Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 62133
Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications

Report Number. .....:	17049975 001
Date of issue .....:	2015-07-13
Total number of pages.....	28 pages
Applicant's name.....:	GlobTek, Inc.
Address .....:	186 Veterans Dr. Northvale, NJ 07647, USA
Test specification:	
Standard .....:	IEC 62133: 2012 (Second Edition)
Test procedure .....:	CB Scheme
Non-standard test method.....:	N/A
Test Report Form No.....:	IEC62133B
Test Report Form(s) Originator ....:	UL(Demko)
Master TRF.....:	Dated 2013-03

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description .....:	Rechargeable Li-polymer Battery
Trade Mark .....:	N/A
Manufacturer.....:	GlobTek, Inc.
Address .....:	186 Veterans Dr. Northvale, NJ 07647, USA
Model/Type reference .....:	BL1200P4054481S1PC*C (*=9, A, B, C, J, K, L, M, N, P, R, T, U, V, 1, 2, 3, Q, W)
Ratings .....:	3.7V, 1200mAh, 4.44Wh

Testing procedure and testing location:			
☒	**CB Testing Laboratory:**	TÜV Rheinland (Shenzhen) Co., Ltd.	
Testing location/ address .....:		East of F/1, F/2~F/4, Building 1, Cybio Technology Building No. 6 Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA	
☐	**Associated CB Testing Laboratory:**		
Testing location/ address .....:			
	Tested by (name + signature).....:	Jason Tang	Jason Tang
	Approved by (name + signature) .....:	Daniel Dai	Daniel Dai
☐	**Testing procedure: TMP**		
Testing location/ address .....:			
	Tested by (name + signature).....:		
	Approved by (name + signature) .....:		
☐	**Testing procedure: WMT**		
Testing location/ address .....:			
	Tested by (name + signature).....:		
	Witnessed by (name + signature) ....:		
	Approved by (name + signature) .....:		
☐	**Testing procedure: SMT**		
Testing location/ address .....:			
	Tested by (name + signature).....:		
	Approved by (name + signature) .....:		
	Supervised by (name + signature)...:		

List of Attachments (including a total number of pages in each attachment):

Attachment 1: Photo documentation (3 pages).

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
cl.5.6.2 Design recommendation(Lithium system); cl.8.1 Charging procedure for test purposes (for Cell and Pack); cl.8.2.1 Continuous charging at constant voltage (Cells); cl.8.3.1 External short circuit (Cell); cl.8.3.2 External short circuit (Battery); cl.8.3.3 Free fall (for Cell and Pack); cl.8.3.4 Thermal abuse (Cells); cl.8.3.5 Crush (Cells); cl.8.3.6 Over-charging of battery; cl.8.3.7 Forced discharge (Cells); cl.8.3.8 Transport tests (Cells); cl.8.3.9 Forced internal short circuit (Cells) The electrolyte type of this cell doesn't belong to polymer, and the additional test cl.8.3.9 was carried out to evaluate the cell. Tests are made with the number of cells and batteries specified in IEC 62133: 2012 (Second Edition) Table 2.	**TÜV Rheinland (Shenzhen) Co., Ltd.** East of F/1, F/2~F/4, Building 1, Cybio Technology Building No. 6 Langshan No.2 Road, North Hi-tech Industry Park 518057 Shenzhen Nanshan District CHINA

Summary of compliance with National Differences:

BE, BY, CH, CN, DE, DK, FI, FR, GB, HU, JP, KR, NL, NO, SE, SG.
BE=Belgium, BY=Belarus, CH=Switzerland, CN=China, DE=Germany, DK=Denmark, FI=Finland, FR=France, GB=United Kingdom, HU=Hungary, JP=Japan, KR=Republic of Korea, NL= Netherlands, NO=Norway, SE=Sweden, SG=Singapore.

☒ The product fulfils the requirements of EN 62133: 2013

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Remark: This is a representative label, the labels of other models are identical to this one except for the Model No. and Part No..

Test item particulars.....:	
Classification of installation and use.....:	To be defined in final product
Supply connection.....:	DC lead wire
Recommend charging method declared by the manufacturer ..... :	Charging the battery with 600mA constant current until 4.23V and then constant voltage until charging current reduces to 12mA.
Discharge current (0,2 I_t A) ..... :	240mA
Specified final voltage ..... :	3.0V
Chemistry ..... :	☐ nickel systems ..... ☒ lithium systems
Recommend of charging limit for lithium system	
Upper limit charging voltage per cell.....:	4.25V
Maximum charging current.....:	1200mA
Charging temperature upper limit.....:	45°C
Charging temperature lower limit.....:	0°C
Polymer cell electrolyte type ..... :	☐ gel polymer ☐ solid polymer ☒ N/A
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	2015-06-12
Date (s) of performance of tests.....:	2015-06-12 to 2015-06-29

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.
Throughout this report a ☐ comma / ☒ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☒ **Yes** ☐ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies) ..... :	1. GlobTek (Suzhou) Co., Ltd. Building 4, No. 76, Jinling East Road, Suzhou Industrial Park, Jiangsu 215021, P.R. China

General product information:

This battery is constructed with one lithium-ion cell, and has overcharge, over-discharge, over current and short-circuits proof circuit.
The manufacturer declared that the battery would be produced in three factories. For each factory, all of the critical components (cell, PCB, IC, MOS, etc.) in the battery are identical. Detail see page 16, TABLE: Critical components information.

The main features of the cell in the battery pack are shown as below (clause 8.1.1):

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
GP404852	1200mAh	3.7V	600mA	240mA	1200mA	1200mA	4.23V	3.0V

The main features of the cell in the battery pack are shown as below (clause 8.1.2):

Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
GP404852	4.25V	60mA	0°C	45°C

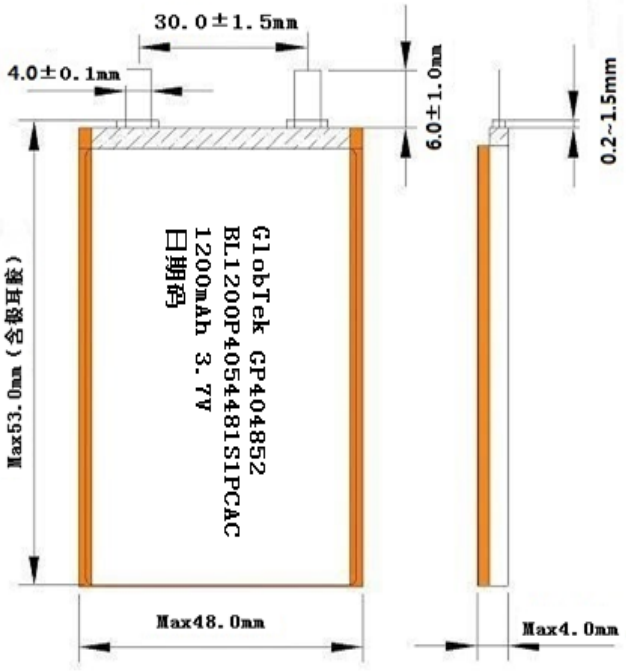
The main features of the battery pack are shown as below (clause 8.1.1):

Model	Nominal capacity	Nominal voltage	Nominal Charge Current	Nominal Discharge Current	Maximum Charge Current	Maximum Discharge Current	Maximum Charge Voltage	Cut-off Voltage
BL1200P4054481S1PC*C (*=9, A, B, C, J, K, L, M, N, P, R, T, U, V, 1, 2, 3, Q, W)	1200mAh	3.7V	600mA	240mA	1200mA	1200mA	4.23V	3.0V

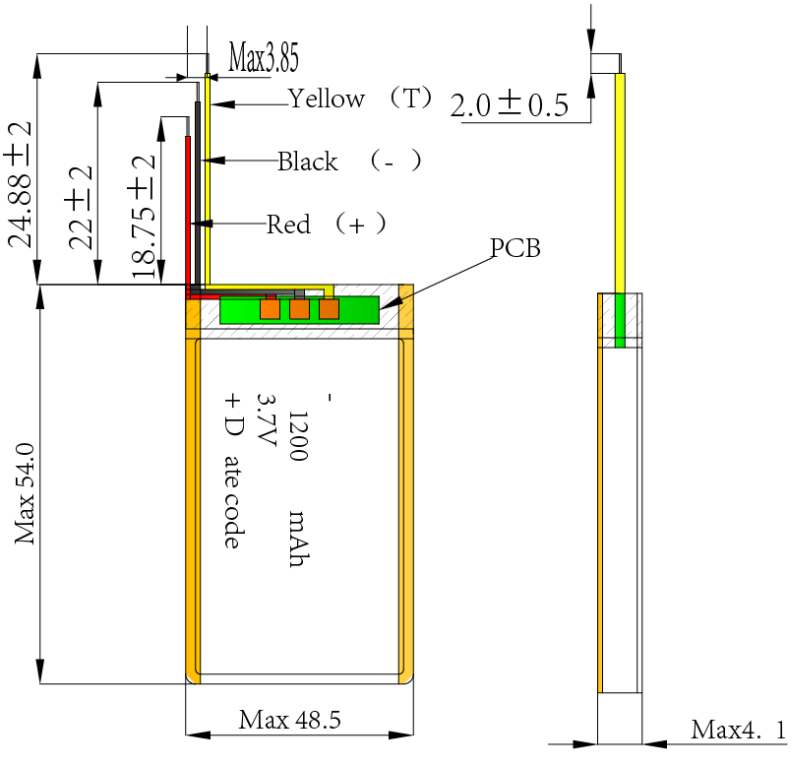
The main features of the battery pack are shown as below (clause 8.1.2):

Model	Upper limit charge voltage	Taper-off current	Lower charge temperature	Upper charge temperature
BL1200P4054481S1PC*C (*=9, A, B, C, J, K, L, M, N, P, R, T, U, V, 1, 2, 3, Q, W)	4.25V	60mA	0°C	45°C

Construction:

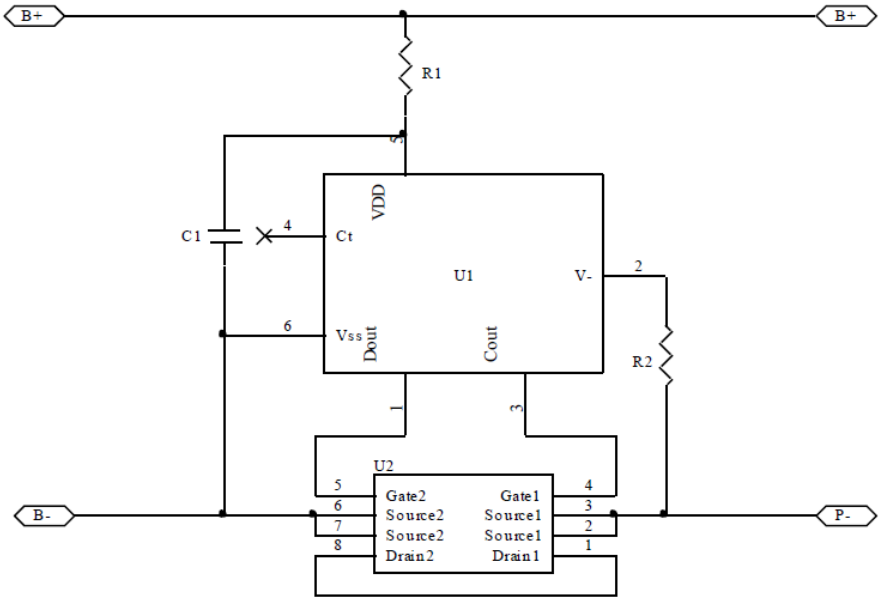


Cell



Battery

Circuit diagram:



Model list:

BL1200P4054481S1PC*C (*=9, A, B, C, J, K, L, M, N, P, R, T, U, V, 1, 2, 3, Q, W):
9 = pin molex, A = Strip + tin, B = Button, C = Contacts, J = 2p JST, K = 3p JST, L = 4p JST
M = 2p Molex, N = 3p Molex, P = 4p Molex, R = Multiple connectors, T = 2p Tyco, U = 3p Tyco, V = 4p Tyco, 1 = 1p contact, 2 = 2p contact, 3 = 3p contact, Q = 8-10 contact, W = wire with 9 pin Molex connector.

Model difference:

All models of battery are identical to each other only except for the output method (See model list) and model name.

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
4	**Parameter measurement tolerances**		**P**
	Parameter measurement tolerances		P
5	**General safety considerations**		**P**
5.1	General		P
5.2	Insulation and wiring		P
	The insulation resistance between the positive terminal and externally exposed metal surfaces of the battery (excluding electrical contact surfaces) is not less than 5 MΩ	No metal case exists.	N/A
	Insulation resistance (MΩ)..... :		—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		P
	Orientation of wiring maintains adequate creepage and clearance distances between conductors		P
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse		P
5.3	Venting		P
	Battery cases and cells incorporate a pressure relief mechanism or are constructed so that they relieve excessive internal pressure at a value and rate that will preclude rupture, explosion and self-ignition	Venting mechanism exists on the narrow side of pouch cell.	P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief		N/A
5.4	Temperature/voltage/current management		P
	Batteries are designed such that abnormal temperature rise conditions are prevented	Overcharge, overdischarge, over current and short-circuit proof circuit used in this battery. See tests of clause 8.	P
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer	See above.	P
	Batteries are provided with specifications and charging instructions for equipment manufacturers so that associated chargers are designed to maintain charging within the temperature, voltage and current limits specified	The charging limits specified in the manufacturer's specifications.	P
5.5	Terminal contacts		P
	Terminals have a clear polarity marking on the external surface of the battery	See page 4.	P

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	DC lead wire contacts complied with the requirements.	P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance		P
	Terminal contacts are arranged to minimize the risk of short circuits		P
5.6	Assembly of cells into batteries		P
5.6.1	If there is more than one battery housed in a single battery case, cells used in the assembly of each battery have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer	Single cell.	N/A
	Each battery has an independent control and protection		N/A
	Manufacturers of cells make recommendations about current, voltage and temperature limits so that the battery manufacturer/designer may ensure proper design and assembly		N/A
	Batteries that are designed for the selective discharge of a portion of their series connected cells incorporate separate circuitry to prevent the cell reversal caused by uneven discharges		N/A
	Protective circuit components are added as appropriate and consideration given to the end-device application		N/A
	When testing a battery, the manufacturer of the battery provides a test report confirming the compliance according to this standard		N/A
5.6.2	Design recommendation for lithium systems only		P
	For the battery consisting of a single cell or a single cellblock: - Charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Clause 8.1.2, Table 4; or	Charging voltage: 4.23V, not exceed 4.25V specified in Clause 8.1.2, table 4.	P
	- Charging voltage of the cell does not exceed the different upper limit of the charging voltage determined through Clause 8.1.2, NOTE 1.		N/A
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks: - The voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Clause 8.1.2, Table 4, by monitoring the voltage of every single cell or the single cellblocks; or		N/A

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
	- The voltages of any one of the single cells or single cellblocks does not exceed the different upper limit of the charging voltage, determined through Clause 8.1.2, NOTE 1, by monitoring the voltage of every single cell or the single cellblocks		N/A
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks: - Charging is stopped when the upper limit of the charging voltage, specified in Clause 8.1.2, Table 4, is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks; or		N/A
	- Charging is stopped when the upper limit of the different charging voltage, determined through Clause 8.1.2, NOTE 1, is exceeded for any one of the single cells or single cellblocks by measuring the voltage of every single cell or the single cellblocks		N/A
5.7	Quality plan		P
	The manufacturer prepares and implements a quality plan that defines procedures for the inspection of materials, components, cells and batteries and which covers the whole process of producing each type of cell or battery	Complied. ISO 9001: 2008 certificate provided.	P
6	**Type test conditions**		**P**
	Tests were made with the number of cells or batteries specified in Table 1 for nickel-cadmium and nickel-metal hydride systems and Table 2 for lithium systems, using cells or batteries that are not more than six months old	Complied. Lithium system.	P
	Unless noted otherwise in the test methods, testing was conducted in an ambient of 20°C ± 5°C.	Tests are carried out at 20°C ± 5°C.	P
7	**Specific requirements and tests (nickel systems)**		**N/A**
7.1	Charging procedure for test purposes	Lithium system.	N/A
7.2	Intended use		N/A
7.2.1	Continuous low-rate charging (cells)		N/A
	Results: No fire. No explosion		N/A
7.2.2	Vibration		N/A
	Results: No fire. No explosion. No leakage	(See Table 7.2.2)	N/A
7.2.3	Moulded case stress at high ambient temperature		N/A
	Oven temperature (°C) .....:		—
	Results: No physical distortion of the battery casing resulting in exposure if internal components		N/A
7.2.4	Temperature cycling		N/A

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
	Results: No fire. No explosion. No leakage.		N/A
7.3	Reasonably foreseeable misuse		N/A
7.3.1	Incorrect installation cell		N/A
	The test was carried out using: - Four fully charged cells of the same brand, type, size and age connected in series, with one of them reversed; or		N/A
	- A stabilized dc power supply.		N/A
	Results: No fire. No explosion.....:	(See Table 7.3.1)	N/A
7.3.2	External short circuit		N/A
	The cells or batteries were tested until one of the following occurred: - 24 hours elapsed; or		N/A
	- The case temperature declined by 20% of the maximum temperature rise		N/A
	Results: No fire. No explosion.....:	(See Table 7.3.2)	N/A
7.3.3	Free fall		N/A
	Results: No fire. No explosion.		N/A
7.3.4	Mechanical shock (crash hazard)		N/A
	Results: No fire. No explosion. No leakage.		N/A
7.3.5	Thermal abuse		N/A
	Oven temperature (°C) .....:		—
	Results: No fire. No explosion.		N/A
7.3.6	Crushing of cells		N/A
	The crushing force was released upon: - The maximum force of 13 kN ± 1 kN has been applied; or		N/A
	- An abrupt voltage drop of one-third of the original voltage has been obtained		N/A
	The cell is prismatic type and a second set of samples was tested, rotated 90° around longitudinal axis compared to the first set		N/A
	Results: No fire. No explosion.....:	(See Table 7.3.6)	N/A
7.3.7	Low pressure		N/A
	Chamber pressure (kPa) .....:		—
	Results: No fire. No explosion. No leakage.		N/A
7.3.8	Overcharge		N/A
	Results: No fire. No explosion.....:	(See Table 7.3.8)	N/A
7.3.9	Forced discharge		N/A

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
	Results: No fire. No explosion .....:	(See Table 7.3.9)	N/A
8	**Specific requirements and tests (lithium systems)**		**P**
8.1	Charging procedures for test purposes	Complied.	P
8.1.1	First procedure: This charging procedure applied to tests other than those specified in 8.1.2		P
8.1.2	Second procedure: This charging procedure applied to the tests of 8.3.1, 8.3.2, 8.3.4, 8.3.5, and 8.3.9		P
	If a cell's specified upper and/or lower charging temperature exceeds values for the upper and/or lower limit test temperatures of Table 4, the cells were charged at the specified values plus 5 °C for the upper limit and minus 5 °C for the lower limit	Charge temperature 0-45°C declared. -5°C used for lower limit tests. 45°C used for upper limit tests.	P
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1) .....:		P
	For a different upper limit charging voltage (i.e. other than for lithium cobalt oxide systems at 4,25 V), the applied upper limit charging voltage and upper limit charging temperatures were adjusted accordingly	Lithium cobalt oxide system only.	N/A
	A valid rationale was provided to ensure the safety of the cell (see Figure A.1) .....:	The upper limit charging voltage: 4.25V	N/A
8.2	Intended use		P
8.2.1	Continuous charging at constant voltage (cells)	Tested complied.	P
	Results: No fire. No explosion .....:	(See Table 8.2.1)	P
8.2.2	Moulded case stress at high ambient temperature (battery)		N/A
	Oven temperature (°C) .....:		—
	Results: No physical distortion of the battery casing resulting in exposure if internal components		P
8.3	Reasonably foreseeable misuse		P
8.3.1	External short circuit (cell)		P
	The cells were tested until one of the following occurred: - 24 hours elapsed; or		N/A
	- The case temperature declined by 20% of the maximum temperature rise		P
	Results: No fire. No explosion .....:	(See Table 8.3.1)	P
8.3.2	External short circuit (battery)		P

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
	The cells were tested until one of the following occurred: - 24 hours elapsed; or		P
	- The case temperature declined by 20% of the maximum temperature rise		N/A
	In case of rapid decline in short circuit current, the battery pack remained on test for an additional one hour after the current reached a low end steady state condition		N/A
	Results: No fire. No explosion.....:	(See Table 8.3.2)	P
8.3.3	Free fall		P
	Results: No fire. No explosion.	No fire. No explosion.	P
8.3.4	Thermal abuse (cells)		P
	The cells were held at 130°C ± 2°C for: - 10 minutes; or	Tested complied.	P
	- 30 minutes for large cells (gross mass of more than 500 g as defined in IEC 62281)		N/A
	Oven temperature (°C).....:	130°C	—
	Gross mass of cell (g).....:	<300g, small cell.	—
	Results: No fire. No explosion.	No fire. No explosion.	P
8.3.5	Crush (cells)		P
	The crushing force was released upon: - The maximum force of 13 kN ± 1 kN has been applied; or	Tested complied.	P
	- An abrupt voltage drop of one-third of the original voltage has been obtained; or		N/A
	- 10% of deformation has occurred compared to the initial dimension		N/A
	Results: No fire. No explosion.....:	(See Table 8.3.5)	P
8.3.6	Over-charging of battery		P
	Test was continued until the temperature of the outer casing: - Reached steady state conditions (less than 10°C change in 30-minute period); or		N/A
	- Returned to ambient		P
	Results: No fire. No explosion.....:	(See Table 8.3.6)	P
8.3.7	Forced discharge (cells)		P
	Results: No fire. No explosion.....:	(See Table 8.3.7)	P
8.3.8	Transport tests		P

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
	Manufacturer's documentation provided to show compliance with UN Recommendations on Transport of Dangerous Goods	T-1, T-2, T-3 and T-4 tested complied. No leakage, no venting, no short-circuit, no rupture, no explosion and no fire. T-5, See Table 8.3.8. T-6 can be replaced by test of clause 8.3.5.	P
8.3.9	Design evaluation – Forced internal short circuit (cells)	Tested complied.	P
	The cells complied with national requirement for .....:	France, Japan, Republic of Korea and Switzerland.	—
	The pressing was stopped upon: - A voltage drop of 50 mV has been detected; or		P
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached	400N (prismatic cells).	P
	Results: No fire .....:	(See Table 8.3.9)	P
9	**Information for safety**		**P**
	The manufacturer of secondary cells ensures that information is provided about current, voltage and temperature limits of their products.	Information for safety mentioned in manufacturer's specifications.	P
	The manufacturer of batteries ensures that equipment manufacturers and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards.	Information for safety mentioned in manufacturer's specifications.	P
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product		N/A
	As appropriate, information relating to hazard avoidance resulting from a system analysis is provided to the end user.....:		N/A
10	**Marking**		**P**
10.1	Cell marking		N/A
	Cells marked as specified in the applicable cell standards: IEC 61951-1, IEC 61951-2 or IEC 61960.	The final product is battery.	N/A
10.2	Battery marking		P
	Batteries marked in accordance with the requirements for the cells from which they are assembled.	The battery is marked in accordance with IEC 61960, also see page 4.	P
	Batteries marked with an appropriate caution statement.		N/A

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
10.3	Other information		P
	Storage and disposal instructions marked on or supplied with the battery.		N/A
	Recommended charging instructions marked on or supplied with the battery.	Information for recommended charging instructions mentioned in manufacturer's specifications.	P
11	**Packaging**		**P**
	The materials and packaging design are chosen so as to prevent the development of unintentional electrical conduction, corrosion of the terminals and ingress of environmental contaminants.		P
Annex A	**Charging range of secondary lithium ion cells for safe use**		**P**
A.1	General		P
A.2	Safety of lithium-ion secondary battery	Complied.	P
A.3	Consideration on charging voltage	Complied.	P
A.3.1	General	Max. charging voltage is 4.23V	P
A.3.2	Upper limit charging voltage	4.25V applied.	P
A.3.2.1	General		P
A.3.2.2	Explanation of safety viewpoint		N/A
A.3.2.3	Safety requirements, when different upper limit charging voltage is applied		N/A
A.4	Consideration of temperature and charging current		P
A.4.1	General		P
A.4.2	Recommended temperature range	See A.4.2.2.	P
A.4.2.1	General		P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	Charging temperature declared by client is: 0-45°C	P
A.4.3	High temperature range	Not higher than the temperature range specific in this standard.	N/A
A.4.3.1	General		N/A
A.4.3.2	Explanation of safety viewpoint		N/A
A.4.3.3	Safety considerations when specifying charging conditions in high temperature range		N/A
A.4.3.4	Safety consideration when specifying new upper limit in high temperature range		N/A
A.4.4	Low temperature range	Charging low temperature declared by client is: 0°C.	P

IEC 62133: 2012			
Clause	Requirement + Test	Result - Remark	Verdict
A.4.4.1	General		P
A.4.4.2	Explanation of safety viewpoint		P
A.4.4.3	Safety considerations, when specifying charging conditions in low temperature range		P
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range	-5°C applied.	P
A.4.5	Scope of the application of charging current		P
A.5	Sample preparation		P
A.5.1	General		P
A.5.2	Insertion procedure for nickel particle to generate internal short		P
	The insertion procedure carried out at 20°C±5°C and under -25 °C of dew point		P
A.5.3	Disassembly of charged cell		P
A.5.4	Shape of nickel particle		P
A.5.5	Insertion of nickel particle to cylindrical cell		N/A
A.5.5.1	Insertion of nickel particle to winding core		N/A
A.5.5.2	Mark the position of nickel particle on the both end of winding core of the separator		N/A
A.5.6	Insertion of nickel particle to prismatic cell		P

TABLE: Critical components information					P
Object/part no.	**Manufacturer Critical components / trademark**	**Type/model**	**Technical data**	**Standard**	**Mark(s) of conformity [1)]**
Cell		GP404852	1200mAh, 3.7V	IEC 62133: 2012	Test with compliance
-Cell Case	SHOWA DENKO K.K	480mm x 0.113mm	113μm±10%, Nylon, PP, Aluminum	--	--
-Positive Electrode		124μm x 6mm x 650mm	$LiCoO_2$, PVDF, NMP, Conductive Additive, Aluminum Foil	--	--
-Negative Electrode		137μm x 57mm x 604mm	Graphite, CMC, SBR, H_2O, Conductive Additive, Copper Foil	--	--
-Separator	Senior	16μm x 59mm x 1310mm	16μm, Nylon, PP, shutdown temperature: 130°C	--	--
-Electrolyte	Guangzhou Tinci Materials Technology Co., Ltd	TC-2011	DMC, EC, PC, EMC	--	--
PCM	LONGSHENGCHANG TECHNOLGY CO., LTD	BH.1S0438009	Overcharge detection voltage: 4.30±0.025V; Overdischarge detection voltage: 3.00±0.05V; Overcurrent detection voltage: 200±15mV; Overcurrent detection current: 5.0-12.0A; R_{DS}≤65mΩ	--	--
IC (U1)	SEIKO	S-8261ABJMD-G3J-T2G	V_{CC}: -0.30-7V, T_A: -20-70°C, I_{SINK}: 5mA, T_J: -40-125°C, TSSOP-8	--	Test with compliance
MOSFET (U2)	SIAI	8205A	V_{DSS}: 20V, V_{GSS}: ±12V, I_D: 6.0A, T_J: -55-150°C, TSSOP-8	--	Test with compliance
NTC (R3)	JOINSET CO LTD	ECTH 160808 103F	R020= 10K±1%, B=3435K, Topr: -40°C-125°C	UL 1434	UL E258805
PCB	JIRUIDA CIRCUIT TECHNOLOGY CO LTD	JRD-S	V-0, 130°C	UL 796/ UL 94	UL E340032

Lead wire	DONGGUAN ZHENGWEI ELECTRIC WIRE & CABLE INDUSTRY CO LTD	1571	80°C, 26AWG, VW-1	UL 758	UL E326510
Plastic material of connector (only for the model with connector)	SABIC JAPAN L L C	945 (GG)	V-0, 130°C	UL 94/ UL 746	UL E207780
Supplementary information: [1] **Provided evidence ensures the agreed level of compliance.**					

7.2.1	TABLE: Continuous low rate charge (cells)				N/A
Model	**Recommended charging method, (CC, CV, or CC/CV)**	**Recommended charging voltage V_c, (Vdc)**	**Recommended charging current I_{rec}, (A)**	**OCV at start of test, (Vdc)**	**Results**

Supplementary information:

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

7.2.2	TABLE: Vibration		N/A
Model	**OCV at start of test, (Vdc)**	**Results**	

Supplementary information:

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

7.3.1	TABLE: Incorrect installation (cells)		N/A
Model	**OCV of reversed cell, (Vdc)**	**Results**	

Supplementary information:

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

7.3.2	TABLE: External short circuit				N/A
Model	**Ambient (at 20°C ± 5°C or 55°C ± 5°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (Ω)**	**Maximum case temperature rise ΔT, (°C)**	**Results**

Supplementary information:

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

7.3.6	TABLE: Crush		N/A
Model	**OCV at start of test, (Vdc)**	**OCV at removal of crushing force, (Vdc)**	**Results**

Supplementary information:

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

7.3.8	TABLE: Overcharge			N/A
Model	**OCV prior to charging, (Vdc)**	**Maximum charge current, (A)**	**Time for charging, (hours)**	**Results**

Supplementary information:

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

7.3.9	TABLE: Forced discharge (cells)			N/A
Model	**OCV before application of reverse charge, (Vdc)**	**Measured reverse charge I_t, (A)**	**Time for reversed charge, (minutes)**	**Results**

Supplementary information:

- No fire or explosion
- No leakage
- Leakage
- Fire
- Explosion
- Bulge
- Others (please explain)

8.2.1	TABLE: Continuous charging at constant voltage (cells)			P
Model	**Recommended charging voltage V_c, (Vdc)**	**Recommended charging current I_{rec}, (A)**	**OCV at start of test, (Vdc)**	**Results**
c1#	4.23	0.6	4.21	P
c2#	4.23	0.6	4.21	P
c3#	4.23	0.6	4.21	P
c4#	4.23	0.6	4.21	P
c5#	4.23	0.6	4.21	P

Supplementary information:

- No fire
- No explosion
- No leakage

8.3.1	TABLE: External short circuit (cells)				P
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (mΩ)**	**Maximum case temperature ~~rise ΔT,~~ (°C)**	**Results**
Samples charged at charging temperature upper limit (45°C)					
c1#	23.0	4.21	79	115.0	P
c2#	23.0	4.21	82	116.7	P
c3#	23.0	4.21	81	113.9	P
c4#	23.0	4.21	75	111.5	P
c5#	23.0	4.21	82	114.0	P
Samples charged at charging temperature lower limit (-5°C)					
c6#	23.0	4.11	76	116.7	P
c7#	23.0	4.11	79	117.5	P
c8#	23.0	4.12	81	120.3	P
c9#	23.0	4.11	79	119.0	P
c10#	23.0	4.11	83	118.8	P

Supplementary information:

- No fire
- No explosion

8.3.2	TABLE: External short circuit (battery)				P
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (mΩ)**	**Maximum case temperature ~~rise ΔT,~~ (°C)**	**Results**
Samples charged at charging temperature upper limit (45°C)					
b1#	54.8	4.21	78	55.8	P
b2#	54.8	4.21	87	56.2	P
b3#	54.8	4.22	75	56.2	P
b4#	54.8	4.21	79	55.9	P
b5#	54.8	4.21	81	55.7	P
Samples charged at charging temperature lower limit (-5°C)					
b6#	54.7	4.11	79	56.5	P
b7#	54.7	4.11	85	57.2	P
b8#	54.7	4.11	82	57.8	P
b9#	54.7	4.11	76	56.9	P
b10#	54.7	4.11	85	57.5	P

Supplementary information:

- No fire
- No explosion

8.3.5	TABLE: Crush				P
Model	**OCV at start of test, (Vdc)**	**OCV at removal of crushing force, (Vdc)**	**Width/ diameter of cell before crush, (mm)**	**Required deformation for crush, (mm)**	**Results**
Samples charged at charging temperature upper limit (45°C)					
c1#	4.22	4.22	--	--	P
c2#	4.22	4.22	--	--	P
c3#	4.22	4.22	--	--	P
c4#	4.22	4.21	--	--	P
c5#	4.22	4.22	--	--	P

Note:

A 13kN force applied at the wide side of prismatic cells.

No voltage abrupt drop occurred.

Supplementary information:

- No fire
- No explosion

8.3.6	TABLE: Over-charging of battery				P
Constant charging current (mA) .....:			2400		—
Supply voltage (Vdc).....:			4.23*		—
Model	**OCV before charging, (Vdc)**	**Resistance of circuit, (mΩ)**	**Maximum outer casing temperature, (°C)**	**Results**	
b1#	3.59	29.6	28.7	P	
b2#	3.60	20.5	30.1	P	
b3#	3.60	20.4	28.5	P	
b4#	3.58	28.3	30.6	P	
b5#	3.58	29.5	31.0	P	

Supplementary information:

***The min. overcharge detections voltage as specified in battery specifications.

- No fire
- No explosion

8.3.7	TABLE: Forced discharge (cells)				P
Model	**OCV before application of reverse charge, (Vdc)**	**Measured Reverse charge I_t, (A)**	**Time for reversed charge, (minutes)**	**Results**	
c1#	3.35	1.2	90	P	
c2#	3.37	1.2	90	P	
c3#	3.36	1.2	90	P	
c4#	3.36	1.2	90	P	
c5#	3.35	1.2	90	P	

Supplementary information:

- No fire
- No explosion

8.3.8 T-5	TABLE: External short circuit (cells)				P
Model	**Ambient, (°C)**	**OCV at start of test, (Vdc)**	**Resistance of circuit, (Ω)**	**Maximum case temperature ~~rise ΔT,~~ (°C)**	**Results**
c1#	55.4	4.22	0.083	102.4	P
c2#	55.4	4.21	0.078	108.9	P
c3#	55.4	4.21	0.086	111.6	P
c4#	55.4	4.22	0.080	101.8	P
c5#	55.4	4.22	0.081	110.8	P
c6#	55.4	4.21	0.080	115.5	P
c7#	55.4	4.21	0.079	112.8	P
c8#	55.4	4.21	0.081	106.7	P
c9#	55.4	4.21	0.080	113.2	P
c10#	55.4	4.22	0.080	108.6	P

Supplementary information:

The external short-circuit test of 10 pcs samples performed after the test of Altitude, Thermal cycling, Vibration and Shock in sequence.

- No fire
- No explosion

8.3.9	TABLE: Forced internal short circuit (cells)					P
Model	**Chamber ambient, (°C)**	**OCV at start of test, (Vdc)**	**Particle location [1)]**	**Maximum applied pressure, (N)**	**Voltage drop, (mV)**	**Results**
Cell #1	45	4.21	1	118	178	P
Cell #2	45	4.21	1	400	0	P
Cell #3	45	4.21	1	400	0	P
Cell #4	45	4.21	2	6	104	P
Cell #5	45	4.21	2	400	0	P
Cell #6	10	4.11	1	400	0	P
Cell #7	10	4.12	1	400	0	P
Cell #8	10	4.11	1	263	196	P
Cell #9	10	4.11	2	400	0	P
Cell #10	10	4.11	2	400	0	P

Supplementary information:

[1)] Identify one of the following**:**

1: Nickel particle inserted between positive and negative (active material) coated area.

2: Nickel particle inserted between positive aluminium foil and negative active material coated area.

- No fire

-- End of Report --