Safety Data Sheet Specification

Product Type: **Lithium-ion Battery LiNiMnCoO2.**

Company: **VOLTA POWER SYSTEMS**

Under normal use, this battery is not expected to expose users to hazardous ingredients.

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 Safety Data Sheet contains valuable information critical to the safe handling and proper use of the product. This SDS 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.

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

Emergency Contacts	Phone
CHEMTREC US Service Center	(703) 527-3887
	(800) 424-9300 (within the USA)

1. Product and Company Identification

Product Name:	Lithium-ion Battery and Cells,
Product Use:	Electrical
Chemical Family:	Mixture
Type of Product:	Lithium Nickel-Manganese-Cobalt Oxide Battery
Manufacturer:	Volta Power Systems; 12550 Superior Ct; Holland, MI 49424
Phone Number:	616-226-4222

2. Composition and Ingredient Information

Material or ingredient	Chemical formula	CAS No.	Approximate Wt %
Positive electrode Lithium Nickel-Manganese-Cobalt Oxide: LiNiMnCoO2	-	346417-97-8	15-40%
Lithium			1-5%
Nickel			10-40%
Manganese			10-40%
Cobalt			10-40%
Oxygen			10-40%
Negative electrode (carbon)	-	7440-44-0	10-30%
Electrolyte (Organic electrolyte mainly composed of alkyl carbonate)	-	-	5-20%
Lead	Pb	7439-92-1	Not Detected
Cadmium	Cd	7440-43-9	Not Detected
Mercury	Hg	7439-97-6	Not Detected

3. Hazard Identification

Preparation Hazards and Classification: Not dangerous with normal use. The materials within the battery may only represent a hazard if the structural integrity of the battery is compromised. Damage to the batteries will result in the risk of fire or explosion, which could release dangerous hydrogen fluoride gas and exposure to the ingredients contained within or their combustion products, could be harmful.

Primary Route(s) of Exposure: Risk of exposure will only occur if the battery cell is mechanically, thermally, or electrically damaged and the enclosure is compromised. If this occurs, exposure to electrolyte solutions contained within the battery cell may occur by inhalation, eye contact, skin contact and ingestion.

The following condition shall be avoided:

- **Do not disassemble, puncture, crush or modify.**
- **Do not expose to heat in excess of 60^{o}C (140^{o}F) or incinerate.**
- **Do not short circuit.**
- **Do not expose to water.**

Recycle the battery per the appropriate local regulation.

4. First Aid Measures

Skin Contact:	Remove affected articles of clothing. Wash affected area with lukewarm water for at least 30 minutes. If irritation or pain persists, seek medical attention.
Eye Contact:	Wash affected eye with lukewarm water for at least 30 minutes. Rinse with saline solution if possible. Seek medical attention.
Inhalation:	Move victim to fresh air and remove source of contamination from area. Seek medical attention.
Caution:	In all cases evacuate the contaminated area. If irritation persists, seek medical assistance at once.

5. Fire Fighting Measures

Extinguishing Media:	Water, carbon dioxide, dry chemical powder and foam are most effective means to extinguish a battery fire
Fire Fighting Procedure:	Put on fully protective gear, including self-contained positive pressure breathing apparatus, goggles, fireproofing jacket and gloves. Caution is advised during application of water because burning particles may be ejected from the fire.
Unusual Fire and Explosion Hazards:	Exposing battery cell to excessive heat, fire or over voltage condition may cause a leak, fire, hazardous vapors and hazardous decomposition products. Damaged or opened cells or batteries can result in rapid heating and the release of flammable vapors and potentially dangerous gases that may be heavier than air and could travel along the ground or be moved by ventilation to an ignition source.

6. Accidental Release Measures

The material contained within the batteries cells is only expelled if the battery is damaged.

Evacuate the area.
Wear protective clothing and glasses.
Use a shovel and cover battery with sand or vermiculite, place in an approved container and dispose in accordance with section 13.

7. Handling and Storage

Handling:	Do not expose battery or cell to extreme temperatures or fire. Do not disassemble, crush or puncture battery. Do not overcharge or over-discharge the battery. Do not mix batteries of varying types or sizes. Do not connect positive and negative terminals or place the batteries on conductive metal.
Storage:	Insulate positive and negative terminals to avoid short circuit and ensure sufficient clearance between batteries and other surfaces. Store in a dry, cool (below 30°C and above -10°C) and well ventilated area and avoid fire, heat. Elevated temperatures can result in reduced battery life and venting of flammable liquid and gases. Keep batteries away from strong oxidizers and acids.

8. Exposure Controls and Personal Protection

Respiratory Protection:	Not necessary under normal use. In case of battery or cell rupture, use a self-contained full face respiratory mask.
Eye Protection:	Not necessary under normal use. Wear safety goggles if handling a ruptured or leaking battery cell.
Hand Protection:	Not necessary under normal use. Wear Viton rubber gloves if handling a ruptured or leaking battery cell.
Skin Protection:	Not necessary under normal use. Wear rubber apron and Viton rubber gloves if handling a ruptured or leaking battery cell.

9. Physical and Chemical Properties

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

10. Stability and Reactivity

Stability:	Stable
Conditions to Avoid:	Avoid exposing battery to high temperatures. Do not incinerate, deform, mutilate, crush, pierce, short circuit or disassemble.
Materials to Avoid:	Not Applicable
Hazardous Decomposition Products:	Combustible vapors may be released if exposed to fire. Hydrogen fluoride gas may be present in combustion products.
Possibility of Hazardous Reactions:	Hydrogen fluoride may be produced in reaction with water.

11. Toxicological Information

Irritation:	Risk of irritation only occurs if battery cells are mechanically, thermally or electrically damaged and the enclosure is compromised.
Neurological Effects:	No information is available at this time.
Sensitization:	The nervous system and organs may be sensitized by exposure.
Teratogenicity:	No information is available at this time.
Reproductive Toxicity:	No information is available at this time.
Mutagenicity (Genetic Effects):	No information is available at this time.
Toxicologically Synergistic Materials:	No information is available at this time.

12. Ecological Information

Bio accumulative potential:	Not available.
Persistence and degradability:	Not available.
Mobility:	Not available.
Ecotoxicity:	Not available.
Other adverse effects:	Not available.

13. Disposal Considerations

Do not incinerate, or subject cells to temperature in excess of 60°C, such abuse can result in loss of seal leakage, and/or cell explosion.

Discharge batteries fully and cap terminals before disposal, in accordance with appropriate local regulations.

14. Transport Information

Label for conveyance:	Lithium Battery Label & Class 9
UN Number:	3480
Packaging Group:	II
EMS No:	**4.1-06**
Marine pollutant:	No
Proper Shipping name:	Lithium-ion Battery
Hazard Classification:	The goods shall be complied with the requirements of Section IA of Packing Instructions 965 of 60th DGR (2019 or most current edition) Manual of IATA or Packing Instructions 903 of IMDG CODE (2018 or most current edition), including the passing of the UN38.3 test.

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

UN 38.3 Recommendations on the Transport of Dangerous Goods

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 SDS contains all the information required by the Controlled Products Regulations.

WHMIS Classification: Not Controlled

New Substance Notification Regulations: All ingredients in the product are listed, as required, on Canada's Domestic Substance List.

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

16. Abbreviations

OSHA:	Occupational Safety and Health Administration
PEL-TWA:	Permissible Exposure Limits-Time Weighted Average Concentration
ACGIH:	American Council of Government Industrial Hygienists
TLV-TWA:	Threshold Limit Value-Time Weighted Average Concentration
OSHA :	Occupational Safety and Health Act
TSCA :	Toxic Substance Control Act
CPSA :	Consumer Product Safety Act
FEPCA:	Federal Environmental Pollution Control Act
SARA:	Superfund Amendments and Reauthorization Act Title
RCRA:	Resource Conservation and Recovery Act
CWA:	Safety Drinking Water Act
CFR:	Code of Federal Regulations
WHMIS	Workplace Hazardous Material Information System

17. Other Information

Preparation Date:	December 28, 2015
Revision Date:	June 28, 2019
Revision	**Rev 1e**
Summary	**Revised "A" to be "IA" in section 14**
Prepared by:	Volta Power Systems; 12550 Superior Ct; Holland,MI 49424
Phone:	616-226-4236

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