



Lithium-ion Rechargeable Battery Pack

LG Chem, Ltd.

MSDS for Dell Batteries.

- History

Version.	Items	Description	Date
V01	Origin	Initial Release	2011.04.05
V20	Revision	MSDS Revision	2014.01.01
V21	Add	Add new project (HFRC3)	2014.01.23
V22	Add	Add new project (FRVYX, YX81V)	2014.01.24
V23	Add	Add new project (2P9KD)	2014.03.12
V24	Add	Add new project (VTDT2)	2014.07.15
V25	Add	Add new project (991XP, RTC77)	2014.07.31
V26	Revision	Modify P/N (OWF28→ 0WF28)	2014.01.01
V27	Add	Add new project (FP02G)	2014.10.28
V28	Add	Add new project (5R9DD, (PREC series))	2014.11.10
V29	Add	Add new project (WTG3T)	2014.11.18
V30	Add	Add Capacity, Delete EOL	2014.12.03
V31	Add	Add new project (242WD)	2014.12.05
V32	Add	Add new project (1V0PP, RDYCT)	2014.12.12
V33	Add	Add New Project (RDRH9, G9G1H)	2014. 12. 13
V34	Add	Add New project (92NCT, 2VMGK)	2015. 01. 07

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

No.	Dell Part Number	Dell Type Number	Capacity	List
1	N4TXM	XX1DX	36Wh	486790
2	V0XTF	TKN25	49Wh	486790 Cell
3	49VTP	MR90Y	65Wh	D1 Cell
4	0MF69	MR90Y	65Wh	D1 Cell
5	T1G4M	XCMRD	40Wh	C2 Cell
6	4KFGD	N3X1D	65Wh	D1 Cell
7	5DN1K	71R31	97Wh	D1 Cell
8	FT6D9	VJXMC	40Wh	C2 Cell
9	NVWGM	VV0NF	65Wh	D1 Cell
10	Y6KM7	N5YH9	97Wh	D1 Cell
11	Y9HNT	W5CVK	31Wh	556659 (Gen1)
12	KR71X	XJ8TX	34Wh	636655 (Gen1)
13	J31N7	JMWGJ	45Wh	556659 (Gen2)
14	0D47W	TJ7V4	47Wh	636655 (Gen2)
15	6MYFW	DGGGT	40Wh	357993 & 305193(Gen2)
16	FT6D9	VJXMC	40Wh	C2 Cell
17	NVWGM	VV0NF	65Wh	D1 Cell
18	Y6KM7	N5YH9	97Wh	D1 Cell
19	G4YJM	F7HVR	58Wh	606080L1
20	V3D9R	7NXVR		3981108L1
21	CFC6C	7WMM7	28Wh	305193L1
22	PWM3D	5MTD8	43Wh	D1 Cell
23	3NG29	YDF9	65Wh	D1 Cell
24	1V2F6	TRHFF	43Wh	606080DL1
25	DFVYN	0PD19	58Wh	606080DL1
26	0WF28	GK5KY	43Wh	606080DL1
27	9P4D2	RYXXH	38Wh	575577L1
28	8V5GX	G5M10	51Wh	575577L1
29	WG6RP	F3G33	39Wh	566860L1
30	W57CV	VFV59	52Wh	566860L1
31	GV7HC	V8XN3	40Wh	646856L1
32	G95J5	3RNFD	54Wh	646856L1
33	HFRC3	2H2G4	38Wh	4763109L1
34	FRVYX	TM9HP	20Wh	405581L1
35	YX81V	271J9	20Wh	405581L1
36	2P9KD	3V806	51Wh	575577L1
37	VTDT2	VMYGJ	58Wh	606080DL1

MATERIAL SAFETY DATA SHEET

38	991XP	M5Y1K	40Wh	C4 Cell
39	RTC77	K185W	47Wh	E1 Cell
40	FP02G	JD33K	28Wh	3281108A1
41	70K80	T40JJ	1.8Wh	423443A1
42	H123V	T40JJ	1.8Wh	423443A1
43	M9XPM	T40JJ	1.8Wh	423443A1
44	KTCCN	5R9DD	43Wh	606080DL1
45	WTG3T	R0TMP	62Wh	575577A1
46	5PD40	K81RP	21Wh	2857127L1
47	242WD	J60J5	54Wh	485780L1
48	1V0PP	T05W1	72Wh	656064L1
49	RDYCT	MFKVP	89Wh	656064A1
50	RDRH9	NGGX5	47Wh	575577A1
51	G9G1H	WJ5R2	81Wh	645465L1
52	92NCT	K4V7T	43Wh	606080DL1
53	2VMGK	N1WM4	62Wh	575577A1

Signed by Representative:



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.

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

Emergency Overview

May explode in a fire, which could release hydrogen fluoride gas.

Use extinguishing media suitable for materials burning in fire.

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), 2015 IATA Dangerous Goods Regulations 56th 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	-No leakage, venting, disassembly, rupture and no fire. -Measuring mass before/after each test. (If M>5g, less than 0.1%) -Measuring voltage before/after each test. (more than 90%)	Pass
Test 2	Thermal test		Pass
Test 3	Vibration		Pass
Test 4	Shock		Pass
Test 5	External circuit short	-No disassembly, rupture and fire within six hours of this test.	Pass
Test 6	Impact	-Max. temperature should not exceed 170°C.	Pass
Test 7	Overcharge	-No disassembly and fire within seven days of 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 55th Edition Effective 1 January 2014.

Hazardous

Non-hazardous