518000
中国 广东省 深圳市
光明新区公明镇楼村后海旭发科技园5栋
深圳市力电电池有限公司
YongZhen Wu

YongZhen Wu
SHENZHEN LIDEA BATTERY CO LTD
3/F NO 5 BLDG
HOUHAI XUFA TECH PARK LOUCUN
GONGMING TOWN
SHENZHEN
GUANGDONG 518000 CHINA

Date: 2017/08/07
Subscriber: None
PartySite: 887823
File No: MH60145
Project No: 4787894465
PD No: 17O36111
Type: R
PO Number:

Subject: **Procedure And/Or Report Material**

The following material resulting from the investigation under the above numbers is enclosed.

Issue Date	Vol	Sec	Pages	Revised Date
	1		Revised Index Page(s) 1	2017/07/28
	1		Appendix	
2014/04/29	1	1	Cert of Compliance	
2014/04/29	1	1	Revised Description Page(s) 1,2,4,7,8,9	2017/07/28
2014/04/29	1	1	New Test Record 2	2017/07/28

Inspections at your plant will be conducted under the supervision of BILL ZHANG, UL INSPECTION CENTER SHENZHEN,

CHINA NAT'L IMPORT & EXP COM INSP CORP, 3/F, GALAXY WIND BUILDING, KEYUAN ROAD, NANSHAN DISTRICT, SHENZHEN, GUANGDONG,

China, 518057., PHONE: 755-86130536, FAX: 755-86130575, EMAIL:UL.InspectionCenter521@ul.com

Please file revised pages and illustrations in place of material of like identity. New material should be filed in its proper numerical order.

NOTE: Follow-Up Service Procedure revisions DO NOT include Cover Pages, Test Records and Conclusion Pages. Report revisions DO NOT include Authorization Pages, Indices, Section General Pages and Appendixes.

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INDEX

Product/Model Numbers	Section	Requirements Evaluated to (US and/or CN)
Primary lithium button (Coin) type cell, Model CR2450, **CR1220, CR1616, CR1225, CR1620, CR2016, CR1632, CR2025, CR2032, CR2330, CR2430, CR2050, CR3032, CR2354, CR2477T**	1	US

COMPONENT - LITHIUM BATTERIES (BBCV2, BBCV3)

TABLE B - SAMPLE SELECTION GUIDE

Sample Group	#/Group	Model #	Report Date	Category	Type of Cells	Cell capacity (C) mAh	Thickness(µm)	Additional Info	Test Program Code
1	**4**	**CR1220**	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**40**	**NA**	**-**	**A**
		CR1225	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**50**	**NA**	**-**	**A**
		CR1616	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**50**	**NA**	**-**	**A**
		CR1620	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**70**	**NA**	**-**	**A**
		CR1632	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**120**	**NA**	**-**	**A**
		CR2016	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**75**	**NA**	**-**	**A**
		CR2025	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**150**	**NA**	**-**	**A**
		CR2032	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**230**	**NA**	**-**	**A**
		CR2050	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**320**	**NA**	**-**	**A**
		CR2330	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**250**	**NA**	**-**	**A**
		CR2354	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**550**	**NA**	**-**	**A**
		CR2430	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**300**	**NA**	**-**	**A**
		CR2450	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**600**	**NA**	**-**	**B**
		CR2477T	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**1100**	**NA**	**-**	**A**
		CR3032	**2014-04-29**	**Primary**	**Lithium/manganese dioxide**	**500**	**NA**	**-**	**A**

COMPONENT - LITHIUM BATTERIES (BBCV2, BBCV3)

INDEX TO FOOTNOTES:

COMPONENT - LITHIUM BATTERIES (BBCV2, BBCV3)

TABLE C - TEST CRITERIA

Refer to Sp. App. B for Footnotes and TABLE B for Additional Information

Model #	Cell capacity (C) mAh	Open Circuit Voltage, Vdc	Top-off Charge voltage(V_C), Vdc	Top-off Charge current (I_C), mA	End Point/ Cut Off Voltage, Vdc	External Protector Left in Circuit, Y/N?	IR Reference	TGA Reference	DSC Reference
CR1220	**40**	**3**	-	-	-	-	-	-	-
CR1225	**50**	**3**	-	-	-	-	-	-	-
CR1616	**50**	**3**	-	-	-	-	-	-	-
CR1620	**70**	**3**	-	-	-	-	-	-	-
CR1632	**120**	**3**	-	-	-	-	-	-	-
CR2016	**75**	**3**	-	-	-	-	-	-	-
CR2025	**150**	**3**	-	-	-	-	-	-	-
CR2032	**230**	**3**	-	-	-	-	-	-	-
CR2050	**320**	**3**	-	-	-	-	-	-	-
CR2330	**250**	**3**	-	-	-	-	-	-	-
CR2354	**550**	**3**	-	-	-	-	-	-	-
CR2430	**300**	**3**	-	-	-	-	-	-	-
CR2450	**600**	**3.3 +/- 0.3**	-	-	-	-	-	-	-
CR2477T	**1100**	**3**	-	-	-	-	-	-	-
CR3032	**500**	**3**	-	-	-	-	-	-	-

COMPONENT – LITHIUM BATTERIES (BBCV2, BBCV3)

TABLE D – CELL MODELS SUBJECT TO PERIODIC PRODUCTION TESTING (WITH SIMPLIFIED CONSTRUCTION DESCRIPTIVE DETAILS)(FOR SECONDARY CELLS)

Cell Model	Section No./Report Date*
N/A	N/A

** - Note to CAS: Cells from the same family (i.e. same chemistry and construction except different ratings) must all be subjected to or all not subjected to Periodic Production Testing, but not both, within a procedure section/report date. Cells from different families may choose either option within each volume, but the two options shall not be mixed within a single section/report date.*

TABLE F - TEST EQUIPMENT

The following equipment has been evaluated with respect to the requirements expressed in Appendix D and has been found suitable:

Test	Type of Equipment	Equipment Manufacturer's Name	Equipment Model No.
Weight	N/A		
Upper Discharge	N/A		
Lower Discharge	N/A		
Leakage	N/A		
X-Ray Construction Review	N/A		

TABLE 1
PRODUCTION WEIGHT TEST PARAMETERS

Cell Models	Section No.	No. of Production Samples Tested per Day (≥ 3 samples)	Manufacturer's Specified Weight ± tolerances, g
N/A			

TABLE 2
PRODUCTION UPPER and LOWER DISCHARGE TEST PARAMETERS

Cell Models	Section No.	No. of Production Samples Tested per Month (≥ 3 Samples for each discharge)	Upper Discharge Test		Lower Discharge Test	
			Discharge Rate, mA	Mfg. Specified Tolerances for V/C Discharge Profile	Discharge Rate, mA	Mfg. Specified Tolerances for V/C Discharge Profile
N/A						

COMPONENT – LITHIUM BATTERIES (BBCV2, BBCV3)

TABLE 3
PRODUCTION LEAKAGE TEST PARAMETERS

Cell Models	Section No.	No. of Production Samples Tested per Month, (≥ 5 Samples)
N/A		

TABLE 4
PRODUCTION X-RAY CONSTRUCTION REVIEW PARAMETERS

Cell Models	Section No.	No. of Production Samples Tested per Month, (≥ 10 Samples)
N/A		

DESCRIPTION

PRODUCT COVERED:

USR Component – Primary lithium cells as noted below.

Model Number	Chemical Reaction at Discharge	Shape	Technician (T) or User (U) Replaceable?
***All Models**	Li+MnO2->MnO2Li (+MnO2,-Li)	Button (Coin)	U

ELECTRICAL RATING:

Model Number	Voltage (Nominal), V	Capacity, (Nominal), mAh
CR2450	3.0	600
CR1220	**3.0**	**40**
CR1225	**3.0**	**50**
CR1616	**3.0**	**50**
CR1620	**3.0**	**70**
CR1632	**3.0**	**120**
CR2016	**3.0**	**75**
CR2025	**3.0**	**150**
CR2032	**3.0**	**230**
CR2050	**3.0**	**320**
CR2330	**3.0**	**250**
CR2354	**3.0**	**550**
CR2430	**3.0**	**300**
CR2477T	**3.0**	**1100**
CR3032	**3.0**	**500**

GENERAL CONSTRUCTION

See Section General at beginning of volume for general construction details employed in these cells.

TECHNICAL CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

These cells are primary (non-rechargeable) cells that employ lithium metal anodes and solid cathodes.

User Replaceable cells are single cell primary batteries that typically contain less than 1.0 g (0.04 ounce) of metallic lithium; comply with all of the requirements for user replaceable batteries in accordance with UL 1642; and do not require trained technicians to replace them.

Technician Replaceable cells are any primary cells other than those determined to be user replaceable. They are intended for installation and replacement only by trained technicians.

*USR indicates compliance with the requirements outlined in UL 1642, Standard for Lithium Batteries, Fifth Edition, Dated March 13, 2012, including revisions through **June 23, 2015**.

Use - For use only in products where the acceptability of the combination is determined by UL LLC.

Conditions of Acceptability - The use of these cells may be considered generally acceptable under the conditions given below:

1. Battery compartments in end use consumer applications such as with remote controls, garage door openers, etc. should be designed such that the battery compartment closure is mechanically retained or secured in such a way as to prevent access by children. This is especially true for devices that use coin cells as these types of batteries may be ingested.

2. The cells should be used within their manufacturer's specified temperature ranges as noted in Table below:

Model	Manufacturer Specified Temperature ranges
***All Models**	-20°C to 60°C

The end product shall be designed to prevent the high temperature excursions on cell surface from exceeding 100°C (212°F).

4. The circuit for these cells shall include protection from abnormal charging currents during use. This protection shall consist of:

a) Two blocking components such as diodes or

b) One blocking component and one current limiting component such as a resistor or a fuse, etc.

When construction b) is employed, the current limiting component shall limit the abnormal charge current to the values noted below.

Model	Abnormal Charge Current Limit, mA
CR2450	2
CR1220	**2**
CR1225	**2**
CR1616	**2**
CR1620	**2**
CR1632	**2**
CR2016	**2**
CR2025	**2**
CR2032	**2**
CR2050	**2**
CR2330	**2**
CR2354	**2**
CR2430	**2**
CR2477T	**2**
CR3032	**2**

The suitability of the combination battery and end product protective circuitry shall be determined in the end use application.

Primary lithium button (Coin) type cells - Fig. 1 to Fig. 2

General – See Ill. 1 for additional details of construction.

1. Cathode Can – Consists of the following as noted below.

Model	Generic Material	Dimensions, mm		
--	--	Diameter	Length	Thickness
CR2450	Stainless steel	24.5	--	0.25
CR1220	**Stainless steel**	**12.5**	**--**	**0.2**
CR1225	**Stainless steel**	**12.5**	**--**	**0.2**
CR1616	**Stainless steel**	**16.0**	**--**	**0.2**
CR1620	**Stainless steel**	**16.0**	**--**	**0.2**
CR1632	**Stainless steel**	**16.0**	**--**	**0.25**
CR2016	**Stainless steel**	**20.0**	**--**	**0.2**
CR2025	**Stainless steel**	**20.0**	**--**	**0.25**
CR2032	**Stainless steel**	**20.0**	**--**	**0.25**
CR2050	**Stainless steel**	**20.0**	**--**	**0.25**
CR2330	**Stainless steel**	**23.0**	**--**	**0.25**
CR2354	**Stainless steel**	**23.0**	**--**	**0.25**
CR2430	**Stainless steel**	**24.5**	**--**	**0.25**
CR2477T	**Stainless steel**	**24.5**	**--**	**0.25**
CR3032	**Stainless steel**	**30.0**	**--**	**0.25**

*

5. Separator – Constructed as noted below.

Model	Generic Separator Material	Separator Thickness, µm
CR2450	Fiberglass	220
CR1220	**Fiberglass**	**180**
CR1225	**Fiberglass**	**180**
CR1616	**Fiberglass**	**180**
CR1620	**Fiberglass**	**180**
CR1632	**Fiberglass**	**200**
CR2016	**Fiberglass**	**180**
CR2025	**Fiberglass**	**200**
CR2032	**Fiberglass**	**200**
CR2050	**Fiberglass**	**200**
CR2330	**Fiberglass**	**200**
CR2354	**Fiberglass**	**200**
CR2430	**Fiberglass**	**200**
CR2477T	**Fiberglass**	**220**
CR3032	**Fiberglass**	**200**

*

6. Electrolyte – Constructed as noted below.

Model	Generic Chemical Description
All Models	PC,DME,DOL,LiClO4

7. Vent Mechanism – Constructed as noted below.

Model	Ills No.
All Models	Gasket, ILL.1

8. Insulation – Provided with the following insulation parts in addition to the separator.

Model	Insulation Parts	Ills. Nos.
All Models	Gasket	ILL.1

CERTIFICATE OF COMPLIANCE

Certificate Number	20170807-MH60145
Report Reference	MH60145-20170728
Issue Date	2017-AUGUST-07
Issued to:	Shenzhen Lidea Battery Co Ltd 3/F NO 5 Bldg, Houhai xufa Tech Park Loucun Gongming town, Shenzhen, Guangdong 518000 CHINA
This is to certify that representative samples of	COMPONENT - LITHIUM BATTERIES Component – Primary lithium cells - CR2450 ,CR1220 ,CR1225 ,CR1616 ,CR1620 ,CR1632 ,CR2016 ,CR2025 ,CR2032 ,CR2050 ,CR2330 ,CR2354 ,CR2430 ,CR2477T ,CR3032 , Have been investigated by UL in accordance with the Standard(s) indicated on this Certificate.
Standard(s) for Safety:	UL 1642, Standard for Safety for Lithium Batteries
Additional Information:	See the UL Online Certifications Directory at www.ul.com/database for additional information

Only those products bearing the UL Certification Mark should be considered as being covered by UL's Certification and Follow-Up Service.

The UL Recognized Component Mark generally consists of the manufacturer's identification and catalog number, model number or other product designation as specified under "Marking" for the particular Recognition as published in the appropriate UL Directory. As a supplementary means of identifying products that have been produced under UL's Component Recognition Program, UL's Recognized Component Mark: , may be used in conjunction with the required Recognized Marks. The Recognized Component Mark is required when specified in the UL Directory preceding the recognitions or under "Markings" for the individual recognitions.

Recognized components are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. The final acceptance of the component is dependent upon its installation and use in complete equipment submitted to UL LLC.

Look for the UL Certification Mark on the product.

Bruce Mahrenholz, Director North American Certification Program

UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please contact a local UL Customer Service Representative at http://ul.com/aboutul/locations/

DESCRIPTION

PRODUCT COVERED:

USR Component – Primary lithium cells as noted below.

Model Number	Chemical Reaction at Discharge	Shape	Technician (T) or User (U) Replaceable?
***All Models**	Li+MnO2->MnO2Li (+MnO2,-Li)	Button (Coin)	U

ELECTRICAL RATING:

Model Number	Voltage (Nominal), V	Capacity, (Nominal), mAh
CR2450	3.0	600
CR1220	**3.0**	**40**
CR1225	**3.0**	**50**
CR1616	**3.0**	**50**
CR1620	**3.0**	**70**
CR1632	**3.0**	**120**
CR2016	**3.0**	**75**
CR2025	**3.0**	**150**
CR2032	**3.0**	**230**
CR2050	**3.0**	**320**
CR2330	**3.0**	**250**
CR2354	**3.0**	**550**
CR2430	**3.0**	**300**
CR2477T	**3.0**	**1100**
CR3032	**3.0**	**500**

GENERAL CONSTRUCTION

See Section General at beginning of volume for general construction details employed in these cells.

TECHNICAL CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

These cells are primary (non-rechargeable) cells that employ lithium metal anodes and solid cathodes.

User Replaceable cells are single cell primary batteries that typically contain less than 1.0 g (0.04 ounce) of metallic lithium; comply with all of the requirements for user replaceable batteries in accordance with UL 1642; and do not require trained technicians to replace them.

Technician Replaceable cells are any primary cells other than those determined to be user replaceable. They are intended for installation and replacement only by trained technicians.

*USR indicates compliance with the requirements outlined in UL 1642, Standard for Lithium Batteries, Fifth Edition, Dated March 13, 2012, including revisions through **June 23, 2015**.

Use - For use only in products where the acceptability of the combination is determined by UL LLC.

Conditions of Acceptability - The use of these cells may be considered generally acceptable under the conditions given below:

1. Battery compartments in end use consumer applications such as with remote controls, garage door openers, etc. should be designed such that the battery compartment closure is mechanically retained or secured in such a way as to prevent access by children. This is especially true for devices that use coin cells as these types of batteries may be ingested.

2. The cells should be used within their manufacturer's specified temperature ranges as noted in Table below:

Model	Manufacturer Specified Temperature ranges
***All Models**	-20°C to 60°C

The end product shall be designed to prevent the high temperature excursions on cell surface from exceeding 100°C (212°F).

4. The circuit for these cells shall include protection from abnormal charging currents during use. This protection shall consist of:

a) Two blocking components such as diodes or

b) One blocking component and one current limiting component such as a resistor or a fuse, etc.

When construction b) is employed, the current limiting component shall limit the abnormal charge current to the values noted below.

Model	Abnormal Charge Current Limit, mA
CR2450	2
CR1220	**2**
CR1225	**2**
CR1616	**2**
CR1620	**2**
CR1632	**2**
CR2016	**2**
CR2025	**2**
CR2032	**2**
CR2050	**2**
CR2330	**2**
CR2354	**2**
CR2430	**2**
CR2477T	**2**
CR3032	**2**

The suitability of the combination battery and end product protective circuitry shall be determined in the end use application.

Primary lithium button (Coin) type cells - Fig. 1 to Fig. 2

General – See Ill. 1 for additional details of construction.

1. Cathode Can – Consists of the following as noted below.

Model	Generic Material	Dimensions, mm		
--	--	Diameter	Length	Thickness
CR2450	Stainless steel	24.5	--	0.25
CR1220	**Stainless steel**	**12.5**	**--**	**0.2**
CR1225	**Stainless steel**	**12.5**	**--**	**0.2**
CR1616	**Stainless steel**	**16.0**	**--**	**0.2**
CR1620	**Stainless steel**	**16.0**	**--**	**0.2**
CR1632	**Stainless steel**	**16.0**	**--**	**0.25**
CR2016	**Stainless steel**	**20.0**	**--**	**0.2**
CR2025	**Stainless steel**	**20.0**	**--**	**0.25**
CR2032	**Stainless steel**	**20.0**	**--**	**0.25**
CR2050	**Stainless steel**	**20.0**	**--**	**0.25**
CR2330	**Stainless steel**	**23.0**	**--**	**0.25**
CR2354	**Stainless steel**	**23.0**	**--**	**0.25**
CR2430	**Stainless steel**	**24.5**	**--**	**0.25**
CR2477T	**Stainless steel**	**24.5**	**--**	**0.25**
CR3032	**Stainless steel**	**30.0**	**--**	**0.25**

*

5. Separator – Constructed as noted below.

Model	Generic Separator Material	Separator Thickness, µm
CR2450	Fiberglass	220
CR1220	**Fiberglass**	**180**
CR1225	**Fiberglass**	**180**
CR1616	**Fiberglass**	**180**
CR1620	**Fiberglass**	**180**
CR1632	**Fiberglass**	**200**
CR2016	**Fiberglass**	**180**
CR2025	**Fiberglass**	**200**
CR2032	**Fiberglass**	**200**
CR2050	**Fiberglass**	**200**
CR2330	**Fiberglass**	**200**
CR2354	**Fiberglass**	**200**
CR2430	**Fiberglass**	**200**
CR2477T	**Fiberglass**	**220**
CR3032	**Fiberglass**	**200**

*

6. Electrolyte – Constructed as noted below.

Model	Generic Chemical Description
All Models	PC,DME,DOL,LiClO4

7. Vent Mechanism – Constructed as noted below.

Model	Ills No.
All Models	Gasket, ILL.1

8. Insulation – Provided with the following insulation parts in addition to the separator.

Model	Insulation Parts	Ills. Nos.
All Models	Gasket	ILL.1

TEST RECORD NO. 2

SAMPLES:

The manufacturer furnished representative samples of the cell Models noted below for the investigation. These samples were subjected to the test program described on the following pages.

Model	Cell Chemistry	Cell Shape	Energy Density, mAh/mm^3	Nominal Voltage Rating, V dc	Capacity, mAh	Maximum Charging Current, mA	Maximum Charging Voltage, V dc
CR1220	Li+MnO2->MnO2Li (+MnO2,-Li)	Button (Coin)	0.1630573	3	40	2	--
CR1620			0.174164	3	70	2	--
CR2032			0.2289013	3	230	2	--
CR2477T			0.3031797	3	1100	2	--

GENERAL:

Test results relate only to the items tested.

The tests were conducted at UL.

Due to similarity of Models CR1220, CR1616, CR1225, CR1620, CR2016, CR1632, CR2025, CR2032, CR2330, CR2430, CR2050, CR3032, CR2354 and CR2477T to R/C Models for this manufacturer in this report, except for capacity, weight, dimension, energy density, separator, only the following tests were conducted necessary.

Abbreviated tests program (V2) was conducted on Model CR1220, cell with smallest capacity in the submitted family.

Abbreviated tests program (V1) was conducted on Model CR2477T, cell with the largest energy density and the maximum capacity in the submitted family.

Abbreviated tests program (V10+V3) was conducted on Models CR1620 and CR2032, cell with the intermediate capacity and different separator in the submitted family.

The tests conducted on cell Models CR1220, CR1620, CR2032 and CR2477T were considered representative of the aforementioned models.

UL 1642 Tests were considered covered as follows:

Test	File Reference	Report Date	Test Record No.
SHORT CIRCUIT TEST: (AT ROOM TEMPERATURE); SHOCK TEST; VIBRATION TEST; TEMPERATURE CYCLING TEST; LOW PRESSURE TEST;	MH60145	2014-04-29	1

The following tests were conducted.

Model	Test	UL 1642, Section	Complied, Y, N Or N/A	Comments
CR1220, CR1620, CR2032 and CR2477T	SHORT CIRCUIT TEST: (AT 55°C)	10	Y	Compliant
	ABNORMAL CHARGING TEST	11	Y	Compliant
	CRUSH TEST	13	Y	Compliant
	IMPACT TEST	14	Y	Compliant
	HEATING TEST	17	Y	Compliant
	PROJECTILE TEST	20	Y	Compliant

The test methods and results of the above tests have been reviewed and found in accordance with the requirements in the Standard for Lithium Batteries, UL 1642, 5th Edition, Dated March 13, 2012, including revisions through June 23, 2015.

Test Record Summary:

The results of this investigation, including construction review and testing, indicate that the products evaluated comply with the applicable requirements in the UL Standard for Safety for Lithium Batteries, UL 1642, 5th Edition, Dated March 13, 2012, with revision date June 23, 2015, therefore, such products are judged eligible to bear UL's Mark as described on the Conclusion Page of this Report. Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL.

Test Record by:

Abby Pan
Engineer

Review by:

Fancy Liang
Project Engineer