

Prüfbericht-Nr.: Test report no.:	CN24NJQ1 001	Auftrags-Nr.: Order no.:	168481300	Seite 1 von 35 Page 1 of 35
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum: Order date:	2024.03.15	
Auftraggeber: Client:	DONGGUAN LIDEA ELECTRONICS CO., LTD. Room 901, Building 2, No. 30 Fumin South Third Road, Baopi, Dalang Town, Dongguan City, Guangdong, P.R. China			
Prüfgegenstand: Test item:	Button Lithium-ion Cell			
Bezeichnung / Typ-Nr.: Identification / Type no.:	See table 4 on page 7			
Auftrags-Inhalt: Order content:	TÜVus mark approval			
Prüfgrundlage: Test specification:	UL 1642:2020 R10.22			
Wareneingangsdatum: Date of sample receipt:	2024.03.15	See Attachment 2: Photo documents		
Prüfmuster-Nr.: Test sample no.:	24031025602-001~345			
Prüfzeitraum: Testing period:	2024.03.15 to 2024.04.01			
Ort der Prüfung: Place of testing:	NRCC (Shenzhen) Safety Technology Co.,Ltd			
Prüflaboratorium: Testing laboratory:	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: Test result*:	Pass			
erstellt von: created by:		genehmigt von: authorized by:		
Datum: Date:	2024.05.10	Ausstellungsdatum: Issue date:	2024.05.10	
Stellung / Position:	Project Engineer	Stellung / Position:	Reviewer	
Sonstiges / Other:	1. The complete test report includes the following attachments: - Attachment 1: Equipment list (6 pages); - Attachment 2: Photo documents (3 pages).			
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
* Legend:	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.				

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Test report no.:

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Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. <i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system.</i> <i>Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i>
2	Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. Informationen zur Verifizierung der Authentizität unserer Dokumente erhalten Sie über folgenden Link: Einführung in digitale Signaturen <i>As contractually agreed, this document has been signed digitally only. TÜV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the Technician of this document. Upon request by its client, TÜV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. For information on verifying the authenticity of our documents, please visit the following link: Introduction to Digital Signature</i>
3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. <i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.</i> <i>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i>
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. <i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i>

Test item particulars:

Information about the product needed to establish a correct test program, such as product mobility, type of power connections and similar.	(Test item particulars are selected by the TRF Originator base on the requirements in the standard)
Designation.....	See table 4 on page 7
Trademark	LIDEA
Nominal voltage.....	3.6V
Rated capacity.....	See table 4 on page 7
Upper limit charging voltage.....	4.25V
Maximum charge current.....	3C (Detail see page 7)
Manufacturer's specified end point voltage.....	3.0V
Operating temperature range	0~45°C (charge), -20~60°C (discharge)
Recommend charging method declared by the manufacturer	Charge the cell at 0.2C CC to 4.2V, then 4.2V CV until charging current reaches 0.02C at ambient 20±5°C.
Utilization Type	Technician replaceable cell

Testing:
Test clauses and results:

cl.10 Short-Circuit Test.....	P
cl.11 Abnormal Charging Test.....	P
cl.12 Forced-Discharge Test	N/A
cl.13 Crush Test	P
cl.14 Impact Test	P
cl.14A Round Bar Crush Test.....	N/A
cl.15 Shock Test	P
cl.16 Vibration Test.....	P
cl.17 Heating Test	P
cl.18 Temperature Cycling Test	P
cl.19 Low Pressure (Altitude Simulation) Test	P
cl.20 Projectile Test	P

Testing location:

NRCC (Shenzhen) Safety Technology Co.,Ltd
Room 301, Unit 1, Building A, No. 2, Tengfeng 5th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen, China

General remarks:

This report shall not be reproduced, except in full, without the written approval of the testing laboratory.
The test results presented in this report relate only to the object tested.

"(see remark #)" refers to a remark appended to the report.

"(see appended table)" refers to a table appended to the report.

Throughout this report a point is used as the decimal separator.

Copy of marking plate:



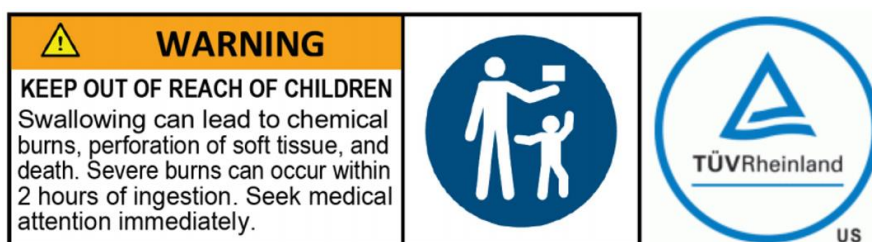
Label 1 for model: LIR1220 8mAh



Label 2 for model: LIR1254 70mAh



Label 3 for model: LIR3048 240mAh



Others should be marked on the smallest package.

Remark:

1. "DXXXXX" represents the date of manufacture.

The first "X" represents the year, the second to third "X" represents the month, the fourth to fifth "X" represents the day. For example, "D40226" means Feb. 26, 2024.

2. Due to similarity of the marking plate, only labels of three representative models listed.

3. Due to the limited surface area of the cell, only partial information is reflected on the surface of cell, others should be marked on the smallest package.

General product information:

This cell consists of the positive electrode plate, negative electrode plate, separator and electrolyte. The positive and negative electrode plates are housed in the case in the state being separated by the separator.

The cell is evaluated according to UL 1642:2020 R10.22 in this test report, and passed all single-cell tests.

1) These tested cells have not been evaluated in combination with charger(s) or host product(s). Additional evaluation to determine compliance may be required on the combination(s) in the end product evaluation.

2) The tested cells were evaluated for a maximum charge current and maximum voltage limit outlined in the Table below. The end product evaluation shall ensure that current and voltage limits noted are maintained.

3) The fifteen models (Model name: LIR1220 8mAh, LIR2016 16mAh, LIR1620 16mAh, LIR2025 25mAh, LIR1632 25mAh, LIR2032 40mAh, LIR1054 45mAh, LIR2430 60mAh, LIR1254 65mAh, LIR1254 70mAh, LIR1454 85mAh, LIR3032 110mAh, LIR1654 110mAh, LIR 2450 120mAh, LIR3048 240mAh) are identical (same shape, same chemical system, using same material), except the model name, size and the capacity. The tested models LIR1220 8mAh, LIR1254 70mAh and LIR3048 240mAh are representatives of all models.

4) The charging method of cl.17: charged the cell (CC/CV) with 3C charging current and 4.25V voltage until the charging current reaches 0.05C (10pcs charged at 45°C and 10pcs charged at -5°C).

- Table 1: Electrical parameter of model LIR1220 8mAh:

Model	Rated capacity	Nominal voltage	Nominal charge current	Nominal discharge current	Max. charge current	Max. discharge current	Upper limit charging voltage	End point voltage
LIR1220 8mAh	8mAh	3.6V	1.6mA	1.6mA	24mA	8mA	4.25V	3.0V

- Table 2: Electrical parameter of model LIR1254 70mAh:

Model	Rated capacity	Nominal voltage	Nominal charge current	Nominal discharge current	Max. charge current	Max. discharge current	Upper limit charging voltage	End point voltage
LIR1254 70mAh	70mAh	3.6V	14mA	14mA	210mA	70mA	4.25V	3.0V

- Table 3: Electrical parameter of model LIR3048 240mAh:

Model	Rated capacity	Nominal voltage	Nominal charge current	Nominal discharge current	Max. charge current	Max. discharge current	Upper limit charging voltage	End point voltage
LIR3048 240mAh	240mAh	3.6V	48mA	48mA	720mA	240mA	4.25V	3.0V

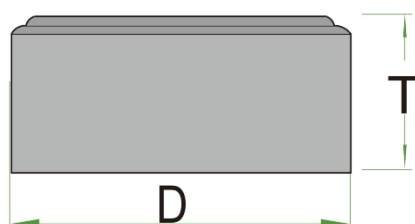
Remark: for other models feature, see Table 4 below.

- Table 4: All of the models:

Model	Energy density (Wh/L)	Rated Capacity (mAh)	Max. Thickness (mm)	Max. Diameter (mm)	Nominal charge current (mA)	Nominal discharge current (mA)	Max. charge current (mA)	Max. discharge current (mA)
LIR1220 8mAh	106.68	8	2.2	12.5	1.6	1.6	24	8
LIR2016 16mAh	101.86	16	1.8	20	3.2	3.2	48	16
LIR1620 16mAh	130.22	16	2.2	16	3.2	3.2	48	16
LIR2025 25mAh	106.11	25	2.7	20	5	5	75	25
LIR1632 25mAh	131.66	25	3.4	16	5	5	75	25
LIR2032 40mAh	134.82	40	3.4	20	8	8	120	40
LIR1054 45mAh	368.34	45	5.6	10	9	9	135	45
LIR2430 60mAh	143.18	60	3.2	24.5	12	12	180	60
LIR1254 65mAh	369.48	65	5.6	12	13	13	195	65
LIR1254 70mAh	397.90	70	5.6	12	14	14	210	70
LIR1454 85mAh	354.98	85	5.6	14	17	17	255	85
LIR3032 110mAh	164.78	110	3.4	30	22	22	330	110
LIR1654 110mAh	351.71	110	5.6	16	22	22	330	110
LIR 2450 120mAh	176.23	120	5.2	24.5	24	24	360	120
LIR3048 240mAh	244.47	240	5	30	48	48	720	240

Remark: 1. All the models have the same nominal voltage 3.6V and the same end discharge voltage 3V, and have the same Max. charge voltage 4.25V.

Construction:



T: Thickness, D: Diameter (Dimensions value refer to Table 4)
Cell

Factory:

DONGGUAN LIDEA ELECTRONICS CO., LTD.

9th to 10th floors, Building 2, No. 30 Fumin South Third Road, Baopi, Dalang Town, Dongguan City, Guangdong, P.R. China

UL 1642:2020			
Clause	Requirement + Test	Result - Remark	Verdict
INTRODUCTION			
1	Scope		P
2	General		P
3	Glossary		P
CONSTRUCTION			
4	General		N/A
4.1	Casing		N/A
4.1.1	The casing of a lithium battery shall have the strength and rigidity necessary to resist the abuses to which it may be subjected, without resulting in a risk of fire. The casing of a Technician-replaceable lithium battery shall have the strength and rigidity necessary to resist the abuses to which it may be subjected without resulting in a risk of injury to persons.	Technician replaceable cell without enclosure.	N/A
4.1.2	A cell of a Technician-replaceable battery shall be in a rigid casing of sufficient strength to prevent flexing. A tool providing the mechanical advantage of a pliers, screwdriver, or hacksaw shall be the minimum capable of opening the Technician-replaceable cell casing, if opening of the casing will expose metallic lithium.	See above	N/A
4.2	Electrolyte		N/A
4.2.1	A Technician-replaceable battery shall not contain pressurized vapor or liquid that could spray materials into the eyes or leak more than 5 mL of liquid when the battery casing is punctured under normal laboratory conditions, 23 ±2°C (73 ±3.6°F).	Technician-replaceable cell.	N/A
4.3	Use		N/A
4.3.1	A lithium battery shall be protected from abnormal charging currents during use. A battery tested and found acceptable for the charging current, IC (see Section 11), under fault conditions specified by the manufacturer, shall be protected from larger charging currents in the end product application by: a) Two blocking components, such as diodes, or b) One blocking component and one current limiting component, such as a resistor or a fuse. The current limiting component shall limit the charging current to one-third the value used in the Abnormal Charging Test, Section 11.	Single cell only	N/A
PERFORMANCE			
5	General		P
5.1	Technician-replaceable Batteries		P

UL 1642:2020			
Clause	Requirement + Test	Result - Remark	Verdict
5.1.1	Technician-replaceable lithium cells or batteries are to be tested as described in Sections 10 – 20. Section 12, Forced-Discharge Test, is applicable only to cells intended to be used in series-connected multicell applications such as battery packs. For multicell installations, also see 5.3.1.		P
5.1.2	When a fire or explosion occurs as a result of the Crush Test, Section 13, or the Impact Test, Section 14, or the Round Bar Crush Test, Section 14A, or the cell or battery ruptures to the extent that the aluminum test cage is penetrated during the Projectile Test, Section 20; the use of the Technician replaceable cell or battery shall be restricted to applications in which it is not exposed to, or is protected from, any conditions shown to cause a fire or explosion.	No fire or explosion occurs	P
5.1.3	Cells and batteries subjected to the Shock Test, Section 15, Vibration Test, Section 16, Temperature Cycling Test, Section 18, and Low Pressure (Altitude Simulation) Test, Section 19, shall also not leak or vent. For these tests, unacceptable leakage is determined to have occurred when the resulting mass loss exceeds the values shown in Table 5.1, Venting and leakage mass loss criteria.	No leak or vent	P
5.2	Technician-replaceable Batteries		N/A
5.2.1	Technician-replaceable lithium cells or batteries are to be tested as described in Sections 10 – 20. Section 12, Forced Discharge Test, is applicable only to cells intended to be used in multicell applications such as battery packs. In addition to complying with the requirements for a Technician replaceable cell or battery as specified in 5.1.1, a Technician-replaceable cell or battery shall not explode or ignite when subjected to the Crush Test, Section 13, or the Impact Test, Section 14. A Technician-replaceable battery shall comply with the requirements for Sections 10 – 20 and with the applicable construction requirements outlined in Section 4. Secondary lithium cells shall not be considered Technician-replaceable.	Technician-replaceable cell	N/A
5.2.2	Sets of five specimens each are to be used for the Projectile Test, Section 20.3; see Table 6.1. When only one specimen from a set of five does not comply with the requirements, another set of five specimens is to be tested. All specimens from this second set shall comply with the requirements.	Technician-replaceable cell	N/A
5.3	Multicell Installations		N/A
5.3.1	A Technician-replaceable or Technician-replaceable cell intended for use in multicell installations or battery packs shall also be tested as described in 10.3 and Section 12. No fire or explosion shall occur as a result of these tests. In addition, batteries subjected to the test described in 10.3 shall meet the requirements as described in 5.1.1 and 5.2.1 for a cell or battery subjected to the Short-Circuit Test, Section 10.	Single cell.	N/A
6	Samples		P

UL 1642:2020			
Clause	Requirement + Test	Result - Remark	Verdict
6.1	Fully charged primary cells or batteries and primary cells or batteries that have been conditioned by partial or complete discharge, or both, are to be used for the tests described in Sections 10 – 20. The number of samples to be used in each test for a primary cell or battery is shown in Table 6.1. When a group of cells or batteries of different sizes, but similar chemistries is involved, selected sizes representative of the range are to be tested.	The samples are secondary cells.	N/A
6.2	Fully charged secondary cells or batteries and secondary cells or batteries that have been conditioned by charge-discharge cycling are to be used for the tests described in Sections 10 – 20. The number of samples to be used in each test for a secondary cell or battery is shown in Table 6.2. When a group of cells or batteries of different sizes, and similar chemistries is involved, selected sizes representative of the range are to be tested.	The samples are secondary Technician-replaceable cells. Prepared as required.	P
6.3	Prior to conducting the testing in Section 17, the lithium ion cell samples shall be pre-conditioned as outlined in 6.4 and 6.5.	Prepared as required.	P
6.4	For the heating test of Section 17, two sets of five lithium ion cell samples are to be fully discharged (i.e. to the manufacturer's specified end point voltage). The samples are then placed in a test chamber and conditioned for 1 to 4 h (5 samples at the upper temperature limit and 5 samples at the lower temperature limit of the operating region) as outlined in Table 6.3.	Prepared as required.	P
6.5	While still in the test chamber set at the temperature limits, the samples are charged (5 samples at the upper temperature limit and 5 samples at lower temperature limit) at the specified maximum charging current and upper limit charging voltage per Table 6.3, using a constant voltage charging method. Charging is continued until the charge current is reduced to the specified end of charge conditions (i.e. 0.05 times the charge current).	Prepared as required.	P
7	Conditioning of Samples		P
7.1	Discharge		N/A
7.1.1	Primary batteries are to be completely discharged by connecting their terminals through resistors that provide the desired level of discharge within 60 days. Batteries are to be discharged at room temperature. Cells with a liquid cathode such as thionyl chloride or sulfur dioxide, shall also be conditioned by one-half discharge	The samples are secondary cells.	N/A

UL 1642:2020			
Clause	Requirement + Test	Result - Remark	Verdict
7.1.2	For solid electrolyte and other types of primary lithium batteries that cannot be discharged within 60 days because of the small currents they inherently produce, longer discharge times plus discharge at higher temperatures may be used to obtain the desired level of discharge. The manufacturer's recommended discharge procedures are to be followed so as to obtain the required discharge level in the minimum time.	The samples are secondary cells.	N/A
7.2	Charge-discharge cycling		P
7.2.1	Secondary cells are to be conditioned at 25°C (77°F). Cells are continuously cycled as per the manufacturer's specifications. The specification shall be such that the full rated capacity of the cell is utilized and the number of cycles accumulated shall be at least equal to 25% of the advertised cycle life of the cell or cycled continuously for 90 days, whichever is shorter. Cycling is to be done either individually or in groups. Cells are to be recharged prior to testing as indicated in Table 6.2.	The samples are cycled at manufacturer's factory before they were sent for test.	P
8	Important test considerations		P
8.1	Some lithium batteries are capable of exploding when the tests described in Sections 10 – 20 are conducted. It is important that personnel be protected from the flying fragments, explosive force, sudden release of heat, and noise that results from such explosions. The test area is to be well ventilated to protect personnel from possible harmful fumes or gases.	Prepared the tests as required.	P
8.2	As an additional precaution, the temperatures on the surface of the battery casings shall be monitored during the tests described in Sections 10, 11, 12, 13, and 14. All personnel involved in the testing of lithium batteries are to be instructed never to approach a lithium battery while the surface temperature exceeds 90°C (194°F) and not to touch the lithium battery while the surface temperature exceeds 45°C (113°F).	Prepared the tests as required.	P
8.3	For protection, the Projectile Test, Section 20 is to be conducted in a room separate from the observer.	Prepared the tests as required.	P
9	Temperature Measurements		P
9.1	Temperatures are to be measured by thermocouples consisting of wires not larger than 24 AWG (0.21 mm ²) and not smaller than 30 AWG (0.05 mm ²) and a potentiometer-type instrument.	Prepared the tests as required.	P
9.2	The temperature measurements on the batteries are to be made with the measuring junction of the thermocouple held tightly against the metal casing of the battery.	Prepared the tests as required. Casing temperature was recorded on the center of the cell surface;	P
TESTS FOR TECHNICIAN-REPLACEABLE AND TECHNICIAN-REPLACEABLE BATTERIES			
ELECTRICAL TESTS			
10	Short-Circuit Test		P

UL 1642:2020			
Clause	Requirement + Test	Result - Remark	Verdict
10.1	Each test sample battery, in turn, is to be short-circuited by connecting the positive and negative terminals of the battery with a circuit load having a resistance load of $80 \pm 20 \text{ m}\Omega$. The temperature of the battery case is to be recorded during the test. The battery is to discharge until a fire or explosion is obtained, or until it has reached a completely discharged state of less than 0.2 V and the battery case temperature has returned to $\pm 10^\circ\text{C}$ ($\pm 18^\circ\text{F}$) of ambient temperature. The voltage at the end of the test may not reach 0.2 V due to operation of protective devices in the circuit. The return to near ambient of the battery (cell) casing in an indication of ultimate results.	Tested as required. See table 10	P
10.2	Tests are to be conducted at $20 \pm 5^\circ\text{C}$ ($68 \pm 9^\circ\text{F}$) and at $55 \pm 5^\circ\text{C}$ ($131 \pm 9^\circ\text{F}$). The batteries are to reach equilibrium at $20 \pm 5^\circ\text{C}$ or $55 \pm 5^\circ\text{C}$, as applicable, before the terminals are connected.	Tested as required.	P
10.3	A battery is to be tested individually unless the manufacturer indicates that it is intended for use in series or parallel. For series or parallel use, additional tests on five sets of batteries are to be conducted using the maximum number of batteries to be covered for each configuration.	Tested as required.	P
10.4	When an overcurrent protective device activates during the test, the test shall be repeated with the battery supply connected to the maximum load that does not cause the protective device to open. Protective devices that are relied upon to meet the compliance criteria for the short circuit test shall comply with 2.3.1.	Only one single lithium-ion cell, no over-current or thermal protective device was integrated into the cell.	N/A
10.5	The samples shall not explode or catch fire.	The test results meet the requirements.	P
11	Abnormal Charging Test		P
11.1	Primary cells or batteries shall comply with 11.2 – 11.7.	Secondary cell	N/A
11.2	Cells or batteries conditioned in accordance with Tables 6.1, as applicable, are to be used for this test. The batteries are to be tested in an ambient temperature of $20 \pm 5^\circ\text{C}$ ($68 \pm 9^\circ\text{F}$).		N/A

UL 1642:2020			
Clause	Requirement + Test	Result - Remark	Verdict
11.3	Each test sample battery is to be subjected to a charging current of three times the current I_c, specified by the manufacturer by connecting it in opposition to a dc-power supply. The specified charging current is to be obtained by connecting a resistor of the specified size and rating in series with the battery. The test charging time is to be calculated using the formula: $t_c = \frac{2.5C}{3(I_c)}$, in which t_c is the charging time in hour C is the capacity of the cell/battery in ampere-hours, and I_c is the maximum charging current, in amperes, specified by the manufacturer. The minimum charging time is to be 7 hours.		N/A
11.4	When a non-resettable overcurrent or protective device operates during the test, the test is to be repeated at a charge current below the level that the protective device operates. When a resettable protective device operates during the test, the protector is allowed to reset to a total of 10 cycles; or until the appropriate charging time has been completed, but not less than 7 hours. Protective devices that are relied upon to meet the compliance criteria for the abnormal charging test shall comply with 2.3.1.		N/A
11.5	The samples shall not explode or catch fire.		N/A
11.6	Secondary cells or batteries shall comply with 11.7 – 11.10.	See table 11, tested as required	P
11.7	Cells or batteries conditioned in accordance with Tables 6.2, as applicable, are to be used for this test. The batteries are to be tested in an ambient temperature of $20 \pm 5^\circ\text{C}$ ($68 \pm 9^\circ\text{F}$).	Tested as required.	P
11.8	Each test sample battery is to be discharged at a constant current of 0.2 C/1 h, to a manufacturer specified discharge endpoint voltage. The cell or battery is then to be charged with a constant maximum specified output voltage and a current limit of three times the maximum charging current I_c , specified by the manufacturer. Charging duration is to be 7 hours or the time required to reach the manufacturer's specified end-of-charge condition, whichever is greater.	Tested as required.	P

UL 1642:2020			
Clause	Requirement + Test	Result - Remark	Verdict
11.9	When a non-resettable overcurrent or protective device operates during the test, the test shall be repeated at an overcharging current below the level that the protection device operates. When a resettable protective device operates during the test, the protector is to be allowed to reset to a total of 10 cycles; or until the appropriate charging time has been completed, but not less than 7 hours. Protective devices that are relied upon to meet the compliance criteria for the abnormal charging test shall comply with 2.3.1.	The samples are to be tested without any assistance of over-current or thermal protective devices.	N/A
11.10	The samples shall not explode or catch fire.	No explosion or catch fire during and after the test	P
12	Forced-Discharged Test		N/A
12.1	This test is intended for cells that are to be used in series-connected, multicell applications, such as battery packs.	One single cell	N/A
12.2	A fully discharged cell is to be force-discharged by connecting it in series with fully charged cells of the same kind. The number of fully charged cells to be connected in series with the discharged cell is to equal the maximum number less one of the cells to be covered for series use. Five cells are to be completely discharged, at room temperature.		N/A
12.3	Once the fully discharged cell is connected in series with the specified number of fully charged cells the resultant battery pack is to be short circuited.		N/A
12.4	The positive and negative terminals of the sample are to be connected with a copper wire with a resistance load of $80 \pm 20 \text{ m}\Omega$. The sample is to discharge until a fire or explosion is obtained, or until it has reached a completely discharged state of less than 0.2V and the battery case temperature has returned to $\pm 10^\circ\text{C}$ (18°F) of ambient temperature. The voltage at the end of the test may not reach 0.2V due to operation of protective devices in the circuit. The return to near ambient of the cell casing is an indication of ultimate results.		N/A
12.5	When an overcurrent or protective operates during the test, the test shall be repeated with the battery supply connected to the maximum load that does not cause the protective device to open. Protective devices that are relied upon to meet the compliance criteria for the forced discharge test shall comply with 2.3.1.		N/A
12.6	The samples shall not explode or catch fire.		N/A
MECHANICAL TESTS			
13	Crush Test		P

UL 1642:2020			
Clause	Requirement + Test	Result - Remark	Verdict
13.1	A battery is to be crushed between two flat surfaces. The force for the crushing is to be applied by a hydraulic ram or similar force mechanism. The flat surfaces are to be brought in contact with the cells and the crushing is to be continued until an applied force of 13 ± 1 kN (3000 ± 224 lbs) is reached. Once the maximum force has been obtained it is to be released.	Tested as required. See table 13	P
13.2	A cylindrical, pouch or prismatic cell is to be crushed with its longitudinal axis parallel to the flat surfaces of the crushing apparatus. A prismatic cell is also to be rotated 90° around its longitudinal axis so that both the wide and narrow sides will be subjected to the crushing force. Each sample is to be subjected to a crushing force in only one direction. Separate samples are to be used for each test.	The sample are button lithium-ion cells.	N/A
	Exception: For Lithium ion systems, a cylindrical, pouch or prismatic cell is to be crushed with its longitudinal axis parallel to the flat surface of the crushing apparatus. Each sample is to be subjected to a crushing force in only one direction. Test only the wide side of pouch and prismatic cells.	Button lithium-ion cell.	N/A
13.3	A coin or button battery is to be crushed with the flat surface of the battery parallel with the flat surfaces of the crushing apparatus.		P
13.4	The samples shall not explode or catch fire.	No explosion or catch fire during and after the test	P
14	Impact Test		P
14.1	A test sample battery is to be placed on a flat surface. A 15.8 ± 0.1 -mm ($5/8 \pm 0.004$ -in) diameter bar is to be placed across the center of the sample. A 9.1 ± 0.46 -kg (20 ± 1 -lb) weight is to be dropped from a height of 610 ± 25 mm (24 ± 1 in) onto the sample. See Figure 14.1.	Tested as required. See table 14	P
14.2	A cylindrical, pouch or prismatic cell is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8-mm ($5/8$ -in) diameter curved surface lying across the center of the test sample. A prismatic cell is also to be rotated 90° around its longitudinal axis so that both the wide and narrow sides are subjected to the impact. Each sample is to be subjected to only a single impact. Separate samples are to be used for each test.	The sample are button lithium-ion cells.	N/A
	Exception 1: For Lithium ion systems, a cylindrical, pouch or prismatic cell is to be impacted with its longitudinal axis parallel to the flat surface and perpendicular to the longitudinal axis of the 15.8-mm ($5/8$ -in) diameter curved surface lying across the center of the test sample. Each sample is to be subjected to only a single impact. Test only the wide side of pouch and prismatic cells.	The sample are button lithium-ion cells.	N/A

UL 1642:2020			
Clause	Requirement + Test	Result - Remark	Verdict
	Exception 2: Pouch cells not evaluated to this test, and with a capacity greater than 300 mAh, shall comply with the Round Bar Crush Test in Section 14A.	Not pouch cells	N/A
14.3	A coin or button battery is to be impacted with the flat surface of the test sample parallel to the flat surface and the 15.8-mm (5/8-in) diameter curved surface lying across its center.	Button lithium-ion cell.	P
14.4	The samples shall not explode or catch fire.	No explosion or catch fire.	P
14A	Round Bar Crush Test		N/A
14A.1	With reference to Exception No. 2 in 14.2, pouch cells not evaluated with the Impact Test in Section 14 and with a capacity greater than 300 mAh shall be evaluated with this test.		N/A
14A.2	The sample shall be fully charged with the method recommended by the manufacturer.		N/A
14A.3	The sample shall be positioned on a flat surface with a 25 ± 1 mm (1 ± 0.039 in) diameter steel round bar placed on top of the sample. The edge of the bar is to be aligned with the top edge of the cell body, with the longitudinal axis of the bar perpendicular to the tab of the cell. The bar shall extend beyond the width of the test sample on each side by at least 5 mm (0.197 in) as shown in Figure 14A.1. A preload pressure of $0.4 - 0.6$ N/cm ² (0.58 – 0.87 psi) shall be applied before the sample thickness is measured in 14A.5 and the crush force in 14A.6 is applied. See 14A.4. NOTE: A sample may be taped, glued or clamped to the flat surface, avoiding obstructing the round bar placement and crush plate motion, to eliminate any unevenness between the sample and the flat test surface.		N/A
14A.4	For cells with the positive tab and negative tab on opposite sides, the bar placement in 14A.3 and the crush force application in 14A.6 are applied on each side of the cell near the tabs, using a different set of samples for each side.		N/A
14A.5	After the bar placement per 14A.3 or 14A.4 and the preload pressure is applied per 14A.3, the thickness of the sample shall be measured allowing a tolerance of ± 0.1 mm (± 0.039 in), using the Measuring Method of Cell Thickness in the Annex for Dimensions of the Cell with a Laminate Film Case in the Standard for Secondary Cells and Batteries Containing Alkaline or Other Non-Acid Electrolytes – Secondary Lithium Cells and Batteries for Portable Applications – Part 3: Prismatic and Cylindrical Lithium Secondary Cells, and Batteries Made from Them, IEC 61960-3.		N/A

UL 1642:2020			
Clause	Requirement + Test	Result - Remark	Verdict
14A.6	A crush force shall be applied onto the round bar, with a crushing direction of $90 \pm 1^\circ$ between the crushing direction and round bar and the crushing direction and test platform. The displacement in the vertical direction shall be measured. The moving speed of the crush plate is to be no greater than 0.1 mm/s (0.004 in/s). The displacement of the crush plate shall be stopped and held for 30 s once the cell deformation reaches $13 \pm 1\%$ of the cell thickness (starting from the preload thickness measured in 14A.5) or the crush force reaches the force value in Table 14A.1, whichever comes first. See Figure 14A.1 and Figure 14A.2.		N/A
14A.7	The samples shall not explode or catch fire.		N/A
15	Shock Test		P
15.1	The cell is to be secured to the testing machine by means of a rigid mount which supports all mounting surfaces of the cell. Each cell shall be subjected to a total of three shocks of equal magnitude. The shocks are to be applied in each of three mutually perpendicular directions unless it has only two axes of symmetry in which case only two directions shall be tested. Each shock is to be applied in a direction normal to the face of the cell. For each shock the cell is to be accelerated in such a manner that during the initial 3 ms the minimum average acceleration is 75 g (where g is the local acceleration due to gravity). The peak acceleration shall be between 125 and 175 g. Cells shall be tested at a temperature of $20 \pm 5^\circ\text{C}$ ($68 \pm 9^\circ\text{F}$).	Prepared the test as required. See table 15	P
15.2	The samples shall not explode or catch fire. In addition, the sample shall not vent or leak as described in 5.1.1.	No explosion or catch fire, the sample not vent or leak	P
16	Vibration Test		P
16.1	A battery is to be subjected to simple harmonic motion with an amplitude of 0.8 mm (0.03 inch) [1.6 mm (0.06 inch) total maximum excursion].	Prepared the test as required. See table 16.	P
16.2	The frequency is to be varied at the rate of 1 Hz/min between 10 and 55 Hz, and return in not less than 90 nor more than 100 min. The battery is to be tested in three mutually perpendicular directions. For a battery that has only two axes of symmetry, the battery is to be tested perpendicular to each axis.	Tested as required.	P
16.3	The samples shall not explode or catch fire. In addition the sample shall not vent or leak as described in 5.1.1.	The test results meet the requirements.	P
ENVIRONMENTAL TESTS			
17	Heating Test		P

UL 1642:2020			
Clause	Requirement + Test	Result - Remark	Verdict
17.1	A battery is to be heated in a gravity convection or circulating air oven with an initial temperature of $20 \pm 5^{\circ}\text{C}$ ($68 \pm 9^{\circ}\text{F}$). The temperature of the oven is to be raised at a rate of $5 \pm 2^{\circ}\text{C}$ ($9 \pm 3.6^{\circ}\text{F}$) per minute to a temperature of $130 \pm 2^{\circ}\text{C}$ ($266 \pm 3.6^{\circ}\text{F}$) and remain for 10 min. The sample shall return to room temperature ($20 \pm 5^{\circ}\text{C}$) and then be examined. For batteries specified for temperatures above 100°C (212°F), the conditioning temperature shall be increased from $130 \pm 2^{\circ}\text{C}$ ($266 \pm 3.6^{\circ}\text{F}$), to $30 \pm 2^{\circ}\text{C}$ ($86 \pm 3.6^{\circ}\text{F}$) above the manufacturers maximum specified temperature. For a battery of lithium metal chemistry, the conditioning temperature shall be increased to a maximum of $170 \pm 2^{\circ}\text{C}$ ($338 \pm 3.6^{\circ}\text{F}$).	Tested as required. Oven temperature: 130°C .	P
17.2	The samples shall not explode or catch fire.	The test results meet the requirements.	P
18	Temperature Cycling Test		P
18.1	The batteries are to be placed in a test chamber and subjected to the following cycles: a) Raising the chamber-temperature to $70 \pm 3^{\circ}\text{C}$ ($158 \pm 5^{\circ}\text{F}$) within 30 minutes and maintaining this temperature for 4 hours. b) Reducing the chamber temperature to $20 \pm 3^{\circ}\text{C}$ ($68 \pm 5^{\circ}\text{F}$) within 30 minutes and maintaining this temperature for 2 hours. c) Reducing the chamber temperature to minus $40 \pm 3^{\circ}\text{C}$ (minus $40 \pm 5^{\circ}\text{F}$) within 30 minutes and maintaining this temperature for 4 hours. d) Raising the chamber temperature to $20 \pm 3^{\circ}\text{C}$ ($68 \pm 5^{\circ}\text{F}$) within 30 minutes. e) Repeating the sequence for a further 9 cycles. f) After the 10th cycle, storing the batteries for a minimum of 24 hours, at a temperature of $20 \pm 5^{\circ}\text{C}$ ($68 \pm 9^{\circ}\text{F}$) prior to examination.	Tested as required. See table 18	P
18.2	The samples shall not explode or catch fire. In addition, the samples shall not vent or leak as described in 5.1.1.	The test results meet the requirements.	P
19	Low Pressure (Altitude Simulation) Test		P
19.1	Sample batteries are to be stored for 6 hours at an absolute pressure of 11.6 kPa (1.68 psi) and a temperature of $20 \pm 3^{\circ}\text{C}$ ($68 \pm 5^{\circ}\text{F}$).	Tested as required. See table 19	P
19.2	The samples shall not explode or catch fire as a result of the Low Pressure (Altitude Simulation) Test. In addition, the samples shall not vent or leak as described in 5.1.1.	The test results meet the requirements.	P
FIRE EXPOSURE TEST			
20	Projectile Test		P
20.1	When subjected to the test described in 20.2 - 20.5 no part of an exploding cell or battery shall penetrate the wire screen such that some or all of the cell or battery protrudes through the screen.	The test results meet the requirements.	P

UL 1642:2020			
Clause	Requirement + Test	Result - Remark	Verdict
20.2	Each test sample cell or battery is to be placed on a screen that covers a 102-mm (4-inch) diameter hole in the center of a platform table. The screen is to be constructed of steel wire mesh having 20 openings per 25.4 mm (1 in) and a wire diameter of 0.43 mm (0.017 in).	Prepared the test as required.	P
20.3	The screen is to be mounted 38 mm (1-1/2 in) above a Meker type burner. The fuel and air flow rates are to be set to provide a bright blue flame that causes the supporting screen to glow a bright red.	Prepared the test as required.	P
20.4	An eight-sided covered wire cage, 610-mm (2-ft) across and 305-mm (1-ft) high, made from metal screening is to be placed over the test sample. See Figure 20.1. The metal screening is to be constructed from 0.25-mm (0.010-in) diameter aluminum wire with 16 -18 wires per 25.4 mm (1 inch) in each direction.	Tested as required.	P
20.5	The sample is to be heated and shall remain on the screen until it explodes or the cell or battery has ignited and burned out. It is not required to secure the sample in place unless it is at risk of falling off the screen before the test is completed. When required, the sample shall be secured to the screen with a single wire tied around the sample.	Tested as required.	P
MARKING			
21	General		P
21.1	A battery shall be legibly and permanently marked with: The manufacturer's name, trade name, or trademark or other descriptive marking by which the organization responsible for the product may be identified; A distinctive ("catalog" or "model") number or the equivalent; The date or other dating period of manufacture not exceeding any three consecutive months.	See marking plate on page 4	P
21.2	If a manufacturer produces a battery at more than one factory, each battery package shall have a distinctive marking to identify it as the product of a particular factory.	One factory only.	N/A
22	Primary Batteries		N/A
22.1	A primary battery shall be marked with the word "WARNING" and the following or an equivalent statement: "Risk of fire and burns. Do not recharge, open, crush, heat above (the manufacturer's specified temperature rating), or incinerate." If space does not permit marking on the battery, the marking may be on the smallest unit package.	Secondary cell	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
22.2	The packaging for a Technician-replaceable battery shall be marked with the word "CAUTION" and the following or equivalent statements: "Risk of fire and burns. Do not recharge, disassemble, heat above (the manufacturer's specified temperature rating), or incinerate. Keep battery out of reach of children and in original package until ready to use. Dispose of used batteries promptly."		N/A
22.3	For Technician replaceable lithium primary coin cells (3.0 V) the packaging shall also include the following or equivalent: "WARNING – Never put batteries in mouth. Swallowing may lead to serious injury or death. If ingested, immediately seek medical attention and have the doctor phone the National Capital Poison Control Center." This marking may be combined with the marking of 22.2, if the signal word "WARNING" is used instead of "CAUTION."		N/A

10	TABLE: Short-Circuit Test (model: LIR1220 8mAh)				P
Fully Charged Samples					
Sample No.	24031025602-001	24031025602-002	24031025602-003	24031025602-004	24031025602-005
Ambient temperature: (at 20±5°C, °C)	23.3	23.3	23.3	23.3	23.3
Max. casing temp Tmax (°C)	72.5	67.1	68.2	72.6	67.2
Sample No.	24031025602-006	24031025602-007	24031025602-008	24031025602-009	24031025602-010
Ambient temperature: (at 55 ±5°C, °C)	53.4	53.4	53.4	53.4	53.4
Max. casing temp Tmax (°C)	84.9	75.1	79.6	73.6	78.6
Cycled Samples					
Sample No.	24031025602-061	24031025602-062	24031025602-063	24031025602-064	24031025602-065
Ambient temperature: (at 20±5°C, °C)	23.2	23.2	23.2	23.2	23.2
Max. casing temp Tmax (°C)	79.3	67.5	65.2	73.6	68.7
Sample No.	24031025602-066	24031025602-067	24031025602-068	24031025602-069	24031025602-070
Ambient temperature: (at 55 ±5°C, °C)	52.9	52.9	52.9	52.9	52.9
Max. casing temp Tmax (°C)	74.8	81.7	71.3	80.7	76.2
Supplementary information:					
Tmax was recorded on the centre of the cell surface.					
No explode or catch fire.					

10	TABLE: Short-Circuit Test (model: LIR1254 70mAh)					P
Fully Charged Samples						
Sample No.	24031025602-116	24031025602-117	24031025602-118	24031025602-119	24031025602-120	
Ambient temperature: (at 20±5°C, °C)	23.7	23.7	23.7	23.7	23.7	
Max. casing temp Tmax (°C)	104.4	101.8	113.5	112.9	116.2	
Sample No.	24031025602-121	24031025602-122	24031025602-123	24031025602-124	24031025602-125	
Ambient temperature: (at 55 ±5°C, °C)	53.5	53.5	53.5	53.5	53.5	
Max. casing temp Tmax (°C)	103.7	112.0	110.5	107.0	106.3	
Cycled Samples						
Sample No.	24031025602-176	24031025602-177	24031025602-178	24031025602-179	24031025602-180	
Ambient temperature: (at 20±5°C, °C)	23.1	23.1	23.1	23.1	23.1	
Max. casing temp Tmax (°C)	102.1	104.7	111.2	111.5	107.7	
Sample No.	24031025602-181	24031025602-182	24031025602-183	24031025602-184	24031025602-185	
Ambient temperature: (at 55 ±5°C, °C)	53.2	53.2	53.2	53.2	53.2	
Max. casing temp Tmax (°C)	100.9	102.5	106.8	101.8	105.1	
Supplementary information:						
Tmax was recorded on the centre of the cell surface.						
No explode or catch fire.						

10	TABLE: Short-Circuit Test (model: LIR3048 240mAh)				P
Fully Charged Samples					
Sample No.	24031025602-231	24031025602-232	24031025602-233	24031025602-234	24031025602-235
Ambient temperature: (at 20±5°C, °C)	22.6	22.6	22.6	22.6	22.6
Max. casing temp Tmax (°C)	103.7	102.9	101.6	104.6	102.8
Sample No.	24031025602-236	24031025602-237	24031025602-238	24031025602-239	24031025602-240
Ambient temperature: (at 55 ±5°C, °C)	53.4	53.4	53.4	53.4	53.4
Max. casing temp Tmax (°C)	109.3	104.6	101.8	102.9	110.9
Cycled Samples					
Sample No.	24031025602-291	24031025602-292	24031025602-293	24031025602-294	24031025602-295
Ambient temperature: (at 20±5°C, °C)	23.4	23.4	23.4	23.4	23.4
Max. casing temp Tmax (°C)	104.3	109.5	101.8	110.8	108.8
Sample No.	24031025602-296	24031025602-297	24031025602-298	24031025602-299	24031025602-300
Ambient temperature: (at 55 ±5°C, °C)	53.7	53.7	53.7	53.7	53.7
Max. casing temp Tmax (°C)	109.4	107.5	112.6	105.0	105.8
Supplementary information:					
Tmax was recorded on the centre of the cell surface.					
No explode or catch fire.					

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11	TABLE: Abnormal Charging Test (model: LIR1220 8mAh)				P
Id		0.0016 A	Ue		3.0 V
Ic		0.024 A	Uc		4.25 V
Fully Charged Samples					
Sample No.	24031025602-011	24031025602-012	24031025602-013	24031025602-014	24031025602-015
Ambient temperature: (°C)	23.2	23.2	23.2	23.2	23.2
Max. casing temp Tmax (°C)	36.8	36.5	33.9	37.7	35.5
Cycled Samples					
Sample No.	24031025602-071	24031025602-072	24031025602-073	24031025602-074	24031025602-075
Ambient temperature: (°C)	23.6	23.6	23.6	23.6	23.6
Max. casing temp Tmax (°C)	40.3	40.6	40.8	37.8	39.6
Supplementary information:					
Test current is 0.072A.					
No explode or catch fire.					

11	TABLE: Abnormal Charging Test (model: LIR1254 70mAh)				P
Id		0.014 A	Ue		3.0 V
Ic		0.21 A	Uc		4.25 V
Fully Charged Samples					
Sample No.	24031025602-126	24031025602-127	24031025602-128	24031025602-129	24031025602-130
Ambient temperature: (°C)	23.7	23.7	23.7	23.7	23.7
Max. casing temp Tmax (°C)	39.2	40.3	41.0	37.8	38.9
Cycled Samples					
Sample No.	24031025602-186	24031025602-187	24031025602-188	24031025602-189	24031025602-190
Ambient temperature: (°C)	24.0	24.0	24.0	24.0	24.0
Max. casing temp Tmax (°C)	34.2	30.5	33.5	30.6	32.0
Supplementary information:					
Test current is 0.63A.					
No explode or catch fire.					

11	TABLE: Abnormal Charging Test (model: LIR3048 240mAh)					P
Id		<u>0.048</u> A		Ue		<u>3.0</u> V
Ic		<u>0.72</u> A		Uc		<u>4.25</u> V
Fully Charged Samples						
Sample No.	24031025602-241	24031025602-242	24031025602-243	24031025602-244	24031025602-245	
Ambient temperature: (°C)	24.3	24.3	24.3	24.3	24.3	
Max. casing temp Tmax (°C)	33.3	30.4	32.0	30.2	30.9	
Cycled Samples						
Sample No.	24031025602-301	24031025602-302	24031025602-303	24031025602-304	24031025602-305	
Ambient temperature: (°C)	23.3	23.3	23.3	23.3	23.3	
Max. casing temp Tmax (°C)	39.8	32.7	34.9	35.0	35.1	
Supplementary information:						
Test current is 2.16A.						
No explode or catch fire.						

13	TABLE: Crush Test (model: LIR1220 8mAh)					P
Ambient temperature: 23.4°C						
Fully Charged Samples						
Sample No.	24031025602-016	24031025602-017	24031025602-018	24031025602-019	24031025602-020	
Fire or explosion?	No	No	No	No	No	
Crush direction	Flat surface	Flat surface	Flat surface	Flat surface	Flat surface	
Cycled Samples						
Sample No.	24031025602-076	24031025602-077	24031025602-078	24031025602-079	24031025602-080	
Fire or explosion?	No	No	No	No	No	
Crush direction	Flat surface	Flat surface	Flat surface	Flat surface	Flat surface	
Supplementary information: no explosion or catch fire.						

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13	TABLE: Crush Test (model: LIR1254 70mAh)					P
Ambient temperature: 23.5°C						
Fully Charged Samples						
Sample No.	24031025602-131	24031025602-132	24031025602-133	24031025602-134	24031025602-135	
Fire or explosion?	No	No	No	No	No	
Crush direction	Flat surface	Flat surface	Flat surface	Flat surface	Flat surface	
Cycled Samples						
Sample No.	24031025602-191	24031025602-192	24031025602-193	24031025602-194	24031025602-195	
Fire or explosion?	No	No	No	No	No	
Crush direction	Flat surface	Flat surface	Flat surface	Flat surface	Flat surface	
Supplementary information: no explosion or catch fire.						

13	TABLE: Crush Test (model: LIR3048 240mAh)					P
Ambient temperature: 23.3°C						
Fully Charged Samples						
Sample No.	24031025602-246	24031025602-247	24031025602-248	24031025602-249	24031025602-250	
Fire or explosion?	No	No	No	No	No	
Crush direction	Flat surface	Flat surface	Flat surface	Flat surface	Flat surface	
Cycled Samples						
Sample No.	24031025602-306	24031025602-307	24031025602-308	24031025602-309	24031025602-310	
Fire or explosion?	No	No	No	No	No	
Crush direction	Flat surface	Flat surface	Flat surface	Flat surface	Flat surface	
Supplementary information: no explosion or catch fire.						

14	TABLE: Impact Test (model: LIR1220 8mAh)					P
Ambient temperature: 23.6°C						
Fully Charged Samples						
Sample No.	24031025602-021	24031025602-022	24031025602-023	24031025602-024	24031025602-025	
Fire or explosion?	No	No	No	No	No	
Impact direction	Flat surface	Flat surface	Flat surface	Flat surface	Flat surface	
Cycled Samples						
Sample No.	24031025602-081	24031025602-082	24031025602-083	24031025602-084	24031025602-085	
Fire or explosion?	No	No	No	No	No	
Impact direction	Flat surface	Flat surface	Flat surface	Flat surface	Flat surface	
Supplementary information: no explosion or catch fire.						

14	TABLE: Impact Test (model: LIR1254 70mAh)					P
Ambient temperature: 23.8°C						
Fully Charged Samples						
Sample No.	24031025602-136	24031025602-137	24031025602-138	24031025602-139	24031025602-140	
Fire or explosion?	No	No	No	No	No	
Impact direction	Flat surface	Flat surface	Flat surface	Flat surface	Flat surface	
Cycled Samples						
Sample No.	24031025602-196	24031025602-197	24031025602-198	24031025602-199	24031025602-200	
Fire or explosion?	No	No	No	No	No	
Impact direction	Flat surface	Flat surface	Flat surface	Flat surface	Flat surface	
Supplementary information: no explosion or catch fire.						

14	TABLE: Impact Test (model: LIR3048 240mAh)					P
Ambient temperature: 23.5°C						
Fully Charged Samples						
Sample No.	24031025602-251	24031025602-252	24031025602-253	24031025602-254	24031025602-255	
Fire or explosion?	No	No	No	No	No	
Impact direction	Flat surface	Flat surface	Flat surface	Flat surface	Flat surface	
Cycled Samples						
Sample No.	24031025602-311	24031025602-312	24031025602-313	24031025602-314	24031025602-315	
Fire or explosion?	No	No	No	No	No	
Impact direction	Flat surface	Flat surface	Flat surface	Flat surface	Flat surface	
Supplementary information: no explosion or catch fire.						

14A	TABLE: Round Bar Crush Test					N/A
Ambient temperature: °C						
Fully Charged Samples						
Sample No.						
Fire or explosion?						
Cell thickness (mm)						
Cycled Samples						
Sample No.						
Fire or explosion?						
Cell thickness (mm)						
Supplementary information:						

15	TABLE: Shock Test (model: LIR1220 8mAh)					P
Ambient temperature: 23.7°C						
Fully Charged Samples						
Sample No.	24031025602-026	24031025602-027	24031025602-028	24031025602-029	24031025602-030	
Mass before test (g)	0.743	0.749	0.752	0.750	0.746	
Mass after test (g)	0.743	0.748	0.752	0.750	0.745	
Mass loss ratio (%)	0.000	0.134	0.000	0.000	0.134	
Cycled Samples						
Sample No.	24031025602-086	24031025602-087	24031025602-088	24031025602-089	24031025602-090	
Mass before test (g)	0.742	0.750	0.744	0.753	0.740	
Mass after test (g)	0.742	0.749	0.744	0.752	0.740	
Mass loss ratio (%)	0.000	0.133	0.000	0.133	0.000	
Supplementary information: no explosion or catch fire, in addition the sample did not vent or leak. Max loss less than 0.5%						

15	TABLE: Shock Test (model: LIR1254 70mAh)					P
Ambient temperature: 23.6°C						
Fully Charged Samples						
Sample No.	24031025602-141	24031025602-142	24031025602-143	24031025602-144	24031025602-145	
Mass before test (g)	1.830	1.842	1.835	1.827	1.843	
Mass after test (g)	1.829	1.841	1.835	1.827	1.842	
Mass loss ratio (%)	0.055	0.054	0.000	0.000	0.054	
Cycled Samples						
Sample No.	24031025602-201	24031025602-202	24031025602-203	24031025602-204	24031025602-205	
Mass before test (g)	1.841	1.825	1.831	1.840	1.826	
Mass after test (g)	1.841	1.825	1.831	1.839	1.825	
Mass loss ratio (%)	0.000	0.000	0.000	0.054	0.055	
Supplementary information: no explosion or catch fire, in addition the sample did not vent or leak. Max loss less than 0.2%						

15	TABLE: Shock Test (model: LIR3048 240mAh)					P
Ambient temperature: 23.3°C						
Fully Charged Samples						
Sample No.	24031025602-256	24031025602-257	24031025602-258	24031025602-259	24031025602-260	
Mass before test (g)	7.534	8.125	8.386	7.549	8.274	
Mass after test (g)	7.534	8.124	8.385	7.548	8.272	
Mass loss ratio (%)	0.000	0.012	0.012	0.013	0.024	
Cycled Samples						
Sample No.	24031025602-316	24031025602-317	24031025602-318	24031025602-319	24031025602-320	
Mass before test (g)	7.725	7.552	7.913	7.738	8.013	
Mass after test (g)	7.724	7.552	7.911	7.737	8.012	
Mass loss ratio (%)	0.013	0.000	0.025	0.013	0.012	
Supplementary information: no explosion or catch fire, in addition the sample did not vent or leak. Max loss less than 0.1%						

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16	TABLE: Vibration Test (model: LIR1220 8mAh)					P
Ambient temperature: 23.4°C						
Fully Charged Samples						
Sample No.	24031025602-031	24031025602-032	24031025602-033	24031025602-034	24031025602-035	
Mass before test (g)	0.741	0.751	0.754	0.743	0.752	
Mass after test (g)	0.740	0.750	0.754	0.743	0.751	
Mass loss ratio (%)	0.135	0.133	0.000	0.000	0.133	
Cycled Samples						
Sample No.	24031025602-091	24031025602-092	24031025602-093	24031025602-094	24031025602-095	
Mass before test (g)	0.755	0.745	0.747	0.756	0.758	
Mass after test (g)	0.755	0.744	0.746	0.756	0.758	
Mass loss ratio (%)	0.000	0.134	0.134	0.000	0.000	
Supplementary information: no explosion or catch fire, in addition the sample did not vent or leak. Max loss less than 0.5%						

16	TABLE: Vibration Test (model: LIR1254 70mAh)					P
Ambient temperature: 23.4°C						
Fully Charged Samples						
Sample No.	24031025602-146	24031025602-147	24031025602-148	24031025602-149	24031025602-150	
Mass before test (g)	1.828	1.842	1.829	1.832	1.840	
Mass after test (g)	1.828	1.841	1.829	1.831	1.840	
Mass loss ratio (%)	0.000	0.054	0.000	0.055	0.000	
Cycled Samples						
Sample No.	24031025602-206	24031025602-207	24031025602-208	24031025602-209	24031025602-210	
Mass before test (g)	1.835	1.830	1.841	1.833	1.831	
Mass after test (g)	1.834	1.829	1.841	1.833	1.830	
Mass loss ratio (%)	0.054	0.055	0.000	0.000	0.055	
Supplementary information: no explosion or catch fire, in addition the sample did not vent or leak. Max loss less than 0.2%						

16	TABLE: Vibration Test (model: LIR3048 240mAh)					P
Ambient temperature: 23.6°C						
Fully Charged Samples						
Sample No.	24031025602-261	24031025602-262	24031025602-263	24031025602-264	24031025602-265	
Mass before test (g)	7.749	7.692	7.860	7.569	8.412	
Mass after test (g)	7.748	7.691	7.858	7.567	8.411	
Mass loss ratio (%)	0.013	0.013	0.025	0.026	0.012	
Cycled Samples						
Sample No.	24031025602-321	24031025602-322	24031025602-323	24031025602-324	24031025602-325	
Mass before test (g)	7.681	8.757	7.712	7.628	7.582	
Mass after test (g)	7.681	8.755	7.711	7.627	7.580	
Mass loss ratio (%)	0.000	0.023	0.013	0.013	0.026	
Supplementary information: no explosion or catch fire, in addition the sample did not vent or leak. Max loss less than 0.1%						

18	TABLE: Temperature Cycling Test (model: LIR1220 8mAh)					P
Ambient temperature:23.7 °C						
Fully Charged Samples						
Sample No.	24031025602-046	24031025602-047	24031025602-048	24031025602-049	24031025602-050	
Mass before test (g)	0.746	0.752	0.748	0.759	0.754	
Mass after test (g)	0.744	0.751	0.746	0.757	0.753	
Mass loss ratio (%)	0.268	0.133	0.267	0.264	0.133	
Cycled Samples						
Sample No.	24031025602-106	24031025602-107	24031025602-108	24031025602-109	24031025602-110	
Mass before test (g)	0.742	0.757	0.753	0.755	0.749	
Mass after test (g)	0.741	0.755	0.752	0.753	0.747	
Mass loss ratio (%)	0.135	0.264	0.133	0.265	0.267	
Supplementary information: no explosion or catch fire, in addition the sample did not vent or leak. Max loss less than 0.5%						

18	TABLE: Temperature Cycling Test (model: LIR1254 70mAh)					P
Ambient temperature:23.7 °C						
Fully Charged Samples						
Sample No.	24031025602-161	24031025602-162	24031025602-163	24031025602-164	24031025602-165	
Mass before test (g)	1.839	1.835	1.832	1.840	1.834	
Mass after test (g)	1.836	1.833	1.830	1.837	1.832	
Mass loss ratio (%)	0.163	0.109	0.109	0.163	0.109	
Cycled Samples						
Sample No.	24031025602-221	24031025602-222	24031025602-223	24031025602-224	24031025602-225	
Mass before test (g)	1.833	1.839	1.835	1.836	1.834	
Mass after test (g)	1.830	1.838	1.833	1.834	1.832	
Mass loss ratio (%)	0.164	0.054	0.109	0.109	0.109	
Supplementary information: no explosion or catch fire, in addition the sample did not vent or leak. Max loss less than 0.2%						

18	TABLE: Temperature Cycling Test (model: LIR3048 240mAh)					P
Ambient temperature:23.7 °C						
Fully Charged Samples						
Sample No.	24031025602-276	24031025602-277	24031025602-278	24031025602-279	24031025602-280	
Mass before test (g)	7.762	7.596	7.849	7.750	7.675	
Mass after test (g)	7.758	7.593	7.846	7.747	7.673	
Mass loss ratio (%)	0.052	0.039	0.038	0.039	0.026	
Cycled Samples						
Sample No.	24031025602-336	24031025602-337	24031025602-338	24031025602-339	24031025602-340	
Mass before test (g)	7.613	8.638	7.778	7.601	7.850	
Mass after test (g)	7.611	8.636	7.775	7.597	7.847	
Mass loss ratio (%)	0.026	0.023	0.039	0.053	0.038	
Supplementary information: no explosion or catch fire, in addition the sample did not vent or leak. Max loss less than 0.1%						

19	TABLE: Low Pressure (Altitude Simulation) Test (model: LIR1220 8mAh)				P
Ambient temperature: 22.5°C					
Fully Charged Samples					
Sample No.	24031025602-051	24031025602-052	24031025602-053	24031025602-054	24031025602-055
Mass before test (g)	0.756	0.745	0.759	0.760	0.746
Mass after test (g)	0.755	0.745	0.759	0.760	0.745
Mass loss ratio (%)	0.132	0.000	0.000	0.000	0.134
Cycled Samples					
Sample No.	24031025602-111	24031025602-112	24031025602-113	24031025602-114	24031025602-115
Mass before test (g)	0.761	0.748	0.744	0.756	0.759
Mass after test (g)	0.760	0.747	0.744	0.756	0.759
Mass loss ratio (%)	0.131	0.134	0.000	0.000	0.000
Supplementary information: no explosion or catch fire, in addition the sample did not vent or leak. Max loss less than 0.5%					

19	TABLE: Low Pressure (Altitude Simulation) Test (model: LIR1254 70mAh)				P
Ambient temperature: 22.5°C					
Fully Charged Samples					
Sample No.	24031025602-166	24031025602-167	24031025602-168	24031025602-169	24031025602-170
Mass before test (g)	1.839	1.836	1.842	1.835	1.841
Mass after test (g)	1.838	1.836	1.842	1.834	1.840
Mass loss ratio (%)	0.054	0.000	0.000	0.054	0.054
Cycled Samples					
Sample No.	24031025602-226	24031025602-227	24031025602-228	24031025602-229	24031025602-230
Mass before test (g)	1.837	1.843	1.840	1.842	1.838
Mass after test (g)	1.837	1.842	1.839	1.842	1.838
Mass loss ratio (%)	0.000	0.054	0.054	0.000	0.000
Supplementary information: no explosion or catch fire, in addition the sample did not vent or leak. Max loss less than 0.2%					

19	TABLE: Low Pressure (Altitude Simulation) Test (model: LIR3048 240mAh)				P
Ambient temperature: 22.5°C					
Fully Charged Samples					
Sample No.	24031025602-281	24031025602-282	24031025602-283	24031025602-284	24031025602-285
Mass before test (g)	7.640	8.534	7.625	7.781	7.639
Mass after test (g)	7.640	8.532	7.624	7.780	7.638
Mass loss ratio (%)	0.000	0.023	0.013	0.013	0.013
Cycled Samples					
Sample No.	24031025602-341	24031025602-342	24031025602-343	24031025602-344	24031025602-345
Mass before test (g)	7.793	7.659	7.812	7.666	7.805
Mass after test (g)	7.791	7.658	7.810	7.665	7.805
Mass loss ratio (%)	0.025	0.013	0.026	0.012	0.000
Supplementary information: no explosion or catch fire, in addition the sample did not vent or leak. Max loss less than 0.1%					

Critical Components

Material: e.g. external enclosure, PCB, closed-end connector, sleeves, cord anchorage etc

Components with winding: e.g. motor, transformer, magnetic coil etc.

Other components: e.g. switch, thermostat, heater, plug, internal wire, capacitor, relay, varistor etc.

Object/ Part No.	Manufacturer/ trademark	Type/ Model	Technical data	Standard	Mark(s) of conformity
Cell	DONGGUAN LIDEA ELECTRONICS CO., LTD.	1) LIR1220 8mAh 2) LIR2016 16mAh 3) LIR1620 16mAh 4) LIR2025 25mAh 5) LIR1632 25mAh 6) LIR2032 40mAh 7) LIR1054 45mAh 8) LIR2430 60mAh 9) LIR1254 65mAh 10) LIR1254 70mAh 11) LIR1454 85mAh 12) LIR3032 110mAh 13) LIR1654 110mAh 14) LIR2450 120mAh 15) LIR3048 240mAh	1) 3.6V, 8mAh 2) 3.6V, 16mAh 3) 3.6V, 16mAh 4) 3.6V, 25mAh 5) 3.6V, 25mAh 6) 3.6V, 40mAh 7) 3.6V, 45mAh 8) 3.6V, 60mAh 9) 3.6V, 65mAh 10) 3.6V, 70mAh 11) 3.6V, 85mAh 12) 3.6V, 110mAh 13) 3.6V, 110mAh 14) 3.6V, 120mAh 15) 3.6V, 240mAh	UL 1642:2020 R10.22	Tested with appliance
-Positive electrode	JIANGMEN KANHOO INDUSTRY CO., LTD.	LC0-103	Material: LiCoO ₂ , PVDF, NMP, Conductive Additive	--	--
-Negative electrode	Hunan Zhongke Shinzoom Co.,Ltd.	S2-10	Material: Graphite, CMC, SBR, Distilled Water, Conductive	--	--
-Separator	Dongguan sunmoxi electronic technology co., ltd.	SMX-PE-12	Material: PE, Dimensions: 12µm, Shutdown temperature: 130°C	--	--
-Electrolyte	Shandong Chengyu new energy co.,LTD.	HCDD-2002	Composition: LiPF ₆ +EMC+EC+D MC Conductivity: 10.0mS/cm	--	--
-Cell case	SAMSUNG PRECISION STAINLESS STEEL(PINGHU) CO., LTD	SUS316L	Stainless steel, Thickness: 0.15mm	--	--

--End of main report--

Attachment 1

List of test equipment used

Test location:

NRCC (Shenzhen) Safety Technology Co., Ltd.

Room 301, Unit 1, Building A, No. 2, Tengfeng 5th Road, Fenghuang Community, Fuyong Street, Baoan District, Shenzhen, China

Clause	Measurement/ testing	Testing/measuring equipment/material used, (equipment ID)	Range used	Last calibration date	Calibration due date
10	Short-Circuit Test	NS-II-007/Precision oven/GX-3020-M150	Temperature: RT~180°C, error: ±2°C;	2023.06.23	2024.06.22
		NS-II-082/Battery external short-circuit switch/ANB61032-80	80±20mΩ	2023.06.23	2024.06.22
		NS-II-020/Ground resistance tester/YD2654D	3-60A, 20-500mΩ	2023.05.09	2024.05.08
		NS-II-081/Multichannel temperature recorder/ANB-WD40	Temperature range: -40°C~500°C	2023.06.23	2024.06.22
		NS-II-033/Digital multimeter/ETX-1810	AC/DC voltage range: 0-400V, AC/DC current range: 0-10A; Resistance range: 0-40MΩ	2023.06.23	2024.06.22
		NS-II-001/Stop Watch/XL-022	0-24hrs	2023.05.22	2024.05.21
		NS-II-055/Digital temperature and humidity meter/HTC-1	Temperature: -50~70°C; error: ±2°C; Humidity: 20%RH~99%RH; error: ±5%RH	2023.06.23	2024.06.22
		NS-II-043/Battery performance test system/CT-4008-5V6A-S1	5V, 6A	2023.06.23	2024.06.22
11	Abnormal Charging Test	NS-II-081/Multichannel temperature recorder/ANB-WD40	Temperature range: -40°C~500°C	2023.06.23	2024.06.22
		NS-II-033/Digital multimeter/ETX-1810	AC/DC voltage range: 0-400V, AC/DC current range: 0-10A; Resistance range: 0-40MΩ	2023.06.23	2024.06.22

		NS-II-001/Stop Watch/XL-022	0-24hrs	2023.05.22	2024.05.21
		NS-II-056/Digital temperature and humidity meter/HTC-1	Temperature: -50~70°C; error: $\pm 2^{\circ}\text{C}$; Humidity: 20%RH~99%RH; error: $\pm 5\%\text{RH}$	2023.06.23	2024.06.22
		NS-II-043/Battery performance test system/CT-4008-5V6A-S1	5V, 6A	2023.06.23	2024.06.22
13	Crush Test	NS-II-018/ Temperature controlled battery crush testing machine/GX-5067-TSM	Temperature range: -45~130°C Voltage: 1~10V Force: 0.15~20.0KN Displacement range: 0.1~100mm Speed range: 0.1-20mm/s	2023.06.23	2024.06.22
		NS-II-033/Digital multimeter/ETX-1810	AC/DC voltage range: 0-400V, AC/DC current range: 0-10A; Resistance range: 0-40M Ω	2023.06.23	2024.06.22
		NS-II-001/Stop Watch/XL-022	0-24hrs	2023.05.22	2024.05.21
		NS-II-057/Digital temperature and humidity meter/HTC-1	Temperature: -50~70°C; error: $\pm 2^{\circ}\text{C}$; Humidity: 20%RH~99%RH; error: $\pm 5\%\text{RH}$	2023.06.23	2024.06.22
		NS-II-043/Battery performance test system/CT-4008-5V6A-S1	5V, 6A	2023.06.23	2024.06.22
14	Impact Test	NS-II-023/Battery Impact Tester/GX-5066	Weight mass: 9.1kg Drop height: 610mm Cross bar diameter: 15.8mm	2023.06.23	2024.06.22
		NS-II-033/Digital multimeter/ETX-1810	AC/DC voltage range: 0-400V, AC/DC current range: 0-10A; Resistance range: 0-40M Ω	2023.06.23	2024.06.22
		NS-II-001/Stop Watch/XL-022	0-24hrs	2023.05.22	2024.05.21

		NS-II-055/Digital temperature and humidity meter/HTC-1	Temperature: -50~70°C; error: ±2°C; Humidity: 20%RH~99%RH; error: ±5%RH	2023.06.23	2024.06.22
		NS-II-043/Battery performance test system/CT-4008-5V6A-S1	5V, 6A	2023.06.23	2024.06.22
15	Shock Test	NS-II-016/Mechanical shock testing machine/SY10-2	Peak acceleration: 50G~1000G Pulse duration: 0.5~11ms	2023.06.23	2024.06.22
		NS-I-060/Electronic scale/JA11003	MAX: 1.1Kg Precision: 0.001g	2023.06.21	2024.06.20
		NS-II-033/Digital multimeter/ETX-1810	AC/DC voltage range: 0-400V, AC/DC current range: 0-10A; Resistance range: 0-40MΩ	2023.06.23	2024.06.22
		NS-II-057/Digital temperature and humidity meter/HTC-1	Temperature: -50~70°C; error: ±2°C; Humidity: 20%RH~99%RH; error: ±5%RH	2023.06.23	2024.06.22
		NS-II-001/Stop Watch/XL-022	0-24hrs	2023.05.22	2024.05.21
		NS-II-043/Battery performance test system/CT-4008-5V6A-S1	5V, 6A	2023.06.23	2024.06.22
16	Vibration Test	NS-II-006/ Electromagnetic vibration testing machine/EV206	Frequency range: 10-2000Hz Acceleration: 10-80m/s ²	2023/06/23	2024/06/22
		NS-I-060/Electronic scale/JA11003	MAX: 1.1Kg Precision: 0.001g	2023.06.21	2024.06.20
		NS-II-033/Digital multimeter/ETX-1810	AC/DC voltage range: 0-400V, AC/DC current range: 0-10A; Resistance range: 0-40MΩ	2023.06.23	2024.06.22
		NS-II-001/Stop Watch/XL-022	0-24hrs	2023.05.22	2024.05.21

		NS-II-059/Digital temperature and humidity meter/TH11R	Temperature: -40~80°C; error: $\pm 2^{\circ}\text{C}$; Humidity: 0%RH~100%RH; error: $\pm 5\%\text{RH}$	2023.06.23	2024.06.22
		NS-II-043/Battery performance test system/CT-4008-5V6A-S1	5V, 6A	2023.06.23	2024.06.22
17	Heating Test	NS-II-017/Battery thermal shock test chamber/GX-3020-B150	Temperature: 50°C~150°C Heating rate: 5.1°C/min	2023.06.23	2024.06.22
		NS-II-033/Digital multimeter/ETX-1810	AC/DC voltage range: 0-400V, AC/DC current range: 0-10A; Resistance range: 0-40M Ω	2023.06.23	2024.06.22
		NS-II-001/Stop Watch/XL-022	0-24hrs	2023.05.22	2024.05.21
		NS-II-057/Digital temperature and humidity meter/HTC-1	Temperature: -50~70°C; error: $\pm 2^{\circ}\text{C}$; Humidity: 20%RH~99%RH; error: $\pm 5\%\text{RH}$	2023.06.23	2024.06.22
		NS-II-043/Battery performance test system/CT-4008-5V6A-S1	5V, 6A	2023.06.23	2024.06.22
		NS-II-002/Constant temperature and humidity test chamber/GX-3000-150L	Temperature: -40~150°C; error: $\pm 2^{\circ}\text{C}$; 5 $\pm 2^{\circ}\text{C}/\text{min}$, Humidity: 0-100% RH; error: $\pm 5\%\text{RH}$	2023.06.23	2024.06.22
18	Temperature Cycling Test	NS-II-002/Constant temperature and humidity test chamber/GX-3000-150L	Temperature: -40~150°C; error: $\pm 2^{\circ}\text{C}$; 5 $\pm 2^{\circ}\text{C}/\text{min}$, Humidity: 0-100% RH; error: $\pm 5\%\text{RH}$	2023.06.23	2024.06.22
		NS-II-033/Digital multimeter/ETX-1810	AC/DC voltage range: 0-400V, AC/DC current range: 0-10A; Resistance range: 0-40M Ω	2023.06.23	2024.06.22
		NS-I-060/Electronic scale/JA11003	MAX: 1.1Kg Precision: 0.001g	2023.06.21	2024.06.20
		NS-II-001/Stop Watch/XL-022	0-24hrs	2023.05.22	2024.05.21

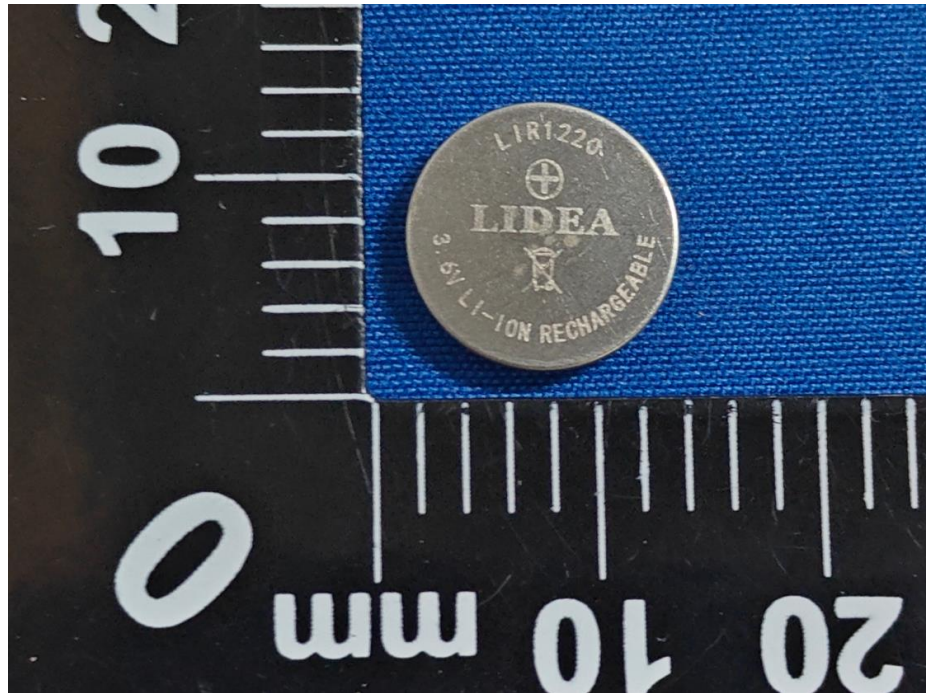
		NS-II-056/Digital temperature and humidity meter/HTC-1	Temperature: -50~70°C; error: $\pm 2^{\circ}\text{C}$; Humidity: 20%RH~99%RH; error: $\pm 5\%\text{RH}$	2023.06.23	2024.06.22
		NS-II-043/Battery performance test system/CT-4008-5V6A-S1	5V, 6A	2023.06.23	2024.06.22
19	Low Pressure (Altitude Simulation) Test	NS-II-019/Battery low pressure high altitude simulation test chamber/GX-3020-Z30	Pressure range: 0.5-100Kpa	2023.06.23	2024.06.22
		NS-II-033/Digital multimeter/ETX-1810	AC/DC voltage range: 0-400V, AC/DC current range: 0-10A; Resistance range: 0-40M Ω	2023.06.23	2024.06.22
		NS-I-060/Electronic scale/JA11003	MAX: 1.1Kg Precision: 0.001g	2023.06.21	2024.06.20
		NS-II-001/Stop Watch/XL-022	0-24hrs	2023.05.22	2024.05.21
		NS-II-057/Digital temperature and humidity meter/HTC-1	Temperature: -50~70°C; error: $\pm 2^{\circ}\text{C}$; Humidity: 20%RH~99%RH; error: $\pm 5\%\text{RH}$	2023.06.23	2024.06.22
		NS-II-043/Battery performance test system/CT-4008-5V6A-S1	5V, 6A	2023.06.23	2024.06.22

20	Projectile Test	NS-II-027/Battery Projectile Tester/GX-6053	Flame application time: 0-9999s; Tolerance: $\pm 1\%$; Test hole diameter: 100mm; Tolerance: $\pm 2\text{mm}$; Test wire mesh: wire diameter 0.45mm, 20 mesh; Flame distance screen height: 38mm; Test octagonal mesh cover: aluminum mesh diameter 0.25mm, 16~18 mesh; The width distance between each side is 24" (610mm); Tolerance: $\pm 10\text{mm}$; Height distance: 12" (305mm) Tolerance: $\pm 5\text{mm}$	2023.06.23	2024.06.22
		NS-II-033/Digital multimeter/ETX-1810	AC/DC voltage range: 0-400V, AC/DC current range: 0-10A; Resistance range: 0-40M Ω	2023.06.23	2024.06.22
		NS-II-001/Stop Watch/XL-022	0-24hrs	2023.05.22	2024.05.21
		NS-II-055/Digital temperature and humidity meter/HTC-1	Temperature: -50~70°C; error: $\pm 2^\circ\text{C}$; Humidity: 20%RH~99%RH; error: $\pm 5\%\text{RH}$	2023.06.23	2024.06.22
		NS-II-043/Battery performance test system/CT-4008-5V6A-S1	5V, 6A	2023.06.23	2024.06.22

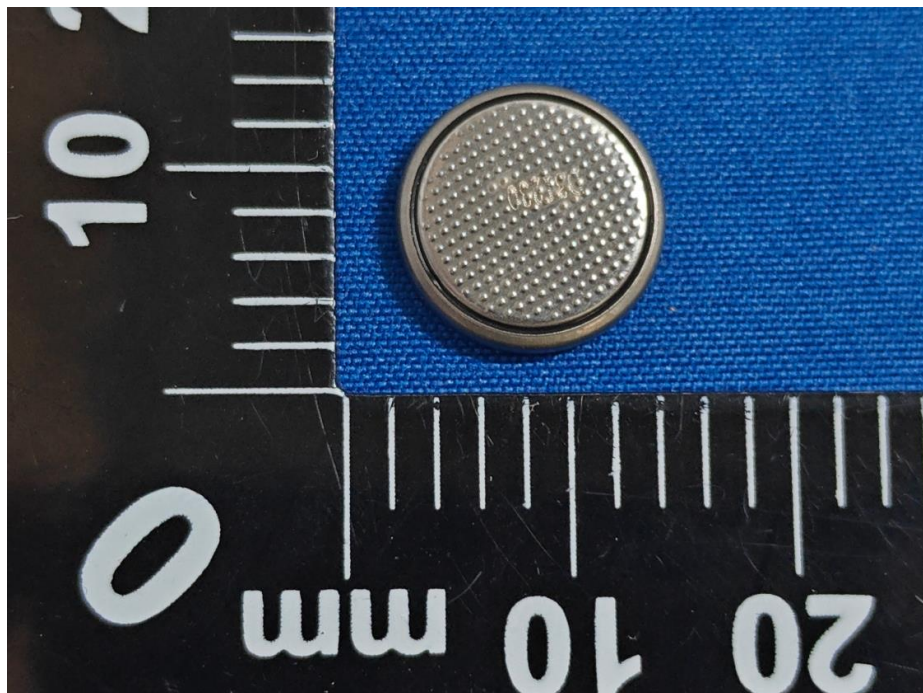
Product: Button Lithium-ion Cell

Type Designation: LIR1220 8mAh, LIR2016 16mAh, LIR1620 16mAh, LIR2025 25mAh, LIR1632 25mAh, LIR2032 40mAh, LIR1054 45mAh, LIR2430 60mAh, LIR1254 65mAh, LIR1254 70mAh, LIR1454 85mAh, LIR3032 110mAh, LIR1654 110mAh, LIR 2450 120mAh, LIR3048 240mAh

Remark: The tested models **LIR1220 8mAh**, **LIR1254 70mAh** and **LIR3048 240mAh** are representatives of all models.



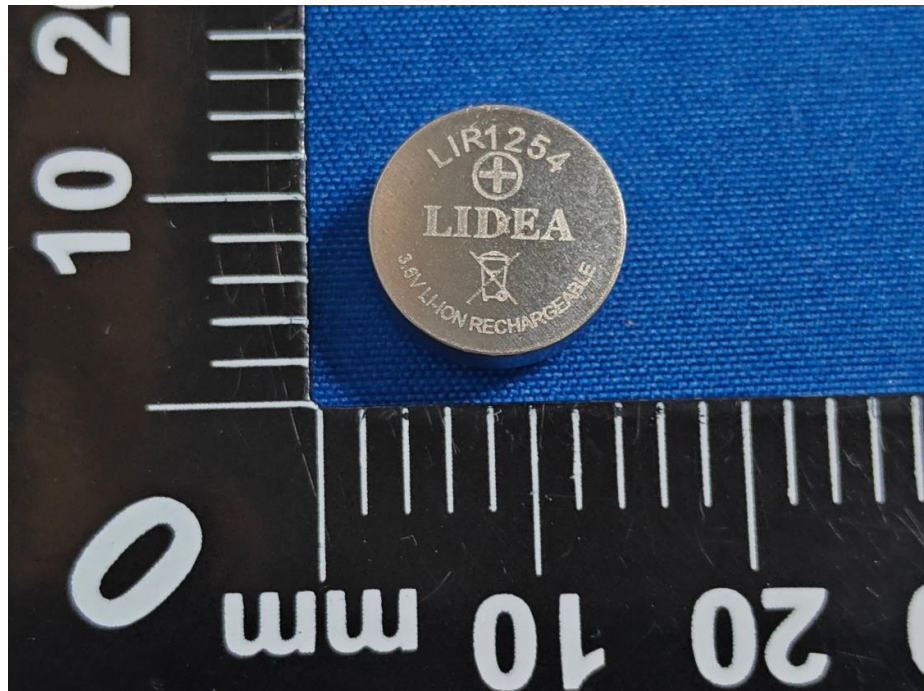
Picture 1. Front view of cell (model: LIR1220 8mAh)
(Final version of the label, see main report)



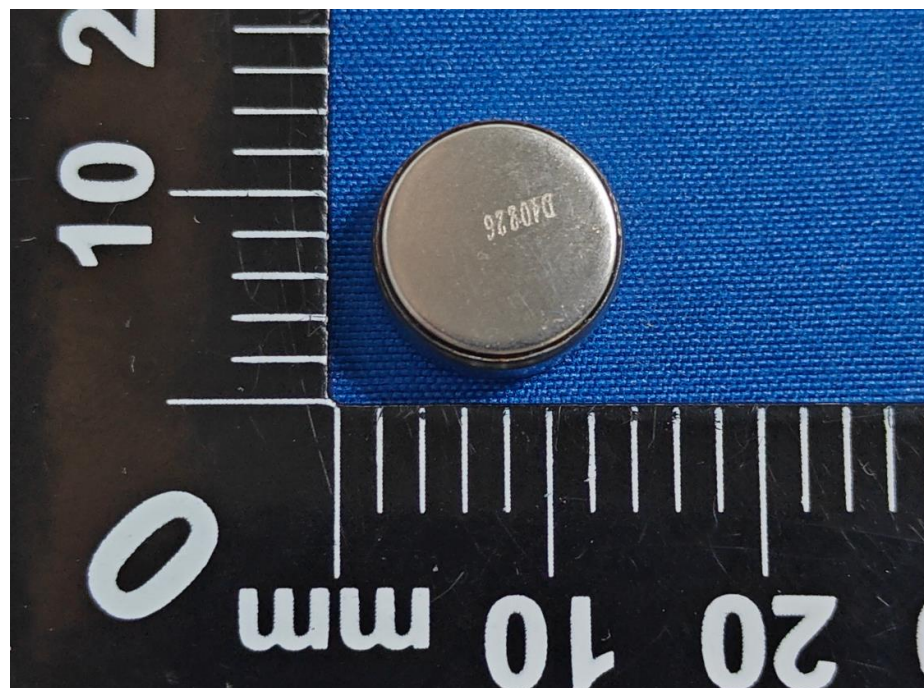
Picture 2 Back view of cell (model: LIR1220 8mAh)

Product: Button Lithium-ion Cell

Type Designation: LIR1220 8mAh, LIR2016 16mAh, LIR1620 16mAh, LIR2025 25mAh, LIR1632 25mAh, LIR2032 40mAh, LIR1054 45mAh, LIR2430 60mAh, LIR1254 65mAh, LIR1254 70mAh, LIR1454 85mAh, LIR3032 110mAh, LIR1654 110mAh, LIR 2450 120mAh, LIR3048 240mAh



Picture 3 Front view of cell (model: LIR1254 70mAh)
(Final version of the label, see main report)



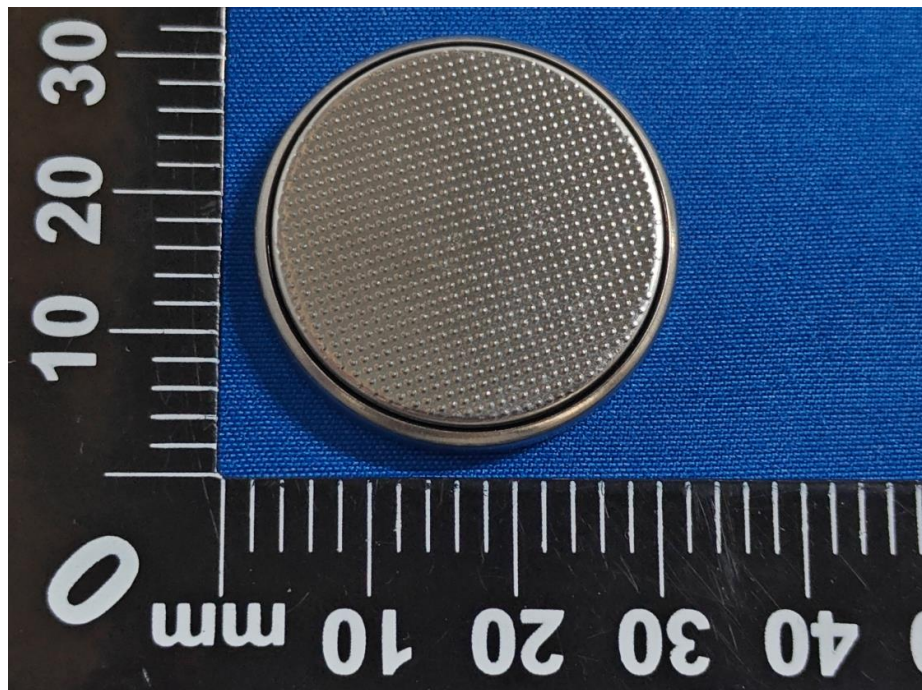
Picture 4 Back view of cell (model: LIR1254 70mAh)

Product: Button Lithium-ion Cell

Type Designation: LIR1220 8mAh, LIR2016 16mAh, LIR1620 16mAh, LIR2025 25mAh, LIR1632 25mAh, LIR2032 40mAh, LIR1054 45mAh, LIR2430 60mAh, LIR1254 65mAh, LIR1254 70mAh, LIR1454 85mAh, LIR3032 110mAh, LIR1654 110mAh, LIR 2450 120mAh, LIR3048 240mAh



Picture 5 Front view of cell (model: LIR3048 240mAh)
(Final version of the label, see main report)



Picture 6 Back view of cell (model: LIR3048 240mAh)