

**MATERIAL SAFETY DATA SHEET****Trade Name: Cap B (89)****Section I - Chemical Products & Company Identification**

Proligo LLC	Proligo Biochemie GmbH	Creation Date: 2/99
6200 Lookout Rd	Georg-Heyken-Str. 14	Revision Date: 3/04
Boulder, Colorado 80301 USA	Hamburg, Germany D21147	Revision Number: 2

Product #: L050250, L050400, L053000, L850020, L850045

For emergency source information (USA) contact: Chemtrec 1-800-424-9300 24 Hours

For emergency source information (International) contact: Chemtrec 001-703-527-3887 (USA) 24 Hours

Trade Names/Synonyms: Capping B SolutionChemical Family: Amines dissolved in Tetrahydrofuran**Section 2 - Composition/Information On Ingredients - % by Weight**

<u>Chemicals:</u>	<u>Composition (w/w) %:</u>	<u>CAS Number:</u>	<u>Classification:</u>	<u>Odor Threshold:</u>
<b>Tetrahydrofuran</b>	65-100%	109-99-9	<b>F; R:</b> 11-19 <b>Xi; R:</b> 36/37	20-50 ppm
<b>Pyridine</b>	0-20%	110-86-1	<b>F; R:</b> 11 <b>Xn; R:</b> 20/21/22	0.17 ppm
<b>1-Methylimidazole</b>	0-20%	616-47-7	<b>Xn; R:</b> 21/22 C; <b>R:</b> 34	None Available

**Section 3 - Hazards Identification**NFPA (National Fire Protection Association) Ratings (Scale 0-4): **Health: 2**      **Flammable: 3**      **Reactivity: 1**

**Emergency Overview:** Causes burns. Harmful by inhalation, in contact with skin and if swallowed. Irritating to the eyes and respiratory system. In case of contact with eyes or skin, rinse immediately with plenty of water seek medical advice. The toxicological properties of this material have not been thoroughly investigated as a mixture. Use prudent laboratory practices for handling chemical substances. Keep away from sources of ignition-No Smoking. Highly flammable (EU). May form explosive peroxides. Take precautionary measures against static discharge.

**Potential Health Effects:**

<b>Skin Contact:</b>	Short Term Exposure:	Harmful
	Long Term Exposure:	Harmful, causes defatting and dermatitis.
<b>Eye Contact:</b>	Short Term Exposure:	Irritant
	Long Term Exposure:	Harmful
<b>Ingestion:</b>	Short Term Exposure:	Harmful, may cause narcotic effects, nausea, dizziness, headache, and unconsciousness.
	Long Term Exposure:	Harmful to the liver, kidneys, and central nervous system.
<b>Inhalation:</b>	Short Term Exposure:	Harmful, may cause narcotic effects, coughing, chest pains, difficulty breathing, nausea, dizziness, headache, and unconsciousness. Irritant.
	Long Term Exposure:	Harmful to the respiratory system.
<b>Injection:</b>	Short Term Exposure:	No information available
	Long Term Exposure:	No information available

**MATERIAL SAFETY DATA SHEET****Trade Name: Cap B (89)****CARCINOGEN/REPRODUCTIVE TOXIN STATUS:**

	<b>Tetrahydrofuran</b>	<b>Pyridine</b>	<b>1-Methylimidazole</b>
<b>OSHA:</b>	Not Listed	Not Listed	Not Listed
<b>NTP:</b>	Not Listed	Not Listed	Not Listed
<b>IARC:</b>	Not Listed	Not Listed	Not Listed

**According to 91/155 EC:**

Hazard designation:

C Corrosive

F Highly flammable

Information pertaining to particular dangers for man and environment

R 11 Highly Flammable

R 19 May form explosive peroxides

R 20/21/22 Harmful by inhalation, in contact with skin and if swallowed.

R 34 Causes burns.

**\*Classification system**

The classification is in line with current EC lists. It is expanded, however, by information from technical literature and by information furnished by supplier companies

**Section 4: First Aid Measures**

- Skin Contact:** Remove contaminated clothing. Flush affected area with water and then wash with soap or mild detergent and water. Observe for signs of irritation. If irritation is present, get medical attention.
- Eye Contact:** Wash eyes with large amounts of water or normal saline for at least 15 minutes. Observe for signs of irritation. If irritation is present, get medical attention.
- Ingestion:** Get medical attention.
- Inhalation:** Remove from exposure area to fresh air immediately. Get medical attention immediately.
- Injection:** If accidentally injected, get medical attention.

**Note to Physician:** There is no specific antidote. Treat symptomatically and supportively.

**Section 5: Fire Fighting Measures**

**FIRE AND EXPLOSION HAZARD:** Highly flammable (EU) and flammable (USA), harmful, liquid. Can form heat-sensitive peroxides, which could explode during concentration or evaporation. **Explosion Limits:** LEL 2% and UEL 11.8% for Tetrahydrofuran **Explosion Limits:** LEL 1.8% and UEL 12.4% for Pyridine. **Autoignite Temperature:** 482°C for Pyridine

**EXTINGUISHING MEDIA:** Carbon dioxide, dry chemical powder or appropriate foam. Water may be effective for cooling, but may not effect extinguishment.

**SPECIFIC HAZARDS:** Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions. Forms explosive mixtures with air. Emits toxic fumes under fire conditions.

**PROTECTION OF FIREFIGHTERS:** Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Use water spray to cool fire-exposed containers.

**MATERIAL SAFETY DATA SHEET****Trade Name: Cap B (89)****Section 6: Accidental Release Measures**

**OCCUPATIONAL SPILL:** Wear appropriate protective clothing and chemically compatible gloves. Remove all sources of ignition. Place spillage in appropriate container for waste disposal. Wash contaminated clothing before reuse. (See Section 8)

**US CERCLA REPORTABLE QUANTITY (RQ):** 1000 lbs. (Tetrahydrofuran:RCRA code U213 and Pyridine: RCRA code U196)

**Section 7 - Handling and Storage**

Observe all federal, state and local regulations. Do not breathe fumes. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Keep tightly closed. Store in cool dry place. Use prudent laboratory practices for handling and storage of chemical substances. Avoid sources of ignition.

**Section 8 - Exposure Controls/Personal Protection**

**Exposure Controls:** Use in laboratory hood or other ventilated device. Wear appropriate approved respirator where no engineering controls exist. Avoid contact with sources of ignition. Use non-sparking tools.

**Eye Protection:** Employees must wear splash-proof safety goggles to prevent eye contact with this substance.

**Clothing:** Employee must wear appropriate protective clothing (laboratory coat with long sleeves) and equipment to prevent skin contact with this material.

**Gloves:** Employee must wear appropriate protective gloves (Nitrile Gloves, 0.33 mm Thickness) to prevent contact with this material.

**Permissible Exposure Limits (USA):**

	<b>Tetrahydrofuran</b>	<b>Pyridine</b>	<b>1-Methylimidazole</b>
<u>ACGIH TWA (ppm)</u>	200	5	N/A
<u>ACGIH STEL/C (ppm)</u>	250	N/A	N/A
<u>IDHL (ppm)</u>	2000 [10% LEL]	1000	N/A
<u>OSHA (ppm)</u>	200	5	N/A
<u>NIOSH (ppm)</u>	200	5	N/A

**Permissible Exposure Limits (Europe):**

	<b>Tetrahydrofuran</b>	<b>Pyridine</b>	<b>1-Methylimidazole</b>
<u>Germany (ppm)</u>			
<u>USSR-UNEP/IRPTC (MAC)</u>	200	5	N/A
<u>U. K. TWA (ppm)</u>	100 mg/ m <sup>3</sup> (work place air)	0.08 mg/m <sup>3</sup>	N/A
<u>U. K. STEL (ppm)</u>	200	N/A	N/A
	N/A	10	N/A

**According to 91/155 EC:**

Components with limit values that require monitoring at the workplace:

Tetrahydrofuran (CAS # 109-99-9) 50-100%

OEL: Short-term value: 735 mg/m<sup>3</sup>, 250 ml/ m<sup>3</sup>

Long-term value: 590 mg/m<sup>3</sup>, 200 ml/ m<sup>3</sup>

Pyridine (CAS # 110-86-1) 10-25%

OEL: Short-term value: 30 mg/m<sup>3</sup>, 10 ml/ m<sup>3</sup>

Long-term value: 15 mg/m<sup>3</sup>, 5 ml/ m<sup>3</sup>

\*Additional information about design of technical systems:  
No further data; see item 7

**Section 9 - Physical and Chemical Properties**

**MATERIAL SAFETY DATA SHEET****Trade Name: Cap B (89)**

**DESCRIPTION:** Liquid, Colorless, with unpleasant odor  
**SOLUBILITY:** Miscible with organic solvents and water ( the mixture)  
**FLASHPOINT:** -14.4°C(6.08°F)( for Tetrahydrofuran) and 20.0°C(68°F)( for Pyridine)  
**BOILING POINT:** 65°C (149°F)AT 1000 mBar ( for Tetrahydrofuran)  
and 1115°C(2039°F) ( for Pyridine)  
**MELTING POINT:** -42.0°C(-43.6°F) (for Pyridine)  
**FREEZING POINT:** < -20.0°C(<-4°F) ( for Tetrahydrofuran)  
**VAPOR PRESSURE:** 190 mBar at 15.0°C(59°F) (for Tetrahydrofuran) and 18mm Hg at 20.0°C(68°F) (for Pyridine)  
**VAPOR DENSITY:** 2.5 (Tetrahydrofuran, air = 1), 2.72 for Pyridine  
**pH:** pH 8-9 at 100 g/L in water(20°C, 68°F)  
**Danger of Explosion:** May form explosive peroxides  
**Self-inflammability:** Product is not selfigniting  
**Solvent Content:** 0% Water

**Section 10 - Stability and Reactivity**

**STABILITY:** Stable at room temperature.  
**REACTIVITY:** Incompatible with bases, slow degradation in water.  
**CONDITIONS TO AVOID:** Incompatible with bases, strong oxidizers, lithium-aluminum alloys. Exposure to a heat source. Peroxides may accumulate upon prolonged storage in presence of air.  
**INCOMPATIBILITIES:** Forms explosive mixture with air. Unless inhibited, can form unstable and explosive peroxides. Incompatible with strong acids, strong oxidizers, organic anhydrides, isocyanates, aldehydes, and oxidizers. Attacks some plastics. May accumulate static electric charges that can result in ignition of its vapors.  
**DECOMPOSITION PRODUCTS:** May include toxic oxides of carbon and nitrogen.  
**POLYMERIZATION:** Not available

**Section 11 - Toxicology Information**

**TOXICITY:** The toxicological properties of this material have not been investigated as a mixture.  
Tetrahydrofuran:LD<sub>50</sub> Oral (Rat)=2816 mg/ kg  
LC<sub>50</sub> Inhalation (Rat)=21000 ppm/ 3 hours  
Human lethal dose 50-500 mg/kg  
Pyridine:LD<sub>50</sub> Oral (Rat)=891 mg/ kg  
LC<sub>50</sub> Inhalation (Rat)=28500 mg/m3/1hour  
1-Methylimidazole: LD<sub>50</sub> Oral (Mus)=1400 mg/kg  
**CARCINOGEN STATUS:** No information available  
**LOCAL EFFECTS:** Irritant, Harmful  
**TARGET EFFECTS:** Eyes, liver (fatty liver degeneration) respiratory system, and central nervous system (CNS)  
**AT INCREASED RISK FROM EXPOSURE:** Effects on fertility may cause post-implantation mortality.

**Chemical Name:** **RTECS Number:**  
**Tetrahydrofuran** LU5950000  
**Pyridine** UR8400000  
**1-Methylimidazole** NI7000000

**MATERIAL SAFETY DATA SHEET****Trade Name: Cap B (89)****According to 91/155 EC:**

Contains larger amounts of solvent, which may cause narcotic effects, headache, unconsciousness, dizziness, lack of concentration, weakness, difficulty breathing, coughing or nausea.

\*Additional toxicological information:

The product shows the following dangers according to the calculation method of the General EC Classification Guidelines for Preparations as issued in the latest version;

Corrosive, Harmful

**Section 12 - Ecological Information**

**ENVIRONMENTAL IMPACT RATING (0-4):**

No data available.

**ACUTE AQUATIC TOXICITY:**

Tetrahydrofuran:

EPA no set criteria, permissible ambient goal of 8,100 µg/L.

USSR-UNEP/IRPTC (MAC): 0.5 mg/L (water bodies)

Pyridine:

EPA permissible goal of 207 µg/L

USSR-UNEP/IRPTC (MAC): 200µg/L (water bodies)

USSR-UNEP/IRPTC (MAC): 10 µg/L (fishery)

**DEGRADABILITY:**

No data available.

**LOG BIOCONCENTRATION FACTOR (BCF):**

No data available.

**Section 13 - Disposal Information**

Observe all Federal, State, and Local Regulations.

**According to 91/155 EC:**

Product:

Recommendation: Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

Uncleaned packaging:

Recommendation: disposal must be made according to official regulations.

Recommended cleaning agent: Water, if necessary with cleaning agent

Before cleaning use up or empty container completely.

**Section 14 - Transportation Information**

Ship as regulated material. Transportation restrictions apply. The acute toxicity profile does warrant shipment as a hazardous material (DOT) or a dangerous good (IATA).

**UN2924**

**Hazard Class 3**

**Subsidiary Risk 8**

**Label Requirements: Flammable liquid, corrosive, n.o.s. (Tetrahydrofuran, Pyridine, and 1-Methylimidazole)**

**According to 91/155 EC:**

Land transport ADR/RID(cross-border)

- ADR/RID-GGVS/E Class: 3 Inflammable liquids
- Number/Letter: 26b
- Kemler Number: 338
- UN-Number: 2924
- Label: 3+8
- Designation of goods: Flammable liquid, corrosive, n.o.s.,

**MATERIAL SAFETY DATA SHEET****Trade Name: Cap B (89)**

tetrahydrofuran, pyridine, and 1-methylimidazole

## Maritime transport IMDG:

• IMDG Class:	3.2
• Page:	3126
• UN Number:	2924
• Packaging group:	II
• EMS Number:	3-02
• MFAG:	760
• Correct technical name:	Flammable liquid, corrosive, n.o.s., tetrahydrofuran, pyridine, and 1-methylimidazole

## Air transport ICAO-TI and IATA-DGR:

• ICAO/IATA Class:	3
• UN/ID Number:	2924
• Packaging group:	II
• Correct technical name:	Flammable liquid, corrosive, n.o.s., tetrahydrofuran, pyridine, and 1-methylimidazole

**Section 15 - Regulatory Information**

	<b>Tetrahydrofuran</b>	<b>Pyridine</b>	<b>1-Methylimidazole</b>
<b>Europe:</b>			
EINECS/ELINCS:	203-726-8	203-809-9	210-484-7
EC INDEX NO.	603-025-00-0	613-002-00-7	613-035-00-7
<b>Canada:</b>			
NDSL/DSL:	DSL	DSL	DSL
<b>United States:</b>			
TSCA STATUS:	Yes, 4/12b, Notice of Export	Yes	Yes
CERCLA SECTION 103 (40 CFR 302.4):	1000 lbs.	1000 lbs.	No
SARA SECTION 302 (40 CFR 355.30):	No	No	No
SARA SECTION 304 (40 CFR 355.40):	No	No	No
SARA SECTION 313 (40 CFR 372.65):	No	Yes	No
OSHA PROCESS SAFETY (29 CFR 1910.119):	No	No	No
CALIFORNIA PROPOSITION 65	No	No	No
SARA ACUTE HAZARD (40 CFR 370.21)	Yes	Yes	No
<b>CHRONIC HAZARD:</b>	Yes	Yes	No
<b>FIRE HAZARD:</b>	Yes	Yes	No
<b>REACTIVITY HAZARD:</b>	Yes	No	No
<b>SUDDEN RELEASE HAZARD:</b>	No	No	No

**Classification:**

F; R: 11/19                      Xn; R: 20/21/22                      C; R: 34                      Xi; R: 36/37

Symbols: F (Flammable), Xn (Harmful), C (Corrosive), and Xi (Irritant)

**Risk Phrase: Mixture****R: 11****Highly Flammable****R: 19****May form explosive peroxides**

## MATERIAL SAFETY DATA SHEET

**Trade Name: Cap B (89)**

**R: 20**  
Harmful by inhalation

**R: 21**  
Harmful in contact with skin

**R: 22**  
Harmful if swallowed

**R: 34**  
Causes burns

**R: 36/37**  
Irritating to eyes and respiratory system

**Safety Phrases: Mixture**

**S: 16**  
Keep away from sources of ignition- No Smoking.

**S: 26**  
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

**S: 36/37/39**  
Wear suitable protective clothing, gloves and eye/ face protection.

**S: 45**  
In case of accident or if you feel unwell seek medical advice immediately

**For Laboratory R&D Use Only.**

**According to 91/155 EC:**

National Regulations

Classification according to VbF: B

Technical instructions (air):

Class Share in %: I 10-25  
II 50-100

<b>Section 16 - Other</b>
---------------------------

**THE AFOREMENTIONED INFORMATION IS BELIEVED TO BE CORRECT, BUT DOES NOT PURPORT TO BE ALL INCLUSIVE AND SHALL BE USED ONLY AS A GUIDE. PROLIGO LLC SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR FROM CONTACT WITH THE ABOVE PRODUCT.**