

SAFETY DATA SHEET



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CAP B SOLUTION (ACETIC ANHYDRIDE AND 2,6-LUTIDINE IN ACETONITRILE, 2:3:5)

SDS No. 0295

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Cap B Solution (Acetic Anhydride and 2,6-Lutidine in Acetonitrile, 2:3:5)

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 2

Acute Toxicity, Oral: GHS Category 4

Serious Eye Damage: GHS Category 1

Skin Irritation: GHS Category 2

Label Elements

Signal Word: DANGER!

Hazard Statements:

H225 – Highly flammable liquid and vapor.

H302 – Harmful if swallowed.

H314 – Causes severe skin burns and eye damage.

H318 – Causes serious eye damage.

H330 – Fatal if inhaled.

Precautionary Statements:

P210 – Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

P233 – Keep container tightly closed.

P241 – Use explosion proof electrical/ventilation/lighting/equipment.

P243 – Take precautionary measures against static discharge.

P261 – Avoid breathing dust/fumes/gas/mist/vapor/spray.

P270 – Do not eat, drink, or smoke while using this product.

P280 – Wear protective gloves/protective clothing/eye protection/face protection.

Clear focus. Consistent results. Complete confidence.

P301+P312+P330 - IF SWALLOWED: Call a POISON CENTER or a doctor/physician if you feel unwell. Rinse mouth.
 P301+P330+P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
 P303+P361+P353 – IF ON SKIN or HAIR: Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
 P304+P340+P310 - IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
 P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing.
 P405 – Store locked up.
 P501 – Dispose of contents/container at an approved waste disposal plant.

Emergency Overview

May be fatal if swallowed, inhaled, or absorbed through the skin. Causes burns and severe irritation to skin, eyes, and respiratory tract. Causes excessive tearing. Readily absorbs through the skin. Affects cardiovascular system, central nervous system, liver, and kidneys. May metabolize to cyanide in the body. Highly flammable liquid and vapor. . Moisture sensitive

HMIS Rating (estimated):

Health – 2* Flammability – 3 Physical Hazard – 1 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

<u>Ingredient</u>	<u>CAS No</u>	<u>Percent</u>	<u>Hazardous</u>
Acetic Anhydride	108-24-7	20%	Yes
2,6-Lutidine	108-48-5	30%	Yes
Acetonitrile	75-05-8	50%	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: 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: Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately. Check for and remove contact lenses if safe to do so.

Notes to Physician: Exposure should also be treated as cyanide poisoning. Effects may be delayed. For methemoglobinemia, administer oxygen alone or oxygen with Methylene Blue depending on the methemoglobin concentration in the blood. May be partially metabolized in the body. Always have a cyanide antidote kit on hand when working with cyanide compounds. Treat symptomatically and supportively.

5. FIRE FIGHTING MEASURES

Flammability: Flammable liquid and vapor (GHS Category 2)

Auto-ignition Temperature: Acetic Anhydride - 316° C (600° F)

Flash Point: Acetonitrile - 2° C (35.6° F)

Flammable Limits: Lower Limit – 2.9 vol %, Upper Limit – 16.0 vol %

Products of Combustion: May decompose into toxic products under fire conditions (hydrogen cyanide, 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. *Acetic anhydride is water reactive.* 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: Containers may explode in the heat of a fire.

Fire Fighting Media: Use sand, dry chemicals, carbon dioxide, or appropriate foam. If water is the only media available, use in flooding amounts.

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. Store locked up.

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 based on most strict values for each component: *Acetonitrile, Acetic Anhydride, Lutidine.*

ACGIH – 5 ppm TWA. (Acetic Anhydride)

NIOSH – 200 ppm IDLH. (Acetic Anhydride)

OSHA Final PELs – 5 ppm TWA, 20 mg/m³ TWA. (Acetic Anhydride)

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Colorless liquid.

Odor: pungent odor

Odor Threshold: Not Available

Molecular Formula: Not Available

Molecular Weight: Not Available

Auto-ignition Temperature: Acetic Anhydride - 316° C (600° F)

Flash Point: Acetonitrile - 2° C (35.6° F)

Flammable Limits: Lower Limit -2.9 vol %, Upper Limit - 16.0 vol %

pH: Acetonitrile - Not available; Acetic Anhydride - 3 (10g/L aq sol 20°C).

Boiling Point: Acetonitrile - 81.6° C @ 760 mm Hg; Acetic Anhydride - 140° C @ 760 mm Hg; Lutidine - 143-145 deg C @ 760 mmHg.

Freezing/Melting Point: Acetonitrile: -45° C; Acetic Anhydride: not available; Lutidine - (-6° C)

Decomposition Temperature: Acetonitrile - > 500° C; Acetic Anhydride: not available; Lutidine: not available

Specific Gravity: Acetonitrile - 0.7810 g/cm³; Acetic Anhydride - 1.082 g/cm³; Lutidine - 0.920 g/cm³

Vapor Density (Air=1): Acetonitrile - 1.42; Acetic Anhydride - 3.5; Lutidine - 3.7

Vapor Pressure: Acetonitrile - 88.8 mm Hg @ 25° C; Acetic Anhydride - 3.9 mm Hg @ 68° F; Lutidine - 4 mm Hg @ 20° C.

Viscosity: Acetonitrile - 0.36 cP 20° C; Acetic Anhydride - 0.91mPa.s @ 20 deg C; Lutidine - not available

Solubility: Acetonitrile is soluble; Acetic Anhydride decomposes in water; Lutidine - 40 g/100mL (20°C).

10. STABILITY AND REACTIVITY

Stability: Stable under normal temperatures and pressures. Acetic Anhydride may decompose if exposed to moist air or water. Substance is readily hydrolyzed. Reacts with water to form acetic acid.

Conditions to Avoid: Ignition sources, excess heat, exposure to moist air or water, contact with water, incompatible materials.

Incompatibility With Various Substances: Metals, oxidizing agents, reducing agents, bases, acids, acid chlorides, chloroformates, alcohols, amines, ammonia, nitrates, nitric acid, permanganates, phenols, sodium hydroxide, hydrogen peroxide, chromium trioxide, potassium hydroxide, perchloric acid, ethanol.

Hazardous Decomposition Products: Hydrogen cyanide, nitrogen oxides, carbon monoxide, carbon, dioxide.

Hazardous Polymerization: Will not occur in acetonitrile. Has not been reported in Acetic Anhydride.

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. Aspiration hazard. Breaks down slowly in the body releasing cyanide ion and very high concentrations may produce cyanide poisoning. Symptoms are usually delayed several hours and include stomach or intestinal upset (nausea, vomiting, diarrhea) irritation (nose, throat, airways), headache, central nervous system depression (dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness), muscle weakness, kidney effects, effects on heart rate, loss of coordination, cyanosis (causes blue coloring of the skin and nails from lack of oxygen), lung edema (fluid buildup in the lung tissue). Victims may have an irregular heartbeat and feel tightness in the chest. Severe overexposure may result in death.

INGESTION HAZARD: Causes burns to the gastrointestinal tract. May cause perforation of the digestive tract. May cause tissue anoxia with symptoms of dizziness, drowsiness, weakness, fatigue, nausea, headache, unconsciousness, effects on heart rate, loss of coordination, cyanosis (causes blue coloring of the skin and nails from lack of oxygen), and coma. Severe overexposure may result in death. In single dose toxicity studies by various routes, different animal species and different individuals of the same species displayed widely varying susceptibility to acetonitrile. The oral LD50 range for mammals was 140-6762 mg/kg body weight. A well conducted study of mice calculated an oral LD50 of 617 mg/kg.

SKIN CONTACT HAZARD: Causes burns to skin. May be absorbed into body. Absorbed material may be metabolized into cyanide which inhibits cytochrome oxidase impairing cellular respiration. Poisoning from dermal contact has been reported and an LD50 > 2000 mg/kg was obtained in a well conducted acute dermal toxicity study in rabbits.

EYE CONTACT HAZARD: Contact causes burns. Damage may be delayed. Causes excessive tearing.

Chronic Exposure Hazards: Effects may be delayed. Prolonged skin contact may be painless and cause redness and subsequently a white appearance of the skin accompanied by wrinkling. Acetonitrile is toxic to blood kidneys, liver, mucous membranes, gastrointestinal tract, upper respiratory tract, skin, eyes, and central nervous system. It may be toxic to the

reproductive system. Repeated or prolonged exposure can produce target organ damage. Repeated exposure may produce general deterioration of health in target organs. Acetonitrile may be metabolized to cyanide in the body which inhibits cytochrome oxidase impairing cellular respiration.

Animal Toxicity (Acetonitrile):

Draize test, rabbit, eye: 100 uL/24H Moderate;
 Inhalation, mouse: LC50 = 2693 ppm/1H;
 Inhalation, rabbit: LC50 = 2828 ppm/4H;
 Inhalation, rat: LC50 = 7551 ppm/8H;
 Oral, mouse: LD50 = 269 mg/kg;
 Oral, rabbit: LD50 = 50 mg/kg;
 Oral, rat: LD50 = 2460 mg/kg;
 Skin, rabbit: LD50 = 2000 mg/kg;

In a well conducted study of mice, the oral LD50 of acetonitrile was calculated to be 617 mg/kg.

Animal Toxicity (Acetic Anhydride):

Inhalation, rat: LC50 = 1000 ppm/4H;
 Oral, rat: LD50 = 1780 mg/kg;
 Skin, rabbit: LD50 = 4 mL/kg;

Animal Toxicity (Lutidine):

Dermal, guinea pig: LD50 = 2500 mg/kg;
 Oral, rat: LD50 = 400 mg/kg;

Carcinogenicity: No component is listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65

Acetonitrile

Epidemiology: Three volunteers were exposed for 4 hours at 40, 80, and 160 ppm acetonitrile. At 40 ppm, odor was detected, after which olfactory fatigue was noted. At this concentration, two persons had no signs of response, including no appreciable blood or urinary cyanide or thiocyanate. The third person experiences slight tightness in the chest that evening. A sensation of cooling in the lungs was observed and persisted for 24 hours. Traces of urinary thiocyanate were recorded.

Teratogenicity: In most of the available assays, teratogenicity was associated with maternal toxicity. In a well conducted study, rats exposed by inhalation to acetonitrile did not result in significant fetal effects, even in concentrations that were overtly toxic to the dam. In this study, a maternal NOAEL of 1200 ppm and NOAEL of 1200 ppm with respect to developmental toxicity were established. A case-control study of pregnancy outcome among Finnish lab workers revealed no association between exposure to acetonitrile and increased risk of spontaneous abortion in mothers, or malformation and birth weight in their children.

Reproductive Effects: In relation to fertility, there is no information available in humans and there are no animal studies specifically investigating such effects. However, no changes were seen in weight of the right cauda or right testis and no effect on sperm motility in rats or mice exposed for 13 weeks with 100, 200, and 400 ppm to acetonitrile.

Acetic Anhydride

No information available

Lutidine

No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity Acetonitrile):

Fish: Fathead minnow: 1150 ppm; 24 Hr; TLm (hard water);
 Fish: Fathead minnow: 1000 mg/L; 96 Hr; TLm (soft water);
 Fish: Bluegill/Sunfish: 1850 mg/L; 96 Hr; TLm (soft water);
 Fish: Fathead minnow: 1640 mg/L; 96 Hr; LC50 (flow-bioassay);
 Fish: Fathead minnow: 1640 mg/L; 96 Hr; EC50 (flow-bioassay) No data available;

Ecotoxicity (Lutidine):

Invertebrates: LC100 (24 hr) Tetrahymena pyriformis 3.50 g l-1 (1).

EC50 (5-30 min) Photobacterium phosphoreum 117 mg l-1 Microtox test (2)

Environmental Fate (Acetonitrile): Estimated Koc value = 16. Acetonitrile is expected to weakly adsorb to most soils based on the Koc value. Volatilization from soil surfaces and leaching into ground water is expected to be significant. Estimated BCF value = 0.3. This value indicates that acetonitrile will not significantly bioconcentrate in aquatic organisms or adsorb to suspended solids and sediments in water. Acetonitrile is unreactive towards photochemically-generated free radicals and direct photolysis in the gaseous phase. Acetonitrile is biodegradable.

Environmental Fate (Acetic Anhydride): Terrestrial: Will readily infiltrate downward toward ground water. Aquatic: Will react slowly and become miscible and will produce an irritating vapor. Mixing takes place and the spill is diluted. In rivers, the principal mixing agent is stream turbulence. Atmospheric: Since acetic anhydride is a relatively non-volatile liquid, direct venting of the vapor to the atmosphere from a hole in a ruptured vessel does not constitute a significant hazard downwind. Only vapor released from a liquid pool spilled on the ground or water surfaces is important. Not expected to bioconcentrate or degrade.

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 hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of containers and unused contents in accordance with federal, state and local requirements. Acetonitrile is a "U" listed waste (U003 – ignitable, toxic waste).

14. TRANSPORT INFORMATION

US DOT, IATA, IMO

Proper Shipping Name: Flammable Liquids, Corrosive, n.o.s. (Acetonitrile, Lutidine, Acetic Anhydride)

Hazard Class: 3(8)

UN Number: UN2924

Packing Group: II

Canada TDG

Additional Information: Flashpoint 2C

15. REGULATORY INFORMATION

US Federal Regulations:

TSCA: CAS# 75-05-8, CAS# 108-48-5 and CAS# 108-24-7 are listed on the TSCA Inventory.

Health and Safety Reporting List: CAS# 75-05-8 – Effective 10/4/82, sunset 10/4/92.

Chemical Test Rules: CAS# 75-05-8 – 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# 75-05-8 – 5000 lb final RQ; 2270 kg final RQ; CAS# 108-24-7: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302: Does not have a TPQ

SARA Codes: CAS# 75-05-8 – immediate, delayed, fire; CAS # 108-24-7: immediate, delayed, fire, reactive; CAS# 108-48-5 – immediate, fire..

Section 313: Acetonitrile (CAS# 75-05-8) is subject to SARA Title III Section 313 and 40 CFR 373 reporting requirements. Lutidine (CAS# 108-48-5) and Acetic Anhydride (CAS# 108-24-7) are not reportable.

Clean Air Act: CAS# 75-05-8 is listed as a hazardous air pollutant (HAP). It is not a Class 1 Ozone Depleter. It is not a Class 2 Ozone Depleter.

Clean Air Act: CAS# 108-24-7 8 is not listed as a hazardous air pollutant (HAP). It is not a Class 1 Ozone Depleter. It is not a Class 2 Ozone Depleter.

Clean Water Act: CAS# 75-05-8 is not listed as a Hazardous Substance. It is not a Priority Pollutant. It is not a Toxic Pollutant.

Clean Water Act: CAS# 108-24-7 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# 75-05-8 and CAS# 108-24-7 are on the following state right-to-know lists: California, New Jersey, Pennsylvania, Minnesota, and Massachusetts

California Prop 65: California No Significant Risk Level: Not listed

Canada:

DSL/NDSL: CAS# 75-05-8, CAS# 108-48-5, and CAS# 108-24-7 are listed on Canada's DSL list.

WHMIS: This product has a WHMIS classification of B2, B3, D1A, D1B, D2B, E. This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and this MSDS contains all the information required by those regulations.

Ingredient Disclosure List: CAS# 75-05-8, CAS# 108-48-5, and CAS# 108-24-7 are listed on Canada's Ingredient Disclosure List.

DSCL (EEC):

Hazard Symbols: C, 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.

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; 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).

WGK (Water Danger/protection): CAS# 75-05-8: 2; CAS# 108-24-7: 1

16. OTHER INFORMATION

Originally Prepared: 2/11/2008

Last Revised: 03/30/2023 – Updated hazard statements, precautionary statements.

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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