

## Production Safety Data Sheet

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### SECTION I - PRODUCT AND COMPANY IDENTIFICATION

- Product name : Lithium ion rechargeable battery (or, Lithium ion secondary battery)
- Product code : All Cylindrical type cell ("LC" Series)
- Company name : AA Portable Power Corp.
- Address : 860 S 19TH STREET, Unit A  
Richmond, CA, 94804, USA
- Telephone number : 510-525-2328
- Telefax number : 510-525-4728

### SECTION II - COMPOSITION / INFORMATION ON INGREDIENTS

- Substance or preparation : Preparation
- Information about the chemical nature of product :

Common chemical name /General name	CAS number	Concentration /Concentration range	Classification and hazard labeling
Lithium Cobaltate (LiCoO2)	12190-79-3	25-40%	-
Iron	7439-89-6	15-25%	-
Aluminum foil	7429-90-5	2-6%	-
Graphite (natural graphite) (Artificial graphite)	7782-42-5 7740-44-0	10-20%	-
Copper foil	7440-50-8	5-15%	Sensitization of the skin group No.2
Organic electrolyte	-	10-20%	Inflammable liquid

### SECTION III - HAZARDS IDENTIFICATION

For the battery cell, chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage.

However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress by miss-use, the gas release vent will be operated. The battery cell case will be breached at the extreme, hazardous materials may be released.

Moreover, if heated strongly by the surrounding fire, acrid gas may be emitted.

- Most important hazard and effects

Human health effects :

Inhalation : The steam of the electrolyte has an anesthesia action and stimulates a respiratory tract.

Skin contact : The steam of the electrolyte stimulates a skin. The electrolyte skin contact causes a

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Hand protection : Protective gloves

Eye protection : Goggle or protective glasses designed to protect against liquid splashes

Skin and body protection : Protective cloth

### SECTION VI - ACCIDENTAL RELEASE MEASURES

Internal cell materials, such as electrolyte leaked from battery cell, are carefully dealt with according to the followings.

- Personal precautions :

Remove leaked materials with protective equipment (protective glasses and protective gloves). Do not inhale the gas as much as possible. Moreover, avoid touching with as much as possible.

- Environmental precautions : Do not throw out into the environment.
- Method of cleaning up : The leaked solid is moved to a container. The leaked place is wiped off with dry cloth.
- Prevention of secondary hazards : Avoid re-scattering. Do not bring the collected materials close to fire.

### SECTION VII - HANDLING AND STORAGE

- Handling

Technical measures

Prevention of user exposure : Not necessary under normal use.

Prevention of fire and explosion : Not necessary under normal use.

Precaution for safe handling : Do not damage or remove the external tube.

Specific safe handling advice : Never throw out cells in a fire or expose to high temperatures. Do not soak cells in water and seawater. Do not expose to strong oxidizers. Do not give a strong mechanical shock or throw down. Never disassemble, modify or deform. Do not connect the positive terminal to the negative terminal with electrically conductive material. In the case of charging, use only dedicated charger or charge according to the conditions specified by Sanyo.

- Storage

Technical measures

Storage conditions (suitable, to be avoid) : Avoid direct sunlight, high temperature, high humidity and the places where it is exposed to the static electricity.

Store in cool place (temperature : -20 ~ 35 degree C, humidity : 45 ~ 85%).

Incompatible products : Conductive materials, water, seawater, strong oxidizers and strong acids

Packing material (recommended, not suitable) : Insulative and tearproof materials are recommended.

### SECTION VIII - EXPOSURE CONTROLS / PERSONAL PROTECTION

- Engineering measures :

No engineering measure is necessary during normal use. In case of internal cell materials' leakage, operate the local exhaust or improve ventilation.

- Control parameters

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sore and a stimulation on the skin.

Eye contact : The steam of the electrolyte stimulates eyes. The electrolyte eye contact causes a sore and a stimulation on the eye. Especially, substance that causes a strong inflammation of the eyes is contained.

Environmental effects :

Since a battery cell remains in the environment, do not throw out it into the environment.

- Specific hazards :

If the electrolyte contact with water, it will generate detrimental hydrogen fluoride.

Since the leaked electrolyte is inflammable liquid, it does not bring close to fire.

### SECTION IV - FIRST-AID MEASURES

Under normal conditions of use, the battery is hermetically sealed.

#### A battery cell and internal cell materials of an opened battery cell

- Ingestion :
  - Swallowing a battery can be harmful.
  - Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.
  - Induce vomiting. When it is impossible or the feeling is not well after vomiting, seek medical attention.
- Inhalation :
  - Contents of an open battery can cause respiratory irritation. Remove to fresh air immediately and make the victim blow his/her nose, gargle. Seek medical attention if necessary.
- Skin contact :
  - Remove contaminated clothes and shoes immediately. Wash the adhere or contact region with soap and plenty of water immediately.
- Eye contact :
  - Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention immediately.

### SECTION V - FIRE-FIGHTING MEASURE

- Suitable extinguishing media : Since vapor, generated from burning batteries may make eyes, nose and throat irritate, be sure to extinguish the fire on the windward side. Pouring water, carbon dioxide gas, nitrogen gas, chemical powder fire extinguishing medium and fire foam are effective.
- Specific hazards : Corrosive gas may be emitted during fire.
- Specific methods of fire-fighting : When the battery burns with other combustibles simultaneously, take fire-extinguishing method which correspond to the combustibles. Extinguish a fire from the windward as much as possible.
- Special protective equipment for firefighters :
  - Respiratory protection : Respiratory equipment of a gas cylinder style or protection-against-dust mask

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Common chemical name / General name	ACGIH (1999)	
	TLV-TWA	BEI
Lithium Cobaltate (LiCoO2)	0.02g/m <sup>3</sup> (as cobalt)	-
Aluminum foil	-	-
Carbon (natural graphite) (Artificial graphite)	Emission nature dust 10mg/m <sup>3</sup>	-
Copper foil	Fume 0.05mg/m <sup>3</sup> A coarse particulate, Mist 1.0mg/m <sup>3</sup>	-
Organic electrolyte	-	-

ACGIH : American Conference of Governmental Industrial Hygienists, Inc.

TLV-TWA : Threshold Limit Value-time weighted average concentration

BEI : Biological Exposure Indices

- Personal protective equipment

Respiratory protection : Protective against dust mask

Hand protection : Protective gloves

Eye protection : Goggle or protective glasses designed to protect against liquid splashes

Skin and body protection : Working clothes with long sleeve and long trousers

### SECTION IX - PHYSICAL AND CHEMICAL PROPERTIES

- Appearance
  - Physical state : Solid
  - Form : Cylindrical (Single cell)
  - Color : Metallic color (without tube)
  - Odor : No odor
  - Nominal voltage : 3.6 volts (Single cell)
- pH : NA
- Specific temperatures/temperature ranges at which changes in physical state occur.
  - There is no useful information for the product as a mixture.
- Flash point : NA
- Explosion properties : NA
- Density : NA
- Solubility ,with indication of the solvent(s) : Insoluble in water

### SECTION X - STABILITY AND REACTIVITY

- Stability : Stable under normal use
- Hazardous reactions occurring under specific conditions
  - Conditions to avoid : When a battery cell is exposed to an external short-circuit, crushes, modification, high temperature above 100 degree C, it will be the cause of heat generation and ignition. Direct sunlight and high humidity.
- Materials to avoid : Conductive materials, water, seawater, strong oxidizers and strong acids.
- Hazardous decomposition products : Acrid or harmful gas is emitted during fire.

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**SECTION XI - ECOLOGICAL INFORMATION AND TOXICOLOGICAL INFORMATION****ECOLOGICAL INFORMATION**

## • Persistence/degradability :

Since a battery cell and the internal materials remain in the environment, do not bury or throw out into the environment.

**TOXICOLOGICAL INFORMATION**

There is no data available on the product itself. The information of the internal cell materials is as follows.

**Lithium cobaltate – LiCoO<sub>2</sub>**

## • Acute toxicity : Unknown.

## • Local effects : Unknown.

## • Sensitization :

The nervous system of respiratory organs may be stimulated sensitively.

## • Chronic toxicity/Long term toxicity :

By the inhalation of coarse particulate and steamy gas of cobalt, it is possible to cause the serious respiratory-organs disease. The person of allergy-natured or sensitive-natured may cause a skin reaction or a lung disease.

## • Local effects(skin) : Although it is very rare, the rash of the skin and allergic erythema may result.

**Graphite**

## • Acute toxicity : Unknown.

## • Local effects : Unknown.

## • Chronic toxicity/Long term toxicity :

Since the prolonged inhalation under the high concentration of a graphite coarse particulate may become a cause of a lung disease or a tracheal disease, it is regulated by the coarse particulate obstacle prevention rule and the dust-lung method enforcement regulations.

## • Carcinogenicity :

Graphite is not recognized as a cause of cancer by research organizations and natural toxic substance research organizations of cancer.

**Copper foil**

## • Acute toxicity :

Coarse particulate stimulates a nose and a tracheal.

LD<sub>50</sub>, oral-sheep 18,000-182,000mg/kg

60-100mg of coarse particulate causes a gastrointestinal disturbance with nausea and inflammation.

## • Local effects : Unknown.

**Organic Electrolyte**

## • Acute toxicity :

LD<sub>50</sub>, oral-rat 2,000mg/kg or more

## • Local effects : Unknown.

## • Skin irritation study : Rabbit - Mild

## • eye irritation study : Rabbit - Very severe

with nerve impulse conduction causing severe pain or absence of sensations. Immediately flush eyes or skin with water for at least 20 minutes to neutralize the acidity and remove some fluoride. Remove and destroy all contaminated clothing and permeable personal possessions. Before re-use, impermeable possessions should be soaked in benzalkonium chloride or 2.5% calcium gluconate gel should be applied to react with the fluoride ion. Compresses and wraps may be used for areas where immersion is not practical. Medicated dressing should be changed every 2 minutes. Exposure to hydrofluoric acid fumes sufficient to cause pain requires immediate hospitalization for monitoring for pulmonary edema.

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Prepared and approved by

AA Portable Power Corp.

Lithium Ion Battery Department

Technical Service Department

**SECTION XII - DISPOSAL CONSIDERATIONS AND TRANSPORT INFORMATION**

## • Recommended methods for safe and environmentally preferred disposal :

**Product(waste from residues)**

Do not throw out a used battery cell. Recycle it through the recycling company.

**Contaminated packaging**

Neither a container nor packing is contaminated during normal use. When internal materials leaked from a battery cell contaminates, dispose as industrial wastes subject to special control.

## • In the case of transportation, confirm no leakage and no overspill from a container. Take in a cargo of them without falling, dropping and breakage. Prevent collapse of cargo piles and wet by rain. The container must be handled carefully. Do not give shocks that result in a mark of hitting on a cell. Please refer to Section VII-HANDLING AND STORAGE also.

## • Codes and classifications according to international regulations for transport

Air

IATA-DGR : special provision A45

Sea

IMO-IMDG Code : special provision 188

**SECTION XIII - REGULATORY INFORMATION AND OTHER INFORMATION**

DOT Hazard Class: Nonregulated

**Reference**

Chemical substances information : Japan Advanced Information center of Safety and Health International Chemical Safety Cards (ICSCs) :

International Occupational Safety and Health Information Centre (CIS)

1999 TLVs and BEIs : American Conference of Governmental Industrial Hygienists (ACGIH)

Dangerous Goods Regulations - 45th Edition Effective 1 January 2004 : International Air Transport Association (IATA)

IMDG Code - 2002 Edition : International Maritime Organization (IMO)

MSDS of raw materials prepared by the manufactures

**HYDROFLUORIC ACID EXPOSURE DURING FIRE FIGHTING**

This information is given for the use of professional fire fighters responding to a warehouse fire where fire from other materials may incinerate LC-cells. This section is provide solely in case of exposure, during fire fighting, to the combustion by-products. Hydrofluoric acid is not present in the products. Contact with LC-cells causes none of the following symptoms.

Hydrofluoric acid is extremely corrosive. Contact with hydrogen fluoride fumes is to be avoided. Permissible exposure limit is 3 ppm. In case of contact with hydrogen fluoride fumes, immediately leave the area and seek first aid and emergency medical attention. Symptoms may have delayed onset. Fluoride ions penetrate skin readily causing destruction of deep tissue layers and even bone. Fluoride interferes