

Modul (enthält 13 Zellen)



LG Chem Ltd.

128, Yeoui-daero, Yeongdeungpo-gu,
Seoul, Korea

Certification & Evaluation Team

Tel: 82-42-870-6195, Fax: 82-42-863-0182

If any of pages is not legible or has not been received,
please notify our office for re-transmission

August 22, 2014

CERTIFICATE OF COMPLIANCE

The following product has been evaluated according to the 5th revised edition Amendment 2 of the UN Manual of Tests and Criteria.

We, LG Chem. Ltd hereby certify that this battery meets the requirements of the regulation for transportation of lithium-ion cells and batteries.

Customer Model Name	:	PL65
Cell Model Name	:	A5(37Ah)
Type of Cell	:	Polymer
Nominal capacity	:	37Ah
Document No.	:	QAE-EF02-140822-PKPL65

Conducted By: Dae Ho Nam

Handwritten signature of Dae Ho Nam.

Manager

Certification & Evaluation

LG Chem. Ltd

E-mail: kkammy@lgchem.com

Reviewed By: Byung Soo Kim

Handwritten signature of Byung Soo Kim.

General Manager

Certification & Evaluation

LG Chem. Ltd

E-mail: bskim@lgchem.com

Test Result

For more information, please refer to Document : QAE-EF02-140822-PKPL65

<input type="checkbox"/> Lithium-ion cell	<input checked="" type="checkbox"/> Lithium-ion battery
Pack Model name	PL65
Cell Model name	A5(37Ah)
Nominal voltage	46.8 V
Nominal capacity	37 Ah

No.	Test Item	Criteria	Result	Remark
Test 1	Altitude simulation	- No leakage (If $M < 1g$, less than 0.5%, If $1g \leq M \leq 75g$, less than 0.2%, If $M > 75g$, less than 0.1%), venting, disassembly, rupture and no fire. -Measuring mass before/after each test. -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 Short Circuit	-No disassembly, rupture and fire within six hours of this test. -Max. temperature should not exceed 170°C.	Pass	
Test 6	Crush	-No disassembly and fire within six hours of this test. -Max. temperature should not exceed 170°C.	Pass	
Test 7	Overcharge	-No disassembly and fire within seven days of the test.	-	Exception item for module
Test 8	Forced discharge	-No disassembly and fire within seven days of the test.	Pass	

Tests through T1-T5 shall be conducted in sequence with the same battery.

We declare that the above-mentioned test is the result of being checked according to UN Test (Manual of Test and Criteria ST/SG/AC.10/11/Rev.5/Amendment2)

We certify that this battery is proved to meet the requirements of each applicable test in the UN Manual of Test and Criteria, Part III, sub-section 38.3

Conducted By: Dae Ho Nam

Reviewed By: Byung Soo Kim




Manager

General Manager

Certification & Evaluation

Certification & Evaluation

LG Chem. Ltd

LG Chem. Ltd

E-mail: kkammy@lgchem.com

E-mail: bskim@lgchem.com

Zelle (13 Stück im Modul)



LG Chem.

LG Twin Tower 20 Yoido-dong
Youngdungpo-gu, Seoul, Korea.

Certification & Evaluation Team

Tel: 82-42-870-6195, Fax: 82-42-863-0182

If any of pages is not legible or has not been received,
please notify our office for re-transmission

October 22, 2013

CERTIFICATE OF COMPLIANCE

The following product has been evaluated according to the 5th revised edition
Amendment 1 of the UN Manual of Tests and Criteria.

We, LG Chem. Ltd hereby certify that this cell meets the requirements of the
regulation for transportation of lithium-ion cells and batteries.

Model Name	:	A5 (37Ah)
Capacity	:	Min. 37Ah
Type of Cell	:	Lithium-ion Polymer
Document No.	:	QAE-EF02-131022-POA5_37Ah

Conducted By: Dae Ho Nam

Handwritten signature of Dae Ho Nam.

Manager

Certification & Evaluation

LG Chem. Ltd

E-mail: kkammy@lgchem.com

Reviewed By: Byung Soo Kim

Handwritten signature of Byung Soo Kim.

Senior Manager

Certification & Evaluation

LG Chem. Ltd

E-mail: bskim@lgchem.com

Test Result

For more information, please refer to Document QAE-EF02-131022-POA5_37Ah

<input checked="" type="checkbox"/> Lithium-ion cell	<input type="checkbox"/> Lithium-ion battery
Model name	A5 (37Ah)
Nominal voltage	3.6V
Minimum capacity	37Ah

No.	Test Item	Criteria	Result	Remark
Test 1	Altitude simulation	- No leakage (If $M < 1g$, less than 0.5%, If $1g \leq M \leq 75g$, less than 0.2%, If $M > 75g$, less than 0.1%), venting, disassembly, rupture and no fire. -Measuring mass before/after each test. -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 Short Circuit	-No disassembly, rupture and fire within six hours of this test. -Max. temperature should not exceed 170°C.	Pass	
Test 6	Crush	-No disassembly and fire within six hours of this test. -Max. temperature should not exceed 170°C.	Pass	
Test 7	Overcharge	-No disassembly and fire within seven days of the test.	Pass	Battery only
Test 8	Forced discharge	-No disassembly and fire within seven days of the test.	Pass	

Tests through T1-T5 shall be conducted in sequence with the same battery.

We declare that the above-mentioned test is the result of being checked according to UN Test (Manual of Test and Criteria ST/SG/AC.10/11/Rev.5/Amendment1)

We certify that this cell is proved to meet the requirements of each applicable test in the UN Manual of Test and Criteria, Part III, sub-section 38.3

Conducted By: Dae Ho Nam

Reviewed By: Byung Soo Kim




Manager

Senior Manager

Certification & Evaluation

Certification & Evaluation

LG Chem. Ltd

LG Chem. Ltd

E-mail: kkammy@lgchem.com

E-mail: bskim@lgchem.com



Test report for HV components

Test report number:

1. General information

All tests are to be conducted in accordance with Group standard VW 80303 "Electrical properties and electrical safety of high-voltage components"

Exceptions are permitted only in consultation with the contact person responsible for the respective part and with identification. In this case, the contact persons of the Group brand and the supplier are to be stated with telephone numbers. *Still reserved*

The specifications stated here represent a minimum standard of safety and may deviate from the requirements in the specifications catalogue. *13.05.2016 46,61V*

2. Component data

DUNS-Nr.	Part number (OEM)	Supplier serial number	Design/Generation status
688279996	4N0.915.591	LGC-KOR20.03.16C0010002	C1 Sample
HW version	Component designation	Supplier (company name)	
C1 Functional	HV Battery	LG CHEM	

3. Insulation resistance

Component	Spec. (MΩ)	Measurement (MΩ)	Test voltage (VDC)
HV-battery	≥ 2.5	9999	500V
HV-components	≥ 5		

Test passed Yes No

4. Equipotential bonding

Every measured value at every arbitrary point on the housing to the earth stud of the housing must be ≤ 5mΩ

Specification (mΩ)	≤ 5	Test current (A)
Measurement (MΩ) ^{*1)} :		

*1) Enter worst / maximum value.

Test passed Yes No

5. Insulation strength

Specified test voltage [V _{AC/DC}]:	according to VW 80303, chapter "insulation coordination"
Test voltage [V _{AC/DC}]:	2150VDC Test duration : 1sec, Criteria : under 1mA

Test passed Yes No

6. HV warning label is present (Part-No. 12E.010.001.B) Yes No

7. Touch protection for the transport of HV battery is assured (IPXXB)^{*2)}

*2) Point 7 is relevant only for the Hv-battery component.

8. Remark:

Name of tester	Date
Jungjin Lee	16.03.24

Signature
Jungjin Lee

MATERIAL SAFETY DATA SHEET

Model A5-C Lithium-Ion Polymer Battery for PHEV

LG CHEMICAL LIMITED

History

Document No.	MSDS-Cell-A5-C			
Revision	MM-DD-YY	Writer	Content	Remark
1.0	23-07-13	Sung J. Kang	Establishment	

Chemical Product and Company Identification

Product Identification

LGCHEM A5-C Lithium-Ion Polymer Battery

Manufacturer

LG Chemical Limited
Twin Tower
Youido-Dong, Youngdeungpo-Ku
Seoul, Korea

Emergency Telephone Number

82-2-3773-3047

1. Composition Information

Hazardous Ingredients	%	CAS Number
Aluminum Foil	2-10	7429-90-5
Metal Oxide (proprietary)	20-50	
Polyvinylidene Fluoride (PVDF)	<5	24937-79-9
Copper Foil	5-20	7440-50-8
Carbon (proprietary)	10-30	7440-44-0
Electrolyte (proprietary)	10-30	
Aluminum, Copper plate and inert materials	Remainder	N/A
PP(Polypropylene)	<10	9003-07-0
PE(Polyethylene)	<10	9002-88-4

Lithium-equivalent Content: 17.35g (133Wh)

2. 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

3. 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.

4. Fire Fighting Measures

General Hazard

Battery is not flammable but some internal organic materials will burn if the cell is incinerated.

Extinguishing Media

Use large amounts of water or CO2 extinguisher for battery related fire.

Use an ABC extinguisher suitable if other materials are involved in a fire.

If combustible metals such as Mg, Na, K are involved in a fire, do not use water.

Hydrogen gas may be evolved and there can be an explosion. Use LITH-X, copper powder fire extinguishers or sand which can act as smothering agents for metal-related fire.

** LG Chem lithium ion polymer battery does not contain any metallic lithium. Therefore, ordinary extinguisher can be used to extinguish a fire.*

Fire Fighting Instructions

If a fire occurs during battery charge, shut off the power to charger.

If possible, remove batteries from the fire fighting area. If the batteries are heated above 150°C, there may be a vent or an explosion. Water is effective to cool down the batteries and around area.

Fire Fighting Instructions

Use NIOSH/MSHA approved full-face self-contained breathing apparatus (SCBA) with full protective gear. Hazardous fumes including carbon monoxide, carbon dioxide, various hydrocarbons and HF can be generated during a fire.

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

No special protective clothing required for handling individual cells.

Storage

Store in a cool, dry place.

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 cells.

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.

Hazardous Decomposition Products

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

Conditions To Avoid

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

10. 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.

11. 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.

12. Disposal Considerations

California regulated debris

RCRA Waste Code : Non-regulated

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

13. Transport Information

UN No. 3480

Proper Shipping Name: Lithium Ion Batteries

Class 9 Packing Group II Hazard Label: Miscellaneous

ICAO/IATA

Packing Instruction: 965

Maximum Gross Weight per Package on Passenger and Cargo Aircraft: 5 kg

Maximum Gross Weight per Package on Cargo Only Aircraft: 35 kg

Special Provision: A45, A88, A99

IMO

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 49 CFR 173.185 (Lithium Batteries and Cells).

14. Regulatory Information

OSHA hazard communication standard (29 CFR 1910.1200)

Hazardous

Non-hazardous



LG Chem.

LG Twin Tower 20 Yoido-dong
Youngdungpo-gu, Seoul, Korea.

Certification & Evaluation Team

Tel: 82-42-870-6195, Fax: 82-42-863-0182

If any of pages is not legible or has not been received,
please notify our office for re-transmission

October 22, 2013

CERTIFICATE OF COMPLIANCE

The following product has been evaluated according to the 5th revised edition Amendment 1 of the UN Manual of Tests and Criteria.

We, LG Chem. Ltd hereby certify that this cell meets the requirements of the regulation for transportation of lithium-ion cells and batteries.

Model Name	:	A5 (37Ah)
Capacity	:	Min. 37Ah
Type of Cell	:	Lithium-ion Polymer
Document No.	:	QAE-EF02-131022-POA5_37Ah

Conducted By: Dae Ho Nam

Handwritten signature of Dae Ho Nam.

Manager
Certification & Evaluation
LG Chem. Ltd
E-mail: kkammy@lgchem.com

Reviewed By: Byung Soo Kim

Handwritten signature of Byung Soo Kim.

Senior Manager
Certification & Evaluation
LG Chem. Ltd
E-mail: bskim@lgchem.com

Test Result

For more information, please refer to Document QAE-EF02-131022-POA5_37Ah

<input checked="" type="checkbox"/> Lithium-ion cell	<input type="checkbox"/> Lithium-ion battery
Model name	A5 (37Ah)
Nominal voltage	3.6V
Minimum capacity	37Ah

No.	Test Item	Criteria	Result	Remark
Test 1	Altitude simulation	- No leakage (If $M < 1g$, less than 0.5%, If $1g \leq M \leq 75g$, less than 0.2%, If $M > 75g$, less than 0.1%), venting, disassembly, rupture and no fire. -Measuring mass before/after each test. -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 Short Circuit	-No disassembly, rupture and fire within six hours of this test. -Max. temperature should not exceed 170°C.	Pass	
Test 6	Crush	-No disassembly and fire within six hours of this test. -Max. temperature should not exceed 170°C.	Pass	
Test 7	Overcharge	-No disassembly and fire within seven days of the test.	Pass	Battery only
Test 8	Forced discharge	-No disassembly and fire within seven days of the test.	Pass	

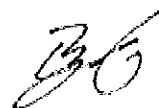
Tests through T1-T5 shall be conducted in sequence with the same battery.

We declare that the above-mentioned test is the result of being checked according to UN Test (Manual of Test and Criteria ST/SG/AC.10/11/Rev.5/Amendment1)

We certify that this cell is proved to meet the requirements of each applicable test in the UN Manual of Test and Criteria, Part III, sub-section 38.3

Conducted By: Dae Ho Nam

Reviewed By: Byung Soo Kim

Manager

Senior Manager

Certification & Evaluation

Certification & Evaluation

LG Chem. Ltd

LG Chem. Ltd

E-mail: kkammy@lgchem.com

E-mail: bskim@lgchem.com



LG Chem Ltd.

128, Yeoui-daero, Yeongdeungpo-gu,
Seoul, Korea

Certification & Evaluation Team

Tel: 82-42-870-6195, Fax: 82-42-863-0182

If any of pages is not legible or has not been received,
please notify our office for re-transmission

August 22, 2014

CERTIFICATE OF COMPLIANCE

The following product has been evaluated according to the 5th revised edition
Amendment 2 of the UN Manual of Tests and Criteria.

We, LG Chem. Ltd hereby certify that this battery meets the requirements of the
regulation for transportation of lithium-ion cells and batteries.

Customer Model Name : **PL65**
Cell Model Name : **A5(37Ah)**
Type of Cell : **Polymer**
Nominal capacity : **37Ah**
Document No. : **QAE-EF02-140822-PKPL65**

Conducted By: Dae Ho Nam

Manager
Certification & Evaluation
LG Chem. Ltd
E-mail: kkammy@lgchem.com

Reviewed By: Byung Soo Kim

General Manager
Certification & Evaluation
LG Chem. Ltd
E-mail: bskim@lgchem.com

Test Result

For more information, please refer to Document : QAE-EF02-140822-PKPL65

<input type="checkbox"/> Lithium-ion cell	<input checked="" type="checkbox"/> Lithium-ion battery
Pack Model name	PL65
Cell Model name	A5(37Ah)
Nominal voltage	46.8 V
Nominal capacity	37 Ah

No.	Test Item	Criteria	Result	Remark
Test 1	Altitude simulation	- No leakage (If $M < 1g$, less than 0.5%, If $1g \leq M \leq 75g$, less than 0.2%, If $M > 75g$, less than 0.1%), venting, disassembly, rupture and no fire. -Measuring mass before/after each test. -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 Short Circuit	-No disassembly, rupture and fire within six hours of this test. -Max. temperature should not exceed 170°C.	Pass	
Test 6	Crush	-No disassembly and fire within six hours of this test. -Max. temperature should not exceed 170°C.	Pass	
Test 7	Overcharge	-No disassembly and fire within seven days of the test.	-	Exception item for module
Test 8	Forced discharge	-No disassembly and fire within seven days of the test.	Pass	

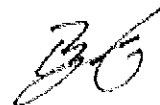
Tests through T1-T5 shall be conducted in sequence with the same battery.

We declare that the above-mentioned test is the result of being checked according to UN Test (Manual of Test and Criteria ST/SG/AC.10/11/Rev.5/Amendment2)

We certify that this battery is proved to meet the requirements of each applicable test in the UN Manual of Test and Criteria, Part III, sub-section 38.3

Conducted By: Dae Ho Nam

Reviewed By: Byung Soo Kim

Manager
 Certification & Evaluation
 LG Chem. Ltd
 E-mail: kkammy@lgchem.com

General Manager
 Certification & Evaluation
 LG Chem. Ltd
 E-mail: bskim@lgchem.com