braille BATTERY

MATERIAL SAFETY DATA SHEET

BBI-003

Prepared to OSHA, ACC, ANSI, NOHSC, WHMIS & 2001/58/EC Standards | MSDS Revision: 1.0 | MSDS Revision Date: 12/03/2015

1. PRODUCT IDENTIFICATION

1.1	Product Name:	**HIGH POWER LITHIUM ION BATTERY**
1.2	Chemical Name:	**Lithium phosphate**
1.3	Synonyms:	**Lithium Ion Battery, Lithium Ion Battery, phosphate-based**
1.4	Trade Names:	**High power lithium ion cell, phosphate-based**
1.5	Product Use:	**Automotive Battery**
1.6	Manufacturer's Name:	**Braille Battery, Inc.**
1.7	Manufacturer's Address:	**6935 15th Street E., Suite 115, Sarasota, FL 34243 USA**
1.8	Business Phone:	**+1 (941) 312-5047**
1.9	Emergency Phone:	**CHEMTREC +1 (800) 424-9300/+1 (703) 527-3887**

CHEMICAL RESPONSE CARD:	91
RESPONSE TEAM PPE:	 
WHMIS:	
HEALTH:	0
FLAMMABILITY:	0
REACTIVITY:	0
PERSONAL PROTECTION:	B

2. IDENTIFICATION OF RISKS

2.1 Hazard Identification:

This product is NOT classified as a HAZARDOUS SUBSTANCE under normal conditions, but is regulated as DANGEROUS GOODS according to the classification criteria of EU Directive 1272/2008NOHSC: 1088 (2004) and ADG Code (Australia). In the event that this cell has been ruptured, the electrolyte solution contained within the cell would be corrosive and can cause burns to skin and eyes.

2.2 Routes of Entry:

Inhalation:	NO	Absorption:	NO	Ingestion:	YES

2.3 Effects of Exposure:

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

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

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

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

2.4 Symptoms of Exposure:

EYES: Stinging or burning sensation, watering, and redness if exposed to an open cell.

SKIN: Stinging or burning, redness, and dermatitis (rash) if exposed to an open cell

INGESTION: Severe irritation of the mouth, throat, esophagus, and stomach. Gastrointestinal discomfort, nausea, vomiting, cramping, and diarrhea if exposed to an open cell.

INHALATION: Upper respiratory irritation, headache, irritability, or an inability to sleep if exposed to an open cell.

2.5 Acute Health Effects:

EYES: Severe irritation, corneal damage, and possibly blindness will result from direct contact with the contents of an open cell.

SKIN: Severe irritation, burns, ulcerations, and contact dermatitis can result from direct contact will result from direct contact with the contents of an open cell.

INGESTION: Severe irritation of the mouth, throat, esophagus, and stomach may result from direct contact with the contents of an open cell

INHALATION: Severe respiratory irritation (from vapors or mists) may result from direct contact with the contents of an open cell.

2.6 Chronic Health Effects:

EYES: Possible corneal scarring may result from direct contact with the contents of an open cell.

SKIN: No chronic health effects are reported by the manufacturer.

INGESTION: No chronic health effects reported by the manufacturer.

INHALATION: Respiratory dermatitis, chronic bronchitis, and tooth enamel erosion may result from direct contact with the contents of an open cell.

2.7 Target Organs:

Eyes, skin, and respiratory system.

2.8 Toxicological Properties:

None reported by the manufacturer.

NA ≡ Not Available; ND ≡ Not Determined; NE ≡ Not Established; NF ≡ Not Found; C ≡ Ceiling Limit; See Section 16 for Additional Definitions of Terms Used

NOTE: all WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-2004 format.

3. COMPOSITION & INGREDIENT INFORMATION

CHEMICAL NAME(S)	CAS No.	RTECS No.	EINECS No.	%	EXPOSURE LIMITS IN AIR (mg/m³)								OTHER
					ACGIH		NOHSC			OSHA			
					ppm		ppm			ppm			
					TLV	STEL	ES-TWA	ES-STEL	ES-PEAK	TLV	STEL	IDLH	
ELECTROLYTE SOLVENTS:				≤ 90.0									
ETHYLENE CARBONATE	96-49-1	FF9550000	202-510-0	---	NA	NA	NF	NF	NF	NA	NA	NA	
PROPYLENE CARBONATE	108-32-7	FF9650000	203-572-1	---	NA	NA	NF	NF	NF	NA	NA	NA	
DIETHYL CARBONATE	105-58-8	YE1050000	203-311-1	---	NA	NA	NF	NF	NF	NA	NA	NA	
DIMETHYL CARBONATE	616-38-6	FG0450000	210-478-4	---	NA	NA	NF	NF	NF	NA	NA	NA	
ETHYL METHYL CARBONATE	623-53-0	NA	NA	---	NA	NA	NF	NF	NF	NA	NA	NA	
ELECTROLYTE SALT:				≤ 20.0									
LITHIUM HEXAFLUORO-PHOSPHATE	21324-40-3	NA	244-334-7	---	NA	NA	NF	NF	NF	NA	NA	NA	

4. FIRST AID

4.1 First Aid:

EYES: Contact with the contents of an opened cell can cause burns. If eye contact with contents of an open cell 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. Seek immediate medical attention.

SKIN: Contact with the contents of an opened cell can cause burns. If skin contact with contents of an open cell 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: Contact with the contents of an opened cell can cause burns. If ingestion of contents of an open cell 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. 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. Seek immediate medical attention.

INHALATION: If contents of an opened cell are inhaled, remove source of contamination or move victim to fresh air. Obtain medical advice.

4.2 Medical Conditions Aggravated by Exposure:

Pre-existing skin and respiratory disorders.

5. FIRE & EXPLOSION HAZARDS

5.1 Flashpoint & Method:

NA

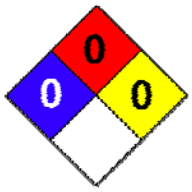
5.2 Autoignition Temperature:

NA

5.3 Flammability Limits: | Lower Explosive Limit (LEL): **NA** | Upper Explosive Limit (UEL): **NA**

5.4 Fire & Explosion Hazards:

Lithium ion batteries contain flammable liquid electrolyte that may vent, ignite and produce sparks when subjected to high temperatures (> 150 °C (302 °F), when damaged or abused (e.g., mechanical damage or electrical overcharge). Burning cells can ignite other batteries in close proximity. Electrostatic discharges imposed directly on the spilled electrolyte may start combustion. Handle as a flammable liquid. Batteries may burst and release hazardous decomposition products when exposed to a fire situation.



5.5 Extinguishing Methods:

Small Fires - Dry chemical, CO2, water spray or regular foam. For incipient fires, carbon dioxide extinguishers are more effective than water.
Large Fires - Water spray, fog or regular foam. Move containers from fire area if you can do it without risk.

5.6 Firefighting Procedures:

Use appropriate media for surrounding fire. Do not use carbon dioxide directly on cells. Keep containers cool until well after the fire is out. Prevent runoff from fire control or dilution from entering sewers, drains, drinking water supply, or any natural waterway. Avoid breathing vapors. Firefighters should wear full-face, self-contained breathing apparatus (MSHA/NIOSH approved or the equivalent) and impervious clothing.

HAZCHEM CODE 2[R].

6. SPILLS & LEAKS

6.1	Spills: **Absorb the spilled material with inert absorbent material such as dry sand, earth or a commercial absorbing agent. Collect all absorbent material and dispose. Wash the affected area with plenty of water and detergent. Properly dispose all contaminated cleaning water.**

7. STORAGE & HANDLING

7.1	Work & Hygiene Practices: **Avoid direct contact with the contents of this battery. Store at room temperature. Avoid mechanical or electrical abuse. DO NOT short or install incorrectly. Batteries may explode, pyrolize or vent if disassembled, crushed or exposed to high temperatures. Install batteries in accordance with equipment instructions. Replace all batteries in equipment at the same time. Do not carry batteries loose in pocket or bag.**
7.2	Storage & Handling: **Keep containers tightly closed when not in use. If battery case is broken, avoid contact with internal components. Do not handle near heat, sparks, or open flames. Protect containers from physical damage to avoid leaks and spills. Place cardboard between layers of stacked batteries to avoid damage and short circuits. Do not allow conductive material to touch the battery terminals. A dangerous short-circuit may occur and cause battery failure and fire. Do not store in unmarked containers or storage devices. Protect units from damage. Do not overcharge battery. Do not short terminals with metal tools.**
7.3	Special Precautions: **Do not allow metal objects to rest against or near terminal posts. Readily available emergency fire, first aid, and spill response equipment and/or measures are highly recommended.**

8. EXPOSURE CONTROL & PERSONAL PROTECTION

8.1	Ventilation & Engineering Controls: **Not normally required since the batteries are sealed units. Charge in areas with adequate ventilation. General mechanical ventilation should be sufficient.**
8.2	Respiratory Protection: **Not required for normal conditions of use. However, a respiratory protection program that meets OSHA's 29CFR1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirators use (e.g., if batteries leaking).**
8.3	Eye Protection: **None under normal use conditions. However, wear safety glasses with side shields when handling leaking batteries. If splashing is anticipated, splash goggles and/or a face-shield are strongly recommended.**
8.4	Hand Protection: **None under normal use conditions. Use butyl gloves if handling leaking batteries, and wash hands thoroughly with soap and warm water after handling.**
8.5	Body Protection: **None required under normal-use conditions for gel/absorbed electrolyte-type batteries.**

9. PHYSICAL & CHEMICAL PROPERTIES

9.1	Density:	**NA**
9.2	Boiling Point:	**NA**
9.3	Melting Point:	**NA**
9.4	Evaporation Rate:	**NA**
9.5	Vapor Pressure @ 20 °C:	**NA**
9.6	Molecular Weight:	**NA**
9.7	Appearance & Color:	**Battery pack with cells. Contents dark in color.**
9.8	Odor Threshold:	**Odorless.**
9.9	Solubility:	**Insoluble in water.**
9.10	pH:	**NA**
9.11	Viscosity:	**NA**
9.12	Coefficient Oil/Water Distribution:	**NA**
9.13	Additional Information:	**NA**

10. STABILITY & REACTIVITY

10.1	Stability: **Stable, when used as intended.**
10.2	Hazardous Decomposition Products: **This material may release toxic fumes if burned or exposed to fire. Breaching of the cell enclosure may lead to generation of hazardous fumes which may include extremely hazardous HF (hydrofluoric acid).**
10.3	Hazardous Polymerization: **Will not occur.**
10.4	Conditions to Avoid: **Avoid exposing the cell to fire or temperatures above 80°C. Do not disassemble, crush, short or install with incorrect polarity. Avoid mechanical or electrical abuse.**
10.5	Incompatible Substances: **Do not immerse in seawater or other high conductivity liquids.**

11. TOXICOLOGICAL INFORMATION

11.1	Toxicity Data: **Acute oral, dermal and inhalation toxicity data are not available for this article.**	
11.2	Acute Toxicity: **See section 2.5**	
11.3	Chronic Toxicity: **None reported by the manufacturer.**	
11.4	Suspected Carcinogen: **Normal safe handling of this product will not result in exposure to substances that are considered human carcinogens by IARC (International Agency for Research on Cancer), ACGIH (American Conference of Governmental Industrial Hygienists, OSHA or NTP (National Toxicology Program).**	
11.5	Reproductive Toxicity:	
	Mutagenicity:	**This product is not expected to cause mutagenic effects in humans.**
	Embryotoxicity:	**This product is not expected to cause embryotoxic effects in humans.**
	Teratogenicity:	**This product is not expected to cause teratogenic effects in humans.**
	Reproductive Toxicity:	**This product is not expected to cause reproductive harm in humans.**
11.6	Irritancy of Product: **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.**	
11.7	Biological Exposure Indices: **NA**	
11.8	Medical Recommendations: **Treat symptomatically.**	

12. ECOLOGICAL INFORMATION

12.1	Environmental Stability: **Not readily biodegradeable.**
12.2	Effect on Plants & Animals: **Solid cells released into the natural environment will slowly degrade and may release harmful or toxic substances. Cells are not intended to be released into water or on land but should be disposed or recycled according to local regulations.**
12.3	Effect on Aquatic Life: **NA**

13. DISPOSAL CONSIDERATIONS

13.1	Waste Disposal: **Dispose of in accordance with local, state, provincial and federal laws and regulations. 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.**
13.2	Special Considerations: **Cell 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.**

14. TRANSPORTATION INFORMATION

The basic description (ID Number, proper shipping name, hazard class & division, packing group) is shown for each mode of transportation. Additional descriptive information may be required by 49 CFR, IATA/ICAO, IMDG and the CTDGR.

14.1	49 CFR (GND): **UN3480, LITHIUM ION BATTERIES, 9, II**
14.2	IATA (AIR): **UN3480, LITHIUM ION BATTERIES, 9, II**
14.3	IMDG (OCN): **UN3480, LITHIUM ION BATTERIES, 9, II**
14.4	TDGR (Canadian GND): **UN3480, LITHIUM ION BATTERIES, 9, II**
14.5	ADR/RID (EU): **UN3480, LITHIUM ION BATTERIES, 9, II**
14.6	SCT (MEXICO): **UN3090, BATERIAS DE LITIO, 9, II**
14.7	ADGR (AUS): **UN3480, LITHIUM ION BATTERIES, 9, II**

15. REGULATORY INFORMATION

15.1	SARA Reporting Requirements: **None**
15.2	SARA Threshold Planning Quantity: **None**
15.3	TSCA Inventory Status: **All chemical substances of this product are listed on the TSCA inventory or are otherwise exempt from inventory status.**
15.4	U.S. EPA CERCLA Reportable Quantity (RQ): **None**
15.5	Other U.S. Federal Requirements: **None**
15.6	Other Canadian 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). This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.**
15.7	State & Other Regulatory Information: **<u>California Proposition 65</u>** **This product does not contain chemicals known to the State of California to cause cancer or reproductive toxicity.** **<u>RoHS</u>** **This product may be subject to Restriction of Hazardous Substances (RoHS) regulations in Europe and China, or may be regulated under additional regulations and laws not identified above, such as for uses other than described or as-designed/as intended by the manufacturer, or for distribution into specific domestic destinations.**
15.8	67/548/EEC (European Union) and Australia NOHSC:2011 (2003) Requirements: **This product, as manufactured article, is not classified as hazardous according to Regulation (EC) No. 1272/2008. However, some of the primary components of this product are listed in Annex I of EU Directive 67/548/EEC. The following applies to the contents of the manufactured article (e.g., damaged or opened cell) and only apply if there is an exposure to the electrolyte or electrolyte solvents within the manufactured article.** **<u>Ethylene Carbonate</u>: Irritant (Xi). Risk Phrases (R): 41- Risk of serious damage to eyes. Safety Phrases (S): 26-39 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.** **<u>Propylene Carbonate</u>: Irritant (Xi). Risk Phrases (R): 36 – Irritating to eyes.** **<u>Lithium Hexafluorophosphate</u>: Toxic (T). Risk Phrases (R): 22-24-34 - Harmful if swallowed. Toxic in contact with skin. Causes burns. Safety Phrases (S): 26-28A-36/37/39 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. After contact with skin, wash immediately with plenty of water. Wear suitable protective clothing, gloves and eye/face protection. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).**

16. OTHER INFORMATION

16.1	Other Information: **NA**	
16.2	Terms & Definitions: **Please see last page of this MSDS.**	
16.3	Disclaimer: This Material Safety Data Sheet complies with Health Canada's Workplace Hazardous Materials Information System (WHMIS) & U.S. OSHA's Hazard Communication Standard, 29 CFR §1910.1200. To the best of ShipMate's or Braille Battery's knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness are not guaranteed and no warranties of any type, either expressed or implied, are provided. The information contained herein relates only to the specific product. Contact the manufacturer for additional information.	
16.4	Prepared for: **Braille Battery Inc.** **6935 15th St E., Suite 115** **Sarasota, FL 34243 USA** **Tel: +1 (941) 312-5047** **Fax: +1 (941) 870-3381**	braille BATTERY LIGHTER•STRONGER•FASTER
16.5	Prepared by: **ShipMate, Inc.** **PO Box 787** **Sisters, OR 97759-0787 USA** **Phone: +1 (310) 370-3600** **Fax: +1 (310) 370-5700** **e-mail: shipmate@shipmate.com**	ShipMate® *Dangerous Goods Training & Consulting*

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these that are commonly used include the following:

GENERAL INFORMATION:

CAS No.	Chemical Abstract Service Number

EXPOSURE LIMITS IN AIR:

ACGIH	American Conference on Governmental Industrial Hygienists
TLV	Threshold Limit Value
OSHA	U.S. Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
IDLH	Immediately Dangerous to Life and Health

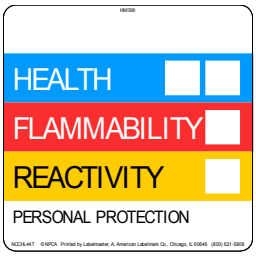
FIRST AID MEASURES:

CPR	Cardiopulmonary resuscitation - method in which a person whose heart has stopped receives manual chest compressions and breathing to circulate blood and provide oxygen to the body.

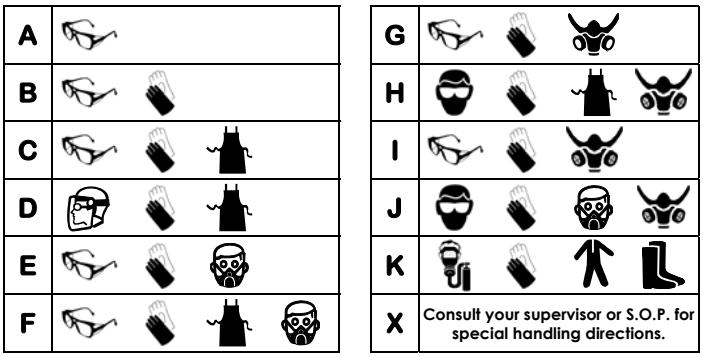
HAZARDOUS MATERIALS IDENTIFICATION SYSTEM: HMIS

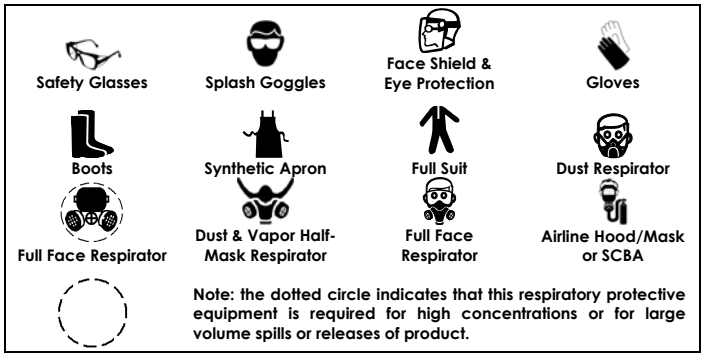
HEALTH, FLAMMABILITY & REACTIVITY RATINGS:

0	Minimal Hazard
1	Slight Hazard
2	Moderate Hazard
3	Severe Hazard
4	Extreme Hazard



PERSONAL PROTECTION RATINGS:





OTHER STANDARD ABBREVIATIONS:

ML	Maximum Limit
NA	Not Available
ND	Not Determined
NE	Not Established
NR	No Results
SCBA	Self-Contained Breathing Apparatus

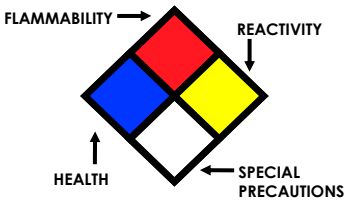
NATIONAL FIRE PROTECTION ASSOCIATION: NFPA

FLAMMABILITY LIMITS IN AIR:

Autoignition Temperature	Minimum temperature required to initiate combustion in air with no other source of ignition
LEL	Lower Explosive Limit - lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source
UEL	Upper Explosive Limit - highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source

HAZARD RATINGS:

0	Minimal Hazard
1	Slight Hazard
2	Moderate Hazard
3	Severe Hazard
4	Extreme Hazard
ACD	Acidic
ALK	Alkaline
COR	Corrosive
~~W~~	Use No Water
OX	Oxidizer



TOXICOLOGICAL INFORMATION:

BCF	Bioconcentration Factor
IARC	International Agency for Research on Cancer
LC_{50}	Lethal concentration (gases) which kills 50% of the exposed animal
LD_{50}	Lethal Dose (solids & liquids) which kills 50% of the exposed animals s
log K_{OW} or log K_{OC}	Coefficient of Oil/Water Distribution
NTP	National Toxicology Program
ppm	Concentration expressed in parts of material per million parts
RTECS	Registry of Toxic Effects of Chemical Substances
TCLo	Lowest concentration to cause a symptom
TD_{lo}	Lowest dose to cause a symptom
TD_{lo}, LD_{lo}, & LD_o or TC, TC_o, LC_{lo}, & LC_o	Lowest dose (or concentration) to cause lethal or toxic effects
TL_m	Median threshold limit

REGULATORY INFORMATION:

DOT	U.S. Department of Transportation
DSL	Canadian Domestic Substance List
EPA	U.S. Environmental Protection Agency
EU	European Union (European Union Directive 67/548/EEC)
NDSL	Canadian Non-Domestic Substance List
NOHSC	National Occupational Health & Safety Code (Australia)
PSL	Canadian Priority Substances List
TC	Transport Canada
TSCA	U.S. Toxic Substance Control Act
WHMIS	Canadian Workplace Hazardous Material Information System

EC INFORMATION:

C	E	F	N	O	T+	Xi	Xn
Corrosive	Explosive	Flammable	Harmful	Oxidizing	Toxic	Irritant	Harmful