

MATERIAL SAFETY DATA SHEET



1000 Tedia Way
Fairfield, Ohio 45014
USA
Email: tedia@tedia.com
Web: www.tedia.com

24-Hour Emergency Number (CHEMTREC)
USA: 800-424-9300
International: 703-527-3887

**All non-emergency numbers should be directed
to Customer Service at 800-PURITY1**

OXIDATION SOLUTION (IODINE IN PYRIDINE, NMI, AND WATER) MSDS No. M0232

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Oxidation Solution (Iodine in Pyridine, 1-Methylimidazole, and Water)

Product Catalog Number(s): OB3996

Synonyms: Oxidation Solution

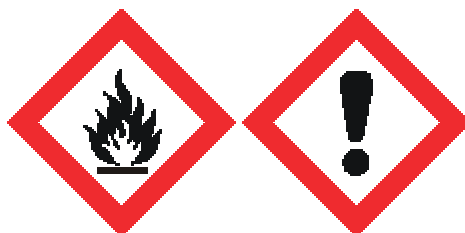
Recommended Use: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

2. COMPOSITION AND INFORMATION ON INGREDIENTS

<u>Ingredient</u>	<u>CAS No</u>	<u>Percent</u>	<u>Hazardous</u>
Pyridine	110-86-1	69-71%	Yes
1-Methylimidazole	616-47-7	19-21%	Yes
Water	7732-18-5	9-11%	No
Iodine	7553-56-2	<1%	Yes

3. HAZARDS IDENTIFICATION

DANGER! CAUSES SEVERE EYE AND SKIN IRRITATION WITH POSSIBLE BURNS. HIGHLY FLAMMABLE LIQUID AND VAPOR! MAY BE HARMFUL IF SWALLOWED, INHALED, OR ABSORBED THROUGH SKIN. FLAMMABLE LIQUID AND VAPOR! OXIDIZER. CAUSES RESPIRATORY TRACT IRRITATION. STENCH. MAY CAUSE CENTRAL NERVOUS SYSTEM DEPRESSION. TARGET ORGANS: BLOOD, KIDNEYS, CENTRAL NERVOUS SYSTEM, LIVER, EYES, SKIN, AND MUCOUS MEMBRANES.



Acute Exposure Hazards:

Inhalation Hazard: Inhalation of high concentrations may cause central nervous effects characterized by nausea, headache, dizziness, unconsciousness, and coma. Causes respiratory tract irritation. Prolonged exposure may result in dizziness and general weakness. Other symptoms reported with acute exposure to pyridine nervousness, insomnia, and loss of appetite.

Ingestion Hazard: May cause gastrointestinal irritation with nausea, vomiting, and diarrhea. May cause liver and kidney damage. May cause central nervous system depression with excitement followed by headache, drowsiness, nausea, and vomiting. Advanced stages may cause collapse, unconsciousness, coma, and possible death. Effects may be delayed.

Skin Contact Hazard: Causes skin irritation. May be harmful if absorbed through the skin. Effects may be delayed. May cause smarting of the skin and first-degree burns after short exposure. Material is readily absorbed through the skin. Pyridine was determined not to be a skin sensitizer in guinea pigs.

Eye Contact Hazard: Contact may cause severe eye irritation and possible burns.

Chronic Exposure Hazards: Repeated or prolonged exposure may cause dermatitis. Chronic inhalation and ingestion may cause effects similar to those of acute inhalation and ingestion. May cause liver and kidney damage. Exposures to pyridine that are too low to produce overt clinical symptoms can cause liver damage and repeated low-level exposures can cause cirrhosis. Feeding studies in rats produced blood effects like changes in clotting factors.

4. FIRST-AID MEASURES

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

Ingestion: Do not induce vomiting unless directed to by medical personnel. If vomiting occurs naturally, have victim lean forward. Never give anything by mouth to an unconscious person. Get medical attention.

Skin Contact: Remove any contaminated clothing. Wash skin with plenty of water for at least 15 minutes. Get medical attention. Wash clothing before reuse.

Eye Contact: Check for and remove contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical help immediately.

Notes to Physician: Treat symptomatically and supportively.

5. FIRE FIGHTING MEASURES

Flammability: Highly flammable liquid and vapor (GHS Category 3)

Auto-ignition Temperature: 482° C (899.6° F)

Flash Point: 17° C (62.6° F)

Flammable Limits: Lower Limit – 1.8 vol %, Upper Limit – 12.4 vol %

Products of Combustion: May decompose into irritating and highly toxic gases under fire conditions (nitrogen oxides, carbon monoxide, and carbon dioxide).

Specific Fire Hazards: As in any fire, always wear self-contained breathing apparatus in pressure-demand (MSA/NIOSH approved or equivalent), and full protective gear. Vapors may form explosive mixtures with air. Use water spray to keep fire exposed containers cool. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

Specific Explosion Hazards: Not available.

Fire Fighting Media: Solid streams of water may be ineffective and spread the fire. Use dry chemical, carbon dioxide, water spray, or alcohol-resistant foam. For larger fires, use water spray, fog, or alcohol-resistant foam. Cool containers with flooding quantities of water and well after fire is out.

National Fire Protective Association: Health - 3, Flammability - 3, Reactivity - 1

NOTE: NFPA ratings involve data and interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this MSDS must be considered.

6. ACCIDENTAL RELEASE MEASURES

Use water spray to reduce vapors. Water spray may reduce vapors but still not prevent ignition in closed spaces. Absorb spilled liquid with sorbent pads, socks, or other inert material such as vermiculite, sand, or earth. Use spark-proof tools. Provide ventilation to the affected area and remove all ignition sources. Evacuate unnecessary personnel and approach the spill from upwind. Pick up absorbed material and place it in a suitable container. Always use proper personal protective equipment as described in section 8. Collect run-off and isolate for proper disposal.

7. HANDLING AND STORAGE

Precautions: Always use proper personal protective equipment as described in section 8. Wash thoroughly after handling. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Remove contaminated clothing and wash before reuse. Empty containers contain product residue (liquid and vapor) and can be dangerous. Keep container tightly closed and away from heat, spark, and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks, or open flames. Use with adequate ventilation. Avoid breathing vapor or mist.

Storage: Keep in a flammables area away from direct sunlight and all sources of ignition and oxidizing materials. Keep in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep from contact with oxidizing materials.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or using the material should be equipped with eyewash station and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Personal Protection: Wear chemical splash goggles. Use butyl rubber gloves and protective clothing to prevent skin exposure. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever possible. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Exposure Limits (Pyridine):

ACGIH – 1 ppm TWA;
NIOSH – 5 ppm TWA; 15 mg/m³ TWA; 1000 ppm IDLH
OSHA Final PELs – 5 ppm TWA; 15 mg/m³ TWA
OSHA Vacated PELs: 5 ppm TWA; 15 mg/m³ TWA

Exposure Limits (Iodine):

ACGIH – 0.1 ppm ceiling;
NIOSH – 0.1 ppm TWA; 1 mg/m³ TWA; 2 ppm IDLH
OSHA Final PELs – 0.1 ppm TWA; 1 mg/m³ TWA

Eye Protection: Wear protective chemical goggles or other appropriate eye protection.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Colorless to dark yellow liquid.

Odor: Strong, penetrating odor – fish-like, nauseating stench

Odor Threshold: 0.4 to 20 ppm for pyridine

Taste: Not available

pH: 8.5 to 11.5

Boiling Point: 115° C @ 760 mm Hg (Pyridine)

Freezing/Melting Point: -42 to -60° C

Decomposition Temperature: Not available

Specific Gravity: 0.9780 to 1.035 g/cm³

Vapor Density (Air=1): 2.73

Vapor Pressure: 0.4 to 40.9 mm Hg @ 20° C.

Evaporation Rate (Butyl acetate = 1): Not available

Viscosity: 0.95 mPa at 20° C

Solubility: Soluble

10. STABILITY AND REACTIVITY

Stability: Stable under normal temperatures and pressure.

Conditions to Avoid: Incompatible materials, ignition sources, excess heat, and confined spaces.

Incompatibility With Various Substances: Strong oxidizing agents, acids, ammonia, powdered metals, alkali metals, carbon dioxide.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, irritating and toxic fumes.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, skin absorption, skin contact

Animal Toxicity (Pyridine):

Draize test, rabbit, skin: 500 mg/24H Mild;

Inhalation, rat: LC50 = 28,500 mg/m³/1H;
Oral, mouse: LD50 = 1500 mg/kg;
Oral, rat: LD50 = 891 mg/kg;
Skin, rabbit: LD50 = 1121 mg/kg;
Skin, rabbit: LD50 = 1 g/kg;

Animal Toxicity (1-Methylimidazole):

Oral, mouse: LD50 = 1400 mg/kg;
Oral, rat: LD50 = 1130 mg/kg;
Intraperitoneal, mouse: LD50 = 380 mg/kg;
Skin, rabbit: LD50 = 400-640 mg/kg;

Animal Toxicity (Iodine):

Oral, rat: LD50 = 14 mg/kg;

Carcinogenicity (Pyridine):

ACGIH: Confirmed animal carcinogen with unknown relevance for humans
California: carcinogen, initial date 5/17/02
Not listed as carcinogens by IARC and NTP.

Epidemiology: No information found.

Teratogenicity: Pyridine cause muscle/skeleton effects when injected into developing chickens but was not teratogenic in frogs at sub lethal doses. The relevance of these studies to human reproduction is unclear.

Reproductive Effects (Iodine): LDLo: 28 mg/kg; Investigated as a reproductive effector

Mutagenicity: Pyridine's mutagenicity potential is equivocal. It was reported to be both positive and negative in Salmonella typhimurium strains. It was not mutagenic in tests for chromosome aberrations, but it did give weak positive results in tests that detect sister chromatid exchanges.

Neurotoxicity: No information found.

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Fish: Fathead minnow: LC50 = 106 mg/L, 96H, flow-through, no data available.

Environmental Fate:

Terrestrial: Should have very high mobility. It is absorbed to acid clay to a moderate extent. Complete degradation in one soil occurred in less than 8 days.

Aquatic: Should biodegrade after an acclimation period and can be lost through volatilization.

Atmospheric: Exists in vapor phase based on a vapor pressure of 20.8 mm Hg and reacts slowly with photochemically produced hydroxyl radicals with experimental half-lives of 32 and 16 days in clean and moderately polluted atmospheres, respectively. Bioconcentration in aquatic animals should not be significant.

Physical: No information available.

13. DISPOSAL CONSIDERATIONS

Material that cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing, use or contamination of this product may change the waste management options. Waste generators must decide if discarded material is a hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of container and unused contents in accordance with federal, state and local requirements. This material is not a "P" listed waste under 40 CFR 261.33. It is a "U" listed waste (U196).

14. TRANSPORT INFORMATION

US DOT

Proper Shipping Name: Flammable liquid, corrosive, n.o.s. (Pyridine, 1-Methylimidazole, Iodine)

Hazard Class: 3, 8

UN Number: UN2924

Packing Group: II

Canada TDG

Proper Shipping Name Flammable liquid, corrosive, n.o.s. (Pyridine, 1-Methylimidazole, Iodine)

Hazard Class: 3, 8

UN Number: UN2924

Packing Group: II

Additional Information: Flashpoint 17C

International (Water, I.M.O.)

Proper Shipping Name: Flammable liquid, corrosive, n.o.s. (Pyridine, 1-Methylimidazole, Iodine)

Hazard Class: 3, 8

UN Number: UN2924

Packing Group: II

International (Air, I.C.A.O.)

Proper Shipping Name: Flammable liquid, corrosive, n.o.s. (Pyridine, 1-Methylimidazole, Iodine)

Hazard Class: 3, 8

UN Number: UN2924

Packing Group: II

15. REGULATORY INFORMATION

US Federal Regulations:

TSCA: All components of this material are listed on the TSCA Inventory.

Health and Safety Reporting List: CAS# 110-86-1: Effective 10/4/82, Sunset 10/4/92.

Chemical Test Rules: CAS# 110-86-1: Not listed

Section 12b: Not listed.

TSCA Significant New Use Rule: Does not have an SNUR under TSCA.

CERCLA Hazardous Substances: CAS# 110-86-1– 1000 lb/454 kg final RQ

SARA Section 302: Does not have a TPQ

SARA Codes: CAS# 110-86-1– immediate, delayed, fire; CAS# 7553-56-2 – acute, chronic, fire

Section 313: CAS# 110-86-1 is subject to SARA Title III Section 313 and 40 CFR 373 reporting requirements.

Clean Air Act: This material contains no hazardous air pollutants (HAP). This material contains no Class 1 Ozone Depleters. This material contains no Class 2 Ozone Depleters.

Clean Water Act: This material contains no Hazardous Substances. This material contains no Priority Pollutants. It has no Toxic Pollutants.

OSHA: Not considered highly hazardous by OSHA.

US State Regulations:

All components can be found on the following state right-to-know lists: California, New Jersey, Pennsylvania, Minnesota, and Massachusetts

California Prop 65: This product contains pyridine, a chemical known to the state of California to cause developmental reproductive toxicity. California No Significant Risk Level: Not listed

Canada:

DSL/NDSL: CAS# 110-86-1 is listed on Canada's DSL list.

WHMIS: This product has a WHMIS classification of B2. This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and this MSDS contains all the information required by those regulations.

Ingredient Disclosure List: CAS# 110-86-1 is listed on Canada's Ingredient Disclosure List.

DSCL (EEC):

Hazard Symbols: Xn; F

Risk Phrases: R11 – Highly Flammable; R20/21/22 – Harmful by inhalation, in contact with skin, and if swallowed; R-34 – Causes burns.

Safety Phrases: S26 – In case of contact with eyes, rinse immediately with plenty of water and seek medical advice; S28A – After contact with skin, wash immediately with plenty of water; S36 - Wear suitable protective clothing; S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/protection): CAS# 110-86-1: 2

16. OTHER INFORMATION

Originally Prepared: 7/21/2008

Last Revised: 7/21/2008

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers and the protection of the environment.

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American International Chemical, Inc.

135 Newbury Street Framingham, MA 01701 (800) 238-0001 (508) 270-1800

Web Site: www.aicma.com Email: info@aicma.com Fax (508) 872-1566