Material Safety Data Sheet

E76A Li-Ion Battery

1. PRODUCTION AND COMPANY IDENTIFICATION

Product Name/Identification : LGCHEM E76A- (B10XLR) Lithium_Ion Polymer Battery

P/N :

Manufacturer : LG Chemical Limited

In Case of Emergency

General Information : 82-42-866-5923,

LG Global Security (after hours) :

Prepared By : LGC

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2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: May explode in a fire, which could release hydrogen, hydrogen fluoride, carbon monoxide, carbon dioxide, aldehydes, and C1-C3 hydrocarbons. Use an ABC dry chemical extinguisher in case of fire.

Warning: This is an electrical energy storage device. Avoid situations that could cause arcing between terminals. The device may cause electrical shock, fire or injury.

OSHA Regulatory Status: While the battery pack is not classified as hazardous under OSHA regulations, this MSDS contains information critical to the safe handling and proper use of the product.

Battery Pack: Potentially hazardous substances are fully contained in a battery pack designed to withstand normal handling and use and pose no risk under normal use. Exposure to the substances could occur only if the battery pack or cells have been opened, disassembled, crushed, burned, exposed to high temperatures > 150°C (302°F), or subjected to other types of abuse.

Cell/Electrolyte Mixture:

Primary routes of entry:

Skin	Yes	**Eye**	Yes	**Inhalation**	Yes	**Ingestion**	Yes

Health Effects

Skin contact : Skin contact may cause irritation. Prolonged contact with electrolyte mixture may result in more sever irritation.

Skin absorption : Possible skin absorption with prolonged contact.

Eye contact : Eye contact may cause sever irritation and possible a burning sensation or corneal tissue injury.

Inhalation : High vapor concentrations may cause respiratory tract irritation.

Ingestion : Swallowing electrolyte mixture may cause gastrointestinal tract burns. May cause nausea and vomiting.

See additional toxicological information (section 11)

3. COMPOSITION/INFORMATION ON INGREDIENTS

IMPORTANT NOTE: The BEV2 Li-ion Battery should not be opened or burned. Exposure to the ingredients contained within or their combustion products could be harmful.

Cell/Electrolyte Mixture

CAS #	Chemical Name	Percent By Wt.	Exposure Limit	
			ACGIH TLV	OSHA PEL
7429-90-5	Aluminum Foil	1-5	2 mg/m3 (PNOS), as Al	15 mg/m3 (total) 5mg/m3 (resp)
proprietary	Metal Oxide	30-50	NE	NE
	-Manganese	5-10	0.2 mgm3, as Mn	5 mg/m3 Ceiling
	-Nickel	15-30	1.5 mg/m3, Inhalable nickel particulate mass -	1mg/m3
	-Cobalt	5-10	0.02 mg/m3, as Co	0. mg/m3
24937-79-9	Polyvinylidene Fluoride (PVDF)	<3	NE	NE
7440-50-8	Copper Foil	1-5	0.2 mg/m2 - Fume, as Cu 1mg/m3 - Dusts and Mists, as Cu	0.1 mg/m2 - Fume, as Cu 1mg/m3 - Dusts and Mists, as Cu
7440-44-0	Carbon	20-30	NE	NE
proprietary	Electrolyte-organic carbonate	10-20	NE	NE
proprietary	Aluminum, Copper plate and inert materials	2-10	NE	NE

Lithium-equivalent Content: 35.1g/cell

Electric power capacity: 276 Wh/cell

Battery Cover

CAS #	Chemical Name	Percent By Wt.	Exposure Limit	
			ACGIH TLV	OSHA PEL
proprietary	Nylon 66	NA	NE	NE

Note: Dex-cool or equivalent coolant may be present and circulating in the battery pack and may be present after battery is removed from vehicle installation. See Dex-cool or equivalent coolant MSDS for information on potential health effects associated with exposure.

4. FIRST AID MEASURES

Battery Pack:

Electrical hazard: In the event of individual electric shock, do not touch the person with bare hands while he or she is still in contact with the battery. Use an object that does not conduct electricity to break contact or push response to stimulation. Contact the emergency medical system immediately. If necessary, start cardiopulmonary resuscitation, or CPR, if the person stops breathing. Use 30 chest compressions for every 2 mouth-to-mouth rescue breaths.

Cell/Electrolyte Mixture:
The following actions are recommended if direct contact occurs with exposed electrolyte mixture due to damage of battery casing:

Inhalation : Leave area immediately and seek medical attention if irritation occurs.

Eye contact : Rinse eyes with water for 30 minutes and seek medical attention immediately.

Skin contact : Wash area thoroughly with soap and water and seek medical attention if irritation occurs.

Ingestion : Drink milk/water and induce vomiting; seek medical attention immediately.

5. FIRE FIGHTING MEASURES

Flashpoint : NE
Flammable Limits : NE
Auto-ignition Temperature : NE

General Hazard : Cell is not flammable but internal electrolyte mixture contains organic substances which will burn if the battery is incinerated. Combustion products include, but are not limited to hydrogen, hydrogen fluoride, carbon monoxide, carbon dioxide, aldehydes, and C1-C3 hydrocarbons.

Extinguishing Media

Suitable Extinguishing : Use a dry chemical ABC extinguisher.

Unsuitable Extinguishing Media : Do not use extinguisher containing metal.

Special Fire Fighting Procedures

Over-Voltage Response
(Excessive heat, burning plastic odor, faint smoke) : Move battery (pack) to safe area.
If heated above 150°C (302°F), battery or cell/electrolyte mixture may explode vent.

Fire/Explosion Response
(Heavy smoke, sparking, visible flames) : If possible, remove battery or cell from fire fight area.
For fires involving battery packs - individual cell fires may occur over a period of several seconds rather than simultaneously.
Isolate all energy sources to battery pack.

Fire Fighting Equipment : Use NIOSH/MSHA approved full-face Self-Contained Breathing Apparatus (SCBA) with full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions :
- Follow local emergency response plan for emergency events.
- Restrict access to the area.
- Attempt to ventilate area, if possible.
- For battery over-voltage, use E-Stop if present and turn of power to recharge points.
- Follow Electrical Safe Work Practices (ESWP) - Isolate energy sources / eliminate ignition sources.
- Remove all metal objects including rings, watches, belts, etc. before handling battery cell or packs.
- Allow battery to cool to ambient temperature before approaching.
- Measure temperature remotely with and infrared temperature (IR) gun or similar device.
- Prevent skin and eye contact or inhalation of vapors.
- Wear neoprene or nitrile rubber gloves and safety glasses/side shields when handling damaged battery cells or packs.

Environmental Precautions : Prevent entry of cell/electrolyte mixture into drains, surface water, or groundwater. Contact local fire/police department.

Methods for Containment : The electrolyte is normally not in a liquid state; it is an electrolyte slurry

and Clean-up (Release of Cell/Electrolyte Mixture)

and not a typical "liquid spill." Leave area and allow any vapor to dissipate. Prevent skin and eye contact or inhalation of vapor. Use Personal Protective Equipment (PPE) including safety glasses and chemical resistant neoprene or nitrile gloves; if vapor is present and cannot be ventilated use respiratory protection. Neutralization is not necessary.

For small releases, use paper towel or dry cloth to absorb electrolyte.

For larger releases, cleanup all spills/leaks immediately using an inert absorbent (vermiculite, cat litter, dry sand).

Place contaminated sorbent in appropriate container and dispose of waste in accordance with local regulations. After removing the battery/cell and absorbent material, clean area with soap and water.

Other Information : Damaged battery should be stored in ventilated area away from flammable material, heat or open flames. Dispose or recycle in a sealed, non-conductive plastic bag, drum or container.

7. HANDLING AND STORAGE

Handling : No special protective clothing required for handling intact cell, section, or battery system

Storage : Store in a cool, dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls : Keep away from heat and open flame. Store in a cool dry place.

Personal Protection

Respirator : Not required during normal operations. Self-Contained Breathing Apparatus
(SCBA) required in the event of a fire.

Eye/face protection : Not required beyond safety practices of employer.

Gloves : Not required for handling of cell or battery pack.

Foot Protection : Safety footwear meeting the requirements of ANSI Z 41.1 -1991 is recommended when it is necessary to handle the finished battery pack.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Cell: Aluminum Colored Sealed Unit Battery Pack: Black Sealed Assembly
State	: Solid
Odor	: NA
pH	: NA
Vapor pressure	: NA
Vapor density	: NA
Boiling point	: NA
Solubility in water	: NA
Specific gravity	: NA
Density	: NA

10. STABILITY AND REACTIVITY

Reactivity	: None
Incompatibilities	: None during normal operation. Avoid exposure to heat, open flame, and corrosives.
Hazardous Decomposition Products	: None during normal operation conditions. Overcharging battery may generate hydrogen, hydrogen fluoride, carbon monoxide, carbon dioxide, aldehydes, and C1-C3 hydrocarbons. These substances may be emitted through the pressure relief opening.
Conditions To Avoid	: Avoid exposure to heat and open flame. Do not puncture, crush or incinerate.

11. TOXICOLOGICAL INFORMATION

TOXIC EFFECTS: During routine use and handling, the battery pack does not result in any adverse toxicological effects. If the cells are opened through misuse or damage, direct contact with internal components may cause irritation or sensitization.

Battery Pack

Acute toxicity	: None
Sensitization	: None
Teratogenicity	: None
Reproductive toxicity	: None

Cell/Electrolyte Mixture

Acute toxicity	: Contact with skin or eyes may cause strong irritation with a burning sensation and possibly tissue injury.
Sensitization	: Prolonged contact with cell/electrolyte mixture may cause skin sensitization.
Teratogenicity	: None
Reproductive toxicity	: None

Health Effects of Decomposition Products: Overexposure to products generated from overcharge or combustion of the cell or battery may result in simple and chemical asphyxiation. Symptoms may include rapid respiration, muscular incoordination, fatigue, dizziness, nausea, vomiting, unconsciousness, and death. Severe eye irritation or tissue injury may occur at high concentrations. Prolonged overexposure to decomposition products may adversely affect the lungs, blood, cardiovascular, and central nervous system. Symptoms may include headache, confusion, excitation, rapid breathing, and irregular heartbeat (arrhythmia), lassitude (weakness, exhaustion), cyanosis (bluish or purplish tinge to the skin), and chest pain.

Carcinogenicity: The following components, that can be present at > 0.1%, are listed in the NTP Annual Report on Carcinogens (latest edition) or have been found to be a potential carcinogen in the IARC Monographs (latest edition) or by OSHA:

Cobalt	: IARC 2B (Possibly Carcinogenic to Humans)
Nickel	: IARC 2B (Possibly Carcinogenic to Humans) and NTP (Reasonably Anticipated to be a Human Carcinogen).

Note: Dex-cool or equivalent coolant may be present and circulating in the battery pack and may be present after battery is removed from vehicle installation. See Dex-cool or equivalent coolant MSDS for information on potential health effects associated with exposure.

12. ECOLOGICAL INFORMATION

Environmental Impact : Some substances within the cell/electrolyte mixture are bioaccumulative. However, under normal conditions, these materials are contained and pose no risk to persons or the surrounding environment.

13. DISPOSAL CONSIDERATIONS

Recover or recycle battery at end of use or end of life. The battery cell/electrolyte mixture contains recyclable material and recycling is encouraged over disposal.

RCRA Waste Code	: Not Regulated
40 CFR	: Batteries are considered universal waste when discarded.
California	: See CCR, title 22, division 4.5, chapter 23.

Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

14. TRANSPORTATION INFORMATION

US DOT

UN No. 3090

Proper Shipping Name	: Lithium Ion Batteries
Class	: 9
Packing Group	: II
Hazard Label toxicity	: Miscellaneous

INTERNATIONAL (Air/vessel)

UN No. 3480

Proper Shipping Name	: Lithium Ion Batteries
Class	: 9
Packing Group	: II
Hazard Label toxicity	: Miscellaneous

ICAO/IATA

Packing Instruction	: 965
Maximum Gross Weight per Package on Passenger and Cargo Aircraft	: 5kg
Maximum Gross Weight per Package on Cargo Only Aircraft	: 35kg
Special Provision	: A88, A99, A154, A164, A183

IMO-IMDG

Packing Instruction	: P903
Special Provision	: 188, 230, 310, 957
EmS	: F-A, S-I

US DOT

This product is not subject to any other requirements of dangerous goods under 49CFR 173.185 (Lithium Batteries and Cells).

15. REGULATORY INFORMATION

Federal Regulations

OSHA HCS (29 CFR 1910.1200) Classification	: *Cell/Electrolyte Mixture:* Regulated *Battery Pack:* Not Regulated
TSCA 8(b) Inventory Status	: All substances in this product are listed or exempt.

SARA Title III

SEC. 302/304	: None
SEC. 311/312	: None
SEC. 313	: If cell or battery is damaged the battery or cell/electrolyte mixture may be subject to the reporting requirements of Section 313 of Title III of SARA and 40 CFR Part 372 for the following categories: Cobalt (N096), Copper (N100), Manganese (N450), and Nickel (N495).
CERCLA RQ	: None

State Regulations

California Prop 65	: This product contains the following listed substances with the State of California has found to cause cancer, birth defects or other reproductive harm12/2/2013 Cobalt (7440-48-4), Nickel (7440-02-0).

15. OTHER INFORMATION

MSDS Version Number : 1

Key : ACGIH = American Conference of Governmental Industrial Hygienists, TLV = Threshold Limit Value, OSHA = Occupational Safety and Health Administration, PEL = Permissible Exposure Limit, CAS = Chemical Abstracts Service, NA = No Available, NE = Not Established, NIOSH = National Institute for Occupational Safety and Health, MSHA = Mine Safety and Health Administration, SCBA = Self-Contained Breathing Apparatus, NTP = National Toxicology Program, IARC = International Agency for Research on Cancer, UN = United Nations, ICAO = International Civil Aviation Organization, IATA = International Air Transport Association, IMO = International Maritime Organization, EmS = Emergency Schedule, US DOT = United States Department of Transportation, CFR = Code of Federal Regulations, HCS = Hazard Communication Standard, TSCA = Toxic Substance Control Act, SARA = Superfund Amendments and Reauthorization Act, PNOS = Particulates (Insoluble) Not Otherwise Specified.

Disclaimer : This information is based upon technical information believed to be reliable. The information is subject to revision as additional knowledge and experience is gained. It is the responsibility of the user to comply with all applicable federal, state and local laws and regulations.

End of MSDS