




## MATERIAL SAFETY DATA SHEET

Protective Clothing	NFPA Rating (USA)	EC Classification	WHMIS (Canada)	Transportation
Not required with normal use		Not Dangerous		

### Section 1: Product and Company Information

<b>Product Name:</b>	High Power Lithium Ion Cell, Phosphate-Based
<b>Product Code:</b>	ANR26650M1, Model No. FS300001 APR18650M1, Model No. FS300030 AVR18650M1, Model No. FS300031 AHR32113-Ultra-A, Model No. FS300045 AHR32157-M1-A, Model No. FS300055
<b>Product Use:</b>	Electrical
<b>Chemical Family:</b>	Mixture
<b>Synonyms:</b>	High Power Lithium Ion Battery, Phosphate-Based
<b>Manufacturer:</b>	A123 Systems Inc Arsenal on the Charles 1 Kingsbury Ave Watertown MA 02472
<b>Phone Number:</b>	(617) 778-5700
<b>Fax:</b>	(617) 778-5749
<b>24-hour Emergency:</b>	Chemtrec: (800) 424-9300

### Section 2: Composition and Ingredient Information

As a solid, manufactured article, exposure to hazardous ingredients is not expected with normal use.

USA: This battery is an article pursuant to 29 CFR 1910.1200 and, as such, is not subject to the OSHA Hazard Communication Standard requirement. The information contained in this Material Safety Data Sheet contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

Canada: This is not a controlled product under WHMIS. This product meets the definition of a "manufactured article" and is not subject to the regulations of the Hazardous Products Act.



## MATERIAL SAFETY DATA SHEET

### Section 3: Hazards Identification

**Preparation Hazards and Classification:**

Not dangerous with normal use. The battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

European Communities (EC): This product is not classified as dangerous according to Directive 1999/45/EC and its amendments. This product contains dangerous ingredients however, there is no expected release during use of the product and there is a barrier preventing exposure of the user and the environment.

**Appearance, Color and Odor:**

Solid object with no odor.

**Primary Route(s) of Exposure:**

These chemicals are contained in a sealed enclosure. Risk of exposure occurs only if the cell is mechanically, thermally or electrically abused to the point of compromising the enclosure. If this occurs, exposure to the electrolyte solution contained within can occur by Inhalation, Ingestion, Eye contact and Skin contact.

**Potential Health Effects:**

**ACUTE (short term): see Section 8 for exposure controls**

In the event that this battery has been ruptured, the electrolyte solution contained within the battery would be corrosive and can cause burns.

**Inhalation:** Inhalation of materials from a sealed battery is not an expected route of exposure. Vapors or mists from a ruptured battery may cause respiratory irritation.

**Ingestion:** Swallowing of materials from a sealed battery is not an expected route of exposure. Swallowing the contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract.

**Skin:** Contact between the battery and skin will not cause any harm. Skin contact with contents of an open battery can cause severe irritation or burns to the skin.

**Eye:** Contact between the battery and the eye will not cause any harm. Eye contact with contents of an open battery can cause severe irritation or burns to the eye.

**CHRONIC (long term): see Section 11 for additional toxicological data**

Not applicable

**Medical Conditions**

Not available

**Aggravated by Exposure:**



## MATERIAL SAFETY DATA SHEET

### Section 4: First Aid Measures

- Inhalation:** If contents of an opened battery are inhaled, remove source of contamination or move victim to fresh air. Obtain medical advice.
- Eye Contact:** If eye contact with contents of an open battery occurs, immediately flush the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes while holding the eyelids open. Neutral saline solution may be used as soon as it is available. If necessary, continue flushing during transport to emergency care facility. Take care not to rinse contaminated water into the unaffected eye or onto face. Quickly transport victim to an emergency care facility.
- Skin Contact:** If skin contact with contents of an open battery occurs, as quickly as possible remove contaminated clothing, shoes and leather goods. Immediately flush with lukewarm, gently flowing water for at least 30 minutes. If irritation or pain persists, seek medical attention. Completely decontaminate clothing, shoes and leather goods before reuse or discard.
- Ingestion:** If ingestion of contents of an open battery occurs, NEVER give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Have victim rinse mouth thoroughly with water. DO NOT INDUCE VOMITING. Have victim drink 60 to 240 mL (2-8 oz.) of water. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Have victim rinse mouth with water again. Quickly transport victim to an emergency care facility.

### Section 5: Fire Fighting Measures

- Flammable Properties:** In the event that this battery has been ruptured, the electrolyte solution contain within the battery would be flammable. Like any sealed container, battery cells may rupture when exposed to excessive heat; this could result in the release of flammable or corrosive materials.
- Suitable extinguishing Media:** Use water or other extinguishing media appropriate for the surrounding fire.
- Unsuitable extinguishing Media:** Not available
- Explosion Data:**
- Sensitivity to Mechanical Impact:** This may result in rupture in extreme cases.
- Sensitivity to Static Discharge:** Not applicable
- Specific Hazards arising from the Chemical:** Fires involving lithium batteries can be controlled with water. When water is used, however, hydrogen gas may evolve. In a confined space, hydrogen gas can form an explosive mixture. In this situation, smothering agents are recommended to extinguish the fire.
- Protective Equipment and precautions for firefighters:** As for any fire, evacuate the area and fight the fire from a safe distance. Wear a pressure-demand, self-contained breathing apparatus and full protective gear. Fight fire from a protected location or a safe distance.
- NFPA**
- |               |   |
|---------------|---|
| Health:       | 0 |
| Flammability: | 0 |
| Instability:  | 0 |



## MATERIAL SAFETY DATA SHEET

### Section 6: Accidental Release Measures

- Personal Precautions:** Restrict access to area until completion of clean-up. Do not touch the spilled material. Wear adequate personal protective equipment as indicated in Section 8.
- Environmental Precautions:** Prevent material from contaminating soil and from entering sewers or waterways.
- Methods for Containment:** Stop the leak if safe to do so. Contain the spilled liquid with dry sand or earth. Clean up spills immediately.
- Methods for Clean-up:** Absorb spilled material with an inert absorbent (dry sand or earth). Scoop contaminated absorbent into an acceptable waste container. Collect all contaminated absorbent and dispose of according to directions in Section 13. Scrub the area with detergent and water; collect all contaminated wash water for proper disposal.

### Section 7: Handling and Storage

- Handling** Do not open, disassemble, crush or burn battery. Do not expose battery to extreme heat or fire.
- Storage:** Store battery in a dry location. Keep at room temperature. Elevated temperatures can result in shortened battery life. Keep out of reach of children.

### Section 8: Exposure Controls and Personal Protection

- Engineering Controls:** Use local exhaust ventilation or other engineering controls to control sources of dust, mist, fume and vapor.
- Personal Protection:**
- Respiratory Protection:** Not necessary under normal conditions.
  - Skin Protection:** Not necessary under normal conditions. Wear neoprene or natural rubber gloves if handling an open or leaking battery.
  - Eye Protection:** Not necessary under normal conditions. Wear safety glasses if handling an open or leaking battery.
- Other Protective Equipment:** Have a safety shower and eye-wash fountain readily available in the immediate work area.
- Hygiene Measures:** Do not eat, drink or smoke in work areas. Maintain good housekeeping.

**MATERIAL SAFETY DATA SHEET****Section 9: Physical and Chemical Properties**

<b><u>Physical State:</u></b>	Solid	<b><u>Vapor Pressure:</u></b> <b><u>(mm Hg @ 20°C)</u></b>	Not applicable
<b><u>Appearance:</u></b>	Battery	<b><u>Vapor Density:</u></b> <b><u>(Air = 1)</u></b>	Not applicable
<b><u>pH:</u></b>	Not applicable	<b><u>Solubility in Water:</u></b>	Insoluble
<b><u>Relative Density:</u></b> <b><u>(water = 1)</u></b>	Not available	<b><u>Water / Oil distribution</u></b> <b><u>coefficient:</u></b>	Not applicable
<b><u>Boiling Point:</u></b>	Not applicable	<b><u>Odor Type:</u></b>	Odorless
<b><u>Melting Point:</u></b>	Not applicable	<b><u>Odor Threshold:</u></b>	Not applicable
<b><u>Viscosity:</u></b>	Not applicable	<b><u>Evaporation Rate:</u></b> <b><u>(n-Butyl Acetate = 1)</u></b>	Not applicable
<b><u>Oxidizing Properties:</u></b>	Not applicable	<b><u>Auto Ignition Temperature</u></b> <b><u>(°C):</u></b>	Not applicable
<b><u>Flash Point and Method (°C):</u></b>	Not applicable	<b><u>Flammability Limits (%):</u></b>	Not applicable

**Section 10: Stability and Reactivity**

<b><u>Stability:</u></b>	Stable
<b><u>Conditions to Avoid:</u></b>	Avoid exposing the battery to fire or high temperature. Do not disassemble, crush, short or install with incorrect polarity. Avoid mechanical or electrical abuse.
<b><u>Incompatible Materials:</u></b>	Not available
<b><u>Hazardous Decomposition Products:</u></b>	This material may release toxic fumes if burned or exposed to fire.
<b><u>Possibility of Hazardous Reactions:</u></b>	Not available



## MATERIAL SAFETY DATA SHEET

### Section 11: Toxicological Information

<b><u>Irritation:</u></b>	Risk of irritation occurs only if the cell is mechanically, thermally or electrically abused to the point of compromising the enclosure. If this occurs, irritation to the skin, eyes and respiratory tract may occur.
<b><u>Sensitization:</u></b>	Not available
<b><u>Neurological Effects:</u></b>	Not available
<b><u>Teratogenicity:</u></b>	Not applicable
<b><u>Reproductive Toxicity:</u></b>	Not applicable
<b><u>Mutagenicity (Genetic Effects):</u></b>	Not applicable
<b><u>Toxicologically Synergistic Materials:</u></b>	Not available

### Section 12: Ecological Information

<b><u>Ecotoxicity:</u></b>	Not available
<b><u>Mobility:</u></b>	Not available
<b><u>Persistence and degradability:</u></b>	Not available
<b><u>Bioaccumulative potential:</u></b>	Not available
<b><u>Other adverse effects:</u></b>	Not available

### Section 13: Disposal Considerations

<b><u>Waste Disposal Method:</u></b>	Battery recycling is encouraged. Do NOT dump into any sewers, on the ground or into any body of water. Store material for disposal as indicated in Section 7 Handling and Storage.
<b><u>USA:</u></b>	Dispose of in accordance with local, state and federal laws and regulations.
<b><u>Canada:</u></b>	Dispose of in accordance with local, provincial and federal laws and regulations.
<b><u>EC:</u></b>	Waste must be disposed of in accordance with relevant EC Directives and national, regional and local environmental control regulations. For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used.

### Section 14: Transport Information:

Lithium-ion batteries comply with all applicable shipping regulations as prescribed by industry and legal standards which includes compliance with the UN Recommendations on the Transport of Dangerous Goods; IATA Dangerous Goods Regulations Special Provision A45, and applicable U.S. DOT regulations for the safe transport of Lithium-ion batteries. Each cell or battery has been tested under provisions of the UN Manual of Tests and Criteria, Part III, sub-section 38.3 and are classified as non-dangerous goods.

**MATERIAL SAFETY DATA SHEET****Section 15: Regulatory Information****USA**

**TSCA Status:** All ingredients in the product are listed on the TSCA inventory.

**SARA Title III:**

Sec. 302/304: None

Sec. 311/312: None

Sec. 313: None

CERCLA RQ None

**California Prop 65 :** This product does not contain chemicals known to the State of California to cause cancer or reproductive toxicity.

**Canada**

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

**WHMIS Classification:** Not Controlled

**New Substance**

**Notification**

**Regulations:**

Lithium hexafluorophosphate is listed on the NDSL. All other ingredients in the product are listed, as required, on Canada's Domestic Substances List (DSL).

**NPRI Substances**

**(National Pollutant**

**Release Inventory):**

This product does not contain any NPRI chemicals.

**EC Classification for the**  
**Substance/Preparation:**

**Symbol:** This product is not classified as dangerous according to Directive 1999/45/EC and its amendments.

**Risk Phrases:** None

**Safety Phrases:** S2: Keep out of the reach of children.

**Section 16: Other Information****Preparation Information:**

**Preparation Date:** February 17, 2006

**Revision Date:** March 27, 2007

**Revision Summary:** June 12, 2006: Updated Section 7.  
November 2, 2006: Added new product code, Section 1.  
March 27, 2007: Added new product codes, Section 1.

**Prepared by:** LEHDER Environmental Services Limited  
704 Mara Street, Suite 210, Pt. Edward, ON  
N7V 1X4  
[www.lehder.com](http://www.lehder.com)

**Phone:** (519) 336-4101

**Disclaimer:** While LEHDER Environmental Services Limited believes that the data set forth herein is accurate, as of the date hereof, LEHDER makes no warranty with respect thereto and expressly disclaims all liability for reliance thereon. Such data is offered solely for your consideration, investigation and verification.

**Manufacturer Disclaimer:** The information and recommendations set forth are made in good faith and believed to be accurate at the date of preparation. A123 Systems makes no warranty expressed or implied with respect to this information and recommendations and disclaims all liability from reliance on it.