



Ref. Certif. No.

DK-19541

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST
CERTIFICATES FOR ELECTRICAL EQUIPMENT (IECEE)
CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE CERTIFICATS
D'ESSAIS DES EQUIPEMENTS ELECTRIQUES (IECEE)
METHODE OC

CB TEST CERTIFICATE CERTIFICAT D'ESSAI OC

Product
Produit

Cylindrical Lithium-ion cell

Name and address of the applicant
Nom et adresse du demandeur

**Sanyo Electric Co., Ltd., Mobile Energy Co.
222-1 Kaminaizen, Sumoto-Shi, Hyogo 656-0017 Japan**

Name and address of the manufacturer
Nom et adresse du fabricant

**Sanyo Electric Co., Ltd., Mobile Energy Co.
222-1 Kaminaizen, Sumoto-Shi, Hyogo 656-0017 Japan**

Name and address of the factory
Nom et adresse de l'usine

See appendix

Note: When more than one factory, please report on page 2
Note: Lorsque il y plus d'une usine, veuillez utiliser la 2^{me} page

Ratings and principal characteristics
Valeurs nominales et caractéristiques principales

1. 3.7 Vdc, 2400 mAh
2. 3.7 Vdc, 2000 mAh

Trademark (if any)
Marque de fabrique (si elle existe)

SANYO

Model / Type Ref.
Ref. De type

1. UR18650F
2. UR18650H

Additional information (if necessary may also be reported
on page 2)
Les informations complémentaires (si nécessaire, peuvent
être indiqués sur la 2^{me} page)

**Testing done under the Witnessed Manufacturer's Testing
(WMT) Procedure. Also investigated to EN 62133: 2003.**

A sample of the product was tested and found
to be in conformity with
Un échantillon de ce produit a été essayé et a été
considéré conforme à la

PUBLICATION
IEC 62133:2002

EDITION
1st

As shown in the Test Report Ref. No. which forms part of
this Certificate
Comme indiqué dans le Rapport d'essais numéro de
référence qui constitue partie de ce Certificat

BA-10CA18045-C-1 issued 2010-07-21

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme **National de Certification**



UL International Demko A/S
Lyskaer 8, P.O. Box 514, DK-2730 Herlev, Denmark
Tel: +45 44856565, Fax: +45 44856500

Date:
2010-07-26

Signature:

Jan-Erik Storgaard
Certification manager



Ref. Certif. No.

DK-19541

Factories:

SANYO ELECTRIC CO LTD MOBILE ENERGY CO
222-1 KAMINAIZEN, SUMOTO CITY, HYOGO 656-0017, JAPAN

SANYO ELECTRIC CO LTD MOBILE ENERGY CO
139-32 TOYOHISA, MATSUSHIGE-CHO, ITANO-GUN, TOKUSHIMA 771-0213, JAPAN

SANYO ENERGY NANDAN CO LTD
407 NOTA, KASHU, MINAMIWAJJI CITY, HYOGO 656-0513, JAPAN

SANYO ENERGY NANDAN CO LTD MIHARA A FACTORY
1370 KAMIHADA, ENAMI, MINAMIWAJJI CITY, HYOGO 656-0422, JAPAN

SANYO ENERGY KAIZUKA CO LTD
174 ASONAKA, KAIZUKA CITY, OSAKA 597-0081, JAPAN

SANYO ENERGY LOGISTICS CO LTD
1-1 KOISO, AWAJI CITY, HYOGO 656-2303, JAPAN

CHUOU ELECTRIC CO LTD
66-2 IKEDA, SUMOTO CITY, HYOGO 656-0043, JAPAN

CHUOU ELECTRIC CO LTD HIROTA FACTORY
884 DOUNOMUKAI, HIROTANAKASUJI, MINAMIWAJJI CITY, HYOGO 656-0131, JAPAN

TSUNADENKI CO LTD
1001 KISOKAMI, AWAJI CITY, HYOGO 656-2152, JAPAN

SANYO ENERGY (BEIJING) CO LTD
16 YONGCHANG ZHONGLU BDA, BEIJING 100176, CHINA

Additional information (if necessary)
Information complémentaire (si nécessaire)



Date:
2010-07-26

UL International Demko A/S
Lyskaer 8, P.O. Box 514, DK-2730 Herlev, Denmark
Tel: +45 44856565, Fax: +45 44856500

Signature:

Jan-Erik Storgaard
Certification manager



TEST REPORT

Applicant: GE Energy NZ Ltd.
Level 2, 22 Moorhouse Avenue,
Christchurch, New Zealand

Number: HK12090549-1
Date: 10 October 2012

Sample Description

Product : Battery Pack, Lilon, rechargeable
Brand / Model No. : Commtest / BATT0206
Rating : 7.4V / 4500mAh
No. of Samples : Battery Pack - 16 (Sixteen)
Component Cell - 5 (Five)

Date Received : 18 September 2012
Date Test Conducted : 18 September 2012 to 5 October 2012

Buyer : GE Energy NZ Ltd
Manufacturer : GE Energy NZ Ltd.

Test Requested : Recommendations on the Transport of Dangerous Goods
United Nations Manual Rev. 5 Lithium Metal and Lithium Ion Batteries

Test Method : UN38.3 Manual Rev. 5
Test T.1: Altitude simulation
Test T.2: Thermal test
Test T.3: Vibration
Test T.4: Shock
Test T.5: External short circuit
Test T.6: Impact
Test T.7: Overcharge
Test T.8: Forced discharge

Test Results : See the attached sheets

Conclusion : See the attached sheets

***** End of Page *****

Reviewed by

 Digitally signed by
Felix Kong
Location: Intertek
Testing Services HK
Ltd.

Kong Ka Hang, Felix
Assistant Manager

- The test report only allows to be revised within the retention period unless further standard or the requirement was noticed.
- This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Safety data sheet for chemical products (SDS)

1. PRODUCT AND COMPANY IDENTIFICATION

- Product name: Lithium ion battery cell
- Product code: Cylindrical type cell
UR14430P, UR14500P, UR14650P, UR18500P, UR18500F, UR18500H, UR18650P, UR18650F
- Company name: Sanyo Electric Co., Ltd. Mobile Energy Company
- Address: 222-1, Kaminaizen, Sumoto City, Hyogo, Japan
- Telephone number: +81-799-24-4111
- Fax number: +81-799-24-4121
- Emergency telephone number: [Weekday] +81-799-23-3942
[Night and holiday] +81-799-24-4131

2. COMPOSITION / INFORMATION ON INGREDIENTS

- Substance or preparation: Preparation
- Information about the chemical nature of product:

Common chemical name / General name	CAS number	Concentration / Concentration range	Classification and hazard labeling
Lithium Cobaltate (LiCoO ₂)	12190-79-3	25-40%	-
Iron	7439-89-6	15-25%	-
Aluminum	7429-90-5	2-6%	-
Graphite (Natural graphite) (Artificial graphite)	7782-42-5 7740-44-0	10-20%	-
Copper	7440-50-8	5-15%	Sensitization of the skin group No.2
Organic electrolyte	-	10-20%	Inflammable liquid

3. HAZARDS IDENTIFICATION

For the battery cell, chemical materials are stored in a hermetically sealed metal case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage.

However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress by miss-use, the gas release vent will be operated. The battery cell case will be breached at the extreme, hazardous materials may be released.

Moreover, if heated strongly by the surrounding fire, acrid gas may be emitted.

- Most important hazard and effects

Human health effects:

Inhalation: The steam of the electrolyte has an anesthesia action and stimulates a respiratory tract.

Skin contact: The steam of the electrolyte stimulates a skin. The electrolyte skin contact causes a sore and stimulation on the skin.

Eye contact: The steam of the electrolyte stimulates eyes. The electrolyte eye contact causes a sore and stimulation on the eye. Especially, substance that causes a strong inflammation of the eyes is contained.

Environmental effects: Since a battery cell remains in the environment, do not throw out it into the environment.

- Specific hazards:

If the electrolyte contacts with water, it will generate detrimental hydrogen fluoride.

Since the leaked electrolyte is inflammable liquid, do not bring close to fire.

4. FIRST-AID MEASURES

Spilled internal cell materials

- Inhalation:
Make the victim blow his/her nose, gargle. Seek medical attention if necessary.
- Skin contact:
Remove contaminated clothes and shoes immediately. Wash extraneous matter or contact region with soap and plenty of water immediately.
- Eye contact:
Do not rub one's eyes. Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention immediately.

A battery cell and spilled internal cell materials

- Ingestion:
Make the victim vomit. When it is impossible or the feeling is not well after vomiting, seek medical attention.
-

5. FIRE-FIGHTING MEASURE

- Suitable extinguishing media: Plenty of water, carbon dioxide gas, nitrogen gas, chemical powder fire extinguishing medium and fire foam.
 - Specific hazards: Corrosive gas may be emitted during fire.
 - Specific methods of fire-fighting: When the battery burns with other combustibles simultaneously, take fire-extinguishing method which correspond to the combustibles. Extinguish a fire from the windward as much as possible.
 - Special protective equipment for firefighters:
 - Respiratory protection: Respiratory equipment of a gas cylinder style or protection-against-dust mask
 - Hand protection: Protective gloves
 - Eye protection: Goggle or protective glasses designed to protect against liquid splashes
 - Skin and body protection: Protective cloth
-

6. ACCIDENTAL RELEASE MEASURES

Spilled internal cell materials, such as electrolyte leaked from a battery cell, are carefully dealt with according to the followings.

- Precautions for human body:
Remove spilled materials with protective equipment (protective glasses and protective gloves). Do not inhale the gas as much as possible. Moreover, avoid touching with as much as possible.
 - Environmental precautions: Do not throw out into the environment.
 - Method of cleaning up: The spilled solids are put into a container. The leaked place is wiped off with dry cloth.
 - Prevention of secondary hazards: Avoid re-scattering. Do not bring the collected materials close to fire.
-

7. HANDLING AND STORAGE

• Handling

Technical measures:

Prevention of user exposure: Not necessary under normal use.

Prevention of fire and explosion: Not necessary under normal use.

Precaution for safe handling: Do not damage or remove the external tube.

Specific safe handling advice: Never throw out cells in a fire or expose to high temperatures. Do not soak cells in water or seawater. Do not expose to strong oxidizers. Do not give a strong mechanical shock or fling. Never disassemble, modify or deform. Do not connect the positive terminal to the negative terminal with electrically conductive material. In the case of charging, use only dedicated charger or charge according to the conditions specified by Sanyo.

• Storage

Technical measures:

Storage conditions (suitable, to be avoided): Avoid direct sunlight, high temperature, high humidity.

Store in cool place (temperature: -20 ~ 35 degree C, humidity: 45 ~ 85%).

Incompatible products: Conductive materials, water, seawater, strong oxidizers and strong acids

Packing material (recommended, not suitable): Insulative and tear proof materials are recommended.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

- Engineering measures:
No engineering measure is necessary during normal use. In case of internal cell materials' leakage, operate the local exhaust or improve ventilation.
- Control parameters

Common chemical name / General name	ACGIH (2002)	
	TLV-TWA	BEI
Lithium Cobaltate (LiCoO ₂)	0.02mg/m ³ (as cobalt)	-
Aluminum	10mg/m ³ (metal coarse particulate) 5mg/m ³ (flammable powder) 5mg/m ³ (weld fume)	-
Carbon (Natural graphite) (Artificial graphite)	2mg/m ³ (inhalant coarse particulate)	-
Copper	0.2mg/m ³ (fume) 1.0mg/m ³ (a coarse particulate, Mist)	-
Organic electrolyte	-	-

ACGIH: American Conference of Governmental Industrial Hygienists, Inc.

TLV-TWA: Threshold Limit Value-Time Weighted Average concentration

BEI: Biological Exposure Indices

- Personal protective equipment
Respiratory protection: Respirator with air cylinder, dust mask
Hand protection: Protective gloves
Eye protection: Goggle or protective glasses designed to protect against liquid splashes
Skin and body protection: Working clothes with long sleeve and long trousers

9. PHYSICAL AND CHEMICAL PROPERTIES

- Appearance
Physical state: Solid
Form: Cylindrical
Color: Metallic color (without tube)
Odor: No odor
- pH: NA
- Specific temperatures/temperature ranges at which changes in physical state occur:
There is no useful information for the product as a mixture.
- Flash point: NA
- Explosion properties: NA
- Density: NA
- Solubility ,with indication of the solvent(s): Insoluble in water

10. STABILITY AND REACTIVITY

- Stability: Stable under normal use
- Hazardous reactions occurring under specific conditions
 - Conditions to avoid: When a battery cell is exposed to an external short-circuit, crushes, deformation, high temperature above 100 degree C, it will be the cause of heat generation and ignition. Direct sunlight and high humidity.
 - Materials to avoid: Conductive materials, water, seawater, strong oxidizers and strong acids.
 - Hazardous decomposition products: Acrid or harmful gas is emitted during fire.

11. TOXICOLOGICAL INFORMATION

There is no available data on the product itself. The information of the internal cell materials is as follows.

Lithium cobaltate - LiCoO₂

- Acute toxicity: No applicable data.
Reference cobalt: LDLo, oral - Guinea pig 20mg/kg
- Local effects: Unknown.
- Sensitization:
The nervous system of respiratory organs may be stimulated sensitively.
- Chronic toxicity/Long term toxicity:
By the long-term inhalation of coarse particulate or vapor of cobalt, it is possible to cause the serious respiratory-organs disease. Skin reaction or a lung disease for allergic or hypersensitive person may be caused.
- Skin causticity: Although it is very rare, the rash of the skin and allergic erythema may result.

Aluminum

- Local effects: Aluminum itself has no toxicity. When it goes into a wound, dermatitis may be caused.
- Chronic toxicity/Long term toxicity: By the long-term inhalation of coarse particulate or fume, it is possible to cause lung damage (aluminum lungs).

Graphite

- Acute toxicity: Unknown.
- Local effects: When it goes into one's eyes, it stimulates one's eyes; conjunctivitis, thickening of corneal epithelium or edematous inflammation palpebra may be caused.
- Chronic toxicity/Long term toxicity:
Since the long-term inhalation of high levels of graphite coarse particulate may become a cause of a lung disease or a tracheal disease.
- Carcinogenicity:
Graphite is not recognized as a cause of cancer by research organizations and natural toxic substance research organizations of cancer.

Copper

- Acute toxicity:
60-100mg sized coarse particulate causes a gastrointestinal disturbance with nausea and inflammation.
TDLo, hypodermic - Rabbit 375mg/kg
- Local effects:
Coarse particulate stimulates a nose and a tracheal.
When it goes into one's eyes, the symptom of the reddening and the pain is caused.
- Sensitization: Sensitization of the skin may be caused by long-term or repetitive contact.
- Reproductive effects: TDLo, oral - Rat 152mg/kg

Organic Electrolyte

- Acute toxicity:
LD₅₀, oral - Rat 2,000mg/kg or more
- Local effects: Unknown.
- Skin irritation study: Rabbit - Mild
- eye irritation study: Rabbit - Very severe

12. ECOLOGICAL INFORMATION

- Persistence/degradability:
Since a battery cell and the internal materials remain in the environment, do not bury or throw out into the environment.
-

13. DISPOSAL CONSIDERATIONS

- Recommended methods for safe and environmentally preferred disposal:

Product (waste from residues)

Do not throw out a used battery cell. 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 cell contaminates, dispose as industrial wastes subject to special control.

14. TRANSPORT INFORMATION

In the case of transportation, avoid exposure to high temperature and prevent the formation of any condensation. Take in a cargo of them without falling, dropping and breakage. Prevent collapse of cargo piles and wet by rain. The container must be handled carefully. Do not give shocks that result in a mark of hitting on a cell. Please refer to Section 7-HANDLING AND STORAGE also.

UN regulation

- ID number: 3480 (or 3481)
- Proper shipping name:
"Lithium ion batteries" (or "Lithium ion Batteries packed with equipment" or "Lithium ion Batteries contained in equipment")
- Class: 9 *
- Packing group: II *

* However this product is defined as above, it is **not** recognized as "DANGEROUS GOODS" when its transport condition accords with instructions or provisions depend on region and transportation mode. About the instructions or provisions, please see descriptions in box brackets of following regulations.

Regulation depends on region and transportation mode

- Worldwide, air transportation:
IATA-DGR [" packing instruction 965section II" (or "packing instruction 966 section II" or "packing instruction 967 section II")
 - Worldwide, sea transportation:
IMO-IMDG Code [special provision 188]
 - Europe, road transportation:
ADR [special provision 188]
-

15. REGULATORY INFORMATION

- Regulations specifically applicable to the product:
Wastes Disposal and Public Cleaning Law [Japan]
Law for Promotion of Effective Utilization of resources [Japan]
US Department of Transportation 49 Code of Federal Regulations [USA]

* About overlapping regulations, please refer to Section 14-TRANSPORT INFOMATION.

16. OTHER INFORMATION

- This safety data sheet is offered an agency who handles this product to handle it safely.
- The agency should utilize this safety data sheet effectively (put it up, educate person in charge) and take proper measures.
- The information contained in this Safety data sheet is based on the present state of knowledge and current legislation.
- This safety data sheet provides guidance on health, safety and environmental aspects of the product and should not be construed as any guarantee of technical performance or suitability for particular applications.

Reference

Chemical substances information: Japan Advanced Information center of Safety and Health
International Chemical Safety Cards (ICSCs): International Occupational Safety and Health Information Centre (CIS)
2002 TLVs and BEIs: American Conference of Governmental Industrial Hygienists (ACGIH)
Dangerous Goods Regulations – 51st Edition Effective 1 January 2010: International Air Transport Association (IATA)
IMDG Code - 2008 Edition: International Maritime Organization (IMO)
The European Agreement concerning the International Carriage of Dangerous Goods by Road - 2009:
The United Nations Economic Commission for Europe (UNECE)
RTECS (CD-ROM)
MSDS of raw materials prepared by the manufactures

First edition: Dec. 01 2003

Prepared and approved by

Sanyo Electric Co., Ltd.


Mobile Energy Company

Battery System Development Management Department

Feb. 18. 2009

Certificate of UN test for Lithium ion cell

SANYO Electric Co.,Ltd.
Mobile Energy Company
Lithium-Ion Battery Division



M. Terasaka Senior Manager
Technology Management Department
Engineering Department No.1

Sanyo Model : UR18650F-SAPP-2

Sanyo Product Code : 166002219

Manual of Tests and Criteria (38.3 Lithium batteries)		Test results	Note	Number of test cells	
No.	Test item				
T 1	Altitude simulation	Pass		First cycle fully charged 10 cells	First cycle fully Discharged 10 cells
T 2	Thermal test	Pass			
T 3	Vibration	Pass			
T 4	Shock	Pass			
T 5	External short circuit	Pass			
T 6	Impact	Pass		First cycle 50% charged 5 cells for cylindrical cell, 10 cells for prismatic cell, 5 cells for coin cell.	After 50 cycles, fully discharged 5 cells for cylindrical cell, 10 cells for prismatic cel, 5 cells for coin cell.
T 7	Overcharge	—	For battery only	For battery only	
T 8	Forced discharge	Pass		First cycle, fully discharged 10 cells	After 50 cycles, fully discharged 10 cells

Lithium ion cell Specification

Item	Nominal value	Note
Watt-hour rating	8.6 Wh	

We declare the above : The test result mentioned above was checked according to UN test.

(Manual of Tests and Criteria ST/SG/AC.10/11/Rev.4, PartIII, sub-section 38.3)