic materials, flammable liquids.

Hazardous Decomposition Products:
Oxides of nitrogen, oxides of sulfur, ammonia

Hazardous Polymerization:
Has not been reported

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11. Toxicological Information

RTECS:
CAS# 7783-83-7: WS5900000
CAS# 7783-85-9: BR6500000.
CAS# 7664-93-9: WS5600000.

LD50/LC50:
CAS# 7783-83-7: Not available.
CAS# 7783-85-9: Oral, rat: LD50 = 3250 mg/kg.
CAS# 7664-93-9:
Draize test, rabbit, eye: 250ug severe,
Inhalation, mouse: LC50 =320 mg/m3/2H
Inhalation, rat: LC50 =510 mg/m3/2H
Oral, rat: LD50 = 2140 mg/kg.
CAS# 7732-18-5- Not available

Carcinogenicity:

CAS# 7732-18-5: Not listed as a carcinogen by ACGIH, IARC, NIOSH, NTP, OSHA, or CA Prop 65.
CAS# 7783-85-9: Not listed as a carcinogen by ACGIH, IARC, NIOSH, NTP, OSHA, or CA Prop 65.
CAS# 7664-93-9
ACGIH: A2 - Suspected Human Carcinogen (contained in strong inorganic acid mists)
California: Carcinogen, initial date 3/14/03 (listed as Strong inorganic acid mists containing sulfuric acid).
NIOSH: Not listed.
NTP: Known carcinogen (listed as Strong inorganic acid mists containing sulfuric acid).
OSHA: Select carcinogen

IARC: Group 1 carcinogen

Epidemiology:

Workers exposed to industrial sulfuric acid mist showed a statistical increase in laryngeal cancer. This suggests a possible relationship between carcinogenesis and inhalation of sulfuric acid mist.

Teratogenicity:

Sulfuric acid was not teratogenic in mice and rabbits, but was slightly embryotoxic in rabbits (a minor, rare skeletal variation). The animals were exposed to 5 and 20 mg/m3 for 7 hr/day throughout pregnancy. Slight maternal toxicity was present at the highest dose in both species.

Reproductive:

No information found.

Mutagenicity:

There are no mutagenicity studies specifically of sulfuric acid. However, there are established effects of reduced pH in mutagenicity testing, as would be caused by sulfuric acid. These effects are an artifact of low pH and are not necessarily due to biological effects of sulfuric acid.

Neurotoxicity:

No information found.

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12. Ecological Information

Environmental Fate:

No information found.

Environmental Toxicity:

Dangerous to the environment. Very toxic to aquatic organisms

Fish: Bluegill/Sunfish: 49 mg/L; 48 Hr; TLm (tap water @ 20 C)

Fish: Bluegill/Sunfish: 24.5 ppm; 48 Hr; TLm (fresh water)

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13. Disposal Considerations

Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

US DOT

Shipping Name: Sulfuric Acid
Hazard Class: 8
UN Number: UN2796
Packing Group: PG II

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15. Regulatory Information

US Federal

TSCA:
CAS# 7783-83-7 is not listed on the TSCA inventory. It is for research and development use only.
CAS# 7783-85-9 is not on the TSCA Inventory. However, its anhydrous form is on the inventory, and so this hydrate is exempt from TSCA Inventory requirements (40CFR270.3(u)(2)).
CAS# 7664-93-9 is listed on the TSCA Inventory.
CAS# 7732-18-5 is listed on the TSCA Inventory.

SARA Reportable Quantities (RQ):
CAS# 7664-93-9: final RQ = 1000 pounds (454 kg)

CERCLA/SARA Section 313:
This material contains Sulfuric acid (CAS# 7664-93-9, 1.5%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

OSHA - Highly Hazardous:
None of the components are on this list.

US State

State Right to Know:
CAS# 7783-83-7 can be found on the following state Right-to-Know lists: California (listed as Iron salts (soluble), Pennsylvania (listed as Iron salts (soluble), Minnesota (listed as Iron salts (soluble).
CAS# 7783-85-9 can be found on the following state Right-to-Know lists: California (listed as Iron salts (soluble), Pennsylvania (listed as Iron salts (soluble), Minnesota (listed as Iron salts (soluble).
CAS# 7664-93-9 can be found on the following state Right-to-Know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, and Massachusetts
California Regulations:
WARNING: This product contains Sulfuric acid, listed as 'Strong inorganic mists containing sulfuric acid,' a chemical known to the state of California to cause cancer.

European/International Regulations

Canadian DSL/NDSL:
CAS# 7783-83-7 is not listed on Canada's DSL List.
CAS# 7783-85-9 is not listed on Canada's DSL List.
CAS# 7664-93-9 is listed on Canada's DSL List.
CAS# 7732-18-5 is listed on Canada's DSL List.

Canada Ingredient Disclosure List:
CAS# 7783-83-7 (listed as Iron salts (soluble)) is listed on Canada's Ingredient Disclosure List.
CAS# 7783-85-(listed as Iron salts (soluble)) is listed on Canada's Ingredient Disclosure List.
CAS# 7664-93-9 is listed on Canada's Ingredient Disclosure List.
CAS# 7732-18-5 is not listed on Canada's Ingredient Disclosure List.

16. Other Information

Label Hazard Warning:

As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS-2010170 rev. a April 2012

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