

# Aqueous Hybrid Ion Rechargeable Battery SDS

SF-FM-00021\_B

Rev Date: 8/5/2014

## Aquion Energy Inc. Aqueous Hybrid Ion Rechargeable Battery

The batteries referenced herein are exempt articles and are not subject to the OSHA Hazard Communication Standard requirement. This sheet is provided as a service to our customers and presumes normal conditions of use of the batteries.

Safety Data Sheets (SDS) are a sub-requirement of the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, 29 CFR Subpart 1910.1200. This Hazard Communication Standard does not apply to various subcategories including anything defined by OSHA as an "article".


OSHA has defined "article" as a manufactured item other than a fluid or particle; (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use does not release more than very small quantities, e.g. minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

*Because all of our batteries are defined as "articles", they are exempt from the requirements of the Hazard Communication Standard; hence an SDS is not required.*

### SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME	Aqueous Hybrid Ion Rechargeable Battery
SYNONYMS	Not known
RELEVANT USE	Electrical
CHEMICAL FAMILY	Mixture
MANUFACTURER	Aquion Energy, Inc.
ADDRESS	32 39 <sup>th</sup> Street Pittsburgh, PA 15206
EMERGENCY PHONE	<b>1-412-904-6400</b>

### SECTION 2: HAZARDS IDENTIFICATION

GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELING (GHS)	
OSHA HAZARDS	Irritant
TARGET ORGANS	Respiratory System and the Cardiovascular System
SIGNAL WORDS	Warning
PICTOGRAMS	
GHS CLASSIFICATION	Not Classified
GHS LABEL ELEMENTS	Exclamation Mark
HAZARD STATEMENTS	H316 Causes Mild Skin Irritation

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## PRECAUTIONARY STATEMENTS

HANDLING	
P261	Avoid breathing dust
P280	Wear protective gloves/protective clothing/eye protection
RESPONSE	
P304+340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+P351+P338	IF IN EYES; Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do so. Continue rinsing.
P332+313	If skin irritation occurs: Get medical advice/attention
STORAGE	
P402	Store in a dry place
P404	Store in a closed container

## CHRONIC HEALTH HAZARDS

None known

## MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

None known

## CARCINOGENICITY

OSHA	Not known
ACGIH	Not known
NTP	Not known
IARC	Not known

## SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENT	COMMON NAME	CAS NUMBER	% WT
Water	Water	7532-18-5	30-35
Sodium Sulfate	Sodium Sulfate	7757-82-6	2-5
Activated Carbon	Activated Carbon	7440-44-0	5-8
Sodium Lithium Ditungsten Hexaphosphate	N/A	N/A	20-25
Lithium Manganese Dioxide	LMO	39457-42-6	25-30
Graphite	Graphite	7782-42-5	2-7
Polypropylene	Polypropylene	9003-07-0	Not applicable
PTFE	PTFE	9002-84-0	0.5-2
Acrylic	Acrylic	Mixture	0.5-2
Stainless Steel	Stainless Steel	N/A	8-10

## SECTION 4: FIRST AID MEASURES

EYES
Contact with the contents of an opened battery can cause irritation. 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. If irritation persists, transport the victim to an emergency care facility. If necessary, continue flushing during transport to emergency care facility.
SKIN
Contact with the contents of an opened battery may cause irritation. If skin contact with contents of an open cell occurs, as quickly as possible remove contaminated clothing, shoes and leather goods. Immediately flush

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with lukewarm, gently flowing water for at least 30 minutes. If irritation persists, seek medical attention.
<b>INGESTION</b>
Give one or two glasses of water to drink to any victim who may have ingested battery materials. Seek medical attention if gastrointestinal symptoms develop. If ingestion of a large amount does occur, call a poison control center immediately. Refer to oral ingestion limits based on LD50 values given below for individual chemical components.
<b>INHALATION</b>
Exposure to combustion products can be harmful. In case of adverse exposure to vapors or combustion products, remove the affected victim from exposure. Provide artificial respiration if necessary and seek medical attention. Inhalation of dust generated from an opened/damaged battery can result in irritation in the throat. Move to fresh air and get medical attention if discomfort continues.
<b>GENERAL</b>
Contaminated clothing should be removed.

## SECTION 5: FIRE-FIGHTING MEASURES

<b>FLAMMABLE LIMITS IN AIR, (% BY VOLUME)</b>	
UPPER	Not known
LOWER	Not known
<b>FLASH POINT</b>	
Not applicable	
<b>AUTOIGNITION TEMPERATURE</b>	
Fahrenheit	Not known
Celsius	Not known
<b>NFPA HAZARD CLASSIFICATION</b>	
HEALTH	1
FLAMMABILITY	0
REACTIVITY	0
OTHER	Not known

<b>GENERAL HAZARD</b>
The battery case may melt when heated above 120°C. The electrode materials may ignite in the event the battery case ruptures. Combustion products include carbon monoxide and carbon dioxide. The case itself may burn above 250°C and toxic fumes may be generated as the case burns.
<b>EXTINGUISHING MEDIA</b>
Water or other suitable extinguishing may be used to put out a fire.
<b>SPECIAL FIRE FIGHTING PROCEDURES</b>
If possible, remove the battery from firefighting area. If heated above 120°C, battery case may melt exposing flammable electrode materials to the fire. However, there is no risk of explosion. Use NIOSH/MSHA approved full-face self-contained breathing apparatus (SCBA) with full protective gear.
<b>UNUSUAL FIRE AND EXPLOSION HAZARDS</b>
Not known to be combustible but if dust is airborne keep a safe distance from dust cloud if ignition is possible. When burned, hazardous products of combustion including carbon oxides can occur.
<b>HAZARDOUS DECOMPOSITION PRODUCTS</b>
Not known

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## SECTION 6: ACCIDENTAL RELEASE MEASURES

<b>ACCIDENTAL RELEASE MEASURES</b>
Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
<b>ON LAND</b>
Use a vacuum equipped with a HEPA filter and place in containers to properly dispose. Avoid raising dust. Avoid inhalation of dust and contact with skin and eyes. Collect the spilled material in containers and prevent them from contaminating water.
<b>IN WATER</b>
If possible, remove from water and call local fire/police department.
<b>CONTAINMENT/CLEANUP</b>
Not known

## SECTION 7: HANDLING AND STORAGE

<b>HANDLING</b>
No special protective clothing required for handling individual battery modules. Do not expose operating temperatures to below 0°C or above 60 °C.
<b>STORAGE</b>
Store in a cool, dry place.
<b>OTHER PRECAUTIONS</b>
Not known

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

<b>ENGINEERING CONTROLS</b>
Airborne exposures to hazardous substances are not expected when product is used for its intended purpose. Keep away from heat and open flame. Store in a cool, dry place.
<b>VENTILATION</b>
Use in well-ventilated area.
<b>RESPIRATORY PROTECTION</b>
Not required during normal operations. SCBA required in the event of a fire.
<b>EYE PROTECTION</b>
Not required beyond safety practices of employer.
<b>SKIN PROTECTION</b>
Not required for handling of cells.
<b>FOOT PROTECTION</b>
Steel-toed shoes recommended for large container handling.
<b>OTHER PROTECTIVE CLOTHING OR EQUIPMENT</b>
Have a safety shower and eye-wash fountain readily available in the immediate work area.
<b>WORK HYGIENE PRACTICES</b>
Wash all exposed areas with soap and water.

CONCENTRATION	PPM	mg/m <sup>3</sup>
OSHA PEL-TWA	Not known	Not known
OSHA PEL STEL	Not known	Not known
OSHA PEL CEILING	Not known	Not known
ACGIH TLV-TWA	Not known	Not known
ACGIH TLV STEL	Not known	Not known
ACGIH TLV CEILING	Not known	Not known

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## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

<b>APPEARANCE</b>	Solid Object
<b>ODOR</b>	No characteristic odor
<b>ODOR THRESHOLD</b>	Not applicable
<b>pH</b>	7
<b>PHYSICAL STATE</b>	Solid
<b>MELTING/FREEZING POINT</b>	Not known
<b>BOILING POINT</b>	Not known
<b>FLASH POINT</b>	Not known
<b>EVAPORATION RATE</b>	Not known
<b>FLAMMABILITY (solid/gas)</b>	Not known
<b>UPPER/LOWER FLAMMABILITY/EXPLOSIVE LIMITS</b>	Not known
<b>VAPOR PRESSURE</b>	Not known
<b>VAPOR DENSITY</b>	Not known
<b>DENSITY</b>	Not known
<b>SOLUBILITY IN WATER</b>	Insoluble
<b>AUTO-IGNITION TEMPERATURE</b>	Not known
<b>DECOMPOSITION TEMPERATURE</b>	Not known
<b>VISCOSITY</b>	Not known
<b>MOLECULAR WEIGHT</b>	Not known

## SECTION 10: STABILITY AND REACTIVITY

<b>REACTIVITY</b>	Not known
<b>CHEMICAL STABILITY</b>	Stable at standard temperature and pressure.
<b>POSSIBILITY OF HAZARDOUS REACTIONS</b>	Not known
<b>CONDITIONS TO AVOID (STABILITY)</b>	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.
<b>HAZARDOUS DECOMPOSITION OR BY-PRODUCTS</b>	No hazardous decomposition materials are generated during normal operating conditions. This material may release toxic fumes if burned or exposed to fire.
<b>HAZARDOUS POLYMERIZATION</b>	Will not occur
<b>CONDITIONS TO AVOID (POLYMERIZATION)</b>	Avoid exposure to heat and open flame. Do not puncture, crush or incinerate.

## SECTION 11: TOXICOLOGICAL INFORMATION

<b>ROUTES OF EXPOSURE</b>	
<b>SKIN CONTACT</b>	The chemicals in this battery are contained in a sealed container. Under normal conditions of use, no known risk of exposure exists via inhalation, ingestion, skin and eyes. Risk of exposure occurs only if the cell is thermally or electrically abused to the point of compromising the
<b>EYE CONTACT</b>	
<b>INHALATION</b>	

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<b>INGESTION</b>	enclosure and/or initiating a fire. If this occurs, exposure to the combustion products may happen by inhalation of the vapors.
<b>SYMPTOMS (PHYSICAL, CHEMICAL, AND TOXICOLOGICAL CHARACTERISTICS)</b>	
Not known	
<b>EFFECTS (DELAYED/IMMEDIATE &amp; CHRONIC EFFECTS OF SHORT/LONG TERM EXPOSURE)</b>	
None known	
<b>NUMERICAL MEASURES OF TOCIXITY</b>	
<b>CHEMICAL NAME</b>	<b>LETHAL DOSE (LD50, oral, rat) mg/kg</b>
Sodium Sulfate	5989
Activated Carbon	10000
Sodium Lithium Dtitanium Triphosphate	Unknown
Manganese Dioxide	3478
Polypropylene	2000-10000
Lithium Carbonate	525
Graphite	2500

## SECTION 12: ECOLOGICAL INFORMATION

<b>ECOTOXICITY</b>
Under normal conditions, these materials are contained and pose no known risk to persons or the surrounding environment. The product is not classified as environmentally hazardous. The degradability of the product has not been stated. No data available on bioaccumulation. The batteries are not intended to be released into water or on land but should be disposed or recycled according to local regulations.
<b>PERSISTENCE AND DEGRADABILITY</b>
The degradability of this material has not been stated.
<b>BIOACCUMULATIVE POTENTIAL</b>
Not known
<b>MOBILITY IN THE SOIL</b>
Not known
<b>OTHER ADVERSE EFFECTS</b>
Not known

## SECTION 13: DISPOSAL CONSIDERATIONS

<b>WASTE DISPOSAL METHOD</b>
Do not dump into any sewers, on the ground or into any body of water. Store material for disposal as indicated in Section 8 - Handling and Storage. Dispose of this material and its container to hazardous or special waste collection point. Do not allow this material to drain into sewers/water supplies. Dispose of according to all federal, state, and local regulations.
<b>RCRA HAZARD CLASS</b>
Not listed

## SECTION 14: TRANSPORT INFORMATION

In general, all batteries in all forms of transportation (ground, air, or ocean) must be packaged in a safe and responsible manner. Regulatory concerns from all agencies for safe packaging require that batteries be packaged in a manner that prevents short circuits and be contained in "strong outer packaging" that prevents spillage of contents.
<b>UN NUMBER AND SHIPPING NAME</b>

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Not known
<b>TRANSPORT HAZARD CLASS(ES)</b>
Not known
<b>U.S. DEPARTMENT OF TRANSPORTATION</b>
The sodium ion battery is not regulated by the DOT as a dangerous good. The individual constituents in the battery are not regulated by DOT.
<b>WATER TRANSPORTATION</b>
Not known
<b>AIR TRANSPORTATION</b>
Not known
<b>OTHER AGENCIES</b>
None

## SECTION 15: REGULATORY INFORMATION

<b>U.S. FEDERAL REGULATIONS</b>
<i>OSHA Hazard Communication Standard, 29 CFR 1910.1200</i> Manganese compounds are listed as hazardous materials. However, in an enclosed battery under normal conditions of use, no known risk of exposure exists.
<i>TSCA Section 8b – Inventory Status</i> All chemicals comprising this product are either exempt or listed on the TSCA Inventory.
<i>TSCA Section 12b – Export Notification</i> If the finished product contains chemicals subject to TSCA Section 12b export notification, they are listed below: Lithium Manganese Oxide (CAS# 12057-17-9) -- 1.0 % One-Time Export Notification only
<i>SARA/TITLE 3 III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)</i> As an article, this battery and its contents are not subject to the requirements of the Emergency Planning and Community Right-To-Know Act.
<b>STATE REGULATIONS</b>
None known
<b>INTERNATIONAL REGULATIONS</b>
None known
<b>OTHER AGENCIES</b>
None known

## SECTION 16: OTHER INFORMATION

**DISCLAIMER:** As the conditions of use of the product described herein are beyond our control, Aquion Energy Inc. neither assumes nor authorizes any person to assume for it any liability in connection with the use of the product. The information provided herein is given in good faith, but Aquion Energy Inc. MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. In no event shall Aquion Energy Inc. be liable for any special, incidental, or consequential damages resulting from the use of the product or in reliance upon information herein.