

Burdick & Jackson

Material Safety Data Sheet

Capping A

(20% N-Methylimidazole/ 80% Acetonitrile, v/v)

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Capping A

OTHER/GENERIC NAMES: N-Methylimidazole/Acetonitrile mixture, Cap Mix B, Cap A, and Capping Reagent

PRODUCT NUMBER: 654

PRODUCT USE: DNA Synthesis Reagent

MANUFACTURER: Honeywell, Burdick & Jackson
1953 South Harvey Street
Muskegon, MI 49442

FOR MORE INFORMATION CALL:
(Monday-Friday, 8:00am-5:00pm Eastern Time)
1-800-368-0050

IN CASE OF EMERGENCY CALL:
(24 Hours/Day, 7 Days/Week)
1-800-707-4555 (Honeywell – Domestic)
602-365-4980 (Honeywell – International)
For Transportation Emergencies:
1-800-424-9300 (CHEMTREC – Domestic)
703-527-3887 (CHEMTREC – International)

3. COMPOSITION/INFORMATION ON INGREDIENTS

| <u>INGREDIENT NAME</u> | <u>CAS NUMBER</u> | <u>WEIGHT %</u> |
|------------------------|-------------------|-----------------|
| Acetonitrile | 75-05-8 | 75 |
| N-Methylimidazole | 616-47-7 | 25 |

Trace impurities and additional material names not listed above may also appear in Section 15 toward the end of the MSDS. These materials may be listed for local "Right-To-Know" compliance and for other reasons.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Flammable liquid and vapor. Corrosive, Toxic. Clear colorless liquid that can cause skin and eye burns. Causes skin, eye and respiratory tract irritation. Can cause convulsions and fatal cyanide poisoning.

POTENTIAL HEALTH HAZARDS

SKIN: Causes irritation and can cause burns. May be absorbed through the skin producing effects similar to those described for inhalation.

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EYES: Causes irritation and may cause burns. Can cause redness, pain and may cause permanent eye injury.

INHALATION: Harmful if inhaled. Causes respiratory tract irritation. Depending on concentration and length of exposure, high concentrations can cause headache, nausea, vomiting, respiratory depression, weakness, irregular heart beat, abdominal pain, chemical pneumonitis, pulmonary edema, convulsions, shock, unconsciousness and death.

INGESTION: Harmful if swallowed. May cause burns to the mouth, throat and stomach and symptoms similar to those described for inhalation.

DELAYED EFFECTS: May cause liver and kidney damage.

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

| <u>INGREDIENT NAME</u> | <u>NTP STATUS</u> | <u>IARC STATUS</u> | <u>OSHA LIST</u> |
|--|-------------------|--------------------|------------------|
| No ingredients listed in this section. | | | |

4. FIRST AID MEASURES

SKIN: Immediately flush affected area with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get immediate medical attention. Launder contaminated clothing before reuse.

EYES: Immediately flush with water, continuing for at least 15 minutes. Get immediate medical attention.

INHALATION: Remove to fresh air. If breathing has stopped, apply artificial respiration. If breathing is difficult, give oxygen provided a qualified operator is available. Get immediate medical attention.

INGESTION: If conscious, rinse mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Get immediate medical attention.

ADVICE TO PHYSICIAN: Acetonitrile is metabolized to cyanide. Patients with significant exposures should be observed for signs of cyanide poisoning and treated accordingly.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: 42°F (6°C)

FLASH POINT METHOD: TAG Closed Cup

AUTOIGNITION TEMPERATURE: 975°F (524°C) for 100% Acetonitrile

UPPER FLAMMABLE LIMIT (volume % in air): 16% for 100% Acetonitrile

LOWER FLAMMABLE LIMIT (volume % in air): 3% for 100% Acetonitrile

FLAME PROPAGATION RATE (solids): Not Applicable

OSHA FLAMMABILITY CLASS: IB, Flammable Liquid

EXTINGUISHING MEDIA:

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Carbon dioxide, dry chemical, water spray or alcohol resistant foam.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Dangerous fire hazard when exposed to heat or flame. Emits toxic fumes under fire conditions. Sealed containers may rupture when heated. Above the flash point, vapor/air mixtures are explosive within flammable limits noted above. Vapor is heavier than air and danger of flashback exists.

SPECIAL FIRE FIGHTING PRECAUTIONS/INSTRUCTIONS:

Wear full protective clothing and NIOSH approved self-contained breathing apparatus with full facepiece. Fire may produce toxic and flammable cyanide fumes. Do not release runoff from fire fighting efforts to sewers or waterways.

6. ACCIDENTAL RELEASE MEASURES

IN CASE OF SPILL OR OTHER RELEASE: (Always wear recommended personal protective equipment.)

Eliminate sources of ignition. Isolate the spill area. Use non-sparking tools and equipment. Stop leak in a safe and practical manner. Contain and recover liquid when possible. Absorb small spills with inert, non-combustible material and place in an approved chemical waste container. Dike large spills with inert material and transfer liquid into same container. Do not allow to enter into sewers or waterways.

Spills and releases may have to be reported to Federal and/or local authorities. See Section 15 regarding reporting requirements.

7. HANDLING AND STORAGE

NORMAL HANDLING: (Always wear recommended personal protective equipment.)

Use with adequate explosion proof ventilation. Use non-sparking tools and ground containers during transfers to avoid static sparks. Keep away from heat, sparks and flame. Do not breathe vapors. Avoid contact with skin, eyes and clothing. Do not eat, drink or smoke in the work area.

STORAGE RECOMMENDATIONS:

Store in a cool, dry, well ventilated area suitable for flammable liquids. (OSHA 29 CFR 1910.106)

Protect from temperature extremes and sunlight, and store away from incompatible substances and in accordance with 29 CFR 1910.106. Avoid acids, bases, oxidizers, explosives, nitrogen-fluorine compounds, sulfites, perchlorates, reducing agents and plastics. Protect containers from physical damage. Empty containers may contain product residue and/or vapors. Label warnings apply to empty containers that have not been cleaned.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS:

Provide general or local exhaust ventilation systems to maintain airborne concentrations below exposure limits. Use of local exhaust and/or a fume hood is recommended.

PERSONAL PROTECTIVE EQUIPMENT

SKIN PROTECTION:

Wear chemically protective gloves, boots and apron, as appropriate to prevent skin contact. Inspect for signs of degradation before each use. Replace as needed. Showering after work is recommended.

EYE PROTECTION:

Wear protective eyeglasses or chemical safety goggles. Use a full-face shield if liquid contact is possible.

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Refer to OSHA eye and face-protection regulations (29 CFR 1910.133).

RESPIRATORY PROTECTION:

Not required for properly ventilated areas. If there is potential for inhalation of vapor or mist, use an appropriate NIOSH approved respirator.

The respirator must be selected based on contamination levels and use conditions found in the workplace. Use conditions must not exceed the working limits of the respirator. The respirator must be approved by the National Institute for Occupational Safety and Health (NIOSH) and used in accordance with Occupational Safety and Health Administration (OSHA) 29 CFR 1910.134.

ADDITIONAL RECOMMENDATIONS:

Safety showers and eyewash stations convenient to work area. Protective clothing, boots, faceshield and hat, cleaned daily, if exposure to liquid (splashing etc.) is possible. Separate contaminated work clothes from street clothes. Launder contaminated clothing before reuse.

EXPOSURE GUIDELINES

| <u>INGREDIENT NAME</u> | <u>ACGIH TLV</u> | <u>OSHA PEL</u> | <u>NIOSH</u> |
|------------------------|---------------------------------------|---|---|
| Acetonitrile | 20 ppm TWA (8 hr exposure limit) * | 40 ppm TWA 70 mg/m ³ TWA 60 ppm STEL 105 mg/m ³ STEL | REL: 20 ppm 10 hr day/40 hr week REL: 34 mg/m ³ 10 hr day/40 hr week IDLH: 500 ppm |

* Skin designation: Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.

OTHER EXPOSURE LIMITS FOR POTENTIAL DECOMPOSITION PRODUCTS:

| <u>INGREDIENT NAME</u> | <u>ACGIH TLV</u> | <u>OSHA PEL</u> | <u>NIOSH</u> |
|------------------------|-------------------------|--|---|
| Hydrogen Cyanide | 4.7 ppm ceiling (skin)* | 10 ppm TWA(skin) 11 mg/m ³ TWA(skin) | NIOSH skin designation 4.7 ppm (5 mg/m ³) STEL IDLH: 50 ppm |

9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|--|---|
| APPEARANCE: | Clear, Colorless |
| PHYSICAL STATE: | Liquid |
| MOLECULAR WEIGHT: | Mixture |
| CHEMICAL FORMULA: | Mixture |
| ODOR: | Ether like odor |
| SPECIFIC GRAVITY (water = 1.0): | 0.827 gm/cc @ 68°F (20°C) |
| SOLUBILITY IN WATER (weight %): | 100% @ 68°F (20°C) |
| pH: | Not applicable |
| BOILING POINT: | 188°F (86.6°C) for 100% Acetonitrile |
| MELTING POINT: | -46.8°F (-43.8°C) a.k.a. Freezing Point for 100% Acetonitrile |
| VAPOR PRESSURE: | 73 mm Hg at 68°F (20°C) for 100% Acetonitrile |
| VAPOR DENSITY (air = 1.0): | 1.42 for 100% Acetonitrile |
| EVAPORATION RATE: | 5 for 100% Acetonitrile |
| % VOLATILES: | 100 for 100% Acetonitrile |
| FLASH POINT: | 42°F (6°C) |

COMPARED TO: Butyl Acetate = 1

(Flash point method and additional flammability data are found in Section 5.)

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10. STABILITY AND REACTIVITY

STABILITY (CONDITIONS TO AVOID):

Stable at room temperature in closed containers under normal storage and handling conditions. Avoid heat, ignition sources, and incompatible materials.

INCOMPATIBILITIES:

Acids, bases, oxidizers, explosives, nitrogen-fluorine compounds, sulfites, perchlorates, reducing agents and plastics.

CONDITIONS TO AVOID:

Heat, flame, ignition sources and incompatible material.

HAZARDOUS DECOMPOSITION PRODUCTS:

Thermal decomposition can produce toxic fumes of hydrogen cyanide, carbon monoxide, carbon dioxide, nitrogen and sulfur oxides.

HAZARDOUS POLYMERIZATION:

Will not occur.

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:

Capping A: In Vitro Corrositex Test: Penetration of biobarrier 38.6 min., indicative of skin corrosion, PG III.

Acetonitrile:

Oral LD₅₀ (rat): 2,460 mg/kg

Oral TDLo (human): 571 mg/kg

Inhalation LC₅₀ (mouse): 3587 ppm/4H, male & female

Inhalation LC₅₀ (rat): 7551 ppm/8H

Inhalation LCLo (dog): 16,000 ppm/4H

Inhalation TCLo (human): 160 ppm/4H, symptoms included slight flushing of face at 2 h & slight feeling of bronchial tightness at 5 h after exposure

Eye Irritation (rabbit): 100 μ L undiluted/24H - Severe, permanent damage to the cornea

Skin Irritation (rabbit): 500 mg - Mild irritation

Skin LD₅₀ (rabbit): >2,000 mg/kg, male & female

Skin Sensitization (guinea pig): Not sensitizing, method of Ritz and Buehler

N-Methylimidazole:

Oral LD₅₀ (rat): 1130 mg/kg

Skin LD₅₀ (rabbit): 400-640 mg/kg

Rabbit Skin: Corrosive

Rabbit Eye (unrinsed): Corrosive

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DELAYED (SUBCHRONIC AND CHRONIC) EFFECTS:

Acetonitrile:

Blood, liver and kidney effects, and pulmonary edema have been observed in animal subchronic and chronic exposure studies. Acetonitrile is metabolized to cyanide in the body, and many toxic consequences (e.g., blood effects) are related to the formation of this metabolite.

2-Year Inhalation Carcinogenesis Studies (rat and mouse): In rats, there was no evidence of carcinogenic activity in females exposed to 100, 200, or 400 ppm; there was equivocal evidence of carcinogenic activity in males exposed to 400 ppm based on marginally increased incidences of liver adenoma and carcinoma. In mice, there was no evidence of carcinogenic activity in males or females exposed to 50, 100, or 200 ppm.

OTHER DATA:

Acetonitrile:

Developmental Toxicity Studies: Acetonitrile is not considered teratogenic, but is embryotoxic and fetotoxic to several animal species by the inhalation, oral and intraperitoneal routes of exposure at high maternally toxic doses.

Ames Test (*Salmonella typhimurium*): Negative in presence and absence of exogenous metabolic activation.

In Vitro Cytogenetics Assay with Chinese Hamster Ovary (CHO) Cells: Weak or equivocal activity using both sister chromatid exchange and chromosome aberration as end points.

Rat Hepatocyte Unscheduled DNA Synthesis Assay: Inactive *in vitro* and *in vivo*.

Micronucleus Assay (mouse): Not clastogenic or aneugenic in the bone marrow of the mouse at the maximum tolerated dose (intraperitoneal injection of 100 and 125 mg/kg for males and females, respectively).

N-Methylimidazole:

Ames *Salmonella* Assay (Direct Plate): Negative.

12. ECOLOGICAL INFORMATION

Acetonitrile:

96 h LC₅₀ (fathead minnow): 1,640 mg/L (confidence limit 1,600-1,690 mg/L), flow-through bioassay with measured concentrations, 26.1°C, dissolved oxygen 6.1 mg/L, hardness 43.0 mg/L calcium carbonate, alkalinity 46.0 mg/L calcium carbonate, and pH 7.4

N-Methylimidazole:

Elimination (OECD Test 302 B): < 30%. Not readily biodegradable

Aquatic Toxicity

Static 96 hr LC₅₀ (Golden Orfe): 100 - 220 mg/L

Static 48 hr EC₅₀ (*Daphnia magna*): 268 mg/L

72 hr EC₅₀ (algae): 180 mg/L

17 hr EC₅₀ (Bacteria): 1100 mg/L

13. DISPOSAL CONSIDERATIONS

RCRA

Is the unused product a RCRA hazardous waste if discarded? Yes

If yes, the RCRA ID number (USEPA Hazardous Waste Code) is: D001, U003 (Acetonitrile)

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OTHER DISPOSAL CONSIDERATIONS:

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to an approved RCRA waste facility. Dispose of container and unused contents in accordance with all applicable local, state, and federal regulations.

The information offered here is for the product as shipped. Use and/or alterations to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

Proper DOT Shipping Description:

Flammable Liquid, Corrosive, N.O.S. (Acetonitrile, N-Methylimidazole), 3, UN 2924, II, (8)

Reportable Quantity (RQ):

Acetonitrile = 5000 lbs (2270 kg)

Label(s) Required:

Primary - Class 3, Flammable Liquid

Subsidiary - Class 8, Corrosive

Emergency Response Guidebook (2000 Edition): Guide No. 132

For additional information on shipping regulations affecting this material, contact the information number found in Section 1.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA)

TSCA INVENTORY STATUS: Components are on the TSCA inventory.

OTHER TSCA ISSUES: None

SARA TITLE III/CERCLA

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

| <u>INGREDIENT NAME</u> | <u>SARA/CERCLA RQ (lb)</u> | <u>SARA EHS TPQ (lb)</u> |
|------------------------|----------------------------|--------------------------|
| Acetonitrile | 5000 | None |

Spills or releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center [(800) 424-8802] and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: Immediate. Delayed. Fire.

SARA 313 TOXIC CHEMICALS:

The following ingredients are SARA 313 "Toxic Chemicals". CAS numbers and weight percents are found in Section 2.

| <u>INGREDIENT NAME</u> | <u>COMMENT</u> |
|------------------------|----------------|
|------------------------|----------------|

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Acetonitrile

DeMinimis concentration is 1.0%

STATE RIGHT-TO-KNOW

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes.

INGREDIENT NAME

WEIGHT %

COMMENT

Acrylonitrile

Trace

See following CA Proposition 65 Statement:

California Proposition 65 Label Statement

Acetonitrile contains trace amounts of Acrylonitrile, which is listed on one of the California Proposition 65 lists; therefore, the following statement has been placed on the product label:

“Warning: This product contains a chemical known to the State of California to cause cancer.”

ADDITIONAL REGULATORY INFORMATION:

None

WHMIS CLASSIFICATION (CANADA):

Class B, Division 2 and Class E.

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by the Controlled Products Regulations.

FOREIGN INVENTORY STATUS:

Acetonitrile is listed on the following inventories:

Australian
Canadian DSL
Chinese
EINECS
Japanese (ENCS)
Korean
Philippine (PICCS)

16. OTHER INFORMATION

CURRENT ISSUE DATE: April 17, 2003.

PREVIOUS ISSUE DATE: December 12, 1996

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:

Convert existing MSDS to ANSI 16 Section format.

OTHER INFORMATION: NFPA Classification

Health: 3

Flammability: 3

Reactivity: 0