Material Safety Data Sheet

Issuing Date 01-Apr-2013 **Revision Date** 19-Mar-2013 **Revision Number** 2

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name **LG18650HB2 Lithium Ion Rechargeable Battery**

Recommended Use LITHIUM ION BATTERIES.

Supplier Name LG Chem
Supplier Address LG Twin Towers,
Yeouido-dong, Yeongdeungpo-gu
Seoul
150-721
KR
Supplier Phone Number Phone:82-10-3229-2308
Contact Phone82-2-3773-3244
Supplier Email mignonchoi@lgchem.co.kr
Supplier Contact Name Minyoung Choi

2. HAZARDS IDENTIFICATION

Emergency Overview

In case of rupture
Harmful by inhalation, in contact with skin and if swallowed
Corrosive
The product causes burns of eyes, skin and mucous membranes
May produce an allergic reaction

Appearance Green **Physical State** Solid. **Odor**

OSHA Regulatory Status This product is an article which contains a sealed battery and as such does not require an MSDS per the OSHA Hazard Communication Standard. While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS 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.

Potential Health Effects
Principle Routes of Exposure Eye contact. Skin contact.

Acute Toxicity
- **Eyes** May cause irritation
- **Skin** No known effect based on information supplied.
- **Inhalation** No known effect based on information supplied May be harmful if inhaled
- **Ingestion** No hazard from product as supplied

Chronic Effects May cause adverse effects on the bone marrow and blood-forming system May cause adverse liver effects

Aggravated Medical Conditions Central nervous system. Pre-existing eye disorders. Blood disorders. Kidney disorders. Liver disorders. Skin disorders. Respiratory disorders. Central Vascular System (CVS). Nasal cavities Lungs.

Interactions with Other Chemicals Use of alcoholic beverages may enhance toxic effects

Environmental Hazard See Section 12 for additional Ecological information. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

3. COMPOSITION/INFORMATION ON INGREDIENTS

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Chemical Name	CAS No	Weight-%
Supplier Trade Secret	Proprietary	30-60
Supplier Trade Secret	Proprietary	15-40
Copper	7440-50-8	7-13
Aluminum foil	7429-90-5	7-13
Supplier Trade Secret	Proprietary	3-7
1,1-Difluoroethylene polymer	24937-79-9	1 - 5
Supplier Trade Secret	Proprietary	1 - 5
Supplier Trade Secret	Proprietary	1 - 5
Supplier Trade Secret	Proprietary	1 - 5
Supplier Trade Secret	Proprietary	1 - 5

4. FIRST AID MEASURES

General Advice First aid is upon rupture of sealed battery.

Eye Contact Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Keep eye wide open while rinsing. Call a physician immediately.

Skin Contact Immediate medical attention is required. Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.

Inhalation Immediate medical attention is required. Remove to fresh air. If not breathing, give artificial respiration. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately. Never give anything by mouth to an unconscious person. Drink plenty of water.

Notes to Physician Treat symptomatically.

Self-protection of the first aider Use personal protective equipment as required. Avoid contact with skin, eyes or clothing.

5. FIRE-FIGHTING MEASURES

Flammable Properties This article contains flammable electrolytes and therefore can cause a fire hazard if ruptured and chemicals are leaked out.

Flash Point Not determined.

Suitable Extinguishing Media Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Hazardous Combustion Products Carbon oxides.

Explosion Data
Sensitivity to Mechanical Impact No.

Sensitivity to Static Discharge No.

Protective equipment and precautions for firefighters As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA **Health Hazards** 1 **Flammability** 0 **Stability** 0 **Physical and Chemical Hazards** -

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions Avoid contact with eyes. Use personal protective equipment as required.

Environmental Precautions Refer to protective measures listed in Sections 7 and 8. Prevent further leakage or spillage if safe to do so. Do not allow to enter into soil/subsoil. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers. Dam up. Soak up with inert absorbent material. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Handling In case of rupture. Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Use personal protection equipment.

Storage Keep container tightly closed. Keep container tightly closed in a dry and well-ventilated place. Bund storage facilities to prevent soil and water pollution in the event of spillage.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Supplier Trade Secret	TWA: 0.02 mg/m³ Co TWA: 0.02 mg/m³ Mn TWA: 0.1 mg/m³ Mn	(vacated) Ceiling: 5 mg/m³ Ceiling: 5 mg/m³ Mn	IDLH: 500 mg/m³ Mn IDLH: 10 mg/m³ Ni TWA: 1 mg/m³ Mn TWA: 0.015 mg/m³ except Nickel carbonyl Ni STEL: 3 mg/m³ Mn
Supplier Trade Secret	TWA: 2 mg/m³ respirable fraction all forms except graphite fibers	TWA: 15 mg/m³ total dust synthetic TWA: 5 mg/m³ respirable fraction synthetic (vacated) TWA: 2.5 mg/m³ respirable dust natural (vacated) TWA: 10 mg/m³ total dust synthetic (vacated) TWA: 5 mg/m³ respirable fraction synthetic TWA: 15 mppcf natural	IDLH: 1250 mg/m³ TWA: 2.5 mg/m³ respirable dust
Copper 7440-50-8	TWA: 0.2 mg/m³ fume TWA: 1 mg/m³ Cu dust and mist	TWA: 0.1 mg/m³ fume TWA: 1 mg/m³ dust and mist (vacated) TWA: 0.1 mg/m³ Cu dust, fume, mist	IDLH: 100 mg/m³ dust, fume and mist TWA: 1 mg/m³ dust and mist TWA: 0.1 mg/m³ fume
Aluminum foil 7429-90-5	TWA: 1 mg/m³ respirable fraction	TWA: 15 mg/m³ total dust TWA: 5 mg/m³ respirable fraction (vacated) TWA: 15 mg/m³ total dust (vacated) TWA: 5 mg/m³ respirable fraction (vacated) TWA: 5 mg/m³ Al Aluminum	TWA: 10 mg/m³ total dust TWA: 5 mg/m³ respirable dust
Supplier Trade Secret	TWA: 2.5 mg/m³ F	TWA: 2.5 mg/m³ F TWA: 2.5 mg/m³ dust (vacated) TWA: 2.5 mg/m³	

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits NIOSH IDLH Immediately Dangerous to Life or Health

Other Exposure Guidelines Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

Engineering Measures Showers
Eyewash stations
Ventilation systems

Personal Protective Equipment

Eye/Face Protection If there is a risk of contact: Tight sealing safety goggles
Skin and Body Protection If there is a risk of contact: Protective gloves Long sleeved clothing
Respiratory Protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required

Hygiene Measures When using do not eat, drink or smoke. Regular cleaning of equipment, work area and clothing is recommended. Avoid contact with skin, eyes or clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance Green.
Odor

Odor Threshold No information available
Physical State Solid
pH No information available
Flash Point No information available
Autoignition Temperature No information available
Decomposition temperature No information available
Boiling point / boiling range No information available
Melting Point/Range No information available

		Flammability Limits in Air	No information available
Explosion Limits	No information available		
Water Solubility		**Solubility**	No information available.
Evaporation Rate	No information available	**Vapor pressure**	No data available
Vapor density	No data available		

10. STABILITY AND REACTIVITY

Stability Stable under recommended storage conditions.

Incompatible Products None known.

Conditions to Avoid None known.

Hazardous Decomposition Products Carbon oxides.

Hazardous Polymerization Hazardous polymerization does not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity

Product Information .

LD50 Oral VALUE 892400 mg/kg (rat) Estimated
LC50 Inhalation (DUST) VALUE 1555.556 mg/L (mist) (dust) mg/m³ Estimated

Chronic Toxicity

Chronic Toxicity May cause adverse effects on the bone marrow and blood-forming system. May cause adverse liver effects.

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Supplier Trade Secret	A3	Group 1 Group 2B	Known	X
Supplier Trade Secret	A3	Group 2B	Reasonably Anticipated	X

ACGIH (American Conference of Governmental Industrial Hygienists)
A3 - Animal Carcinogen
IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP (National Toxicology Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen
OSHA (Occupational Safety and Health Administration of the US Department of Labor)
X - Present

Target Organ Effects Blood. Central Nervous System (CNS). Central Vascular System (CVS). Eyes. Kidney. Liver. Lungs. Nasal cavities. Respiratory system. Skin.

12. ECOLOGICAL INFORMATION

Ecotoxicity

The environmental impact of this product has not been fully investigated. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Copper	96h EC50: 0.031 - 0.054 mg/L (Pseudokirchneriella subcapitata) 72h EC50: 0.0426 - 0.0535 mg/L (Pseudokirchneriella subcapitata)	96h LC50: 0.0068 - 0.0156 mg/L (Pimephales promelas) 96h LC50: = 0.112 mg/L (Poecilia reticulata) 96h LC50: = 0.3 mg/L (Cyprinus carpio) 96h LC50: = 0.8 mg/L (Cyprinus carpio) 96h LC50: = 1.25 mg/L (Lepomis macrochirus) 96h LC50: = 0.052 mg/L (Oncorhynchus mykiss) 96h LC50: = 0.2 mg/L (Pimephales promelas) 96h LC50: < 0.3 mg/L (Pimephales promelas)		48h EC50: = 0.03 mg/L
Supplier Trade Secret	72h EC50: > 500 mg/L (Desmodesmus subspicatus)	96h LC50: > 1000 mg/L (Cyprinus carpio) 96h LC50: = 5300 mg/L (Leuciscus idus)	EC50 > 10000 mg/L 17 h	48h EC50: > 500 mg/L

Chemical Name	Log Pow
Supplier Trade Secret	0.48

13. DISPOSAL CONSIDERATIONS

Disposal methods This material, as supplied, is not a hazardous waste according to Federal regulations (40 CFR 261). This material could become a hazardous waste if it is mixed with or otherwise comes in contact with a hazardous waste, if chemical additions are made to this material, or if the material is processed or otherwise altered. Consult 40 CFR 261 to determine whether the altered material is a hazardous waste. Consult the appropriate state, regional, or local regulations for additional requirements.

Contaminated Packaging Dispose of in accordance with federal, state and local regulations

Chemical Name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Supplier Trade Secret -	U193			U193

California Hazardous Waste Codes 141

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California EHW	California Carc	California Hazardous Waste	California Waste - Part 2
Supplier Trade Secret			Toxic	STLC (for PBTs): 80 mg/L STLC (for PBTs): 20 mg/L TTLC (for PBTs): 8000 mg/kg TTLC (for PBTs): 2000 mg/kg
Copper			Toxic	STLC (for PBTs): 25 mg/L TTLC (for PBTs): 2500 mg/kg
Aluminum foil			Ignitable powder	

14. TRANSPORT INFORMATION

Note:	The transportation of primary lithium cells and batteries is regulated by the International Civil Aviation Organization, International Air Transport Association, International Maritime Dangerous Goods Code and the US Department of Transportation. The batteries must meet the following criteria for shipment: 1. Air shipments must meet the requirements listed in Special Provision A45 of the International Air Transport Association Dangerous Goods Regulations. 2. Meet the requirements for the US Department of Transportation listed in 49 CFR 173.185. 3. The transport of primary lithium batteries is prohibited aboard passenger aircraft. Refer to the Federal Register December 15, 2004 (Hazardous Materials; Prohibited on the Transportation of Primary Lithium Batteries and Cells Aboard Passenger Aircraft; Final Rule) Lithium batteries shipped as "Lithium batteries", "Lithium batteries packed with equipment", or "Lithium batteries contained in equipment" may not be classified as "Dangerous Goods" when shipped in accordance with "special provision A45 of IATA-DGR" or "special provision 188 of IMO-IMDG Code"
Emergency Response Guide Number	147
DOT	NOT REGULATED
TDG	Not regulated
MEX	Not regulated
ICAO	Not regulated
IATA	Not regulated
IMDG/IMO	Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA Complies
DSL Not determined

US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	CAS No	Weight-%	SARA 313 - Threshold Values %
Supplier Trade Secret		30-60	1.0 0.1
Copper	7440-50-8	7-13	1.0
Aluminum foil	7429-90-5	7-13	1.0
Supplier Trade Secret		1 - 5	0.1

SARA 311/312 Hazard Categories

Acute Health Hazard	No
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)
This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Supplier Trade Secret		X		
Copper		X	X	

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)
This product contains the following substances which are listed hazardous air pollutants (HAPS) under Section 112 of the Clean Air Act:

Chemical Name	CAS No	Weight-%	HAPS data	VOC Chemicals	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Aluminum foil	7429-90-5	7-13				
Supplier Trade Secret		3-7		Group V		
Supplier Trade Secret		1 - 5		Group I		
Supplier Trade Secret		1 - 5				

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs
Copper	5000 lb	
Aluminum foil		
Supplier Trade Secret	10 lb	

US State Regulations

California Proposition 65
This product contains the following Proposition 65 chemicals

Chemical Name	CAS No	California Proposition 65
Cobalt lithium manganese nickel oxide	182442-95-1	Carcinogen

1,3-Propane sultone	1120-71-4	Carcinogen

U.S. State Right-to-Know Regulations

Chemical Name	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Supplier Trade Secret			X	X	X
Supplier Trade Secret	X	X	X		
Aluminum foil	X				X
Copper	X	X	X	X	X
Supplier Trade Secret	X	X	X		
Supplier Trade Secret	X	X	X	X	X

International Regulations

Mexico - Grade Minimum risk, Grade 0

Chemical Name	Carcinogen Status	Exposure Limits
Supplier Trade Secret		Mexico: TWA 0.2 mg/m^3
Supplier Trade Secret		Mexico: TWA= 2 mg/m^3
Copper		Mexico: TWA= 1 mg/m^3 Mexico: TWA= 0.2 mg/m^3 Mexico: STEL= 2 mg/m^3
Aluminum foil		Mexico: TWA 10 mg/m^3

Canada

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

WHMIS Hazard Class
Non-controlled

16. OTHER INFORMATION

Prepared By Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

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Revision Note No information available.

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of Safety Data Sheet