



**MD-0057935**  
**DECLARATIONS OF CONFORMITY,**  
**Elo AI Edge Pack ESY00GX**

REVISION HISTORY

Rev	Description	Originator	Reviewer	Date
A	Initial release per CA-00000854	Vincent Lai	Angela Huang	01/12/2026
B	Change Product Name from "Elo Edge Server" to "Elo AI Edge Pack", per CA-00001031	Vincent Lai	Angela Huang	02/03/2026

**Contents**

- 1. LBB Air
- 2. LBB Sea
- 3. US38.3
- 4. 1.2M drop
- 5. MSDS

**MD-0057935.zip**

**DOC #:**

**MD-0057935**

Print Date: 3-Feb-26

REV: B

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仅限货机  
CAO

NO.212600500359683



# 运输危险性鉴定书

## Hazard Classification and Identification Report for Transport of Goods

### 危险品

样品名称 : 成品配/备件,纽扣型锂金属电池,锂金属电池,纽扣电池,原电池,锂电池  
CR2032(3.0V 225mAh)

Sample name: Lithium coin battery CR2032(3.0V 225mAh)

委托单位 : 松下产业科技股份有限公司  
Panasonic Industrial Devices Sales Taiwan Co., Ltd.

生产单位 : Panasonic Gobel Energy Indonesia PT.  
Panasonic Gobel Energy Indonesia PT.



上海化工院检测有限公司  
SHANGHAI INSTITUTE OF CHEMICAL INDUSTRY TESTING CO.,LTD.



# 运输危险性鉴定书

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## Hazard Classification and Identification Report for Transport of Goods

样品名称 Sample Name	中文 Chinese	成品配/备件,纽扣型锂金属电池,锂金属电池,纽扣电池,原电池,锂电池 CR2032(3.0V 225mAh)				
	英文 English	Lithium coin battery CR2032(3.0V 225mAh)				
委托单位 Applicant	松下产业科技股份有限公司 Panasonic Industrial Devices Sales Taiwan Co., Ltd.					
生产单位 Manufacturer	Panasonic Gobel Energy Indonesia PT. Panasonic Gobel Energy Indonesia PT.					
检验方法、程序 Inspection method and procedure	国际航空运输协会《危险品规则》67版 IATA Dangerous Goods Regulations (DGR) 67th Edition					
样品外观 Sample appearance	银色金属外壳 Silvery Metal shell					
包装件信息 Package information	锂电池总净重≤2.5kg. Lithium batteries total net weight≤2.5kg.					
序号 NO.	电池种类 Battery type	型号 Model	容量Capacity /锂含量Li content	放置方式 Placement	单颗重量kg Unit weight	数量 Quantity
1	不可充电锂金属电池芯 Primary Li-metal cell	CR2032	225mAh / ≤0.3g	电池单独运输 Battery only	0.0029	800
鉴定结论 IDENTIFICATION CONCLUSION	<p>1. 危险性识别 (Hazards identification)</p> <p>杂项。 Miscellaneous.</p> <p>2. 空运按照国际航空运输协会《危险品规则》办理的类项 (Suggestion according to IATA DGR)</p> <p>Proper Shipping Name: Lithium metal batteries Class or Division: 9 UN Number: UN3090</p> <p>3. 包装要求 (Packaging requirements)</p> <p>按968第IB部分包装说明的要求办理。 The article is packaged according to the Packaging Instruction of 968 section IB.</p> <p>仅限货机 Cargo Aircraft Only</p>					
	<p>检验日期: 2025-11-12      签发日期: 2025-11-12</p> <p>Inspection Date:                      Issue Date:</p> <p>生效日期: 2026-01-01</p> <p>Effective Date:</p>					
备注 Comment						

批准  
Approver: 毛军

审核  
Checker: 钱玉婷

主检  
Appraiser: 孙清



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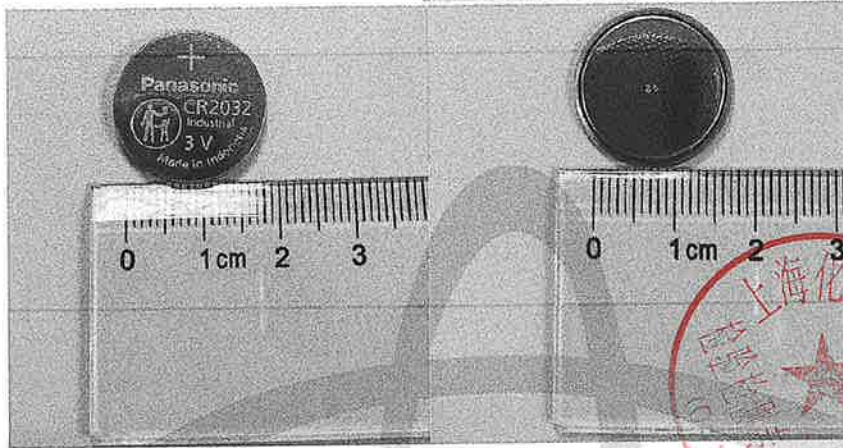
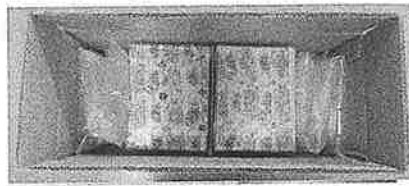
序号 No.	检验结果及其他事项 Inspection results and other things
1	<p>本鉴定书所述锂电池按照《危险品规则》(67版) 3.9.2.6.1(e)规定的质量管理体系进行制造。 本鉴定书所述锂电池不属于损坏或有缺陷的电池。 本鉴定书所述锂电池不进行以回收或处置为目的的航空运输, 不属于废弃锂电池。 Lithium cells and batteries listed in this report were manufactured under the quality management program described in IATA DGR 67th 3.9.2.6.1(e). Lithium cells and batteries listed in this report are not damaged or defective cells or batteries. Lithium cells and batteries listed in this report are not waste lithium cells or batteries, and they will not be shipped for recycling or disposal.</p>
2	<p>本鉴定书所述锂电池已通过联合国《试验和标准手册》第III部分38.3小节相应测试要求。 包装件能够承受1.2m跌落试验。包装件能够承受《危险品规则》所要求的堆码试验。 Lithium cells and batteries listed in this report are of the types proved to meet the requirements of each applicable test in the UN Manual of Tests and Criteria, Part III, sub-section 38.3. The package has passed the 1.2m drop test. The package has passed the stacking test required in DGR. UN38.3试验概要编号 The UN38.3 Test Summary No. (s) 812200400866404 详细信息请扫描右侧二维码。 Please scan the QR code on the right for more information.</p> 
3	<p>锂电池完全封装在内包装内, 位于坚固的刚性外包装中。 电池具有适当的防短路措施。 Lithium cells and batteries are packed in inner packagings that completely enclose the cell or battery and placed in a strong rigid outer packaging. Cells and batteries are properly protected to prevent short circuits.</p>
4	<p>按DGR 1B部分托运的电池必须根据第8部分规定在托运人申报单中描述; 并且当使用航空货运单时, 货运单必须包含8.2.1和8.2.2中相关适用要求。 Cells or batteries shipped under the provisions of Section 1B in IATA DGR must be described on a Shipper's Declaration as set out in Section 8, and the air waybill, when used, must contain the applicable information required by 8.2.1 and 8.2.2.</p>
5	<p>除使用9类锂电池或钠离子电池危险性标签(DGR图7.3.X)外, 每个包装件必须按DGR图7.1.C所示做耐久清晰的电池标记。注: 63版DGR图7.1.C所示锂电池标记可继续使用至2026年12月31日。 每个包装件必须按DGR7.1.4.1(a)和(b)要求标记, 此外当7.1.4.1(c)有要求时还必须标明包装件净重。 每个包装件必须贴有“仅限货机”标签(DGR图7.4.B)。 Each package must be durably and legibly marked with the battery mark shown in Figure 7.1.C in IATA DGR in addition to the Class 9-Lithium Battery or Sodium Ion battery hazard label (Figure 7.3.X in IATA DGR). Note: The mark illustrated in Figure 7.1.C of the 63rd edition of DGR may continue to be used until 31 December 2026. Each package must be marked in accordance with the requirements of 7.1.4.1(a) and (b) in IATA DGR and in addition the net weight when required by 7.1.4.1(c) must be marked on the package. Each package must be labelled with the "Cargo Aircraft Only" label (Figure 7.4.B in IATA DGR).</p>
6	<p>锂电池不得与第1类爆炸品(1.4S项除外), 2.1项易燃气体, 第3类易燃液体, 4.1项易燃固体或5.1项氧化性物质等危险品包装在同一外包装或集合包装内。 Lithium cells and batteries must not be packed in the same outer packaging or overpack with dangerous goods classified in Class 1 (explosives) other than Division 1.4S, Division 2.1 (flammable gases), Class 3 (flammable liquids), Division 4.1 (flammable solids) or Division 5.1 (oxidizers).</p>
7	/

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NO.212600400459684



# 运输危险性鉴定书

Hazard Classification and Identification Report for Transport of Goods

## 锂电池类物品

样品名称 : 成品配/备件,纽扣型锂金属电池,锂金属电池,纽扣电池,原电池,锂电池  
CR2032(3.0V 225mAh)

Sample name: Lithium coin battery CR2032(3.0V 225mAh)

委托单位 : 松下产业科技股份有限公司  
Panasonic Industrial Devices Sales Taiwan Co., Ltd.

生产单位 : Panasonic Gobel Energy Indonesia PT.  
Panasonic Gobel Energy Indonesia PT.



上海化工院检测有限公司  
SHANGHAI INSTITUTE OF CHEMICAL INDUSTRY TESTING CO.,LTD.



## 运输危险性鉴定书

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样品名称 Sample Name	中文 Chinese	成品配/备件,纽扣型锂金属电池,锂金属电池,纽扣电池,原电池,锂电池 CR2032(3.0V 225mAh)		
	英文 English	Lithium coin battery CR2032(3.0V 225mAh)		
委托单位 Applicant	松下产业科技股份有限公司 Panasonic Industrial Devices Sales Taiwan Co., Ltd.			
生产单位 Manufacturer	Panasonic Gobel Energy Indonesia PT. Panasonic Gobel Energy Indonesia PT.			
检验方法、程序 Inspection method and procedure	国际海事组织《国际海运危险货物规则》(2024版) IMO International Maritime Dangerous Goods Code (2024 Edition)			
样品外观 Sample appearance	银色金属外壳 Silvery Metal shell			
包装件信息 Package information	重量≤30kg. weight≤30kg.			
序号 NO.	电池种类 Battery type	型号 Model	容量Capacity /锂含量Li content	放置方式 Placement
1	不可充电锂金属电池芯 Primary Li-metal cell	CR2032	225mAh / ≤0.3g	电池单独运输 Battery only
鉴定 结论	1. 危险性识别 (Hazards identification) 锂金属电池。 Lithium metal battery.			
	2. 海运按照国际海事组织《国际海运危险货物规则》办理的类型 (Suggestion according to IMO IMDG Code) 根据特殊规定188, 该物品不受IMO IMDG Code其他条款限制。 The article is not subject to other provisions of IMO IMDG Code according to special provision 188.			
IDENTIFICATION CONCLUSION	3. 包装要求 (Packaging requirements) 无。 None.			
	检验日期: 2025-11-12 Inspection Date: 2025-11-12 签发日期: 2025-11-12 Issue Date: 2025-11-12 生效日期: 2026-01-01 Effective Date: 2026-01-01			
备注 Comment				


批准  
Approver: 王景审核  
Checker: 钱玉婷主检  
Appraiser: 孙倩

# 运输危险性鉴定书

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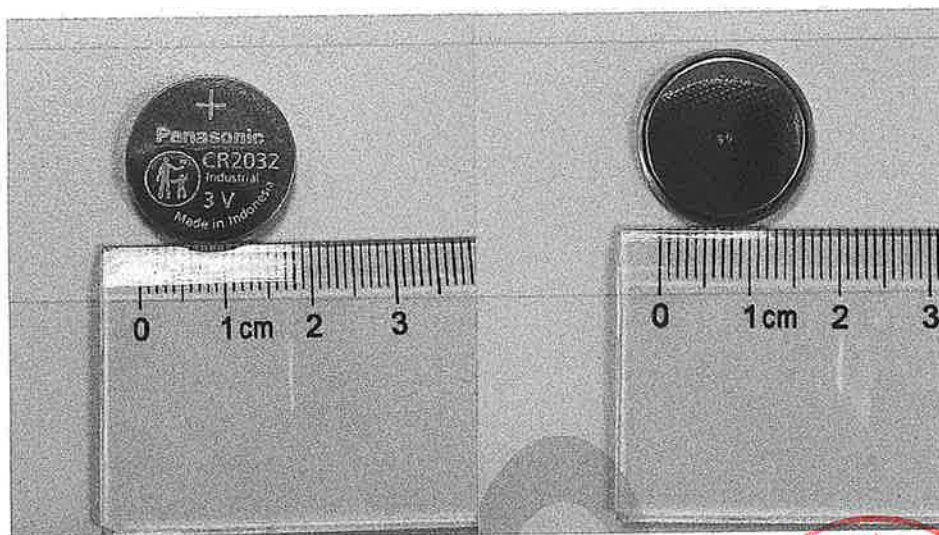
序号 No.	检验结果及其他事项 Inspection results and other things
1	<p>本鉴定书所述锂电池按照《国际海运危险货物规则》(2024版) 2.9.4.5规定的质量管理体系进行制造。 Lithium cells and batteries listed in this report were manufactured under the quality management program described in IMDG CODE 2024 EDITION 2.9.4.5.</p>
2	<p>本鉴定书所述锂电池已通过联合国《试验和标准手册》第III部分38.3小节相应测试要求。 包装件能够承受1.2m跌落试验。 Lithium cells and batteries listed in this report are of the types proved to meet the requirements of each applicable test in the UN Manual of Tests and Criteria, Part III, sub-section 38.3. The package has passed the 1.2m drop test. UN38.3试验概要编号 The UN38.3 Test Summary No. (s) 812200400866404 详细信息请扫描右侧二维码。 Please scan the QR code on the right for more information.</p> 
3	<p>锂电池完全封装在内包装内, 位于坚固的外包装中。 Lithium cells and batteries are packed in inner packagings that completely enclose the cell or battery and placed in a strong outer packaging.</p>
4	<p>电池具有适当的防短路措施。 Cells and batteries are properly protected to prevent short circuits.</p>
5	<p>每个包装件必须标示恰当的锂或钠离子电池标记。 装有锂电池的包装件, 符合国际民航组织《危险物品安全航空运输技术细则》第4部分第11章的包装说明965或968第IB部分规定的, 黏贴5.2.1.10(锂或钠离子电池标记)和5.2.2.2所示的9A型标签, 应视为符合本特殊规定188的规定。注:《国际海运危险货物规则》(2020版)5.2.1.10中显示电话号码附加信息的锂电池标记, 可继续使用至2026年12月31日。 Each package shall be marked with the appropriate lithium or sodium ion battery mark. Packages containing lithium batteries packed in conformity with the provisions of part 4, chapter 11, packing instructions 965 or 968, section IB of the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by air that bear the mark as shown in 5.2.1.10(lithium or sodium ion battery mark) and the label shown 5.2.2.2, Model No.9A shall be deemed to meet the provisions of this special provision 188. Note: The mark shown in 5.2.1.10(lithium battery mark) of the IMDG CODE 2020 EDITION, showing the telephone number for additional information, may continue to be applied until 31 December 2026.</p>
6	/
7	/

# 运输危险性鉴定书

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# UN38.3 试验概要

## UN38.3 Test Summary



812200400866404

单位信息 Company information			
委托单位 Consignor	松下新能源株式会社 Panasonic Energy Co., Ltd. 日本大阪府守口市松下町 1 番 1 号 1-1 Matsushita-cho, Moriguchi-shi, Osaka, Japan 021-3855-2331 zhuwenjun@cn.panasonic.com /		
生产单位 Manufacturer	Panasonic Gobel Energy Indonesia PT. Panasonic Gobel Energy Indonesia PT. JI. Teuku Umar Km. 44, Cikarang Barat Bekasi, Jawa Barat - Indonesia 021-38552000 sunyongze@cn.panasonic.com /		
测试单位 Test lab	松下新能源株式会社 Panasonic Energy Co., Ltd. 日本大阪府守口市松下町 1 番 1 号 1-1 Matsushita-cho, Moriguchi-shi, Osaka, Japan 021-3855-2331 zhuwenjun@cn.panasonic.com /		
电池信息 Battery information			
名称 Name	锂电池	品牌 Brand	/
型号 Type	CR2032	原始测试型号 Original tested type	/
标称电压(V) Nominal voltage	3	容量/能量 Capacity/energy	225mAh
描述 Description	不可充电锂金属电池芯 Primary Li-metal cell	锂含量(g) Li content	0.07
质量(kg) Mass	0.00284	外观 Appearance	银色钮扣状金属外壳 Silvery button metal shell
测试信息 Test information			
原报告编号 Original test report No.	CP0008-12	测试报告日期 Date of test report	2020-06-29
测试标准 Test standard	联合国《关于危险货物运输的建议书试验和标准手册》 第 38.3 章 UNITEDNATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria 38.3 ST/SG/AC.10/11/Rev.6/Ame nd.1		
T.1 高度模拟 Altitude simulation	合格 Passed	T.2 温度测试 Thermal test	合格 Passed
T.3 振动测试 Vibration	合格 Passed	T.4 冲击测试 Shock	合格 Passed
T.5 外部短路 External short circuit	合格 Passed	T.6 挤压 Crush	合格 Passed
T.7 过度充电 Overcharge	/	T.8 强制放电 Forced discharge	合格 Passed
38.3.3 (f)	/	38.3.3 (g)	/





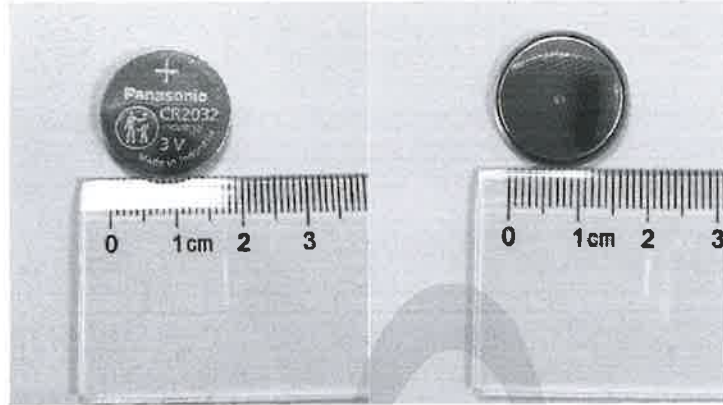
# UN38.3 试验概要



## UN38.3 Test Summary



812200400866404

### 样品图片 Sample Picture



<p>结论 Conclusion</p>	<p>测试样品符合联合国《关于危险货物运输的建议书试验和标准手册》ST/SG/AC.10/11/Rev.6/Amend.1 38.3 标准要求。The tested samples meet the requirements of test items of the UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS" Manual of Tests and Criteria ST/SG/AC.10/11/Rev.6/Amend.1 38.3</p>		
<p>备注 Remark</p>	<p>/</p>		
<p>签名 Signature 职务 Title</p>	<p> 王寅 副总工程师 Vice chief engineer</p>	<p>签发日期 Issued date</p>	<p>2022-11-18 </p>

-验证码:295592-

\*\*\*报告结束\*\*\*

松下电器产业株式会社  
检验报告パナソニック株式会社  
エナジーデバイス事業部

Panasonic Corporation - Test Report

No. CP0008-12

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样品名称 Name of Sample	中文 Chinese	锂电池 CR2032 (3.0V 225mAh)		
	英文 English	Lithium Battery CR2032 (3.0V 225mAh)		
送检单位 Consignor	松下电器产业株式会社/ Panasonic Corporation			
生产单位 Manufacturer	松下电器产业株式会社/ PT. Panasonic Gobel Energy Indonesia			
检验方法 Test Method	联合国《关于危险货物运输的建议书》 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS"			
判定标准 Criterion	联合国《关于危险货物运输的建议书》 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS"			
样品外观 Appearance	硬币形 Coin type			
检测起迄日期 Test Date	2019/6/21 - 2020/6/29	样品编号 Sample No	/	
检测项目 Test Items	高度模拟试检; 热测试; 振动试检; 冲击试检; 外短路试检; 压坏试检; 强制放电试检 Altitude simulation, Thermal test, Vibration test, Shock, External short circuit, Crush, Forced discharge			
检验结论 Conclusion	受检样品通过 UN38.3检测, 检测合格。 The sample has passed the test items of UN38.3. 日期(date):2020年(y) 6月(m) 29日(d)			
备注 Remark	/			
受检单位地址 Consignor Address	日本:大阪府守口市松下町1番1号 1-1 Matsushita-cho, Moriguchi City Osaka, Japan	邮政编码 Post Code	570-8511	

批准人职务(the title of approver):

- 质量保证部长(Director of Quality Assurance)  
 质量保证科长(Manager of Quality Assurance)  
 质量保证主任工程师(Chief Engineer of QA)

批准 Approver: M. Amanno审核 Checker: J. Yano主检 Appraiser: S. Shimakawa

1. Oct. 2020 No.1

Panasonic Confidential

# 松下电器产业株式会社 检验报告

Panasonic Corporation - Test Report

No. CP0008-12

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序号 No	检测项目 Name of Test Items	标准要求或标准款号 Standard Requirement or the Clause Number of Standard	检验结果 Test Result	本项结论 Test Conclusion	备注 Remark
1	高度模拟试检 Altitude simulation	试检和标准手册 38.3(6 <sup>th</sup> Amd1) 38.3 Test T-1 UN Manual of Tests and Criteria Section (6 <sup>th</sup> Amd1) 38.3 Test T-1	见附表1 See Appendix 1	合格 Passed	/
2	热测试检 Thermal test	试检和标准手册 38.3(6 <sup>th</sup> Amd1) 38.3 Test T-2 UN Manual of Tests and Criteria Section (6 <sup>th</sup> Amd1) 38.3 Test T-2	见附表2 See Appendix 2	合格 Passed	/
3	振动试检 Vibration test	试检和标准手册 38.3(6 <sup>th</sup> Amd1) 38.3 Test T-3 UN Manual of Tests and Criteria Section (6 <sup>th</sup> Amd1) 38.3 Test T-3	见附表3 See Appendix 3	合格 Passed	/
4	冲击试检 Shock	试检和标准手册 38.3(6 <sup>th</sup> Amd1) 38.3 Test T-4 UN Manual of Tests and Criteria Section (6 <sup>th</sup> Amd1) 38.3 Test T-4	见附表4 See Appendix 4	合格 Passed	/
5	外短路试检 External short circuit	试检和标准手册 38.3(6 <sup>th</sup> Amd1) 38.3 Test T-5 UN Manual of Tests and Criteria Section (6 <sup>th</sup> Amd1) 38.3 Test T-5	见附表5 See Appendix 5	合格 Passed	/
6	压坏试检 Crush	试检和标准手册 38.3(6 <sup>th</sup> Amd1) 38.3 Test T-6 UN Manual of Tests and Criteria Section (6 <sup>th</sup> Amd1) 38.3 Test T-6	见附表6 See Appendix 6	合格 Passed	/
7	强制放电试检 Forced discharge	试检和标准手册 38.3(6 <sup>th</sup> Amd1) 38.3 Test T-8 UN Manual of Tests and Criteria Section (6 <sup>th</sup> Amd1) 38.3 Test T-8	见附表7 See Appendix 7	合格 Passed	/
检验环境条件 / Test Environment Condition		环境温度: 15-25°C / Ambient Temperature: 15-25°C			
分包检验状况 Subcontracted Test Condition	检测项目 Test Items	/			
	分包实验室 Subcontracted Laboratory	名称 Name	/	邮编 Post Code	/
		地址 Address	/	电话 Tel	/

## 松下电器产业株式会社

## 检验报告

-----附表1

Panasonic Corporation - Test Report

No. CP0008-12

Appendix 1

共9页第3页

序号 No.	T-1	检测项目名称 Name of Test Items		高度模拟试检 Altitude simulation				
		试检前 Before		试检后 After		质量 Mass Loss (%)	剩余电压 Residual OCV (%)	其他 现象 Other Event
样品 号码 Sample No.	样品状态 Sample State	质量 Mass (g)	开路电压 OCV (V)	质量 Mass (g)	开路电压 OCV (V)			
1	未放电 Undischarged	2.818	3.192	2.820	3.211	0.00	100.6	0
2	未放电 Undischarged	2.823	3.190	2.823	3.210	0.00	100.6	0
3	未放电 Undischarged	2.829	3.188	2.829	3.209	0.00	100.7	0
4	未放电 Undischarged	2.811	3.187	2.810	3.207	0.04	100.6	0
5	未放电 Undischarged	2.833	3.191	2.832	3.211	0.04	100.6	0
6	未放电 Undischarged	2.807	3.190	2.806	3.209	0.04	100.6	0
7	未放电 Undischarged	2.834	3.199	2.835	3.217	0.00	100.6	0
8	未放电 Undischarged	2.826	3.189	2.826	3.208	0.00	100.6	0
9	未放电 Undischarged	2.821	3.190	2.820	3.210	0.04	100.6	0
10	未放电 Undischarged	2.813	3.189	2.812	3.208	0.04	100.6	0
11	完全放电 Fully Discharged	2.837	-	2.837	-	0.00	-	0
12	完全放电 Fully Discharged	2.832	-	2.831	-	0.04	-	0
13	完全放电 Fully Discharged	2.821	-	2.821	-	0.00	-	0
14	完全放电 Fully Discharged	2.830	-	2.829	-	0.04	-	0
15	完全放电 Fully Discharged	2.816	-	2.816	-	0.00	-	0
16	完全放电 Fully Discharged	2.824	-	2.825	-	0.00	-	0
17	完全放电 Fully Discharged	2.813	-	2.814	-	0.00	-	0
18	完全放电 Fully Discharged	2.828	-	2.829	-	0.00	-	0
19	完全放电 Fully Discharged	2.821	-	2.822	-	0.00	-	0
20	完全放电 Fully Discharged	2.820	-	2.820	-	0.00	-	0

备注: L-漏液, V-漏气, D-解体, R-破裂, F-起火, 0-无漏液, 无漏气, 无解体, 无破裂, 无起火  
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.

1. Oct. 2020 No.3

Panasonic Confidential

## 松下电器产业株式会社

## 检验报告

-----附表2

Panasonic Corporation - Test Report

No. CP0008-12

Appendix 2

共9页第4页

序号 No.	T-2	检测项目名称 Name of Test Items		热测试检 Thermal test				
		试检前 Before		试检后 After		质量 Mass Loss (%)	剩余电压 Residual OCV (%)	其他 现象 Other Event
样品 号码 Sample No.	样品状态 Sample State	质量 Mass (g)	开路电压 OCV (V)	质量 Mass (g)	开路电压 OCV (V)			
1	未放电 Undischarged	2.820	3.211	2.819	3.228	0.04	100.5	0
2	未放电 Undischarged	2.823	3.210	2.823	3.230	0.00	100.6	0
3	未放电 Undischarged	2.829	3.209	2.829	3.227	0.00	100.6	0
4	未放电 Undischarged	2.810	3.207	2.808	3.228	0.07	100.7	0
5	未放电 Undischarged	2.832	3.211	2.833	3.229	0.00	100.6	0
6	未放电 Undischarged	2.806	3.209	2.806	3.228	0.00	100.6	0
7	未放电 Undischarged	2.835	3.217	2.834	3.232	0.04	100.5	0
8	未放电 Undischarged	2.826	3.208	2.826	3.227	0.00	100.6	0
9	未放电 Undischarged	2.820	3.210	2.821	3.230	0.00	100.6	0
10	未放电 Undischarged	2.812	3.208	2.813	3.227	0.00	100.6	0
11	完全放电 Fully Discharged	2.837	-	2.837	-	0.00	-	0
12	完全放电 Fully Discharged	2.831	-	2.830	-	0.04	-	0
13	完全放电 Fully Discharged	2.821	-	2.821	-	0.00	-	0
14	完全放电 Fully Discharged	2.829	-	2.830	-	0.00	-	0
15	完全放电 Fully Discharged	2.816	-	2.815	-	0.04	-	0
16	完全放电 Fully Discharged	2.825	-	2.824	-	0.04	-	0
17	完全放电 Fully Discharged	2.814	-	2.813	-	0.04	-	0
18	完全放电 Fully Discharged	2.829	-	2.829	-	0.00	-	0
19	完全放电 Fully Discharged	2.822	-	2.821	-	0.04	-	0
20	完全放电 Fully Discharged	2.820	-	2.820	-	0.00	-	0

备注: L-漏液, V-漏气, D-解体, R-破裂, F-起火, 0-无漏液, 无漏气, 无解体, 无破裂, 无起火  
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.

## 松下电器产业株式会社

## 检验报告

-----附表3

Panasonic Corporation - Test Report

No. CP0008-12

Appendix 3

共9页第5页

序号 No.	T-3	检测项目名称 Name of Test Items		振动试检 Vibration Test				
		试检前 Before		试检后 After		质量 Mass Loss (%)	剩余电压 Residual OCV (%)	其他 现象 Other Event
样品 号码 Sample No.	样品状态 Sample State	质量 Mass (g)	开路电压 OCV (V)	质量 Mass (g)	开路电压 OCV (V)			
1	未放电 Undischarged	2.819	3.228	2.819	3.229	0.00	100.0	0
2	未放电 Undischarged	2.823	3.230	2.822	3.231	0.04	100.0	0
3	未放电 Undischarged	2.829	3.227	2.828	3.228	0.04	100.0	0
4	未放电 Undischarged	2.808	3.228	2.809	3.229	0.00	100.0	0
5	未放电 Undischarged	2.833	3.229	2.833	3.230	0.00	100.0	0
6	未放电 Undischarged	2.806	3.228	2.806	3.229	0.00	100.0	0
7	未放电 Undischarged	2.834	3.232	2.834	3.233	0.00	100.0	0
8	未放电 Undischarged	2.826	3.227	2.826	3.228	0.00	100.0	0
9	未放电 Undischarged	2.821	3.230	2.821	3.231	0.00	100.0	0
10	未放电 Undischarged	2.813	3.227	2.813	3.228	0.00	100.0	0
11	完全放电 Fully Discharged	2.837	-	2.837	-	0.00	-	0
12	完全放电 Fully Discharged	2.830	-	2.831	-	0.00	-	0
13	完全放电 Fully Discharged	2.821	-	2.821	-	0.00	-	0
14	完全放电 Fully Discharged	2.830	-	2.830	-	0.00	-	0
15	完全放电 Fully Discharged	2.815	-	2.816	-	0.00	-	0
16	完全放电 Fully Discharged	2.824	-	2.824	-	0.00	-	0
17	完全放电 Fully Discharged	2.813	-	2.813	-	0.00	-	0
18	完全放电 Fully Discharged	2.829	-	2.828	-	0.04	-	0
19	完全放电 Fully Discharged	2.821	-	2.821	-	0.00	-	0
20	完全放电 Fully Discharged	2.820	-	2.820	-	0.00	-	0

备注: L-漏液, V-漏气, D-解体, R-破裂, F-起火, 0-无漏液, 无漏气, 无解体, 无破裂, 无起火  
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.

## 松下电器产业株式会社

## 检验报告

-----附表4

Panasonic Corporation - Test Report

No. CP0008-12

Appendix 4

共9页第6页

序号 No.	T-4	检测项目名称 Name of Test Items		冲击试检 Shock Test				
		试检前 Before		试检后 After		质量 Mass Loss (%)	剩余电压 Residual OCV (%)	其他 现象 Other Event
样品 号码 Sample No.	样品状态 Sample State	质量 Mass (g)	开路电压 OCV (V)	质量 Mass (g)	开路电压 OCV (V)			
1	未放电 Undischarged	2.819	3.229	2.819	3.234	0.00	100.2	0
2	未放电 Undischarged	2.822	3.231	2.822	3.234	0.00	100.1	0
3	未放电 Undischarged	2.828	3.228	2.829	3.231	0.00	100.1	0
4	未放电 Undischarged	2.809	3.229	2.810	3.232	0.00	100.1	0
5	未放电 Undischarged	2.833	3.230	2.833	3.233	0.00	100.1	0
6	未放电 Undischarged	2.806	3.229	2.806	3.232	0.00	100.1	0
7	未放电 Undischarged	2.834	3.233	2.834	3.236	0.00	100.1	0
8	未放电 Undischarged	2.826	3.228	2.825	3.231	0.04	100.1	0
9	未放电 Undischarged	2.821	3.231	2.821	3.234	0.00	100.1	0
10	未放电 Undischarged	2.813	3.228	2.812	3.231	0.04	100.1	0
11	完全放电 Fully Discharged	2.837	-	2.837	-	0.00	-	0
12	完全放电 Fully Discharged	2.831	-	2.831	-	0.00	-	0
13	完全放电 Fully Discharged	2.821	-	2.821	-	0.00	-	0
14	完全放电 Fully Discharged	2.830	-	2.830	-	0.00	-	0
15	完全放电 Fully Discharged	2.816	-	2.816	-	0.00	-	0
16	完全放电 Fully Discharged	2.824	-	2.824	-	0.00	-	0
17	完全放电 Fully Discharged	2.813	-	2.814	-	0.00	-	0
18	完全放电 Fully Discharged	2.828	-	2.828	-	0.00	-	0
19	完全放电 Fully Discharged	2.821	-	2.821	-	0.00	-	0
20	完全放电 Fully Discharged	2.820	-	2.820	-	0.00	-	0

备注: L-漏液, V-漏气, D-解体, R-破裂, F-起火, 0-无漏液, 无漏气, 无解体, 无破裂, 无起火  
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.

## 松下电器产业株式会社

## 检验报告

-----附表5

Panasonic Corporation - Test Report  
Appendix 5No. CP0008-12  
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序号 No.	T-5	检测项目名称 Name of Test Items	外短路试检 External short circuit
样品号码 Sample No.	样品状态 Sample State	样品表面最高温度 Max. External Temperature(°C)	其他现象 Other Event
1	未放电 Undischarged	65.5	0
2	未放电 Undischarged	65.6	0
3	未放电 Undischarged	64.8	0
4	未放电 Undischarged	64.6	0
5	未放电 Undischarged	65.5	0
6	未放电 Undischarged	65.6	0
7	未放电 Undischarged	65.4	0
8	未放电 Undischarged	64.6	0
9	未放电 Undischarged	64.0	0
10	未放电 Undischarged	63.9	0
11	完全放电 Fully Discharged	58.1	0
12	完全放电 Fully Discharged	58.1	0
13	完全放电 Fully Discharged	58.0	0
14	完全放电 Fully Discharged	58.3	0
15	完全放电 Fully Discharged	58.1	0
16	完全放电 Fully Discharged	58.1	0
17	完全放电 Fully Discharged	58.0	0
18	完全放电 Fully Discharged	58.0	0
19	完全放电 Fully Discharged	58.3	0
20	完全放电 Fully Discharged	58.1	0

备注: D-解体, R-破裂, F-起火, 0-无解体, 无破裂, 无起火  
Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.



# 松下电器产业株式会社 检验报告

-----附表7

Panasonic Corporation - Test Report  
Appendix 7

No. CP0008-12  
共9页第9页

序号 No.	T-8	检测项目名称 Name of Test Items	强制放电试检 Forced Discharge
样品号码 Sample No.	样品状态 Sample State	试检现象 Event	
31	完全放电 Fully Discharged		0
32	完全放电 Fully Discharged		0
33	完全放电 Fully Discharged		0
34	完全放电 Fully Discharged		0
35	完全放电 Fully Discharged		0
36	完全放电 Fully Discharged		0
37	完全放电 Fully Discharged		0
38	完全放电 Fully Discharged		0
39	完全放电 Fully Discharged		0
40	完全放电 Fully Discharged		0
备注: D-解体, F-起火, 0-无解体, 无起火 Note: L-Leakage, V-Venting, D-Disassembly, R-Rupture, F-Fire, 0-No leakage, no venting, no disassembly, no rupture & no fire.			

松下新能源株式会社  
检验报告

No CPCN12402-1

Panasonic Energy Co., Ltd. - Test Report

共2页第1页

样品名称 Name of Sample	中文 Chinese	锂电池 CR-2032L/BE	
	英文 English	Lithium Battery CR-2032L/BE	
送检单位 Consignor	松下新能源株式会社/Panasonic Energy Co., Ltd.		
生产单位 Manufacturer	松下新能源株式会社/ PT. Panasonic Gobel Energy Indonesia		
检验方法 Test Method	联合国《关于危险货物运输的建议书》 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS"		
判定标准 Criterion	联合国《关于危险货物运输的建议书》 UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS"		
样品外观 Appearance	淡茶颜色直方形纸箱 Cardboard Box of Rectangular Solid of Light Brown		
检测起迄日期 Test Date	2024.06.27	样品编号 Sample No	/
检测项目 Test Items	1.2米跌落试验、包装件重量测试 1.2m Drop Test, Weight Measure		
检验结论 Conclusion	受检样品通过所有项目检测，检测结果合格。 The sample has passed all of the testing items.  签发日期(date):2024年(y) 10月(m)17日(d)		
备注 Remark	/		
受检单位地址 Consignor Address	日本:大阪府守口市松下町1番1号 1-1 Matsushita-cho, Moriguchi City Osaka, Japan	邮政编码 Post Code	570-8511

批准人职务(the title of approver):

 质量保证部长(Director of Quality Assurance) 质量保证科长(Manager of Quality Assurance) 质量保证主任工程师(Chief Engineer of QA)

批准 Approver:

J. Okamoto

审核 Checker:

J. Masumura

主检 Appraiser:

J. Shimizu

17. Oct. 2024 No.1

Confidential

松下新能源株式会社  
检验报告

No CPCN12402-1

Panasonic Energy Co., Ltd. - Test Report

共2页第2页

序号 No	检验项目名称 name of test items	标准要求或标准条款号 standard requirement or the clause number of standard	检测结果 test result		本项结论 test conclusion	备注 remark
1	1.2米 跌落试验 1.2m Drop Test	联合国《关于危险货物运输 的建议书规章范本》(22th) (以下简称: 规章范本) (22th) 3.3章188条款  Recommendations on the TRANSPORT OF DANGEROUS GOODS Model  Regulations(22th) (for short: UN Model Regulations) SPECIAL PROVISION 188	面跌落	包装未破裂, 内装物完好。  The package is not cracked, and the contents are not damaged and not shifted.	合格 Passed	/
			棱跌落	包装未破裂, 内装物完好。  The package is not cracked, and the contents are not damaged and not shifted.		
			角跌落	包装未破裂, 内装物完好。  The package is not cracked, and the contents are not damaged and not shifted.		
2	包装件 质量测试 Weight Measure	规章范本 (22th) 3.3章188条款  UN Model Regulations(22th) SPECIAL PROVISION 188	Weight of 1box : 11.4 kg(Net) 13.7 kg(Gross)		合格 Passed	/
检验环境条件 test environment condition		环境温度: 25deg-C Ambient temperature: 25deg-C				
分包检验情况 Subcontracted test condition	检验项目 test item	/				
	分包 实验室 Subcontracted Laboratory	名称 name	/		邮编 post code	/
		地址 address	/		电话 tel	/

Control  
number

02019-06E-004-1

Specification

Lithium Primary Battery

Ordering code

CR-2032L/BE

Model code

CR2032

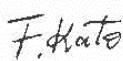

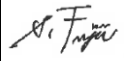

Approved by

Division/Department

Name

Signature/date

Date of Issue : Jun,4,2019  
Industrial Solutions Company  
Panasonic Corporation

Approved	Checked	Checked	Drafted
 F.Kato	 D.Sumimoto	 S.Fujii	 Y.Kashimura

Eng. Dep.

PECGI

Eng. Sec.

SE

## Revision history

No.	Date	
1	2019/6/4	Issued
2		
3		
4		
5		
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10		
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15		

### 1. Applicable range

This specification applies to manganese dioxide lithium batteries, CR-2032L/BE (the Products) which are manufactured by Industrial Solutions (IS) Company, Panasonic Corporation.

### 2. Nominal specification

- 2.1. Model code (bare cell) CR2032
- 2.2. Nominal voltage 3V
- 2.3. Nominal capacity 225 mAh
- 2.4. Operation temperature From -30 to 60 °C  
(Please consult Panasonic in case continuous high-temperature usage conditions)
- 2.5. Storage Condition (Recommendable) Temperature : 5°C to 35°C, Humidity : 45~85%RH
- 2.6. Mass Refer to drawing 1
- 2.7. Dimension Refer to drawing 1
- 2.8. Battery composition Lithium primary battery composed of cathode from manganese dioxide anode from lithium and electrolyte from organic solvent and lithium salt.

### 3. Battery characteristics

Table 1. CR2032 characteristics

	Items	Test method	Temperature		initial	After 1 year in room temperature
1	Open circuit voltage	Voltage between terminals (Min)	20 +/- 2°C		3.1 V	3.1 V
2	Internal resistance	1kHz sine wave method (Max.)	20 +/- 2°C		20 Ω	-
3	Discharge duration	Continuous discharge (Std.)	20 +/- 2°C	Load : 15 kΩ cut offV : 2.0V	1183 h	1133 h
		Continuous discharge (Min.)			1041 h	1019 h

### 4. Indication

#### 4.1. Below items are indicated on battery or its package

- Model code CR2032
- Nominal voltage 3V
- Plus polarity +
- Manufacturer or its brand Panasonic
- Production country and Classification : Made in Indonesia

\*There may be a case that design of indication is changed and in this case, Panasonic will inform it in advance

#### 4.2. Production date code

##### 4.2.1 Battery assemble date.

Battery assembling date is expressed by two digit code and is stamped at the center of negative case.

First digit: The last digit of dominical year;

Second digit; Month (October=O, November=Y, December=Z)

Example : 8Y ⇒ (November 2018)

#### 4.3. UL

This battery is certificate by UL and listed on file number MH12210

#### 4.4 Production Site

PT. Panasonic Gobel Energy Indonesia, Jl. Teuku Umar Km. 44, Cikarang Barat Bekasi, Jawa Barat Indonesia

#### 4.5 RoHS comply

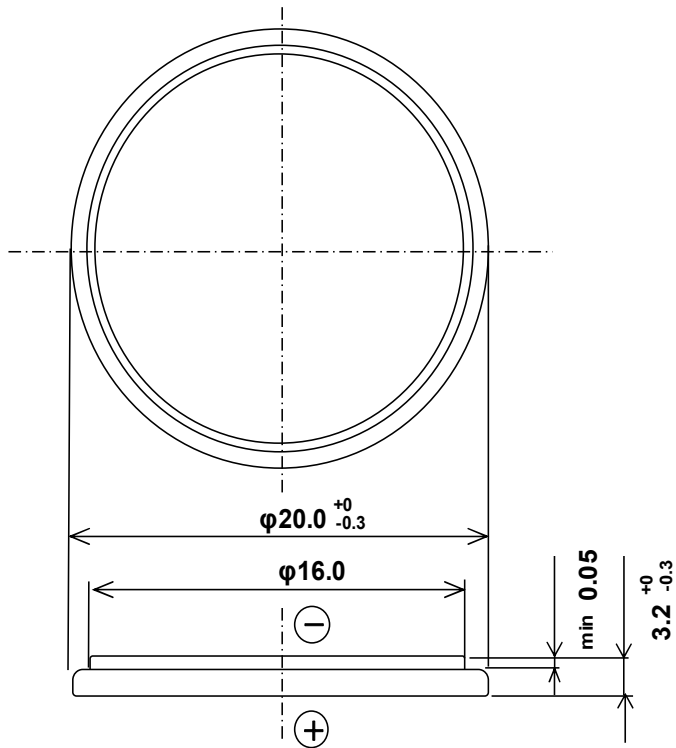
The battery herein complies with EU battery directive (2006/66/EC).

Since the batteries shall comply with EU battery directive (2006/66/EC), RoHS directive does not cover batteries. However, this battery does not use the Six substances restricted by RoHS directive.

Therefore, each content of Six restricted substances is less than the maximum amount regulated by RoHS.

Drawing 1. Dimensions

Model code : CR2032



Terminal : Plus terminal material : Stainless steel / Ni coat  
Minus terminal material : Stainless steel / Ni coat

Mass(bare cell) : Approx. 2.8 g

5. Test condition and performance

5.1. External dimensions

Measured with caliper described in item 6.3.(1) herein without making short-circuit.

Dimensions should confirm to drawing 1 herein.

5.2. Open circuit voltage

Measure the open circuit voltage with the voltage meter described in item 6.3.(2) herein after keeping the battery for 4 hours at least in measurement environment. Open circuit voltage shall conform to table 1 herein.

5.3 Internal resistance

Measure the internal resistance with the resistance meter described in item 6.3.(3) herein after keeping the battery for 4 hours at least in measurement environment. Internal resistance shall conform to table 1 herein.

5.4. Discharge duration

Discharge the battery with the load resistance specified in table 1 herein after keeping the battery in measurement environment for 4 hours at least. The discharge duration is determined as an operation time that the operation voltage reaches to the cut off voltage specified in the table 1 herein.

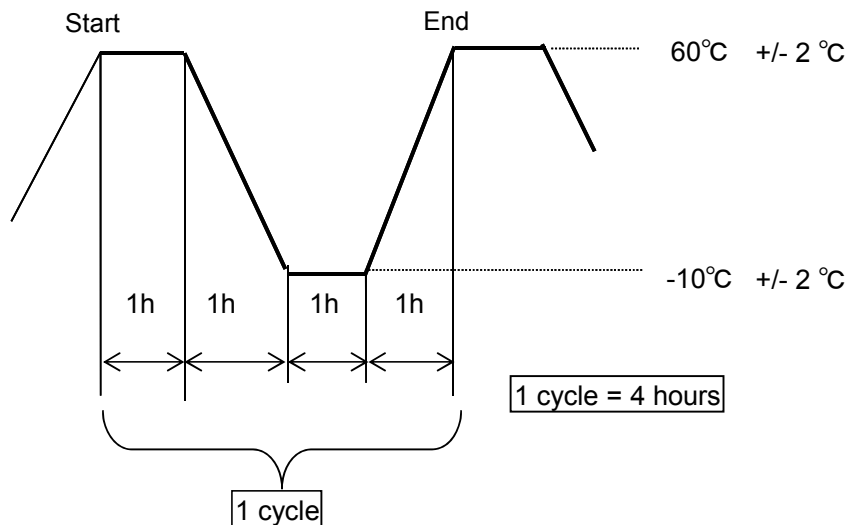
Discharge duration shall conform to table 1 herein.

5.5. Anti-leakage

Appearance check after 42 cycles of thermal cycle by the condition showing below. Battery shall not have deformation or

\* This test should start from high temperature (60°C) position.

\* No humidifying to ambient temperature and humidity.



5.6. Storage characteristics	
(1) Open circuit voltage	After storage term described on table 1 herein, keep the battery for 4 hours at least in measurement environment, then measure the open circuit voltage with the voltage meter described in item 6.3.(2) herein.
(2) Internal resistance	After storage term described on table 1 herein, keep the battery for 4 hours at least in measurement environment, then measure the internal resistance with the resistance meter described in item 6.3.(3) herein. Internal resistance shall conform to table 1
(3) Discharge duration	After storage term described on table 1 herein, keep the battery for 4 hours at least in measurement environment, then discharge the battery with the load resistance specified in table 1 herein. The discharge duration is determined as an operation time that the operation voltage reaches to the cut off voltage specified in the table 1 herein. Discharge duration shall conform to values described in table 1 herein.
5.7. Appearance	No deformation, bruise and stain which cause practical interference.
6. Test environment and methods	
6.1. Initial test	Initial test must be done within 2 months from delivery.
6.2. Temperature and humidity	Unless otherwise specified, test should be carried out in room temperature (20 +/- 2 °C) and room humidity (65 +/- 20%RH).
6.3. Measuring equipment	
(1) Dimension	Micrometer defined by JIS B7502 or equivalent or more accurate one must be used for dimension measurement. For one digit decimals tolerance, caliper with 0.05mm accuracy which is defined JIS B7507 or higher accuracy equipment must be used.
(2) Voltage	Voltage meter defined by JIS C1102 class 0.2 or higher, and more than 10Mohm impedance must be used.
(3) Internal resistance	It should be measured by sinusoidal current method (1kHz). Measurement should be finished within 5 seconds. (As a general rule, HIOKI LCR meter IM3523 with DC BAIS VOLTAGE UNIT 9268-10 or equivalent should be used.)
(4) Load resistance	Load resistance includes all resistance of discharge circuit, and its tolerance shall be less than 0.5%.
(5) Visual inspection	Appearance check is observed by human eyes.

## 7. Revision and modification of this specification

Revision and modification must be carried out after the prior mutual agreement.

All accidents or issues caused by any events that are neither defined nor described in this specification, mutual discussion shall take place for the resolution.

If the customer fails to sign and return this specification, this specification will be automatically deemed to be accepted by the customer upon the earlier of (a) six (6) months from the issue date of this specification or (b) the issue date of the first P/O for the Products from the customer.

## 8. Important Notes (Warranty)

- (1) The Products are warranted to conform to the description contained in this specifications for a period of twelve [12] months from the ex-factory date the Products is shipped and any claim by the customer (apparatus manufacturer or distributor) must be made within such period. During that warranty period, if the customer finds a non-conformity of the Products and presents sufficient evidence that (i) such defect was caused by Panasonic's negligence, and (ii) the usage and handling of the Products were appropriate, Panasonic will independently analyze the cause of such non-conformity in the Products. If Panasonic's analysis confirms the non-conformity is solely attributable to the negligence of Panasonic, Panasonic agrees to supply conforming Products as a replacement at its sole expense. {The customer agrees that the rights and remedies of the customer will be strictly limited to those contained in this warranty with respect to any matter relating to the use of the Products and this specification. To the maximum extent permitted by law, the customer waives all other rights and remedies with respect to any matter in any way relating to the use of the Products and this specification.
- (2) Confirm and assure the matching and reliability of the Products on actual set or unit application with the customer's responsibility.
- (3) Panasonic shall not warrant or be responsible in any case where the customer fails to carry out proper handling, operating, installation, testing, service and checkout of the Products and/or to follow the instruction, cautions, warnings, notes provided in this specifications, or other Panasonic's reasonable instructions or advise.
- (4) Panasonic will not be held responsible for any issues caused by modifications to the Products taken place after that the Products are delivered to the customer.
- (5) If the customer intends to use or incorporate the Products for or into devices for which failure or malfunction of the Products may directly jeopardize life or cause threat of personal injury, such as for medical equipment, vehicle equipment, aircraft and aerospace equipment, aircraft electronics equipment, explosion-proof equipment or any other similar equipment ("Specific Application Devices"), the customer agrees to obtain prior written approval from Panasonic. Unless otherwise approved by Panasonic in advance, Panasonic shall not take any responsibility for the use or incorporation of the Products for or into any Specific Application Devices.
- (6) To the maximum extent permitted by applicable law, irrespective of whether the said prior written approval from Panasonic is obtained, Panasonic shall not be liable for any claims from third parties arising from, or in connection with the use of the Products and this specification.

## 9. Precautions for use

### 9.1 Cautions for storage

- Store the battery at a constant temperature of 35 degree C or less in order to prevent deteriorations from heat.
- Keep the battery away from high humidity such as 85% RH or higher in order to prevent dew condensations on the battery that may cause to electrical leakage.
- Keep the battery away from heat sources i.e., boiler, radiator and etc., and from . direct sunlight.

### 9.2 Warning for safety

Following cautions should be taken into consideration in order to use this battery in safe, since the battery contains combustible materials such as Lithium metal and organic electrolyte.

- Do not use except in applicable model or equipment.
- Do not mix fresh and used batteries.
- Do not mix different types (chemistries) of batteries.
- Do not short circuit.
- Do not charge.
- If multiple batteries are kept in contact with each other. The (+) and (-) terminals may short-circuit, and/or the charging possibly happen by other adjacent batteries, which may cause of shorten service life, significant damages and catching fire.
- Do not dispose into fire.
- Do not heat up higher than 100°C.
- Do not solder direct to battery.
- Do not disassemble.
- Do not soak in water.
- Do not deform.
- Do not apply inadequacy modifications or remodeling on the batteries.
- Insert the batteries in the correct polarity position.

### Warning for prevention of ingestion accident

- Small-sized batteries can easily be swallowed. They must be kept out of the reach of small children.
- Also, in the design of equipment using batteries, the care should be taken to ensure that batteries are NOT easy removable for children.

### 9.3 Caution for better usage

- Use gold-plated or nickel-plated steel or stainless steel strips for terminals in order to keep good conductivity with the battery surface. Terminals made of gold-plated phosphor bronze will ensure stable conductivity.
- Apply and keep the contact pressure more than 2N for stable conductivity.
- Before inserting batteries, check the terminal contact surfaces on both the equipment and the batteries are clean, and also check that they are not deformed. If the contact surfaces are dirty, clean up and dry them thoroughly before inserting batteries.
- If there is a sliding between the equipment terminal and the battery terminal, the surface condition of the terminal may change and the contact resistance may increase. Please design the equipment which does not cause a sliding. Depending on the usage environment, if using conductive lubricant at the contact point, there may be the effect of delaying the change of the surface condition of the terminal.
- Even if batteries of the same size or same shape, they may differ in type or grade. When replacing batteries, confirm that they are correct type by checking the identification symbol (designated by I.E.C. standards) which is marked on the battery and its packages.
- Lithium primary batteries continuously indicate high voltage even toward the end of their service life. As such, they may be mistakenly judged as yet being strong. In case of multiple batteries are used in an application or equipment, all batteries should be replaced at the same time when the one of those batteries shows it has totally consumed even other batteries seems time when the one of those batteries shows it has totally consumed even other batteries seems still operating, since the remaining capacity in other batteries must be also quite little at the time.
- When multiple batteries are used in series in applications or equipments, it may occur that the one battery has a polarity inversion at the end of operation life. That behavior happen when the battery had consumed its capacity earlier than other batteries. Therefore, that is not failure of battery.
- When the Lithium battery has short-circuit, even slightly. A certain amount of time is required for recovering its voltage completely. If the electrical characteristics of the battery are measured at a time before a sufficient time has passed, it may indicate unstable values due to the battery was in recovering mode.
- If the battery touch with any antistatic conductive materials include packing bags, trays, mats, sheets, films and resin cases, sheets, for example, have a resistance of  $10^3$  to  $10^6 \Omega$ , it may cause of short-circuit since both the positive and the negative terminal of the battery may contact with those materials. In order to prevent short circuit, special attention may apply when handle batteries or battery attached PCB in close to those materials.

#### Notice for equipment design

- Keep batteries away from heat source or flame, and water.
- Please contact us in case of using multiple batteries.

# Packaging Specification

Drawing  
Number

232-CN1-001G\_A

Lithium battery coin type

Tray for 20pcs.×Shrink Packing for 200pcs.×Outer Carton for 4000pcs.

## 1-Product

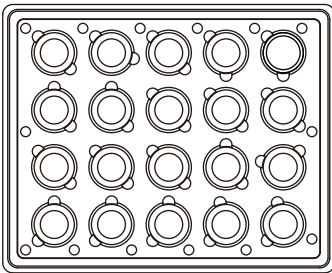
Refer to the product drawing

- ① This packaging specification is possibly modified if Panasonic decides it is required.
- ② The shape and dimensions of the tray may have varieties among molding dies or suppliers.
- ③ Please consult Panasonic if any detail information are required for handling battery with automatic insertion machine.

## 2-Tray for 20pcs.

\*The battery shape is different by product number

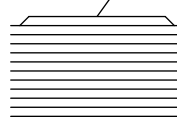
Arrange cells negative side up



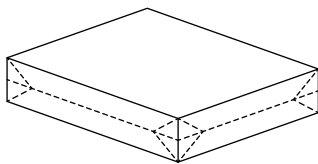
×10



Empty tray as lid 1pc.



## 3-Shrink Packing for 200pcs.



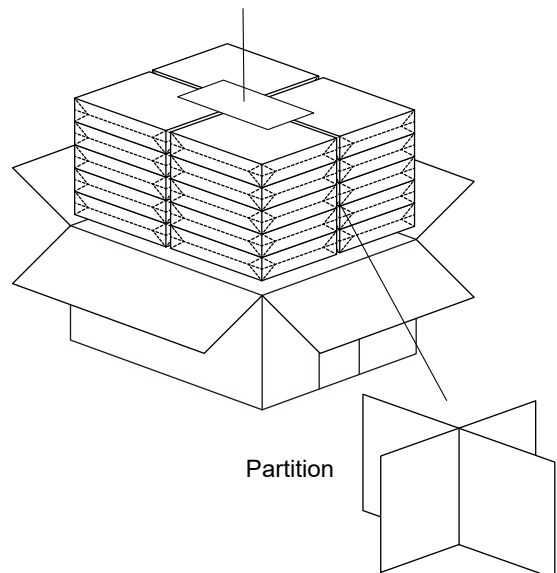
×20



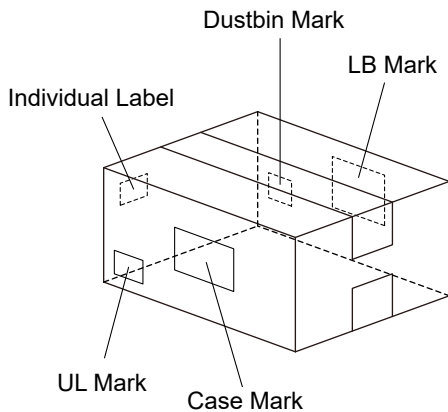
### Alignment

Internal management label

( This label is intended for Panasonic's internal management only and is not necessarily included with the products. )



## 4-Outer Carton for 4000pcs.



Partition

### Packing List

Dimension : 295×360×237mm  
M3 : 0.0251m<sup>3</sup>  
Net : 11.4kg  
Gross : 13.7kg

# Cautions for using lithium batteries

Improper battery Usage may result in deteriorated battery performance.  
Please read and follow the precautions below.

## 1. Prevent unexpected short-circuit or leakage of electricity

Short circuit decreases the initial battery capacity and requires voltage recovery time to indicate appropriate voltage level. If it happens before inspection the battery might indicate lower voltage.

At the voltage check, please use voltage meter having high input resistance which should be equal or higher than 10MΩ. Otherwise, battery may indicate lower voltage because of leakage current into the voltage meter.

## 2. Prevent charging

Lithium batteries are not rechargeable. Accordingly, they should be protected with a backflow prevention diode having extremely low current leakage.

Charged electricity should be less than 3% of nominal capacity at a maximum 1 μA, when it is inevitable.

## 3. Solder properly

Reflow or overheated soldering may result in decreased electric capacity.

Lithium batteries should be soldered only with the dip soldering (wave soldering) or hand soldering method.

Soldering should be completed within 3 to 5 seconds.

Maximum soldering conditions are shown below.

<u>Tip temperature</u>	<u>Solder time</u>
350 degree C (662°F)	5 seconds maximum
260 degree C (500°F)	10 seconds maximum

When soldering with the dip soldering method, the terminal should be placed in a 260°C solder bath for 3 to 5 sec. with the battery shell protected by a thermal shield, circuit board, or similar medium.

## 4. For Cleaning

Special care in selecting solvent type and drying conditions is required for cleaning with organic solvents. In case of cleaning with distilled water, please make sure it has enough low conductivity, and absolutely dry without any dews.

## 5. Mount properly

The battery shall be mounted properly without any dust or foreign matters attached in order to prevent any decrease in insulation.

Lithium batteries should not be mounted cross to high heat sources or used for extended periods in high temperatures.

Do not put printed circuit boards (PCB) and similar products on a conductive plate after battery mounted which may cause the battery to short.

Putting the PCB on antistatic boards or mats (used to protect printed circuit boards, during shipping) can be a cause of leakage current from the battery after it mounted. Please make sure to sufficiently insulate the battery.

## 6. Prevent improper handling

Do not invert polarities

Do not disassemble.

Do not burn.

Do not solder directly on the battery.

Improper spot welding on the battery may damage on materials inside.

Applying excessive pressure to the battery terminals may cause them to bend or break off.

Wearing a rubber or cloth fingerstall is recommended when handling the batteries to keep them clean.

Appropriate storage condition (described in the product specification) helps the battery last longer.

Any conductivity materials shall be kept away from the battery all the time before installing.

## 7. UL standards

Whether the battery complies with UL or not can be confirmed on the product specification. Where the application using the battery must comply with UL standard, the battery also needs to be complied with UL.

## 8. Others

Please contact your Panasonic distributor or our Panasonic sales office in where you have any questions for handling the battery.

# Battery Safety Practices

## Avoiding hazards in lithium battery handling



### Warning

Mishandling batteries can cause battery leakage, heat generation, rupture, ignition etc., that can lead to possible fire or injury.

Both of coin type and cylinder type of lithium batteries contain flammable materials such as lithium, organic solvent and other chemical ingredients. Improper handling of lithium batteries may result in heat generation, fire or explosion, with a risk of personal injury or damage. To prevent these accidents in battery handling, be sure to observe the following precautions.

#### 1. Do not Short circuit

Direct connection of plus(+) and minus(-) poles may result in leakage, heat generation, explosion and/or fire.

Do not store and/or carry batteries with metallic product such as necklace. (Refer fig.1)

#### 2. Do not stack and/or jumble batteries

Stacked and/or jumbled batteries may cause short circuit and/or forced discharge by the contact of other batteries. This may result in leakage, heat generation, explosion and/or fire.

Especially, a connection with the 006P(9V) type batteries may have a high risk of leakage, heat generation, explosion and/or fire. (Refer fig.2 & 3)

#### 3. Do not make forced discharge batteries

Forced discharge by external power source, the battery voltage goes to negative and this cause gas generation in inside of the battery. This may result in leakage, heat generation, explosion and/or fire. (Refer fig.3)

\* In your disposal and/or storage of the batteries, please isolate plus and minus poles by adhesive tape. A connection with other metals and/or batteries may result in leakage, heat generation, explosion and/or fire.

\* When using the stored battery, please remove the tape perfectly to avoid high contact resistance problem. (Refer fig.4)

#### 4. Do not dispose of batteries in fire

Disposal of batteries in fire is extremely dangerous with a risk of explosion and violent flaring.

#### 5. Do not heat batteries

Heating batteries above 100°C (212°F) may damage the resin in crimping, separator and other parts, causing electrolyte leak, internal short circuit, fire and explosion.

#### 6. Do not solder directly onto batteries

Direct soldering onto batteries may damage the resin in crimping, separator and other parts, causing electrolyte leak, internal short circuit, fire and explosion.

#### 7. Do not charge batteries

Charging of primary batteries may result internal gas generation, causing electrolyte leak, battery swelling, fire and explosion.

#### 8. Do not disassemble batteries

Disassembly batteries may cause gas generation that may irritate your throat. Lithium may also react with moisture to generate heat and fire.

#### 9. Do not deform batteries

Applying extreme pressure to batteries may cause deformation of the crimping and internal short circuit, causing electrolyte leak, battery swelling, fire and explosion.

#### 10. Do not mix different type batteries

For some applications, mixing of different type batteries, or new and old batteries, can cause over discharge due to differences in voltage and discharge capacities. This may lead to the risk of swelling and/or explosion.

#### 11. Do not insert batteries with opposite polarity

For some applications, battery insertion with opposite polarity (reverse insertion of plus and minus) may result in leakage, heat generation, explosion and/or fire.

Please ensure the above precautions are strictly observed by related divisions including production departments, sales departments and external subcontractors. For additional details and information, please contact our sales representatives.

Fig. 1 Short circuit

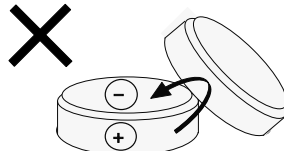
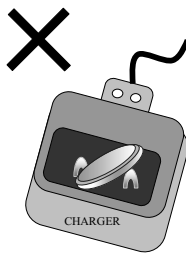


Fig. 2 stacked & jumble batteries



Connection with battery charger

**DANGER**

Fig. 3  
Examples of forced discharge

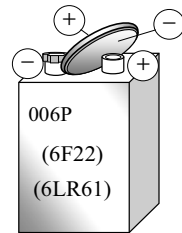
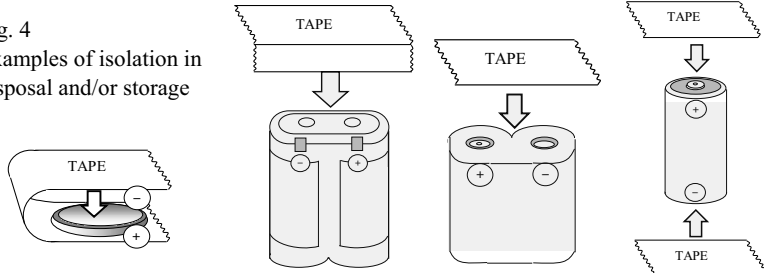


Fig. 4  
Examples of isolation in disposal and/or storage



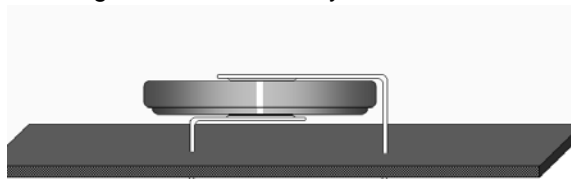
# To prevent unexpected capacity loss

## Beware of Antistatic Materials

We have been informed some incidents of battery voltage drop and unexpectedly capacity loss occurred due to batteries contacted antistatic materials that are used to protect semiconductor devices such as IC and LSI from static damage. Many of antistatic materials contain carbon, aluminum foil or other metallic materials so that they can remove static electricity. Antistatic materials used for packing bags, trays, mats, sheets, film and resin cases and etc. have a conductivity of  $10^3$  to  $10^6 \Omega$ , which means that when they contact the positive and negative terminals of a battery at the same time, the battery discharges at a load depending the conductivity of the material, and it causes the battery to have lower voltage and capacity loss. It is highly recommended to consider the battery not to have such unexpected deterioration

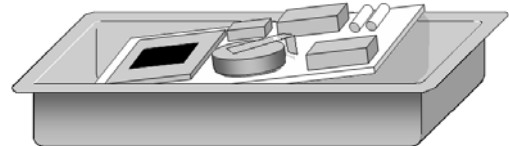
Example

Terminal attached battery installed into a conductive mat had been completely discharged after several days



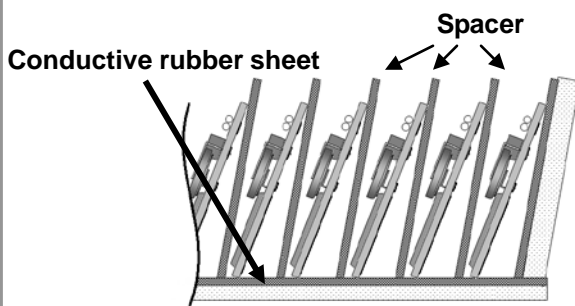
**Conductive mat**

PCB-mounted battery had been completely discharged by contact with the conductive resin case



**Conductive resin case**

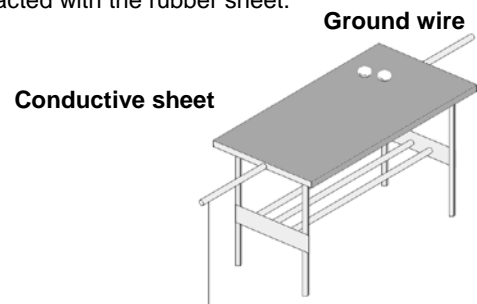
PCB-mounted batteries are discharged by contact with spacer and conductive rubber sheets



**Conductive rubber sheet**

**Spacer**

Batteries left on a work desk having conductive rubber sheet had been completely discharged due to both positive and negative poles contacted with the rubber sheet.



**Conductive sheet**

**Ground wire**

For more information, please contact your local dealer or the sales department in charge.

# To maintain good contact with the battery

## Beware unexpected memory erasure

Coin-type Lithium batteries are widely used for memory backup purposes. However, incidents of accidental memory erasure due to inadequate connecting to batteries have been informed to us. To prevent unexpected memory erasure, consider the following tips for proper use.

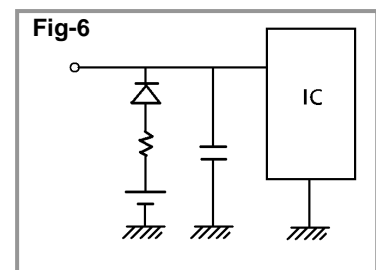
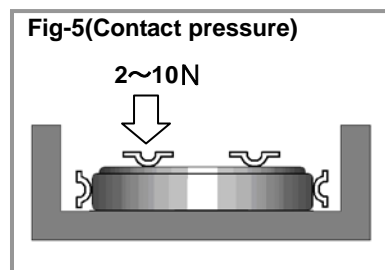
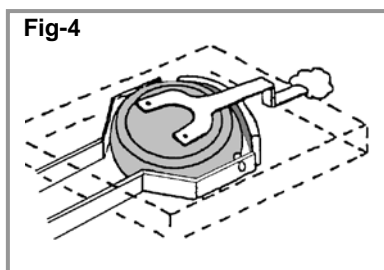
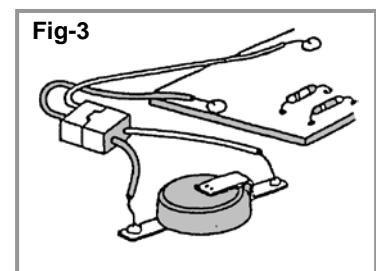
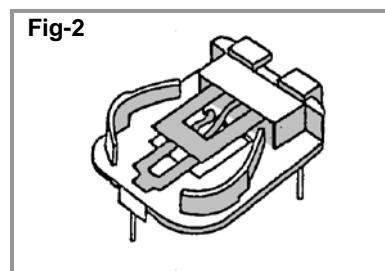
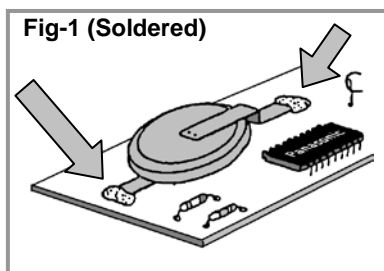
<In case of long-term use>

- Highly recommended to use a battery with tab terminals for soldering, so that the battery can keep stable connection on the circuit board. (Fig. 1)
- In case of periodical battery replacement is required, installing into a battery holder or using lead wire and connector attached battery are recommended. (Fig. 3)
- Panasonic has battery holders which is available for 2032 size of batteries. (Fig. 2)

<In case of short-term periodical replacement required>  
(for batteries without tab terminals or lead connectors)

- Gold or Nickel-plated steel or Au or Ni-plated stainless-steel strips is recommended for battery terminal contacts. Especially, gold-plating is highly recommended to ensure the contact in stable for long-term.
  - Y-shaped terminals (double contacts) for both the positive and negative surface offer higher stability in contact (Fig. 4)  
Each contact on the Y-shaped terminals requires contact pressure which should be 2-10N {approximately 200~1000gf} (Fig. 5)
  - To protect IC chip against a few milliseconds momentary contact failures, tantalum capacitor-diode-resistor circuit shown in Fig. 6 can be solution.
- \* Note: Touching the battery surface with bare hand might cause the contact resistance to be increased due to salt from sweat. Do not touch the contact surfaces of the battery with bare hands. Please consider to keep the battery surface clean in assembling process.

Figure 1 through 6 show examples of how to ensure proper battery contact.



# Precautions for Soldering I

When lithium batteries (with terminals for soldering) are soldered to a PC board, over heat by soldering may cause the battery to have damage on the sealing gasket which poses electrolyte leakage. To prevent such a problem, please refer precautions as follows:

## Precautions for Soldering

### 1. Do not use reflow soldering

Reflow soldering heats the battery to extremely high temperature, and it causes electrolyte leakage, lower performance, or in the worst case, explosion or catching fire. Please do not solder by reflow.

### 2. Tab terminal soldering with a soldering iron:

Please keep the soldering iron not to touch the battery body directly. The temperature of the soldering iron should be around 350 degree C, and should be done by within 5 seconds. Please beware the battery surface does not exceed 85 degree C during the process. (In case of BR coin battery high temp version, the maximum battery surface temperature is up to 125 degree C.)

### 3. Solder bath, Dip soldering, Flow soldering, Wave soldering:

Solder bath, Dip soldering, Flow soldering, Wave soldering are available to attach tab terminal attached batteries on the PCB. However, the battery surface temperature must be kept equal of less than 85 degree C during the whole process. (In case of BR coin battery high temp version, the maximum battery surface temperature is up to 125 degree C.)

Basic Condition	
Temp of soldering bath	260 degree C or less than
Dipping time	5 seconds or less than
Number of times	2 times as maximum

(If the battery temperature is expected to exceed 85°C, please consult us.)

### Other cautions

- Please do not solder directly on the battery body.
- Please consider to use BR high temperature coin battery models in case of the temperature condition is sever for normal coin battery models. .

Gasket and separator used for lithium batteries are made of plastics which have low softening temperature. Also, the electrolyte is organic solvent having low boiling point. Therefore, if the battery is heated beyond a certain threshold, deteriorated performance, electrolyte leakage, and explosion or catching fire because of excessive inner pressure may happen.

For more information, please contact the sales department in charge

## Precautions for Soldering II

### **Beware not to make any damages on the battery by overheating with solder iron or hot air where removing the battery from PCB.**

Some incidents have been reported which external heat elements affected on gasket then making deformation of sealing condition which caused electrolyte leakage or evaporation makes batteries to have deteriorated performances.

Gasket and separator used for lithium batteries are made of plastics which have low softening temperature. Also, the electrolyte is organic solvent having low boiling point. Therefore, if the battery is heated beyond a certain threshold, deteriorated performance and electrolyte leakage may happen.

Sometimes, detaching electric devices from PCB are required after soldering by some reasons. Heated air blowing is generally used as a method of removing IC chips having multiple terminals, but it may also heat a battery placed near from the IC chip and make it damaged by extreme high temperature.

Not only heated air blowing, but in case of removing and re-soldering devices with solder iron also requires special handling not to make any damages on the battery by overheating.

### **Incident examples:**

Case 1: Leakage happened in field

Cause: A battery had a leakage of electrolyte was found due to the heat damage on the gasket, because the PCB with IC chip was once failed in inspection and had a removing and a reattaching IC chip by heated air blowing, and the battery placed next to the IC chip also received the heated air.

Case 2: Memory disappearing from IC chip in field

Cause: During the solder process, the battery was partially overheated by solder iron and then had a deformation of the gasket caused sealing problem posed electrolyte evaporation and deteriorated performance of the battery.

### **Preventive measures:**

- 1) Remove the battery first by soldering iron in case of using heated air blowing to remove the devices.
- 2) Please beware not to overheat the battery even when using soldering iron.
- 3) Please remove the battery first where the battery is attached by a battery holder.

### **Other caution and information**

- Please do not solder directly on the battery body.
- Please consider to use BR high temperature coin battery models in case of the temperature condition is sever for normal coin battery models. .

**Please share those precautions among all relevant parties/departments including manufacturing and sales department or subcontractors.**