Test Report No.:	BAT208WDG0387
Client	
Name:	Shenzhen Tcbest Battery Industry Co.,Ltd
Address:	5/F,Building A6,Yintian Industrial Zone,xixiang, Bao'an District, Shenzhen,518000,China
Test Item description:	Rechargeable lithium Ion Battery
Identification:	10440 350mAh 3.7V
Testing laboratory	
Name:	BUREAU VERITAS SHENZHEN CO., LTD. DONGGUAN BRANCH
Address:	No. 96, Guantai Road (Houjie Section), Houjie Town, Dongguan City, Guangdong Province, 523942, People's Republic of China
Test specification	
Standard :	IEC 62133-2:2017, EN 62133-2:2017 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 – Part 2: Lithium systems
Test Result :	**The sample satisfies to the clauses examined.**
Prepared By :	Sean Tu / Engineer — 2021-10-20 Date
Approved By:	Ivan Ni / Engineer — 2021-10-20 Date

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TEST REPORT
IEC/EN 62133-2
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 – Part 2: Lithium systems

Report Number..... :	BAT208WDG0387
Date of issue..... :	2021-10-20
Total number of pages ..... :	28
Name of Testing Laboratory preparing the Report	
Test location..... :	BUREAU VERITAS SHENZHEN CO., LTD. DONGGUAN BRANCH
Address..... :	No. 96, Guantai Road (Houjie Section), Houjie Town, Dongguan City, Guangdong Province, 523942, People's Republic of China
Applicant's name ..... :	Shenzhen Tcbest Battery Industry Co.,Ltd.
Address..... :	5/F,Building A6,Yintian Industrial Zone,Xixiang,Bao'an District,Shenzhen,China.
Test specification:	
Standard ..... :	IEC 62133-2:2017, EN 62133-2:2017
Non-standard test method……..:	N/A
Test Report Form No. ..... :	TEST REPORT IEC/EN 62133-2 VER.0
Test Report Form(s) Originator .... :	BUREAU VERITAS SHENZHEN CO., LTD. DONGGUAN BRANCH
Master TRF ..... :	Dated 2017-09
Test item description..... :	Rechargeable Li-ion Cell
Trade Mark..... :	N/A
Manufacturer ..... :	Shenzhen Tcbest Battery Industry Co.,Ltd 5/F,Building A6,Yintian Industrial Zone,xixiang, Bao'an District, Shenzhen,518000,China
Model/Type reference..... :	10440 350mAh 3.7V
Ratings..... :	3.7V, 350mAh, 1.295Wh

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

- Pages 28 (1 page of EUT photo)

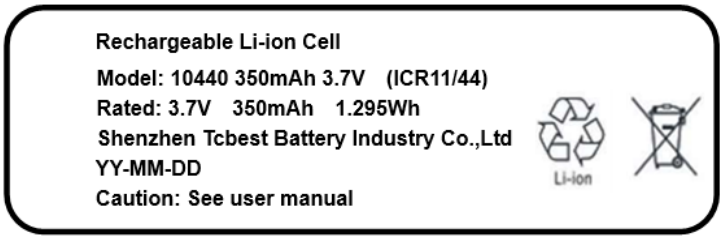
Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
- 5.2 Insulation on and wiring - 5.3 Venting - 5.4 Temperature/voltage/current management - 5.5 Terminal contacts - 5.6 Assembly of cells into batteries - 5.7 Quality plan - 5.8 Battery safety components - 7.1 Charging procedure for test purposes (Cells) - 7.2.1 Continuous charging at constant voltage(Cells) - 7.3.1 External short circuit(Cells) - 7.3.3 Free fall(Cells) - 7.3.4 Thermal abuse(Cells) - 7.3.5 Crush(Cells) - 7.3.7 Forced discharge(Cells) - 7.3.9 Design evaluation – Forced internal short-circuit (cells) The load conditions used during testing: The unit is charging the empty battery and cell, discharging the full charged battery and cell according to its rating. Note: (1) Unless otherwise stated, the charging procedure for test purposes is carried out in an ambient temperature of 20±5°C, using the method declared by the manufacturer. (2) Prior to charging, the battery or cell shall have been discharged at 20±5°C at a constant current of 0.2 It A down to a specified final voltage.	BUREAU VERITAS SHENZHEN CO., LTD. DONGGUAN BRANCH No. 96, Guantai Road (Houjie Section), Houjie Town, Dongguan City, Guangdong Province, 523942, People's Republic of China

Summary of compliance with National Differences: N/A

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.



Explanation of date Code:

YY-MM-DD

"YY" indicate year;
"MM" indicate month;
"DD" indicate day.

Test item particulars ..... :	
Classification of installation and use ..... :	Built-in and use in portable applications
Supply Connection ..... :	Custom DC connection terminals
Recommend charging method declared by the manufacturer ..... :	Charging with constant current at 0.2C and then with constant voltage at 4.2V till charge current declines to 0.01C.
Discharge current (0,2 It A) ..... :	70mA
Specified final voltage ..... :	3.0V
Upper limit charging voltage per cell ..... :	4.2V
Maximum charging current ..... :	350mA
Charging temperature upper limit ..... :	45˚C
Charging temperature lower limit ..... :	-10˚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 .....:	2021-08-31
Date (s) of performance of tests .....:	2021-08-31 to 2021-10-11

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.**
Name and address of factory (ies).....: Shenzhen Tcbest Battery Industry Co.,Ltd 5/F,Building A6,Yintian Industrial Zone,xixiang, Bao'an District, Shenzhen,518000,China
General product information and other remarks: (1) The equipment under test (EUT) contain single non-certified cell (1S1P) which completed IEC/EN 62133-2 clauses 7.1, 7.2.1, 7.3.1, 7.3.3, 7.3.4, 7.3.5, 7.3.7 and 7.3.9 tested in this report. (2) Battery designating is ICR11/44 according to clause 9.2. (3) The cell maximum ambient temperature is specified as -10~45˚C for Charging and -25~60˚C for Discharging. (5) Dimension of the Cell unit: (Φ10.4mm x 44.0mm) max. (6) Cell Weight: Approx. 9.374g. **Conditions of acceptability:** The battery is a built-in type without external physical moulded case, the compliance of clause “7.2.2 Moulded case stress at high ambient temperature (battery)” shall be evaluated during the final assembly. Test condition: Temperature: 20±5˚C Relative humidity: 60% Air pressure: 950 mbar

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
4	**PARAMETER MEASUREMENT TOLERANCES**		P
	Parameter measurement tolerances	Both normal and foreseeable misuses are evaluated in the report. All control and measure values were within the tolerances.	P
5	**GENERAL SAFETY CONSIDERATIONS**		P
5.1	**General**	See below	P
	Cells and batteries so designed and constructed that they are safe under conditions of both intended use and reasonably foreseeable misuse	The battery and cell is safe and continues to function in all respects under the condition of intended use.	P
5.2	**Insulation and wiring**	See below	N/A
	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	The EUT is single cell type; compliance shall be evaluated in the final assembly.	N/A
	Insulation resistance (MΩ) ..... :	--	—
	Internal wiring and insulation are sufficient to withstand maximum anticipated current, voltage and temperature requirements		N/A
	Orientation of wiring maintains adequate clearance and creepage distances between conductors		N/A
	Mechanical integrity of internal connections accommodates reasonably foreseeable misuse		N/A
5.3	**Venting**	See below	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	The Explosion-proof safety valve which was at the top of cell was considered as the pressure relief mechanism, which can release the pressure during the abnormal operation.	P
	Encapsulation used to support cells within an outer casing does not cause the battery to overheat during normal operation nor inhibit pressure relief	The EUT is built-in type, no such outer case used. It shall be evaluated in the final assembly.	N/A
5.4	**Temperature, voltage and current management**	The EUT is single cell type; compliance shall be evaluated in the final assembly.	N/A
	Batteries are designed such that abnormal temperature rise conditions are prevented		N/A

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
	Batteries are designed to be within temperature, voltage and current limits specified by the cell manufacturer		N/A
	Batteries are provided with specifications and charging instructions for equipment manufacturers so that specified chargers are designed to maintain charging within the temperature, voltage and current limits specified		N/A
5.5	**Terminal contacts**	See below.	**P**
	The size and shape of the terminal contacts ensure that they can carry the maximum anticipated current	The electrode tab complied with the requirements.	P
	External terminal contact surfaces are formed from conductive materials with good mechanical strength and corrosion resistance	The EUT does not have wire.	N/A
	Terminal contacts are arranged to minimize the risk of short-circuit	The distance between the terminals is considered enough to minimize the possibility of short circuits.	P
5.6	**Assembly of cells into batteries**	See below.	N/A
5.6.1	General	The EUT is single cell type; It shall be evaluated in the final assembly.	N/A
	Each battery have an independent control and protection for current, voltage, temperature and any other parameter required for safety and to maintain the cells within their operating region		N/A
	This protection may be provided external to the battery such as within the charger or the end devices		N/A
	If protection is external to the battery, the manufacturer of the battery provide this safety relevant information to the external device manufacturer for implementation		N/A
	If there is more than one battery housed in a single battery case, each battery have protective circuitry that can maintain the cells within their operating regions		N/A
	Manufacturers of cells specify 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 circuitry to prevent operation of cells outside the limits specified by the cell manufacturer		N/A

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
	Protective circuit components added as appropriate and consideration given to the end-device application		N/A
	The manufacturer of the battery provide a safety analysis of the battery safety circuitry with a test report including a fault analysis of the protection circuit under both charging and discharging conditions confirming the compliance		N/A
5.6.2	Design recommendation	The EUT is single cell type; It shall be evaluated in the final assembly.	N/A
	For the battery consisting of a single cell or a single cellblock, it is recommended that the charging voltage of the cell does not exceed the upper limit of the charging voltage specified in Table 2		N/A
	For the battery consisting of series-connected plural single cells or series-connected plural cellblocks, it is recommended that the voltages of any one of the single cells or single cellblocks does not exceed the upper limit of the charging voltage, specified in Table 2, 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, it is recommended that charging is stopped when the upper limit of the charging voltage 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
	For batteries consisting of series-connected cells or cell blocks, nominal charge voltage not be counted as an overcharge protection		N/A
	For batteries consisting of series-connected cells or cell blocks, cells have closely matched capacities, be of the same design, be of the same chemistry and be from the same manufacturer		N/A
	It is recommended that the cells and cell blocks not discharged beyond the cell manufacturer's specified final voltage		N/A
	For batteries consisting of series-connected cells or cell blocks, cell balancing circuitry incorporated into the battery management system		N/A
5.6.3	Mechanical protection for cells and components of batteries	The EUT is single cell type; It shall be evaluated in the final assembly.	N/A

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
	Mechanical protection for cells, cell connections and control circuits within the battery provided to prevent damage as a result of intended use and reasonably foreseeable misuse		N/A
	The mechanical protection can be provided by the battery case or it can be provided by the end product enclosure for those batteries intended for building into an end product		N/A
	The battery case and compartments housing cells designed to accommodate cell dimensional tolerances during charging and discharging as recommended by the cell manufacturer		N/A
	For batteries intended for building into a portable end product, testing with the battery installed within the end product considered when conducting mechanical tests		N/A
5.7	**Quality plan**	See below	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	The manufacturer's procedures for the inspection of materials, components, cells and batteries and which covers the process of producing each type of cell and battery comply with the requirement.	P
5.8	**Battery safety components**	See below	P
	According annex F	Complied	P
6	**TYPE TEST AND SAMPLE SIZE**		P
	Tests are made with the number of cells or batteries specified in Table 1 using cells or batteries that are not more than six months old	The batteries and cells under testing were less than six months old.	P
	Coin cells with resistance ≤ 3 Ω (measured according annex D) are tested according table 1	The EUT isn't coin cells.	N/A
	Unless otherwise specified, tests are carried out in an ambient temperature of 20 °C ± 5 °C	The testing was conducted at the ambient range of 15.0°C - 25°C.	P
	The safety analysis of 5.6.1 identify those components of the protection circuit that are critical for short-circuit, overcharge and overdischarge protection	The EUT is single cell type; It shall be evaluated in the final assembly.	N/A
	When conducting the short-circuit test, consideration given to the simulation of any single fault condition that is likely to occur in the protecting circuit that would affect the short-circuit test	The EUT is single cell type; It shall be evaluated in the final assembly.	N/A

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
7	**SPECIFIC REQUIREMENTS AND TESTS**		P
7.1	**Charging procedure for test purposes**	See below	P
7.1.1	First procedure	See below	P
	This charging procedure applies to subclauses other than those specified in 7.1.2	Complied.	P
	Unless otherwise stated in this document, the charging procedure for test purposes is carried out in an ambient temperature of 20 °C ± 5 °C, using the method declared by the manufacturer	The cells are charged in the ambient temp (20°C ± 5°C) and charging procedure according to manufacturer's spec	P
	Prior to charging, the battery have been discharged at 20 °C ± 5 °C at a constant current of 0,2 It A down to a specified final voltage	Complied.	P
7.1.2	Second procedure	See below	P
	This charging procedure applies only to 7.3.1, 7.3.4, 7.3.5, and 7.3.9	The cells are charged at the specified values (45°C) for the upper limit and (-15°C) for the lower limit by testing.	P
	After stabilization for 1 h and 4 h, respectively, at ambient temperature of highest test temperature and lowest test temperature, as specified in Table 2, cells are charged by using the upper limit charging voltage and maximum charging current, until the charging current is reduced to 0,05 It A, using a constant voltage charging method	Complied.	P
7.2	**Intended use**	Considered.	P
7.2.1	Continuous charging at constant voltage (cells)	See below	P
	Fully charged cells are subjected for 7 days to a charge using the charging method for current and standard voltage specified by the cell manufacturer	Five fully cells were submitted to 7 days test.	P
	Results: No fire. No explosion. No leakage.....:	(See appended table 7.2.1)	P
7.2.2	Case stress at high ambient temperature (battery)	The battery is built in type without physical moulded case. It should be evaluated in the final system.	N/A
	Oven temperature (°C).....:	--	—
	Results: No physical distortion of the battery case resulting in exposure of internal protective components and cells	The battery is built in type without physical moulded case. It should be evaluated in the final system.	N/A
7.3	**Reasonably foreseeable misuse**	Considered.	P

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
7.3.1	External short-circuit (cell)	Considered.	P
	The cells were tested until one of the following occurred:	See below	P
	- 24 hours elapsed; or	The case temperature declined by 20% of the maximum temperature rise	N/A
	- The case temperature declined by 20 % of the maximum temperature rise	The case temperature declined by 20% of the maximum temperature rise	P
	Results: No fire. No explosion..... :	(See Table 7.3.1)	P
7.3.2	External short-circuit (battery)	The test equipment is single cell type; compliance shall be evaluated in the final assembly.	N/A
	The batteries were tested until one of the following occurred:		N/A
	- 24 hours elapsed; or		N/A
	- 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
	A single fault in the discharge protection circuit conducted on one to four (depending upon the protection circuit) of the five samples before conducting the short-circuit test		N/A
	A single fault applies to protective component parts such as MOSFET, fuse, thermostat or positive temperature coefficient (PTC) thermistor		N/A
	Results: No fire. No explosion..... :		P
7.3.3	Free fall	See below Free fall sample ID: Cells: 10440 350mAh 3.7V / C51; 10440 350mAh 3.7V / C52; 10440 350mAh 3.7V / C53;	P
	Results: No fire. No explosion	After testing, no fire or explosion occurred.	P

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
7.3.4	Thermal abuse (cells)	See below Thermal abuse sample ID: Cells: 45°C for charging: 10440 350mAh 3.7V / C16; 10440 350mAh 3.7V / C17; 10440 350mAh 3.7V / C18; 10440 350mAh 3.7V / C19; 10440 350mAh 3.7V / C20; -15°C for charging: 10440 350mAh 3.7V / C21; 10440 350mAh 3.7V / C22; 10440 350mAh 3.7V / C23; 10440 350mAh 3.7V / C24; 10440 350mAh 3.7V / C25;	P
	Oven temperature (°C) ..... :	130.3	—
	Results: No fire. No explosion	After testing, No fire. No explosion.	P
7.3.5	Crush (cells)	Considered.	P
	The crushing force was released upon:	See below.	P
	- The maximum force of 13 kN ± 0,78 kN has been applied; or	The maximum force of 13 kN ± 0,78 kN has been applied.	P
	- An abrupt voltage drop of one-third of the original voltage has been obtained	The maximum force of 13 kN ± 0,78 kN has been applied.	N/A
	Results: No fire. No explosion..... :	(See appended table 7.3.5)	P
7.3.6	Over-charging of battery	The test equipment is single cell type; compliance shall be evaluated in the final assembly.	N/A
	The supply voltage which is:		N/A
	- 1,4 times the upper limit charging voltage presented in Table A.1 (but not to exceed 6,0 V) for single cell/cell block batteries or		N/A
	- 1,2 times the upper limit charging voltage resented in Table A.1 per cell for series connected multi-cell batteries, and		N/A
	- Sufficient to maintain a current of 2,0 It A throughout the duration of the test or until the supply voltage is reached		N/A

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
	Test was continued until the temperature of the outer casing:		N/A
	- Reached steady state conditions (less than 10 °C change in 30-minute period); or		N/A
	- Returned to ambient		N/A
	Results: No fire. No explosion..... :		N/A
7.3.7	Forced discharge (cells)	See below	P
	If the discharge voltage reaches the negative value of upper limit charging voltage within the testing duration, the voltage is maintained at the negative value of the upper limit charging voltage by reducing the current for the remainder of the testing duration	The voltage is maintained at the negative value of the upper limit charging voltage by reducing the current for the remainder of the testing duration.	P
	If the discharge voltage does not reach the negative value of upper limit charging voltage within the testing duration, the test is terminated at the end of the testing duration	The voltage is maintained at the negative value of the upper limit charging voltage by reducing the current for the remainder of the testing duration.	N/A
	Results: No fire. No explosion..... :	(See appended table 7.3.7)	P
7.3.8	Mechanical tests (batteries)	The test equipment is single cell type; compliance shall be evaluated in the final assembly.	N/A
7.3.8.1	Vibration		N/A
	Results: No fire, no explosion, no rupture, no leakage or venting. ..... :		N/A
7.3.8.2	Mechanical shock		N/A
	Results: No leakage, no venting, no rupture, no explosion and no fire ..... :		N/A
7.3.9	Design evaluation – Forced internal short-circuit (cells)	Considered.	P
	The cells complied with national requirement for ..... :	France, Japan, Korea, Switzerland	—
	The pressing was stopped upon:	See below.	P
	- A voltage drop of 50 mV has been detected; or	The pressing force of 800 N (cylindrical cells) has been reached.	N/A
	- The pressing force of 800 N (cylindrical cells) or 400 N (prismatic cells) has been reached	The pressing force of 800 N (cylindrical cells) has been reached.	P
	Results: No fire ..... :	(See appended table 7.3.9)	P

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
8	**INFORMATION FOR SAFETY**		P
8.1	**General**	See below	P
	Manufacturers of secondary cells ensure that information is provided about current, voltage and temperature limits of their products	Provided in the cell specification, which is given to the equipment manufacturer.	P
	Manufacturers of batteries ensure that equipment manufacturers and, in the case of direct sales, end-users are provided with information to minimize and mitigate hazards	Provided battery specification including with safety instruction for equipment manufacture.	N/A
	Systems analyses performed by device manufacturers to ensure that a particular battery design prevents hazards from occurring during use of a product	Provided in the battery specification, which will be considered during the end product investigation.	N/A
	As appropriate, any information relating to hazard avoidance resulting from a system analysis provided to the end user	Provided in the battery specification, which will be considered during the end product investigation.	N/A
	Do not allow children to replace batteries without adult supervision	Provided in the battery specification, which will be considered during the end product investigation.	N/A
8.2	**Small cell and battery safety information**	Small cell and battery.	**P**
	The following warning language is to be provided with the information packaged with the small cells and batteries or equipment using them:	Caution for ingestion shall be given on the immediate package.	P
	- Keep small cells and batteries which are considered swallowable out of the reach of children	Show on the immediate package.	P
	- Swallowing may lead to burns, perforation of soft tissue, and death. Severe burns can occur within 2 h of ingestion	Show on the immediate package.	P
	- In case of ingestion of a cell or battery, seek medical assistance promptly	Show on the immediate package.	P
9	**MARKING**		P
9.1	**Cell marking**	See below.	P
	Cells marked as specified in IEC 61960, except coin cells		N/A
	Coin cells whose external surface area is too small to accommodate the markings on the cells show the designation and polarity		N/A

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
	By agreement between the cell manufacturer and the battery and/or end product manufacturer, component cells used in the manufacture of a battery need not be marked	Complied.	P
9.2	**Battery marking**	The test equipment is single cell type; compliance shall be evaluated in the final assembly.	N/A
	Batteries marked as specified in IEC 61960, except for coin batteries		N/A
	Coin batteries whose external surface area is too small to accommodate the markings on the batteries show the designation and polarity. Batteries also marked with an appropriate caution statement		N/A
	Terminals have clear polarity marking on the external surface of the battery		N/A
	Batteries with keyed external connectors designed for connection to specific end products need not be marked with polarity markings if the design of the external connector prevents reverse polarity connections		N/A
9.3	**Caution for ingestion of small cells and batteries**	Small cells and batteries	P
	Coin cells and batteries identified as small batteries according to 8.2 include a caution statement regarding the hazards of ingestion in accordance with 8.2	Complied.	P
	When small cells and batteries are intended for direct sale in consumer-replaceable applications, caution for ingestion given on the immediate package	Complied.	P
9.4	**Other information**	See below.	P
	Storage and disposal instructions	The storage and disposal instructions are provided in the specification.	P
	Recommended charging instructions	The recommended charging instructions are provided in the specification.	P
10	**PACKAGING AND TRANSPORT**		P
	Packaging for coin cells not small enough to fit within the limits of the ingestion gauge of Figure 3	The EUT is not coin cells.	N/A

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
	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	The material and packing which can prevent battery for short circuit, mechanical damage and possible ingress.	P
ANNEX A	**CHARGING AND DISCHARGING RANGE OF SECONDARY LITHIUM ION CELLS FOR SAFE USE**		P
A.1	**General**	See below.	P
A.2	**Safety of lithium ion secondary battery**	Considered.	P
A.3	**Consideration on charging voltage**	Considered.	P
A.3.1	General	See below.	P
A.3.2	Upper limit charging voltage	Cell Upper limit charging voltage is 4.20Vdc.	P
A.3.2.1	General	See below.	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	Cell Upper limit charging voltage is 4.20Vdc.	N/A
A.4	**Consideration of temperature and charging current**	Considered.	P
A.4.1	General	See below.	P
A.4.2	Recommended temperature range	The cell recommended charging temperature is -10°C - 45°C.	P
A.4.2.1	General	See below.	P
A.4.2.2	Safety consideration when a different recommended temperature range is applied	Test results which verify that the cells, charged at the lower and high limit of test temperature (lower than -15°C; high: 45°C), and by using the upper limit of charging voltage are tested by the test methods, specified in 7.2 to 7.3.	P
A.4.3	High temperature range	The cell high charging temperature was declared by manufacturer is 45°C.	N/A
A.4.3.1	General	See below.	N/A
A.4.3.2	Explanation of safety viewpoint		N/A
A.4.3.3	Safety considerations when specifying charging conditions in the high temperature range	High temperature for testing: 45°C.	N/A

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
A.4.3.4	Safety considerations when specifying a new upper limit in the high temperature range		N/A
A.4.4	Low temperature range	The cell lower charging temperature was declared by Manufacturer is -10°C.	P
A.4.4.1	General	See below.	P
A.4.4.2	Explanation of safety viewpoint		N/A
A.4.4.3	Safety considerations, when specifying charging conditions in the low temperature range		P
A.4.4.4	Safety considerations when specifying a new lower limit in the low temperature range	New lower temperature for testing: -15°C.	P
A.4.5	Scope of the application of charging current	The charge current is specified specification by manufacturer.	P
A.4.6	Consideration of discharge	The discharge current is specified specification by manufacturer.	P
A.4.6.1	General	See below.	P
A.4.6.2	Final discharge voltage and explanation of safety viewpoint	Considered.	P
A.4.6.3	Discharge current and temperature range	The discharge current and temperature range is specified specification by manufacturer.	P
A.4.6.4	Scope of application of the discharging current	The discharge current is specified specification by manufacturer.	P
A.5	**Sample preparation**	Complied.	P
A.5.1	General	See below	P
A.5.2	Insertion procedure for nickel particle to generate internal short	Complied.	P
A.5.3	Disassembly of charged cell	Complied.	P
A.5.4	Shape of nickel particle	Complied.	P
A.5.5	Insertion of nickel particle in cylindrical cell	Complied.	P
A.5.5.1	Insertion of nickel particle in winding core	Complied.	P
A.5.5.2	Marking the position of the nickel particle on both ends of the winding core of the separator	Complied.	P
A.5.6	Insertion of nickel particle in prismatic cell	The cell shape is cylindrical.	N/A
A.6	**Experimental procedure of the forced internal short-circuit test**	Complied.	P
A.6.1	Material and tools for preparation of nickel particle	Complied.	P

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict
A.6.2	Example of a nickel particle preparation procedure	Complied.	P
A.6.3	Positioning (or placement) of a nickel particle	Complied.	P
A.6.4	Damaged separator precaution	Complied.	P
A.6.5	Caution for rewinding separator and electrode	Complied.	P
A.6.6	Insulation film for preventing short-circuit	Complied.	P
A.6.7	Caution when disassembling a cell	Complied.	P
A.6.8	Protective equipment for safety	Complied.	P
A.6.9	Caution in the case of fire during disassembling	Complied.	P
A.6.10	Caution for the disassembling process and pressing the electrode core	Complied.	P
A.6.11	Recommended specifications for the pressing device	Complied.	P
ANNEX B	**RECOMMENDATIONS TO EQUIPMENT MANUFACTURERS AND BATTERY ASSEMBLERS**		P
ANNEX C	**RECOMMENDATIONS TO THE END-USERS**		P
ANNEX D	**MEASUREMENT OF THE INTERNAL AC RESISTANCE FOR COIN CELLS**		N/A
D.1	**General**	The EUT is not coin cells.	N/A
D.2	**Method**	The EUT is not coin cells.	N/A
	A sample size of three coin cells is required for this measurement..... :		N/A
	Coin cells with an internal resistance of less than or equal to 3 Ω are subjected to the testing according to Clause 6 and Table 1		N/A
	Coin cells with an internal resistance greater than 3 Ω require no further testing		N/A
ANNEX E	**PACKAGING AND TRANSPORT**		**P**
ANNEX F	**COMPONENT STANDARDS REFERENCES**		**P**

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict

	TABLE: Critical components information				P
Object / part No.	**Manufacturer / trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Cell (1S1P)	Shenzhen Tcbest Battery Industry Co.,Ltd.	10440 350mAh 3.7V	3.7V, 350mAh	IEC/EN 62133-2: 2017	Tested in this report
- Electrolyte	Through Tinci Materials Technology Co., Ltd.	2631C27	$LiPF_6$ salt + EC solvent; H_2O<20ppm; HF<50ppm	--	--
- Separator	W-SCOPE KOREA CO.,LTD	20μm	PP, Shutdown temperature: 130°C	--	--
- Positive electrode	XINXIANG TIANLI ENERGY CO.,LTD	TLM510	$LiCoO_2$	--	--
- Negative electrode	Ganzhou RFT Technology Co.Ltd	AGF-2	Graphite	--	--
- Description: Interchangeability based on standardized dimensions and specified rating					
Supplementary information: 1) Provided evidence ensures the agreed level of compliance. See OD-CB2039.					

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict

7.2.1	TABLE: Continuous charging at constant voltage (cells)			P
Sample no.	**Recommended charging voltage Vc (Vdc)**	**Recommended charging current I_{rec} (A)**	**OCV before test (Vdc)**	**Results**
10440 350mAh 3.7V / C01	4.20	0.07	4.16	No fire, no explosion, no leakage
10440 350mAh 3.7V / C02	4.20	0.07	4.16	No fire, no explosion, no leakage
10440 350mAh 3.7V / C03	4.20	0.07	4.16	No fire, no explosion, no leakage
10440 350mAh 3.7V / C04	4.20	0.07	4.16	No fire, no explosion, no leakage
10440 350mAh 3.7V / C05	4.20	0.07	4.17	No fire, no explosion, no leakage

Supplementary information:

- No fire or explosion
- No leakage
- Others (please explain)

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict

7.3.1	TABLE: External short-circuit (cell)				P
Sample no.	**Ambient T (°C)**	**OCV before test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature rise ΔT (K)**	**Results**
Samples charged at charging temperature upper limit					
10440 350mAh 3.7V / C06	55.2	4.16	82	64.3	No fire, no explosion
10440 350mAh 3.7V / C07	55.2	4.16	85	57.5	No fire, no explosion
10440 350mAh 3.7V / C08	55.2	4.16	81	60.7	No fire, no explosion
10440 350mAh 3.7V / C09	55.2	4.16	84	52.6	No fire, no explosion
10440 350mAh 3.7V / C10	55.2	4.16	86	61.0	No fire, no explosion
Samples charged at charging temperature lower limit					
10440 350mAh 3.7V / C11	55.3	4.02	86	61.9	No fire, no explosion
10440 350mAh 3.7V / C12	55.3	4.02	83	56.3	No fire, no explosion
10440 350mAh 3.7V / C13	55.3	4.01	85	52.4	No fire, no explosion
10440 350mAh 3.7V / C14	55.3	4.02	84	58.5	No fire, no explosion
10440 350mAh 3.7V / C15	55.3	4.01	82	51.4	No fire, no explosion

Supplementary information:

- No fire or explosion
- Others (please explain)

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict

7.3.2	TABLE: External short-circuit (batteries)					N/A
Sample no.	**Ambient T (°C)**	**OCV before test (Vdc)**	**Resistance of circuit (mΩ)**	**Maximum case temperature rise ΔT (K)**	**Component single fault condition**	**Results**
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Supplementary information:

- No fire or explosion
- Others (please explain)

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict

7.3.5	TABLE: Crush (cells)			P
Sample no.	**OCV before test (Vdc)**	**OCV at removal of crushing force (Vdc)**	**Maximum force applied to the cell during crush (kN)**	**Results**
Samples charged at charging temperature upper limit				
10440 350mAh 3.7V / C26	4.16	4.15	12.8	No fire, no explosion
10440 350mAh 3.7V / C27	4.16	4.15	12.8	No fire, no explosion
10440 350mAh 3.7V / C28	4.16	4.15	12.7	No fire, no explosion
10440 350mAh 3.7V / C29	4.15	4.14	13.0	No fire, no explosion
10440 350mAh 3.7V / C30	4.16	4.15	12.9	No fire, no explosion
Samples charged at charging temperature lower limit				
10440 350mAh 3.7V / C31	4.02	4.01	12.8	No fire, no explosion
10440 350mAh 3.7V / C32	4.02	4.01	12.9	No fire, no explosion
10440 350mAh 3.7V / C33	4.02	4.01	13.2	No fire, no explosion
10440 350mAh 3.7V / C34	4.01	4.00	12.9	No fire, no explosion
10440 350mAh 3.7V / C35	4.02	4.01	13.0	No fire, no explosion

Supplementary information:

- No fire or explosion
- Others (The maximum force of 13 kN ± 0,78 kN has been applied.)

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict

7.3.6	TABLE: Over-charging of battery		N/A
Constant charging current (A) ..... :		--	—
Supply voltage (Vdc) ..... :		--	—

Sample no.	OCV before charging (Vdc)	Total charging time (minute)	Maximum outer case temperature (°C)	Results
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Supplementary information:

- No fire or explosion
- Others (please explain)

7.3.7	TABLE: Forced discharge (cells)			P

Sample no.	OCV before application of reverse charge (Vdc)	Measured reverse charge I_t (A)	Lower limit discharge voltage (Vdc)	Results
10440 350mAh 3.7V / C36	3.38	0.35	-4.20	No fire, no explosion
10440 350mAh 3.7V / C37	3.39	0.35	-4.20	No fire, no explosion
10440 350mAh 3.7V / C38	3.40	0.35	-4.20	No fire, no explosion
10440 350mAh 3.7V / C39	3.40	0.35	-4.20	No fire, no explosion
10440 350mAh 3.7V / C40	3.40	0.35	-4.20	No fire, no explosion

Supplementary information:

- No fire or explosion
- Others (please explain)

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict

7.3.8.1	TABLE: Vibration				N/A
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
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Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting
- Others (please explain)

7.3.8.2	TABLE: Mechanical shock				N/A
Sample no.	**OCV before test (Vdc)**	**OCV after test (Vdc)**	**Mass before test (g)**	**Mass after test (g)**	**Results**
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Supplementary information:

- No fire or explosion
- No rupture
- No leakage
- No venting
- Others (please explain)

IEC/EN 62133-2			
Clause	Requirement – Test	Result - Remark	Verdict

7.3.9	TABLE: Forced internal short circuit (cells)				P
Sample no.	**Chamber ambient T (°C)**	**OCV before test (Vdc)**	**Particle location [1)]**	**Maximum applied pressure (N)**	**Results**
Samples charged at charging temperature upper limit					
10440 350mAh 3.7V / C41	45	4.16	1	800	No fire
10440 350mAh 3.7V / C42	45	4.16	1	800	No fire
10440 350mAh 3.7V / C43	45	4.16	1	800	No fire
10440 350mAh 3.7V / C44	45	4.16	1	800	No fire
10440 350mAh 3.7V / C45	45	4.16	1	800	No fire
Samples charged at charging temperature lower limit					
10440 350mAh 3.7V / C46	-10	4.02	1	800	No fire
10440 350mAh 3.7V / C47	-10	4.02	1	800	No fire
10440 350mAh 3.7V / C48	-10	4.01	1	800	No fire
10440 350mAh 3.7V / C49	-10	4.01	1	800	No fire
10440 350mAh 3.7V / C50	-10	4.02	1	800	No fire

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 or explosion

- Others (please explain)

D.2	TABLE: Internal AC resistance for coin cells			N/A
Sample no.	**Ambient T (°C)**	**Store time (h)**	**Resistance Rac (Ω)**	**Results [1)]**
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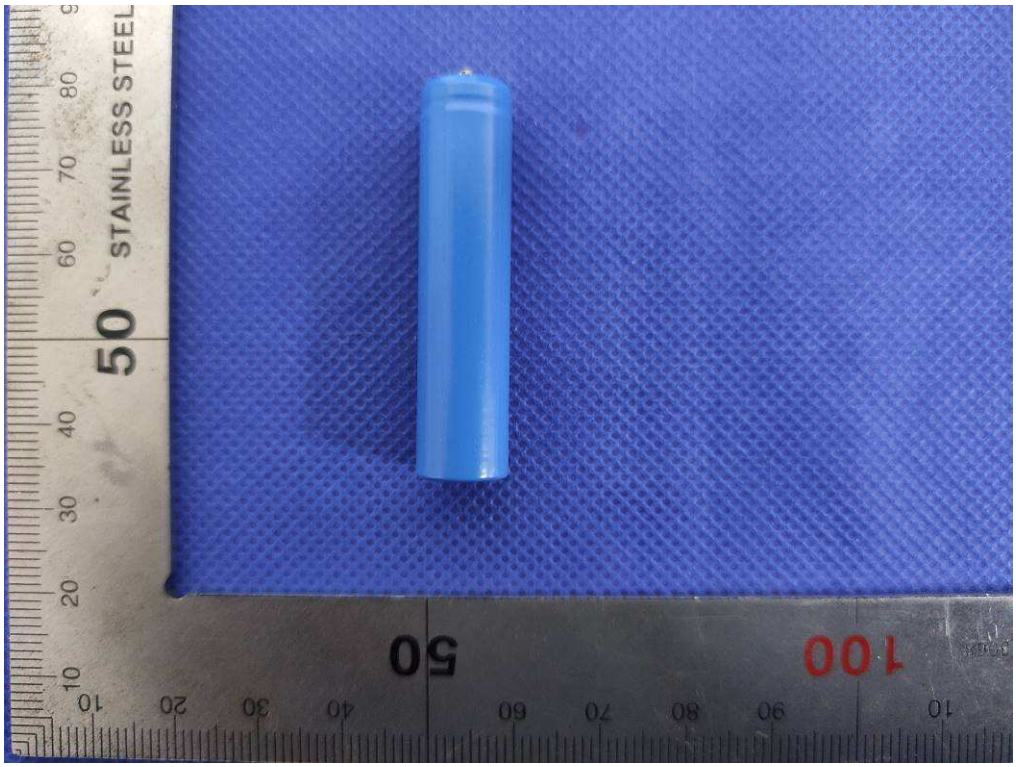
Supplementary information:

[1)] Coin cells with internal resistance less than or equal to 3 Ω, see test result on corresponding tables

General view-1 of cell



General view-2 of cell