Lithium-ion Rechargeable Battery Pack

LG Chem, Ltd.

MSDS for HP Batteries.

- **History**

Version.	Items	Description	Date
V01	Origin	Initial Release	2014.08.01
V02	Add	Add HV02032XL, DB03036	2014.09.15
V03	Add	Add KI04041, KI04048	2014.10.14
V04	Add	Add HS03031, HS04041	2014.12.06
V05	Add	Update 2015 format Add CI03048XL	2015.01.06
V06	Add	Add DO02033XL, AI06096XL, ZO04064XL, RI06055XL, RO06055XL	2015.02.02
V07	Add	Update OA03031/OA04041 of C4	2015.02.04
V08	Add	Add MU06055	2015.02.13
V09	Add	Add HV03048XL	2015.04.20
V10	Add	Update CA06055XL/VI04041 of C4	2015.07.23
V11	Add	Add PG03064XL/GI02033XL	2015.08.05
V12	Add	Add Vail	2015.08.13
V13	Add	Add MU06062	2015.10.13
V14	Add	Add BP02041XL/SE03041XL	2015.11.17
V15	Update	IATA regulation	2016.01.08
V16	Add	Add SG03041XL/SG03061XL	2016.01.11

The Attached MSDS, accurately represents the chemical construction, of the HP Batteries listed below.

No.	Model	HP Project P/N	Wh	Cell type
1	CA06055	HSTNN-LB4X	55	18650 B4
2	CA06055XL	HSTNN-LB4Y	55	18650 C2 / C4
3	CA09100	HSTNN-LB4Z	91	18650 D1
4	CC06055	HSTNN-LB2F	55	18650 B4

5	CC06055XL	HSTNN-LB2H	55	18650 C2
6	CC06062	HSTNN-LB2G	62	18650 C2
7	CC09100	HSTNN-LB2I	100	18650 D1
8	FP06047	HSTNN-LB4J	47	18650 S3
9	FP09093	HSTNN-LB4K	93	18650 C2
10	HY04041	HSTNN-LB4U	41	18650 C2
11	MO09100	HSTNN-LB3P	100	18650 D1
12	OA03031	HSTNN-LB5Y	31	18650 C2 / C4
13	OA04041	HSTNN-LB5S	41	18650 C2 / C4
14	PH06047	HSTNN-LB1A	47	18650 S3
15	PI06047	HSTNN-LB4N	47	18650 S3
16	PI06062	HSTNN-LB4O	62	18650 C2
17	PR06047	HSTNN-LB2R	47	18650 S3
18	PR08073	HSTNN-LB2S	73	18650 B4
19	VH08075XL	HSTNN-LB2Q	75	18650 C2
20	VH08083	HSTNN-LB2P	83	18650 C2
21	VI04041	HSTNN-LB6I	41	18650 C2 / C4
22	VI04044	HSTNN-LB6J	44	18650 D1
23	VI04048	HSTNN-LB6K	48	18650 E1
24	AO02030XL	HSTNN-LB5O	30	ICP3674120L1
25	A2304051XL	HSTNN-LB5R	51	ICP3768110L2
26	CD02031	HSTNH-L01B	31	ICP3473131L1
27	CM03050XL	HSTNN-LB4R	50	ICP666180L1
28	KT02025XL	HSTNN-LB6F	25	ICP3076120L1
29	MA02025XL	HSTNN-LB5B	25	ICP3076120L1
30	ME03037XL	HSTNN-LB6O	37	ICP485780A1
31	MY02021XL	HSTNN-LB5C	21	ICP289791L1
32	NP03043XL	HSTNN-LB6L	43	ICP606080L1
33	PE03036XL	HSTNN-LB6M	36	ICP485780A1
34	PL02029XL	HSTNN-LB6B	29	ICP606080L1
35	PX03050XL (Pol)	HSTNN-LB4P	50	ICP646480L1
36	PX03050XL (Pri)	HSTNN-LB4P	50	ICP666180L1
37	RG04051XL	HSTNN-LB5Q	51	ICP3768110L2
38	RR04058	HSTNN-LB6N	58	ICP606080L1
39	SK02030XL	HSTNN-LB6G	30	ICP556790L1
40	SB03046XL	HSTNN-LB4T	46	ICP556790L1

41	HV02032XL	HSTNN-LB6P	32	ICP606080A2
42	DB03036	HSTNN-LB6Q	36	18650 E1
43	KI04041	HSTNN-LB6R	41	18650 C4
44	KI04048	HSTNN-LB6S	48	18650 E1
45	HS03031	HSTNN-LB6U	31	18650 C4
46	HS04041	HSTNN-LB6V	41	18650 C4
47	CI03048XL	HSTNN-LB6T	48	ICP606080A2
48	DO02033XL	HSTNN-LB6Y	33	ICP3182113L1
49	AI06096XL	HSTNN-LB6X	96	ICP606080A2
50	ZO04064XL	HSTNN-LB6W	64	ICP606080A2
51	RI06055XL	HSTNN-LB6Z	55	18650 C4
52	RO06055XL	HSTNN-LB7A	55	18650 C4
53	MU06055	HSTNN-LB0X	55	18650 B4
54	HV03048XL	HSTNN-LB7B	48	ICP606080A2
55	PG03064XL	HSTNN-LB7C	64	ICP3678122
56	GI02033XL	HSTNN-LB7D	33	ICP3182113L1
57	Vail	HSTNN-LB11	69	ICR18650 A2
58	MU06062	HSTNN-LB0Y	62	ICR18650 C2
59	BP02041XL	HSTNN-LB7H	41	ICP666180B1
60	SE03041XL	HSTNN-LB7G	41	ICP496080L1
61	SG03041XL	HSTNN-LB7E	41	ICP496080L1
62	SG03061XL	HSTNN-LB7F	61	ICP666180B1

MATERIAL SAFETY DATA SHEET

Lithium-Ion Battery

LG Chem, Ltd.

1. Chemical Product and Company Identification

Product Identification

Lithium-Ion Battery (All models manufactured by LG Chem, Ltd)

Manufacturer

LG Chem, Ltd.

Emergency Overview

May explode in a fire, which could release hydrogen fluoride gas.
Use extinguishing media suitable for materials burning in fire.

LG Twin Towers, 128, Yeoui-daero,
Yeongdeungpo-gu, Seoul 150-721, Korea

Emergency Telephone Number

82-2-3773-7256

2. Composition Information

Hazardous Ingredients	%	CAS Number
Aluminum Foil	2-10	7429-90-5
Nickel compound (proprietary)	0-25	
Manganese compound (proprietary)	0-15	
Cobalt compound (proprietary)	4-50	
Styrene-Butadiene-Rubber	<1	
Polyvinylidene Fluoride (PVDF)	<5	24937-79-9
Copper Foil	2-10	7440-50-8
Carbon (proprietary)	10-30	7440-44-0
Electrolyte (proprietary)	10-20	
Stainless steel, Nickel and inert materials	Remainder	N/A

3. Hazards Identification

Primary routes of entry

Skin contact	:	NO
Skin absorption	:	NO
Eye contact	:	NO
Inhalation	:	NO
Ingestion	:	NO

Symptoms of exposure

Skin contact

No effect under routine handling and use.

Skin absorption

No effect under routine handling and use.

Eye contact

No effect under routine handling and use.

Inhalation

No effect under routine handling and use.

Reported as carcinogen

Not applicable

4. First Aid Measures

Inhalation

Not a health hazard.

Eye contact

Not a health hazard.

Skin contact

Not a health hazard.

Ingestion

If swallowed, obtain medical attention immediately.

IF EXPOSURE TO INTERNAL MATERIALS WITHIN CELL DUE TO DAMAGED OUTER CASING, THE FOLLOWING ACTIONS ARE RECOMMENDED ;

Inhalation

Leave area immediately and seek medical attention.

Eye contact

Rinse eyes with water for 15 minutes and seek medical attention.

Skin contact

Wash area thoroughly with soap and water and seek medical attention.

Ingestion

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

5. Fire Fighting Measures

General Hazard
Cell is not flammable but internal organic material will burn if the cell is incinerated. Combustion products include, but are not limited to hydrogen fluoride, carbon monoxide and carbon dioxide.

Extinguishing Media
Use extinguishing media suitable for the materials that are burning.

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

Firefighting Equipment
Use NIOSH/MSHA approved full-face self-contained breathing apparatus (SCBA) with full protective gear.

6. Accidental Release Measures

On Land
Place material into suitable containers and call local fire/police department.

In Water
If possible, remove from water and call local fire/police department.

7. Handling and Storage

Handling
No special protective clothing required for handling individual cells.

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. SCBA required in the event of a fire.

Eye/face protection

Not required beyond safety practices of employer.

Gloves

Not required for handling of cells.

Foot protection

Steel toed shoes recommended for large container handling.

9. Physical and Chemical Properties

State	Solid
Odor	N/A
PH	N/A
Vapor pressure	N/A
Vapor density	N/A
Boiling point	N/A
Solubility in water	Insoluble
Specific gravity	N/A
Density	N/A

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 operating conditions. If cells are opened, hydrogen fluoride and carbon monoxide may be released.

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

11. Toxicological Information

This product does not elicit toxicological properties during routine handling and use.

Sensitization	Teratogenicity	Reproductive toxicity	Acute toxicity
NO	NO	NO	NO

If the cells are opened through misuse or damage, discard immediately. Internal components of cell are irritants and sensitizers.

12. 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.

13. Disposal Considerations

California regulated debris

RCRA Waste Code : Nonregulated

Dispose of according to all federal, state, and local regulations.

14. Transport Information

Lithium Ion batteries are considered to be "Rechargeable batteries" and meet the requirements of transportation by the U.S. Department of Transportation(DOT), the International Civil Aviation Administration(ICAO), the International Maritime Dangerous Goods (IMDG) Code.

Even classified as lithium ion batteries (UN3480), 2016 IATA Dangerous Goods Regulations 57th edition Packing Instruction 965 Section IB or II is applied.

The general and additional requirements apply to all lithium ion cells and batteries prepared for transport according to this packing instruction:

1) Section IB applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that exceed the allowance permitted in Section IB, Table 965-IB; and

TABLE 965-IB

	Net quantity per package Passenger aircraft	Net quantity per package Cargo Aircraft Only
Lithium ion cells and batteries	10 kg	10 kg
OUTER PACKAGINGS		
Type	Drums	Jerricans	Boxes

2) Section II applies to lithium ion cells with a Watt-hour rating not exceeding 20 Wh and lithium ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities not exceeding the allowance permitted in Section II, Table 965-II.

TABLE 965-II

Contents	Lithium ion cells and/or batteries with a Watt-hour rating of 2.7 Wh or less	Lithium ion cells with a Watt-hour rating of more than 2.7 Wh but not more than 20 Wh	Lithium ion batteries with a Watt-hour rating of more than 2.7 Wh but not more than 100 Wh
1	2	3	4
Maximum number of cells/batteries per package	No limit	8 cells	2 Batteries
Maximum net quantity per package	2.5 kg	N/A	N/A

Cells and/or batteries specified in columns 2, 3 and 4 of Table 965-II must not be

combined in the same package.

Each cell or battery is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria Part 3 subsection 38.3.

The product has been evaluated according to the UN Manual of Tests and Criteria.

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%	Pass
Test 2	Thermal test		Pass
Test 3	Vibration		Pass
Test 4	Shock		Pass
Test 5	External short circuit	- No disassembly, no rupture, no fire within 6 hours after the test - Max. Temp ≤ 170℃	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

15. Regulatory Information

This product is not hazardous under the criteria of the Federal Occupational Safety and Health

Administration(OSHA) Hazard Communication Standard.(29 CFR 1910.1200)

IATA Dangerous Goods Regulations **57**th Edition Effective 1 January **2016**.

Hazardous ✔ Non-hazardous

16. 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.

REFERENCE

International Chemical Safety Cards(ICSCs) International Occupational Safety and Health Information Centre(CIS) 0710 March 1999

Opinion of the scientific committee on toxicity, ecotoxicity and the environment(CSTEE)
Adopted by the CSTEE during the 43rd plenary meeting of 28 May 2004

UN-Recommendations on the Transport of Dangerous Goods Model Regulations.
(ST/SG/AC. 10/1/Rev.5/Amend.2)