SAFETY DATA SHEET

TEDIA®
High Purity Solvents

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CAP B SOLUTION (1-METHYLIMIDAZOLE, PYRIDINE IN TOLUENE, 20:30:50)

SDS No. M0540

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Capping Solution (1-Methylimidazole and Pyridine in Toluene, 20:30:50)
Synonyms: Capping Solution
Recommended Use: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

2. HAZARDS IDENTIFICATION

Classification:
Flammable Liquids: GHS Category 2
Acute Toxicity, Inhalation: GHS Category 4
Acute Toxicity, Dermal: GHS Category 4
Acute Toxicity, Oral: GHS Category 4
Skin Irritation: GHS Category 4
Eye Damage: GHS Category 1

Label Elements
Signal Word: DANGER!
Hazard Statements:
- H225 – Highly flammable liquid and vapor.
- H302 – Harmful if swallowed
- H305 – May be harmful if swallowed and enters airways.
- H312 – Harmful in contact with skin.
- H314 – Causes severe skin damage and eye burns.
- H332 – Harmful if inhaled.
- H360 – May damage fertility or the unborn child.

Precautionary Statements:
- P210 – Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
- P280 – Wear protective gloves/protective clothing/eye protection/face protection.
- P284 – Wear respiratory protection.

P301+P310 – If SWALLOWED: Immediately call or POISON CENTER or a doctor/physician.
P303+P361+P353 – If on skin or hair: Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P341 – If inhaled: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

Emergency Overview
Harmful if swallowed inhaled, or absorbed though the skin. Causes burns or sever irritation to skin, eyes, and respiratory tract. Aspiration hazards. Breathing vapors may cause drowsiness or dizziness. May be absorbed though intact skin. Affects cardiovascular system, central nervous system, liver, and kidneys. Possible risk to unborn children. Highly flammable liquid or vapor. Static electrical hazard. Hygroscopic.

HMIS Rating:
Health – 2* Flammability – 3 Physical Hazard – 0 PPE – User supplied
NOTE: HMIS ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. These ratings are based on the inherent properties of this chemical under expected conditions of normal use and are not intended to be used in emergency situations. PPE is determined by the user based on their needs and conditions.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Ingredient	CAS No	Percent	Hazardous
1-Methylimidazole	616-47-7	19-21%	Yes
Pyridine	110-86-1	29-31%	Yes
Toluene	108-88-3	49-51%	Yes

4. FIRST-AID MEASURES

Inhalation: If inhaled, remove to fresh air. If breathing is labored or with coughing, give 100% supplemental oxygen. If not breathing, begin artificial respiration, but DO NOT give mouth-to-mouth resuscitation.
Ingestion: Aspiration hazard. If swallowed, rinse mouth with water. Get medical attention immediately; DO NOT induce vomiting unless directed by medical personnel. Never give anything by mouth to an unconscious person. If not breathing, begin artificial respiration. DO NOT give mouth-to-mouth resuscitation.
Skin Contact: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover irritated skin with an emollient or anti-bacterial cream. Soap and cold water may be used. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes 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 attention immediately.
Notes to Physician: Treat symptomatically and supportively. Persons with skin problems or liver, kidney, lung, or blood diseases may at increased risk from exposure to this product. Toluene causes cardiac sensitization to endogenous catelcholamines which may lead to cardiac arrhythmias. Do NOT use adrenergic agents such as epinephrine and pseudoepinepherne.

5. FIRE FIGHTING MEASURES

Flammability: Flammable liquid and vapor (GHS Category 2)
Auto-ignition Temperature (Toluene): 480° C (896° F)
Flash Point (Toluene): 4° C (6° F)
Flammable Limits: Lower Limit –1.8 vol %, Upper Limit – 12.4 vol %
Products of Combustion: May decompose into toxic products under fire conditions (nitrogen oxides, carbon monoxide, 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. 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.
Fire Fighting Media: Water may be ineffective. Use dry chemical, carbon dioxide, or appropriate foam. Solid streams of water may be ineffective and spread material. Cool containers with flooding quantities of water until well after fire is out.
Special Remarks: None
National Fire Protective Association: (ESTIMATED) Health - 2, Flammability - 3, Reactivity - 1
NOTE: NFPA ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. They are for use by emergency personnel to address the hazards that are presented by short term, acute exposure to this product under fire, spill, or similar emergencies. Ratings involve data and interpretations that may vary from company to company.

6. ACCIDENTAL RELEASE MEASURES

Absorb spilled liquid with sorbent pads, socks, or other inert material such as vermiculite, sand, or earth. Avoid runoff into streams and sewers. Provide ventilation to the affected area and remove all ignition sources. Approach the spill from upwind and pick up absorbed material and place it in a suitable container. Always use proper personal protective equipment as described in section 8.

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. 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 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. Protect from moisture.

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 protective chemical goggles and face shield for eye and face protection. Use appropriate protective 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 (Toluene):
ACGIH – 20 ppm TWA
NIOSH – 100 ppm TWA; 375 mg/m^3; 500 ppm IDLH
OSHA Final PELs – 200 ppm; 300 ppm Ceiling
OSHA Vacated PELs: 100 ppm TWA; 375 mg/m^3
Exposure Limits (Pyridine):
ACGIH – 1 ppm TWA;
NIOSH – 5 ppm TWA; 15 mg/m^3 TWA; 1000 ppm IDLH
OSHA Final PELs – 5 ppm TWA; 15 mg/m^3 TWA
OSHA Vacated PELs: 5 ppm TWA; 15 mg/m^3 TWA
Exposure Limits (Methylimidazole): None established

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Colorless liquid.
Odor: Sweetish, ethereal, possibly penetrating odor

Odor Threshold: Toluene – 2.9 ppm; Pyridine - 0.4-20 ppm
Molecular Formula: Not Available
Molecular Weight: Not Available
Auto-ignition Temperature (Toluene): 480° C (896° F)
Flash Point (Toluene): 4° C (6° F)
Flammable Limits: Lower Limit –1.8 vol %, Upper Limit – 12.4 vol %
pH: Toluene- not available; Methylimidazole – 11.3 (100g/l H_2O); Pyridine - 8.5 (0.2 M aqueous solution).
Boiling Point: Toluene – 110.6° C; Methylimidazole – 198° C @ 760 mm Hg; Pyridine - 115° C @ 760 mm Hg.
Freezing/Melting Point: Toluene: -95° C; Methylimidazole: (-60° C); Pyridine – (-42° C)
Decomposition Temperature: Toluene – not available; Methylimidazole: not available; Pyridine: not available
Specific Gravity: Toluene - 0.86 g/cm^3; Methylimidazole – 1.03 g/cm^3; Pyridine - 0.9780 g/cm^3
Vapor Density (Air=1): Toluene – 3.1; Methylimidazole – 2.83; Pyridine – 2.73
Vapor Pressure: Toluene– 28.4 mm Hg @ 25° C; Methylimidazole – 0.478 mm Hg @ 68° F; Pyridine - 40.9 mm Hg @ 20° C.
Viscosity: Toluene - 0.59 cP 20° C; Methylimidazole - not available; Pyridine - 0.95 mPa at 20° C
Solubility: Toluene is insoluble; Methylimidazole is soluble; Pyridine is soluble.
Conductivity (Toluene): Nonconductive; Conductivity = <1 pS/m; Dielectric Constant = 2.38; Relaxation Time Constant = 21 seconds
Conductivity (Pyridine): Conductive; Conductivity = 5.3x10^6 pS/m; Dielectric Constant = 12.4; Relaxation Time Constant = 2.1x10^{-5} seconds

10. STABILITY AND REACTIVITY

Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Ignition sources, excess heat, confined spaces, exposure to moist air or water, contact with water, incompatible materials.
Incompatibility With Various Substances: Strong oxidizing agents, strong acids, mineral acids, nitric acid, sulfuric acid.
Hazardous Decomposition Products: Nitrogen oxides, carbon monoxide, carbon, dioxide.
Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, skin absorption, skin contact
Acute Exposure Hazards:

INHALATION HAZARD: May be harmful if inhaled. Causes chemical burns to the respiratory tract. May cause lung damage. Vapors may cause dizziness or suffocation. Inhalation may cause coughing, irritation of the mucous membranes and respiratory tract, difficulty breathing, and loss of consciousness. Inhalation of vapors may cause abnormal liver function as detected by laboratory results. Other symptoms reported with acute exposure to pyridine nervousness, insomnia, and loss of appetite. Inhalation of high concentrations (>200 ppm) of toluene are clearly associated with central nervous system encephalopathy, headache depression, weakness, exhaustion, impaired coordination, transient memory loss, and impaired reaction time.

INGESTION HAZARD: Causes burns to the gastrointestinal tract. Aspiration into lungs may cause chemical pneumonitis, which may be fatal. May cause severe and permanent damage to the digestive tract. 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.

SKIN CONTACT HAZARD: Causes burns and irritation to skin. Pyridine is not a skin sensitizer in animals. May cause smarting of the skin and first-degree burns after short exposure. Material is readily absorbed through the skin causing symptoms similar to those of inhalation.

EYE CONTACT HAZARD: Contact causes severe eye irritation and burns. Vapors may cause eye irritation. May cause reversible damage.

Chronic Exposure Hazards: Repeated or prolonged exposure may cause dermatitis and defatting of skin. Repeated exposure in combination with constant, loud noise can produce hearing loss and dizziness. Chronic hydrocarbon abuse, such as sniffing glue or light hydrocarbons as contained in this material, has been associated with irregular hear rhythms and potential cardiac arrest. Toluene abuse has been linked with kidney disease, as evidenced by blood, protein, and pus in

the urine, accompanied by elevated serum creatinine, decreased urinary output, and metabolic and renal tubular acidosis. Although kidney toxicity is not common in cases of occupational toluene exposure, there has been at least one report of renal toxicity following a 40-year occupational exposure to toluene. Toluene does not cause severe bone marrow injury characteristic to benzene poisoning. Intentional abuse of toluene vapors has been linked to damage to the brain, liver, and kidneys, as well as to death. Repeated inhalation exposure to animals causes histological changes in the brain, degeneration of heart tissue, and possible immune system effects. 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.

Animal Toxicity (Toluene):

Draize test, rabbit, eye: 870 ug Mild;
Draize test, rabbit, eye: 2 mg/24H Severe;
Draize test, rabbit, skin: 435 mg Mild;
Draize test, rabbit, skin: 500 mg Moderate;
Draize test, rabbit, skin: 20 mg/24 hr Moderate;
Inhalation, mouse: LC50 = 400 ppm/42H;
Inhalation, mouse: LC50 = 30,000 mg/m^3/2H;
Inhalation, mouse: LC50 = 19,900 mg/m^3/7H;
Inhalation, mouse: LC50 = 10,000 mg/m^3;
Inhalation, rat: LC50 = 49 mg/m^3/4H;
Oral, rat: LD50 = 636 mg/kg;
Skin, rabbit: LD50 = 14,100 mg/kg;

Animal Toxicity (Methylimidazole):

Oral, mouse: LD50 = 1400 mg/kg;
Rabbit, eye irritation (unrinsed): corrosive.
Rabbit, primary skin irritation: corrosive.
Rat, inhalation safety screen: not lethal, sat vapor, room temp.
Rabbit, dermal LD50: 400-640 mg/kg moderately toxic.

Animal Toxicity (Pyridine):

Draize test, rabbit, skin: 500 mg/24H Mild;
Inhalation, rat: LC50 = 28,500 mg/m^3/1H;
Oral, mouse: LD50 = 1500 mg/kg;
Carcinogenicity: Methylimidazole and toluene are not listed as carcinogens by ACGIH, IARC, NTP, or CA Prop 65. Pyridine is an ACGIH Confirmed animal carcinogen with unknown relevance for humans and a California: carcinogen, initial date 5/17/02.

Toluene

Epidemiology: No information available.
Teratogenicity: In an epidemiological study of toluene and pregnancy, occupational exposures to toluene were said to be associated with an increased incidence of renal, urinary, gastrointestinal, and cardiac anomalies. Reduced fetal weight, effects on learning and memory, and hearing loss in males were observed in the of-spring of rats exposed by inhalation at levels that did not cause toxic affects in the mother.
Reproductive Effects: Many reports of reproductive effects of toluene abuse or heavy occupational exposure are confounded by mixed solvent exposure or fetal alcohol syndrome. In women exposed to toluene in lab work, the risk of spontaneous abortion increased 4.7 times.
Mutagenicity: No information available.
Neurotoxicity: No information available.

Pyridine

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: No information found.

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.

Methylimidazole
Epidemiology: No information found.
Teratogenicity: No information found.
Reproductive Effects: No information found.
Mutagenicity: No information found.
Neurotoxicity: 1-Methylimidazole produced neurological effects and convulsions in mice.

12. ECOLOGICAL INFORMATION

Ecotoxicity (Toluene):
Bluegill: LC50 = 17 mg/L/24H;
Shrimp: LC50 = 4.3 ppm/96H;
Fathead minnow: LC50 = 36.2 mg/L/96H;
Sunfish (Fresh water): TLm = 1180 mg/L/96H;
Environmental Fate (Toluene): When released to soil, product is expected to evaporate and be microbially biodegraded. In water, product is expected to biodegrade and volatilize. Photochemically produced hydroxyl radicals degrade this material.
Ecotoxicity (Pyridine):
Fish: Fathead minnow: LC50 = 106 mg/L, 96H, flow-through, no data available.
Environmental Fate (Pyridine):
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 volatization.
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.
Environmental Fate (Methylimidazole): Not readily biodegradable.

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. Toluene is a "U" listed waste (U220). Pyridine is a "U" listed waste (U196).

14. TRANSPORT INFORMATION

US DOT, IATA, IMO
Proper Shipping Name: Flammable Liquid, corrosive, n.o.s. (Toluene, Pyridine, Methylimidazole)
Hazard Class: 3(8)
UN Number: UN2924
Packing Group: II

Canada TDG
Additional Information: Flashpoint 4 C

15. REGULATORY INFORMATION

US Federal Regulations:

TSCA: CAS# 108-88-3, CAS# 110-86-1, and CAS# 616-47-7 are listed on the TSCA Inventory.

Health and Safety Reporting List: CAS# 110-86-1and CAS# 108-88-3: Effective 10/4/82, Sunset 10/4/92.

Chemical Test Rules: CAS# 109-99-9 – 40 CFR 799.5115

Section 12b: CAS# 75-05-8 – Section 4, 1% de minimis rule

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

CERCLA Hazardous Substances: CAS# 108-88-3; 1000 lbs/454 kg final RQ; CAS#; CAS# 110-86-1– 1000 lb/454 kg final RQ

SARA Section 302: Does not have a TPQ

SARA Codes: CAS# 108-88-3– immediate, fire; CAS# 110-86-1– immediate, delayed, fire.

Section 313: Methylimidazole (CAS# 616-47-7) is not subject to SARA Title III Section 313 and 40 CFR 373 reporting requirements. Pyridine (CAS# 110-86-1) and Toluene (CAS# 108-88-3) are subject to SARA Title III Section 313 and 40 CFR 373 reporting requirements.

Clean Air Act: CAS# 616-47-7 and CAS# 110-86-1 are not listed as hazardous air pollutants (HAP). They are not Class 1 Ozone Depleters. They are not Class 2 Ozone Depleters.

Clean Air Act: CAS# 108-88-3 is listed as hazardous air pollutants (HAP). It is not a Class 1 Ozone Depleter. It is not a Class 2 Ozone Depleter.

Clean Water Act: CAS# 616-47-7 and CAS# 110-86-1 are not listed as a Hazardous Substance. They are not Priority Pollutants. They are not Toxic Pollutants.

Clean Water Act: CAS# 108-88-3 is listed as a Hazardous Substance. It is not a Priority Pollutant. It is not a Toxic Pollutant.

OSHA: Not considered highly hazardous by OSHA.

US State Regulations:

CAS# 108-88-3, CAS# 110-86-1, and CAS# 108-24-7 are 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# 108-88-3, CAS# 110-86-1, and CAS# 616-47-7 are listed on Canada's DSL list.

WHMIS: This product has a WHMIS classification of B2, D1B, D2A, D2B, E. 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# 108-88-3, CAS# 110-86-1, and CAS# 108-24-7 are listed on Canada's Ingredient Disclosure List.

DSCL (EEC):

Hazard Symbols: C, T, Xn; F

Risk Phrases: R11 – Highly Flammable; R20/21/22 – Harmful by inhalation, in contact with skin, and if swallowed; R34 – Causes burns; R36/37/38 – Irritating to eyes, skin, and respiratory system; R40 – Harmful: danger of serious damage to health; R63 – Possible risk of harm to the unborn child; R65 – Harmful: may cause lung damage if swallowed; R67 – vapors may cause drowziness and dizziness.

Safety Phrases: S16 – Keep away from sources of ignition-no smoking; S26 – In case of contact with eyes, rinse immediately with water and seek medical advice; S28 – After contact with skin, wash immediately with plenty of water; S29: Do not empty into drains; S33: Take precautionary measures against static discharges; S36/37/39: Wear suitable protective clothing, gloves, and eye/face protection; S45 - In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible); S46 – If swallowed, seek medical advice immediately and show this container or label; S62 – If swallowed, do not induce vomiting, seek medical advice immediately and show this container or label.

WGK (Water Danger/protection): CAS# 108-88-3: 1; CAS# 16-47-7: 2; CAS# 110-86-1: 2

16. OTHER INFORMATION

Originally Prepared: 2/11/2008

Last Revised: 12/1/2015 – Updated information for eye and face protection in Section 8.

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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