Electrolyte Specifications

1.0M LiPF6 in EC:DMC:EMC=1:1:1 v/v with 1.0 wt% VC

Characteristics	Requirement	Unit
LiPF6 Concentration	0.95-1.10	M
EC Concentration	30.0 – 35.0	% (v/v)
DMC Concentration	30.0 – 35.0	% (v/v)
EMC Concentration	30.0 – 35.0	% (v/v)
VC Concentration	0.1 – 5	% (w/w)
Water Content	<15	ppm
Hydrofluoric Acid [HF]	<50	ppm
Color	Clear/Colorless (<50)	APHA
Trace Metal Content	<100	ppm

Safety Data Sheet (SDS)
1.0M $LiPF_6$ in EC:DMC:EMC (1:1:1 v/v) with 1.0 wt% VC

SECTION 1: IDENTIFICATION

Product Name: 1.0M Lithium Hexafluorophosphate ($LiPF_6$) in Ethylene Carbonate (EC), Dimethyl Carbonate (DMC), and Ethyl Methyl Carbonate (EMC) (1:1:1 v/v) with 1.0 wt% Vinylene Carbonate (VC)
CAS Numbers:

- $LiPF_6$: 21324-40-3
- EC: 96-49-1
- DMC: 616-38-6
- EMC: 623-53-0
- VC: 872-36-6
  Recommended Use: Electrolyte for lithium-ion batteries
  Supplier: Automat Solutions, Inc.
  Emergency Contact: (510) 982-6488

SECTION 2: HAZARD IDENTIFICATION

GHS Classification:

- Flammable Liquid – Category 2
- Acute Toxicity (Oral) – Category 4
- Skin Irritation – Category 2
- Eye Irritation – Category 2A
- Specific Target Organ Toxicity (Single Exposure) – Category 3

Signal Word: Danger
Hazard Statements:

- Highly flammable liquid and vapor.
- Harmful if swallowed.
- Causes skin irritation.
- Causes serious eye irritation.

- May cause respiratory irritation.

Precautionary Statements:

- Keep away from heat, sparks, open flames, and hot surfaces. No smoking.
- Use explosion-proof electrical/ventilating/lighting equipment.
- Wear protective gloves, protective clothing, and eye protection.
- Avoid breathing vapors.
- In case of fire: Use CO_2, dry chemical, or foam to extinguish.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS Number	% Composition
Lithium Hexafluorophosphate ($LiPF_6$)	21324-40-3	0.90-1.10M
Ethylene Carbonate (EC)	96-49-1	25-35%
Dimethyl Carbonate (DMC)	616-38-6	25-35%
Ethyl Methyl Carbonate (EMC)	623-53-0	25-35%
Vinylene Carbonate (VC)	872-36-6	0.1-5 wt%

SECTION 4: FIRST AID MEASURES

Inhalation: Remove person to fresh air. Seek medical attention if symptoms persist.
Skin Contact: Wash with soap and water. Seek medical attention if irritation develops.
Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Seek immediate medical attention.
Ingestion: Do not induce vomiting. Seek immediate medical attention.

SECTION 5: FIRE-FIGHTING MEASURES

Extinguishing Media: Use CO_2, dry chemical, or foam. Avoid using water.
Hazardous Combustion Products: Hydrogen fluoride, phosphorus oxides, carbon oxides.
Special Protective Equipment: Wear self-contained breathing apparatus and full protective gear.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions: Wear PPE including gloves, goggles, and a respirator.
Environmental Precautions: Avoid release to the environment. Prevent from entering

waterways.
Cleanup Methods: Absorb with inert material and place in a properly labeled container. Dispose of per local regulations.

SECTION 7: HANDLING AND STORAGE

Handling: Handle in a well-ventilated area. Avoid contact with skin and eyes. Avoid inhalation.
Storage: Store in a cool, dry, well-ventilated place away from incompatible materials. Keep container tightly closed.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use local exhaust ventilation or a fume hood.
Personal Protective Equipment (PPE):

- **Respiratory Protection:** Use NIOSH-approved respirator if airborne concentrations exceed limits.
- **Hand Protection:** Chemical-resistant gloves.
- **Eye Protection:** Safety goggles or face shield.
- **Skin Protection:** Protective clothing.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid
Odor: Slightly sweet, solvent-like odor
Melting Point: Not applicable
Boiling Point: 90-250°C (varies by component)
Flash Point: 25°C (77°F)
Solubility: Miscible with organic solvents, reacts with water
Density: ~1.2 g/cm^3

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable under recommended storage conditions.
Incompatible Materials: Water, strong acids, strong bases, oxidizing agents.
Hazardous Decomposition Products: Hydrogen fluoride, phosphorus oxides, carbon oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

Routes of Exposure: Inhalation, skin contact, eye contact, ingestion.

Symptoms: Irritation, dizziness, nausea.
Chronic Effects: Prolonged exposure may cause organ damage.

SECTION 12: ECOLOGICAL INFORMATION

Toxicity: Harmful to aquatic organisms.
Persistence & Degradability: Not readily biodegradable.

SECTION 13: DISPOSAL CONSIDERATIONS

Dispose of in accordance with local, state, and federal regulations. Do not release into the environment.

SECTION 14: TRANSPORT INFORMATION

UN Number: UN2924
Hazard Class: 3 (Flammable Liquid)
Packing Group: II
Proper Shipping Name: Flammable Liquid, Corrosive, N.O.S. (Contains $LiPF_6$ and Carbonate Solvents)

SECTION 15: REGULATORY INFORMATION

TSCA Status: Listed
SARA 311/312 Hazards: Fire hazard, acute health hazard

SECTION 16: OTHER INFORMATION

Revision Date: February 2025
Disclaimer: The information provided in this SDS is believed to be accurate but is not guaranteed to be exhaustive. Users should conduct their own assessments for specific applications.