

MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

A. PRODUCT IDENTIFICATION

Lithium ion Rechargeable Battery

CAS number: Not specified

Composition:

A-1. Cases: Plastic or Metal Not dangerous

A-2. Printed Circuit Board Assembly Not dangerous

A-3. Lithium Ion Cell:

Aluminum	2%	-	10%
Metal Oxide (proprietary)	20%	-	50%
Polyvinylidene fluoride (PVDF)	0%	-	5%
Copper	2%	-	10%
Carbon (proprietary)	10%	-	30%
Electrolyte (proprietary)	10%	-	20%

B. Battery Product Matrix

Customer (Dell)

<u>Customer P/N</u>	<u>Dynapack P/N</u>	<u>Cell applied</u>
TT344	DAK100260-018900L	LG-Chem 2.6Ah (CL)
HX198	DAK100260-018902L	LG-Chem 2.6Ah (CL)
NX511	DAK100520-018905L	LG-Chem 2.6Ah (CL)
CR036	DAK100520-018908L	LG-Chem 2.6Ah (CL)
JN039	DAK100780-018900L	LG-Chem 2.6Ah (CL)
TT483	DAK100780-018903L	LG-Chem 2.6Ah (CL)
RN887	DAK100520-018211L	Samsung 2.6Ah (CL)
	DAK100520-018223L	
TK363	DAK100520-018215L	Samsung 2.6Ah (CL)
XR697	DAK100520-018216L	Samsung 2.6Ah (CL)
WK381	DAK100520-018221LH	Samsung 2.6Ah (CL)
KM976	DAK100520-018214LH	Samsung 2.6Ah (CL)
	DAK100520-018228LH	
RM870	DAK100520-018219LH	Samsung 2.6Ah (CL)
KM976	DAK100520-018913LH	LG-Chem 2.6Ah (CL)
RM870	DAK100520-018920LH	LG-Chem 2.6Ah (CL)
PW823	DAK100780-018205LH	Samsung 2.6Ah (CL)
	DAK100780-018214LH	
RM868	DAK100780-018210LH	Samsung 2.6Ah (CL)
PW823	DAK100780-018906LH	LG-Chem 2.6Ah (CL)
RM868	DAK100780-018914LH	LG-Chem 2.6Ah (CL)
MP303,	DAK100520-018212L	Samsung 2.6Ah (CL)
NM633	DAK100520-018217LH	Samsung 2.6Ah (CL)
MP303	DAK100520-018909L	LG-Chem 2.6Ah (CL)
NM633	DAK100520-018918LH	LG-Chem 2.6Ah (CL)

PT650	DAK100780-018203L	Samsung 2.6Ah (CL)
FU444	DAK100780-018208LH	Samsung 2.6Ah (CL)
PT650	DAK100780-018902L	LG-Chem 2.6Ah (CL)
FU444	DAK100780-018912LH	LG-Chem 2.6Ah (CL)
X064D	DAK100260-018201LH	Samsung 2.6Ah (CL)
P858D	DAK100260-018202LH	Samsung 2.6Ah (CL)
WU843	DAK100520-018213LH	Samsung 2.6Ah (CL)
MT187	DAK100520-018218LH	Samsung 2.6Ah (CL)
WU843	DAK100520-018910LH	LG-Chem 2.6Ah (CL)
MT187	DAK100520-018919LH	LG-Chem 2.6Ah (CL)
RM668	DAK100780-018204LH	Samsung 2.6Ah (CL)
PW651	DAK100780-018209LH	Samsung 2.6Ah (CL)
RM668	DAK100780-018905LH	LG-Chem 2.6Ah (CL)
PW651	DAK100780-018913LH	LG-Chem 2.6Ah (CL)
HW901	DAK100430-018100LH	Sanyo 2.15Ah (PY)
G102C	DAK100780-018206LH	Samsung 2.6Ah (CL)
F224C	DAK100780-018213LH	Samsung 2.6Ah (CL)
H355F	DAK100780-018211LH	Samsung 2.6Ah (CL)
F729F	DAK100780-018212LH	Samsung 2.6Ah (CL)
X595C	DAK100190-018101LH	Sanyo 1.9Ah (PM)
U444C	DAK100190-018102LH	Sanyo 1.9Ah (PM)
Y084C	DAK100530-018900LH	LG Chem 2.8Ah (CL)+ ATL 2.566hA (PY)
R840C	DAK100530-018901LH	LG Chem 2.8Ah (CL)+ ATL 2.566hA (PY)
W342C	DAK120430-018100LH	Sanyo 2.15Ah (PY)
Y635G	DAK100220-018200LH	Samsung 2.2Ah (CL)
H075H	DAK100220-018204LH	Samsung 2.2Ah (CL)
M297J	DAK100260-018907LH	LG-Chem 2.6Ah (CL)
N254J	DAK100260-018908LH	LG-Chem 2.6Ah (CL)
G784H	DAK100220-018201LH	Samsung 2.2Ah (CL)
J100H	DAK100220-018205LH	Samsung 2.2Ah (CL)
G914H	DAK100440-018200LH	Samsung 2.2Ah (CL)
J101H	DAK100440-018204LH	Samsung 2.2Ah (CL)
M303J	DAK100520-018922LH	LG-Chem 2.6Ah (CL)
N256J	DAK100520-018923LH	LG-Chem 2.6Ah (CL)
C412H	DAK100220-018202LH	Samsung 2.2Ah (CL)
C412H	DAK100220-018900LH	LG-Chem 2.2Ah (CL)
C412H	DAK100220-018L00LH	BAK 2.2Ah (CL)
X612G	DAK100440-018201LH	Samsung 2.2Ah (CL)
X612G	DAK100440-018901LH	LG-Chem 2.2Ah (CL)
X612G	DAK100440-018L01LH	BAK 2.2Ah (CL)
65X8N	DAK100440-018203L	Samsung 2.2Ah (CL)
P776K	DAK100520-018926LH	Samsung 2.6Ah (CL)
M921K	DAK100520-018927LH	Samsung 2.6Ah (CL)

W075J	DAK100780-018215LH	Samsung 2.6Ah (CL)
W075J	DAK100780-018915LH	LG-Chem 2.6Ah (CL)
T780R	DAK100520-018230LH	Samsung 2.6Ah (CL)
T780R	DAK100520-018103LH	Sanyo 2.6Ah(CL)
T779R	DAK100780-018216LH	Samsung 2.6Ah (CL)
T779R	DAK100780-018101LH	Sanyo 2.6Ah(CL)
U151P	DAK100520-018930LH	LG-Chem 2.6Ah(CL)
3M190	DAK100840-018200LH	Samsung 2.8Ah (CL)
6K145	DAK100840-W020800LH	Samsung 2.8Ah (CL)
9G869	DAK100840-018201LH	Samsung 2.8Ah (CL)
CH174	DAK100840-W020801LH	Samsung 2.8Ah (CL)
D034T	DAK100520-018233LH	Samsung 2.6Ah (CL)
D034T	DAK100520-018931LH	LG-Chem 2.6Ah (CL)
385GK	DAK100260-018914LH	LG-Chem 2.6Ah (CL)
2RF28	DAK100560-018201LH	Samsung 2.8Ah (CL)
GU715	DAK100560-018202LH	Samsung 2.8Ah (CL)
2F2CW	DAK100560-W020804LH	Samsung 2.8Ah (CL)
XP394	DAK100840-018204LH	Samsung 2.8Ah (CL)
7KPVR	DAK100840-1020801LH	Samsung 2.8Ah (CL)
7RVXY	DAK100560-W020807LH	Samsung 2.8Ah (CL)
JJT7P	DAK100560-W020808LH	Samsung 2.8Ah (CL)
TM8K0	DAK100840-W020803LH	Samsung 2.8Ah (CL)
CWN5H	DAK100840-W020804LH	Samsung 2.8Ah (CL)
FMHC1	DAK100440-018100LH	Sanyo 2.2Ah(CL)
FMHC1	DAK100440-018L00LH	BAK 2.2Ah (CL)
N42J8	DAK100260-W020800LH	Samsung 2.6Ah (CL)
N42J8	DAK100260-W090800LH	LG-Chem 2.6Ah (CL)
TT84R	DAK100520-W090800LH	LG-Chem 2.6Ah (CL)
WR5NP	DAK100560-W020800LH	Samsung 2.8Ah (CL)
T4NT7	DAK100260-W020805LH	Samsung 2.6Ah (CL)
T4NT7	DAK100260-W090801LH	LG-Chem 2.6Ah (CL)
RC4FT	DAK100520-W090804LH	LG-Chem 2.6Ah (CL)
RDPGX	DAK100560-W020802LH	Samsung 2.8Ah (CL)
1X395	DAK120430-W010800LH	Sanyo 2.15Ah (PY)
XXDG0	DAK100280-W090800LH DAK100280-W090804LH	LG-Chem 2.8Ah(CL)
V9TYF	DAK100560-W090800LH DAK100560-W090808LH	LG-Chem 2.8Ah(CL)
CWX2D	DAK100260-W020802LH	Samsung 2.6Ah (CL)
CWX2D	DAK100260-W010800LH	Sanyo 2.6Ah(CL)

TY3P4	DAK100520-W020802LH	Samsung 2.6Ah (CL)
TY3P4	DAK100520-W010800LH	Sanyo 2.6Ah(CL)
4GN0G	DAK100840-W090800LH	LG-Chem 2.8Ah(CL)
9TCXN	DAK100840-W090801LH DAK100840-W090806LH	LG-Chem 2.8Ah(CL)
J4XDH	DAK100440-W090800LH	LG-Chem 2.2Ah(CL)
J4XDH	DAK100440-W020801LH	Samsung 2.2Ah (CL)
6P6PN	DAK100440-W090802LH	LG-Chem 2.2Ah(CL)
6P6PN	DAK100440-W020802LH	Samsung 2.2Ah (CL)
FP4TP	DAK100520-W090802LH DAK100520-W090806LH	LG-Chem 2.6Ah(CL)
FP4TP	DAK100520-W010802LH	Sanyo 2.6Ah (CL)
R6G71	DAK100520-W020805LH	Samsung 2.6Ah (CL)
R6G71	DAK100520-W090801LH DAK100520-W090807LH	LG-Chem 2.6Ah(CL)
H3KWF	DAK100840-W090803LH	LG-Chem 2.8Ah(CL)
30PY4	DAK100220-W090800LH	LG-Chem 2.2Ah(CL)
30PY4	DAK100220-W010800LH	Sanyo 2.2Ah(CL)
0WNW5	DAK100440-W090801LH	LG-Chem 2.2Ah(CL)
0WNW5	DAK100440-W010800LH	Sanyo 2.2Ah(CL)
N4X3H	DAK100900-W090803LH	LG-Chem 3.0Ah(CL)
HJ474	DAK100280-W090802LH DAK100280-W090805LH	LG-Chem 2.8Ah(CL)
9GJJY	DAK100280-W090803LH	LG-Chem 2.8Ah(CL)
HJ474	DAK100280-W020801LH	Samsung 2.8Ah (CL)
9GJJY	DAK100280-W020802LH	Samsung 2.8Ah (CL)
YJNKK	DAK100560-W090805LH DAK100560-W090807LH	LG-Chem 2.8Ah(CL)
11HYV	DAK100560-W090806LH	LG-Chem 2.8Ah(CL)
YJNKK	DAK100560-W020805LH	Samsung 2.8Ah (CL)
11HYV	DAK100560-W020806LH	Samsung 2.8Ah (CL)
7M0N5	DAK100600-W090804LH	LG-Chem 3.0Ah(CL)
JN0C3	DAK100600-W090805LH	LG-Chem 3.0Ah(CL)
KP437	DAK100520-018904L	LG-Chem 2.6Ah(CL)
KP437	DAK100520-018205L DAK100520-018222L	Samsung 2.6Ah (CL)
K731N	DAK100260-018203LH	Samsung 2.6Ah (CL)
K731N	DAK100260-018911LH	LG-Chem 2.6Ah(CL)
H771N	DAK100520-018229LH	Samsung 2.6Ah (CL)
H771N	DAK100520-018928LH	LG-Chem 2.6Ah(CL)
5K4WW	DAK100400-W010800LH	Sanyo 2.2Ah (PM)

4JGY8	DAK100400-W010802LH	Sanyo 2.2Ah (PM)
422N4	DAK130700-W090800LH	Sanyo 2.2Ah (PM)+ LG-Chem 3.0Ah(CL)
37HGH	DAK130700-W090802LH	Sanyo 2.2Ah (PM)+ LG-Chem 3.0Ah(CL)
01DN6	DAK100280-W020804LH	Samsung 2.8Ah (CL)
01DN6	DAK100280-W090801LH	LG-Chem 2.8Ah(CL)
C13TM	DAK100280-W020806LH	Samsung 2.8Ah (CL)
C13TM	DAK100280-W090806LH	LG-Chem 2.8Ah(CL)
88WR6	DAK100560-W020810LH	Samsung 2.8Ah (CL)
88WR6	DAK100560-W090804LH	LG-Chem 2.8Ah(CL)
JHW87	DAK100560-W020812LH	Samsung 2.8Ah (CL)
JHW87	DAK100560-W090809LH	LG-Chem 2.8Ah(CL)
VCTWN	DAK100600-W020804LH	Samsung 3.0Ah (CL)
VCTWN	DAK100600-W090807LH	LG-Chem 3.0Ah(CL)
XTD1J	DAK120218-W0G0800LH	ATL 2.18Ah (PY)
PY961	DAK100200-018201L	Samsung 2.0Ah (CL)
MJ365	DAK100480-018800L	Sony 2.6Ah (CL)
MJ365	DAK100480-018100L	Sanyo 2.6Ah (CL)
HJ588	DAK100480-018801L	Sony 2.6Ah (CL)
HJ588	DAK100480-018101L	Sanyo 2.6Ah (CL)
MJ440	DAK100780-018200L	Samsung 2.6Ah (CL)
HJ603	DAK100780-018201L	Samsung 2.6Ah (CL)
MJ456	DAK100520-018201L	Samsung 2.6Ah (CL)
MJ456	DAK100520-018901L	LG-Chem 2.6Ah(CL)
HJ607	DAK100520-018204L	Samsung 2.6Ah (CL)
HJ607	DAK100520-018903L	LG-Chem 2.6Ah(CL)
TM795	DAK100200-018203L	Samsung 2.0Ah (CL)
DY375	DAK100520-018202L	Samsung 2.6Ah (CL)
DY375	DAK100520-018906L	LG-Chem 2.6Ah(CL)
G617H	DAK100440-018G00L	ATL 2.2Ah (CL)
G617H	DAK100440-018202L DAK100440-018203L	Samsung 2.2Ah (CL)
F632H	DAK100440-018G02L	ATL 2.2Ah (CL)
F632H	DAK100440-018208LH	Samsung 2.2Ah (CL)
Y570H	DAK100440-018G03LH	ATL 2.2Ah (CL)
Y570H	DAK100440-018904LH	LG-Chem 2.2Ah(CL)
R893R	DAK100260-018205LH	Samsung 2.6Ah (CL)
R893R	DAK100260-018913LH	LG-Chem 2.6Ah(CL)
D603H	DAK120370-018G00L	ATL 1.850Ah (PY)

C595H	DAK120370-018G01L	ATL 1.850Ah (PY)
X21HF	DAK120436-W0G0801LH	ATL 2.18Ah (PY)
JX87H	DAK100900-W090801LH	LG-Chem 3.0Ah(CL)
NGXCJ	DAK100300-W020801LH	Samsung 3.0Ah (CL)
NGXCJ	DAK100300-W090801LH	LG-Chem 3.0Ah(CL)
RXJR6	DAK100300-W020802LH	Samsung 3.0Ah (CL)
RXJR6	DAK100300-W090802LH	LG-Chem 3.0Ah(CL)
7MMG4	DAK100560-W020803LH	Samsung 2.8Ah (CL)
7MMG4	DAK100560-W090803LH	LG-Chem 2.8Ah(CL)
FWNDC	DAK100560-W020801LH	Samsung 2.8Ah (CL)
FWNDC	DAK100560-W090810LH	LG-Chem 2.8Ah(CL)
P9TJ0	DAK100440-W020804LH	Samsung 2.2Ah (CL)
P9TJ0	DAK100440-W090805LH	LG-Chem 2.2Ah(CL)
P9TJ0	DAK100440-W010801LH	Sanyo 2.2Ah (CL)

Notice 1: CL – Cylindrical type; PM – Prismatic type; PY – Polymer type

Notice 2:

- * Lithium ion cells and batteries may be offered for transport if they meet the following :
- * for cells, the Watt-hour rating is not more than 20 Wh;
- * for batteries, Watt-hour rating is not more than 100 Wh. The Watt-hour rating must be marked on the outside of the battery case except those manufactured before 1 January 2009 which may be transported without this marking until 31 December 2010;

MANUFACTURER

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2. Hazards Identification

Primary routes of entry: Skin contact. Skin absorption, eye contact, inhalation and 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

3. First Aid Measures

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

4. Fire Fighting Measures

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

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

5. 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

6. Handling and Storage

Handling:

Do not expose the battery to excessive physical shock or vibration. Short-circuiting should be avoided. However, accidental short-circuiting for a few seconds will not seriously affect the battery. Prolonged short circuits will cause the battery to rapidly lose energy, could generate enough heat to burn skin. Sources of short circuits include jumbled batteries in bulk containers, coins, metal jewelry, metal covered tables, or metal belts used for assembly of batteries in devices. To minimize risk of short-circuiting, the protective case supplied with the battery should be used to cover the terminals when transporting or storing the battery. Do not disassemble or deform the battery. Should an individual cell within a battery become ruptured, do not allow contact with water.

Storage:

The lithium ion battery should be between 25% and 75% of full charge when stored for a long period of time. Store in a cool, dry, well ventilated area. And temperature above 100°C can result in loss of battery performance, leakage, or rust. Do not expose the battery to open flames.

7. 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 battery

Foot Protection: Steel toed shoes recommended for large container handling.

8. 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

9. Stability and Reactivity

Reactivity: None

Incompatibilities: None during normal operation. Avoid exposure to heat, open flame, and corrosives.

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

10. Toxicological Information

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

11. Ecological Information

Lithium ion battery pack can be disposable in accordance with appropriate federal, state and local regulations.

12. Disposal Considerations

Recommended methods for safe and environmentally preferred disposal:

Product(waste from residues)

Do not throw out a used battery. Recycle it through the recycling company.

Contaminated packaging

Neither a container nor packing is contaminated during normal use. When internal materials leaked from a battery contaminates, dispose as industrial wastes subject to special control.

13. Transport Information

Lithium ion batteries containing no more than 1.5g/cell and 8g/battery pack and also power is no more than 20Wh/cell and 100Wh/battery pack of lithium can be treated as “Non-dangerous goods” under the United Nations Recommendations on the Transport of Dangerous Goods, Special Provision 188, provided that packaging is strong and prevent the products from short-circuit.

With regard to air transport, the following regulations are cited and considered:

- The International Civil Aviation Organization (ICAO) Technical Instructions (2011-2012 Edition)
- The International Air Transport Association (IATA) Dangerous Goods Regulations. (53rd Edition, 2012)
- The International Maritime Dangerous Goods (IMDG) Code (2010 Edition)
- The US Hazardous Materials Regulation (HMR) pursuant to a final rule issued by RSPA (Part 49 CFR Sections 100-185),
- The Office of Hazardous Materials Safety within the US Department of Transportation’s (DOT) Research and Special Programs Administration (RSPA), and
- The UN Recommendations on the Transport of Dangerous Goods Model Regulations and the Manual of Tests and Criteria.

Our products are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to all the applicable international and national governmental regulations, not limited to the above mentioned. We further certify that the enclosed products have been tested and fulfilled the requirements and conditions in accordance with UN Recommendations 38.3 (T1-T8) on the Transport of Dangerous Goods Model Regulations and the Manual of Testes and Criteria that can be treated as “Non-Dangerous Goods”.

14. Regulatory Information

OSHA Hazard communication standard (29 CFR 1910.1200)

_____ Hazardous √ Non-hazardous

15. UN Test Result

There is no hazards in accordance with the UN recommendations tests (Manual of Tests and Criteria , Part III , sub-section 38.3)

No	ITEMS	RESULT	REMARKS
1	Altitude Simulation	Pass	
2	Thermal Shock	Pass	
3	Vibration	Pass	
4	Shock	Pass	
5	External Short	Pass	
6	Impact	Pass	For cell only
7	Overcharge	Pass	
8	1.2m packing drop	Pass	