



# Product Data Sheet

The products referenced herein are "articles" under 29 CFR 1910.1200(c) and are not subject to OSHA's requirements for material safety data sheets under its Hazard Communication Standard, 29 CFR 1910.1200. This Product Data Sheet is provided as a service to our customers.

## Section I - Product and Company Information

**Identity:** Lithium-ion and Lithium-ion Polymer Batteries (Li-ion Batteries)  
**Models:** All  
**Effective Date:** March 18, 2016

**Manufacturer**  
Vertex Standard LMR, Inc.  
Tamachi First Bldg.  
4-6-8 Shibaura, Minato-ku  
Tokyo, 108-0023  
**Phone: +81 3 6722 2400**

## Section II – Composition Information

Vertex Standard battery packs contain Li-ion cells from various manufacturers. Li-ion cells are generally composed of the following major ingredients:

Cell component	Common chemical name / General name	CAS number	Concentration range		
Positive electrode	Lithiated cobalt oxides	12190-79-3	20-40%		
	Lithiated manganese oxides	12057-17-9			
	Proprietary lithiated nickel-manganese-cobalt oxides	N/A			
Negative electrode	Graphite	7782-42-5	10-20%		
Binders	Polyvinylidene difluoride and/or polytetrafluoroethylene	24937-79-9	0-3%		
		9002-84-0			
Electrolyte salt	Lithium salt (one or more of lithium hexafluorophosphate and lithium tetrafluoroborate)	21324-40-3	1-5%		
		14283-07-9			
Electrolyte solvent	Organic solvents including one or more of the following: ethylene carbonate, diethylcarbonate, dimethylcarbonate, ethylmethylcarbonate, and propylene carbonate.	96-49-1	5-20%		
		105-58-8			
		616-38-6			
		623-53-0			
Other components	Copper	108-32-7	5-10%		
		7440-50-8			
		Aluminum		7429-90-5	5-40%
		Nickel		7440-02-0	0-5%
	Polyethylene and/or polypropylene	9002-88-4	1-3%		
		9003-07-0			

As manufactured, Li-ion cells do not contain lithium metal.

## Section III – Hazards Identification

Potentially hazardous materials are fully contained in a hermetically sealed case designed to withstand normal handling and use. Exposure could occur only if the battery or cells have been opened, disassembled, crushed, burned, exposed to high temperatures (> 60° C or 140° F), or subjected to other types of abuse. Exposure to cell contents may be harmful under some circumstances.

Follow instructions and precautions for safe use of the battery pack.

## Section IV – First Aid Measures

Cell manufacturers recommend that in case of exposure to cell contents, wash affected area for at least 15 minutes with generous amounts of water and seek medical attention.

## Section V – Firefighting Measures

Fires involving these types of battery packs should be flooded with water or use CO<sub>2</sub>, foam, or dry chemical extinguishing media. Fires involving large quantities of batteries may produce toxic, corrosive, or irritating fumes including HF.

## Section VI – Accidental Release Measures

If batteries are spilled and damaged, they should be disposed of according to the disposal section.

## Section VII – Handling and Storage

---

The battery pack and enclosed cells should not be opened, disassembled, crushed, burned, or exposed to high temperatures (> 60° C or 140° F).

## Section VIII – Exposure Controls / Personal Protection

---

No personal protection is required during normal handling and use. Exposure to the ingredients contained within the cells within the battery pack could be harmful under some circumstances. In case of exposure to cell contents, wash affected area for at least 15 minutes with generous amounts of water and seek medical attention.

## Section IX – Physical and Chemical Properties

---

These batteries are solid articles. Properties such as odor, pH, vapor pressure, solubility, etc. are not applicable.

## Section X – Stability and Reactivity

---

Reactivity	None during normal handling and use
Incompatibility	None during normal handling and use
Hazardous Decomposition Products	None during normal handling and use
Conditions to Avoid	The battery pack and enclosed cells should not be opened, disassembled, crushed, burned, or exposed to high temperatures.

## Section XI – Toxicological Information

---

There are no known toxicological properties of the batteries during normal handling and use.

## Section XII – Ecological Information

---

There are no known ecological risks of the batteries during normal handling and use.

## Section XIII – Disposal

---

All Vertex Standard Li-ion batteries contain recyclable materials. Recycling options available in your local area should be considered when disposing of this product. Do not dispose of in fire.

## Section XIV – Transport Information

---

UN 3480 – Lithium ion batteries

UN 3481 – Lithium ion batteries contained in equipment

UN 3481 – Lithium ion batteries packed with equipment

The Watt-hour rating for all Vertex Standard LMR, Inc. lithium ion products is less than 20 Watt-hours for cells and less than 100 Watt-hours for batteries.

When packaged and shipped by Vertex Standard., these batteries are tested, packaged and labeled in accordance with all applicable requirements for transport by mode of shipment (air, sea or ground), as follows:

1) International Air Transport Association (IATA), International Civil Aviation Organization (ICAO) Technical Instructions Dangerous Goods Regulations 57th Edition 2016, and additional Addendums to Packaging Instructions (PI) 965 and Supplement effective April 1<sup>st</sup> 2016:

a) PI 965 Section IB or Section II (UN 3480, batteries), including 30% state of charge maximum limit addendum effective April 1<sup>st</sup> 2016

b) PI 966 Section II (UN 3481, batteries packed with equipment), and 967 Section II (UN 3481, batteries contained in equipment);

2) International Maritime Dangerous Goods (IMDG 2015, Amendment 37)

3) U.S. Department of Transportation (DOT) 49 CFR 173.185 and Special Provision 188;

4) European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR 2015) Special Provisions 188 and 230

All Vertex Standard Li-ion batteries are tested in accordance with the *UN Manual of Tests and Criteria*, Part III, Subsection 38.3.

**For transportation emergencies involving Vertex Standard battery products, call CHEMTREC at 1-800-424-9300.**

## Section XV – Regulatory Information

---

The products referenced herein are "articles" under 29 CFR 1910.1200(c) and are not subject to OSHA's requirements for material safety data sheets under its Hazard Communication Standard, 29 CFR 1910.1200.

## Section XVI – Other Information

---

Notice: The information and recommendations set forth are made in good faith and are believed to be accurate at the date of preparation. Vertex Standard makes no warranty expressed or implied with respect to this information and recommendations and disclaims all liability from reliance on it. "Equivalent lithium content" information is available from the manufacturer.