LG Energy Solution	Product Safety Data Sheet (PSDS)	Version: R0001.0001
		Date of issue: 2021-02-05
	INR18650 MJ1	Revision date: 2021-02-05
		Change List:

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Version	Items	Description	Date
V01	Origin	Initial Release	2021.02.05

1.2. Relevant identified uses of the substance or mixture and uses advised against

1.2.1. Relevant identified uses

- Not available

1.2.2. Uses advised against

- Not available

1.3. Details of the supplier of the safety data sheet

Manufacturer/Supplier : LG Energy Solution
Address :
Telephone :
Email :

1.4. Emergency telephone number

Emergency number : 112
See section 16.6 for the list of telephone number of National Helpdesks in the European Economic Area.

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SECTION 2: HAZARD IDENTIFICATION

These products are classified as Articles under OSHA Hazard Communication Standard and are not subject to the requirements for Information in the Supply Chain (Safety Data Sheets and Labels).
While batteries may release hazardous substances if damaged, this is not an intended release as defined under OSHA.
Batteries are not classified as hazardous under the 29 CFR 1910.1200.

The following information is provided to assist in the safe use of our products.

CAUTION: Battery can explode or leak if heated, disassembled, shorted, recharged, exposed to fire or high temperature or inserted incorrectly. Keep in original package until ready to use. Do not carry batteries loose in your pocket or purse. Keep batteries away from children. If swallowed, consult a physician at once. Under certain misuse conditions and by abusively opening the battery, exposed lithium can react with water or moisture in the air causing potential thermal burns or fire.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

Name	CAS No.	% [weight]
Aluminium Foil	7429-90-5	2 - 10
Nikel compound (proprietary)	1313-99-1	0 - 80
Manganese compound (proprietary)	1313-13-9	0 - 15
Cobalt compound (proprietary)	1307-96-6	0 - 15
Styrene-Butadiene-Rubber	9003-55-3	< 1
Polyvinylidene Fluoride (PVDF)	24937-79-9	< 5
Copper Foil	7440-50-8	2 - 10
Carbon (proprietary)	7440-44-0	10 - 30
Electrolyte (proprietary)	96-49-1	10 - 20
Steel, Nickel and inert materials	N/A	Remainder

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General

- The chemicals and metals in this product are contained in a sealed can. Exposure to the contents will not occur unless the battery leaks, is exposed to high temperatures or is mechanically, physically, or electrically abused.

Inhalation

- When exposed to large amounts of steam and mist, move to fresh air.
- Take specific treatment if needed.

Skin contact

- Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
- Wash contaminated clothing thoroughly before re-using.

Eye contact

- Do not rub your eyes.
- Immediately flush eyes with plenty of water for at least 15 minutes and call a doctor/physician.

Ingestion

- Please be advised by doctor whether induction of vomit is demanded or not.
- Rinse your mouth with water immediately.

Note to Physician

- Published reports recommend removal from the esophagus be done endoscopically (under direct visualization). Batteries beyond the esophagus need not be retrieved unless there are signs of injury to the GI tract or a large diameter battery fails to pass the pylorus. If asymptomatic, follow-up xrays are necessary only to confirm the passage of larger batteries. Confirmation by stool inspection is preferable under most circumstances. Potential leakage of less than 50 milligrams of dimethoxyethane and propylene carbonate. Dimethoxyethane rapidly evaporates. Do not give ipecac.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

General Hazard

- Cell is not flammable but internal organic material will burn if the cell is incinerated or exposed to high temperatures.

Suitable extinguishing media

- Use extinguishing media suitable for the materials that are burning.

5.2. Special hazards arising from the substance or mixture

Hazardous combustion products

- Combustion products include, but are not limited to hydrogen fluoride, carbon monoxide and carbon dioxide.

5.3. Advice for firefighters

- If possible, remove cell(s) from fire fighting area. If heated above 125°C, cell(s) may explode/vent.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Accidental release measures

- Notify safety personnel of large spills. Irritating vapors and flammable may be released from leaking or ruptured batteries. Eliminate all ignition sources. Evacuate the area and allow the vapors to dissipate.
Clean-up personnel should wear appropriate protective clothing to avoid eye and skin contact and inhalation of vapors or fumes. Increase ventilation. Carefully collect batteries and place in an appropriate container for disposal. Remove spilled liquid with absorbent and contain for disposal.

6.2. Personal Precautions, protective equipment and emergency procedures

6.2.1. For non-emergency personnel

- Protective equipment: Wear proper protective equipment.
- Emergency procedures: Not applicable
- If required, notify relevant authorities according to all applicable regulations.

6.2.2. For emergency responders

- Wear proper personal protective apparatus as indicated in Section 8 and avoid skin contact and inhalation.
- Must work against the wind, let the upwind people to evacuate.
- Move container to safe area from the leak area.

6.3. Environmental precautions

- Prevent runoff and contact with waterways, drains or sewers.
- If large amounts have been spilled, inform the relevant authorities.
- Avoid dispersal of spilt material and runoff and contact with waterways, drains and sewers. If large spills, advise emergency services.

6.4. Methods and material for containment and cleaning up

6.4.1. For containment

- Clear spills immediately
- Clean up all spills immediately.
- Control personal contact by using protective equipment.
- Prevent, by any means available, spillage from entering drains or water course.

6.4.2. For cleaning up

- Large spill : Stay upwind and keep out of low areas. Dike for later disposal.
- Notify the central and local government if the emission reach the standard threshold.
- Disposal of waste shall be in compliance with the Wastes Control?Act
- Appropriate container for disposal of spilled material collected.

6.4.3. Other information

- Slippery when spilt.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

- Avoid mechanical or electrical abuse. DO NOT short circuit or install incorrectly. Batteries may explode, pyrolize or vent if disassembled, crushed, recharged or exposed to high temperatures. Install batteries in accordance with equipment instructions. Replace all batteries in equipment at the same time. Do not carry batteries loose in a pocket or bag.
- Avoid contact with incompatible materials.
- Get the manual before use.
- Do not handle until all safety precautions have been read and understood.

7.2. Conditions for safe storage, including any incompatibilities

- Store in a cool, dry place.
- Do not apply any physical shock to container.
- Avoid direct sunlight.
- Keep in the original container.
- Please pay attention to incompatibilities materials and conditions to avoid.
- Keep sealed when not in use.

7.3. Specific end use(s)

- See Section 1 for information on 1.2 Relevant identified uses.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Exposure controls/Personal protection

8.1.1. Appropriate engineering controls

- Keep away from heat and open flame. Store in a cool dry place.

8.1.2. Individual protection measures, such as personal protective equipment

Hand protection

- Wear appropriate glove made out of rubber, neoprene, vinyl coated, PVC.

Eye protection

- Wear primary eye protection such as splash resistant safety goggles with a secondary protection face shield.
- Provide an emergency eye wash station and quick drench shower in the immediate work area.

Respiratory Protection

- Respiratory protection is ranked in order from minimum to maximum.
- Consider warning properties before use.

Skin protection

- Wear appropriate clothing.

Others

- It is necessary to wear protective clothes and other protection equipment. Cover your face, head and neck.
- Prior to removing protective garments the employee should undergo decontamination and be required to shower upon removal of the garments and hood.
- Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely.

Thermal hazards

- Not available

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance(State)	Other
Appearance(Color)	Not available
Odor	Not available
Odor threshold	Not available
pH	Not available
Melting point/Freezing point	Not available
Initial boiling point and boiling range	Not available
Flash point	Not available
Evaporation rate	Not available

Flammability(solid, gas)	Not available
Upper/Lower Flammability or explosive limits	Not available
Vapour pressure	Not available
Vapour density	Not available
Relative density	Not available
Solubility	Insoluble
Partition coefficient of n-octanol/water	Not available
Autoignition temperature	Not available
Decomposition temperature	Not available
Viscosity	Not available
Explosive properties	Not available
Oxidising properties	Not available

9.2. Other information

- Not available

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

- None

10.2. Chemical Stability

- This procduct is stable under recommended storage and handling conditions.

10.3. Conditions to avoid

- Avoid exposure to heat and open flame.
- Do not puncture, crush or incinerate.

10.4. Incompatible materials

- Not available

10.5. Hazardous decomposition products

- None during normal operating conditions. If cells are opened, hydrogen fluoride and carbon monoxide may be released.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Toxicological information

- This product does not elicit toxicological properties during routine handling and use.
- If the cells are opened through misuse or damage, discard immediately. Internal components of cell are irritants and sensitizers.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Ecological information

- Some materials within the cell are bioaccumulative. Under normal conditions, these materials are contained and pose no risk to persons or the surrounding environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

- Disposal should be in accordance with national and local regulations. Do not incinerate for disposal except for in a controlled incinerator.

SECTION 14: TRANSPORT INFORMATION

14.1. UN No.

14.1.1. UN No. (ADR/RID/ADN)

- 3480
- 3481

14.1.2. UN No. (IMDG)

- 3480
- 3481

14.1.3. UN No. (ICAO)

- 3480
- 3481

14.2. UN proper shipping name

- LITHIUM ION BATTERIES (including lithium ion polymer batteries)
- LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT (including lithium ion polymer batteries)

14.3. Transport hazard class(es)

14.3.1. ADR/RID/ADN Class

- 9
- 9

14.3.2. ADR/RID/ADN Class

- Class : 9, LITHIUM ION BATTERIES (including lithium ion polymer batteries)
- Class : 9, LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT or LITHIUM ION BATTERIES PACKED WITH EQUIPMENT (including lithium ion polymer batteries)

14.3.3. ADR Label No.

- 9A
- 9A

14.3.4. IMDG Class

- 9
- 9

14.3.5. ICAO Class/Division

- 9
- 9

14.4. Packing instruction

14.4.1. ADR/RID/ADN Packing instruction

- P903
- P903

14.4.2. IMDG Packing instruction

- P903
- P903

14.4.3. ICAO Packing instruction

- P903
- P903

14.5. Environmental hazards

- Not available

14.6. Special precautions for user

- Local transport follows in accordance with Dangerous goods Safety Management Law.
- Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.
- EmS FIRE SCHEDULE : F-A (General fire schedule)
- EmS SPILLAGE SCHEDULE : S-I (Flammable solids (repacking possible))
- Emergency Action Code : 4W(1)
- Tunnel Restriction Code : 2 (E)
- This product passed 1.2M drop test and comply with UN38.3.

No	Test item	Criteria	Result
Test 1	Altitude simulation	- After OCV (%) ≥ 90% - No leakage, no venting, no disassembly, no rupture, no fire - Mass loss limit (leakage) 1) If M<1g, less than 0.5%, 2) If 1g≤M≤75g, less than 0.2%, 3) If M>75g, less than 0.1%) - No disassembly, no rupture, no fire within 6 hours after the test - Max. Temp ≤ 170℃	Pass
Test 2	Thermal test		Pass
Test 3	Vibration		Pass
Test 4	Shock		Pass
Test 5	External short circuit		Pass
Test 6	Impact or Crush	- No disassembly, no fire within 6 hours after the test - Max. Temp ≤ 170℃	Pass
Test 7	Overcharge	- No disassembly, no fire within 7 days after the test	Pass
Test 8	Forced discharge	- No disassembly, no fire within 7 days after the test	Pass

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

- Not applicable

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulation / legislation specific for the substance or mixture

- This product is not hazardous under the criteria of the Federal Occupational Safety and Health Administration(OSHA) Hazard Communication Standard.(29 CFR 1910.1200)

SECTION 16: OTHER INFORMATION

16.1. Other information

- The data in this Product Safety Data Sheet relates only to the specific product designated herein and does not relate to use in combination with any other product or in any process. This PSDS may not meet regulatory requirements in other countries. This information is based on technical information believed to be reliable. It is subject to revision as additional knowledge and experiences are gained.

GP Batteries

Material Safety Data Sheet for GP Cylindrical Alkaline Battery

IDENTITY (As Used on Label and List) Alkaline batteries	Note : Blank spaces are not permitted if any item is not applicable or no information is available, the space must be marked to indicate that.

Section 1- Identification

Manufacturer's Name GPI International Ltd.	Emergency Telephone Number
Address (Number, Street, City State, and ZIP Code) 8/F GP Building, 30 Kwai Wing Road,	Telephone Number for information 852-2484-3333
Kwai Chung, N.T. H.K.	Date of prepared and revision Jan 1, 2016
	Signature of Prepare (optional)

Section 2 – Hazards Identification

Classification

N.A.

Section 3 – Composition/Information On Ingredients

Hazardous Components:

Description:	CAS#	EINECS No.	Approximate % of total weight
Lead	7439-92-1	231-106-7	<0.004Wt%
Mercury	7439-97-6	231-106-7	<0.0001Wt%
Cadmium	7440-43-9	231-152-8	<0.002Wt%
Manganese Dioxide	1313-13-9	215-202-6	~40Wt%
Zinc Metal	7440-66-6	231-175-3	~16Wt%
Potassium hydroxide	1310-58-3	215-181-3	~18Wt%

Section 4 – First Aid Measures

First Aid Procedures

If electrolyte leakage occurs and makes contact with skin, wash with plenty of water immediately.

If electrolyte comes into contact with eyes, wash with copious amounts of water for fifteen (15) minutes, and contact a physician.

If electrolyte vapors are inhaled, provide fresh air and seek medical attention if respiratory irritation develops. Ventilate the contaminated area.

Section 5 – Fire-Fighting Measures

Flash Point (Method Used)	Ignition Temp.	Flammable Limits	LEL	UEL
N.A.	N.A.	N.A.	N.A.	N.A.

Extinguishing Media

Carbon Dioxide, Dry Chemical or Foam extinguishers

Special Fire Fighting Procedures

N.A.

Unusual Fire and Explosion Hazards

Do not dispose of battery in fire - may explode.

Do not short-circuit battery - may cause burns.

Section 6 – Accidental Release Measures

Steps to Be Taken in Case Material is Released or Spilled

Batteries that are leakage should be handled with rubber gloves.

Avoid direct contact with electrolyte.

Wear protective clothing and a positive pressure Self-Contained Breathing Apparatus (SCBA).

Section 7 – Handling and Storage

Safe handling and storage advice

Batteries should be handled and stored carefully to avoid short circuits.

Do not store in disorderly fashion, or allow metal objects to be mixed with stored batteries.

Never disassemble a battery.

Do not breathe cell vapors or touch internal material with bare hands.

The cells and batteries shall not be stored in high temperature ,the maximum temperature allowed is 60℃ for a short period during the shipment , Otherwise the cells maybe leakage and can result in shortened service life..

Section 8– Exposure Controls / Person Protection

Occupational Exposure Limits: LTEP N.A.		STEP N.A.
Respiratory Protection (Specify Type) N.A.		
Ventilation	Local Exhausts N.A.	Special N.A.
	Mechanical (General) N.A.	Other N.A.
Protective Gloves N.A.		Eye Protection N.A.
Other Protective Clothing or Equipment N.A.		
Work / Hygienic Practices N.A.		

Section 9 - Physical / Chemical Properties

Boiling Point N.A.	Specific Gravity (H_2O=1) N.A.
Vapor Pressure (mm Hg) N.A.	Melting Point N.A.
Vapor Density (AIR=1) N.A.	Evaporation Rate (Butyl Acetate) N.A.
Solubility in Water N.A.	
Appearance and Odor Cylindrical Shape, odorless	

Section 10 – Stability and Reactivity

Stability	Unstable		Conditions to Avoid
	Stable	X	
Incompatibility (Materials to Avoid)			
Hazardous Decomposition or Byproducts			
Hazardous Polymerization	May Occur		Conditions to Avoid
	Will Not Occur	X	

Section 11 – Toxicological Information

Route(s) of	Inhalation?	Skin?	Ingestion?
Entry	N.A.	N.A.	N.A.

Health Hazard (Acute and Chronic) / Toxiclogical information

In case of electrolyte leakage, skin will be itchy when contaminated with electrolyte.

In contact with electrolyte can cause severe irritation and chemical burns.

Inhalation of electrolyte vapors may cause irritation of the upper respiratory tract and lungs.

Section 12 – Ecological Information

N.A.

Section 13 – Disposal Considerations

Dispose of batteries according to government regulations.

Section 14 – Transportation 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. All original packaging for GP alkaline batteries has been designed to be compliant with these regulatory concerns.

Alkaline batteries (sometimes referred to as "Dry cell" batteries) are not listed as dangerous goods under the ADR European Agreement Concerning the International Carriage of Dangerous Goods by Road, the IMDG International Maritime Dangerous Goods Code, UN Dangerous Good Regulations, IATA Dangerous Goods Regulations 57th edition , ICAO Technical Instructions and the U.S. hazardous materials regulations (49 CFR). These batteries are not subject to the dangerous goods regulations provided they meet the requirements contained in the following special provisions

. **Regulatory Body**	**Special Provisions**
ADR	Not regulated
IMDG	Not regulated
UN	Not regulated
US DOT	49 CFR 172.102 Provision 130
IATA	A123
ICAO	Not regulated

All GP alkaline batteries are packed in such a way to prevent short circuits or the generation dangerous quantities of heat and meet the special provisions listed above. In addition, the IATA Dangerous Goods Regulations and ICAO Technical Instructions require the words "not restricted" and the Special Provision number A123 be provided on the air waybill, when an air waybill is issued.

Section 15 – Regulatory Information

Special requirement be according to the local regulatories.

Section 16 – Other Information

The data in this Material Safety Data Sheet relates only to the specific material designated herein.

Section 17 – Measures for fire extinction

In case of fire, it is permissible to use any class of extinguishing medium on these batteries or their packing material. Cool exterior of batteries if exposed to fire to prevent rupture.

Fire fighters should wear self-contained breathing apparatus.