



BUREAU
VERITAS

Test Report No.: BAT2511WDG0014

Test Report No.: BAT2511WDG0014	
Applicant's name:	PAK KO HOLDING (HK) LIMITED
Address:	FALT/RM 2004-6, 20/F., STAND 50, 50 BONHAM STAND, SHEUNG WAN, HK
Test Item description:	Lithium Manganese Dioxide Coin Cell
Identification:	CR2032
Testing laboratory	
Name:	Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch
Address:	No. 96, Guantai Road (Houjie Section) Houjie Town, Dongguan City Guangdong Province, 523942, People's Republic of China
Test specification	
Standard:	IEC 60086-4: 2025 Primary batteries – Part 4: Safety of lithium batteries
Test Result:	The sample satisfies to the clauses examined.
Prepared By:	
 _____ Karser Li/ Engineer <u>2025-12-30</u> Date	
Approved By:	
 _____ Jetter Yang/ Senior Engineer <u>2025-12-30</u> Date	
This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/ and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.	



TEST REPORT
IEC/EN IEC 60086-4
Primary batteries
Part 4: Safety of lithium batteries

Report Number. BAT2511WDG0014

Date of issue 2025-12-30

Total number of pages 15

**Name of Testing Laboratory
preparing the Report** Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch
No. 96, Guantai Road (Houjie Section) Houjie Town, Dongguan
City Guangdong Province, 523942, People's Republic of China

Applicant's name PAK KO HOLDING (HK) LIMITED

Address FALT/RM 2004-6, 20/F., STAND 50, 50 BONHAM STAND,
SHEUNG WAN, HK

Test specification:

Standard IEC 60086-4: 2025

Non-standard test method N/A

Test Report Form No. TEST REPORT IEC/EN IEC 60086-4 VER.5

Test Report Form(s) Originator Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch

Master TRF Dated 2025-03

Test item description Lithium Manganese Dioxide Coin Cell

Trade Mark N/A

Manufacturer Guizhou Pak Ko Energy Technology Co., Ltd.
Building A3, First Industrial Park, Xiaoba Town, Jinhaihu New
District, Bijie City, Guizhou Province, P.R. China

Model/Type reference CR2032

Ratings 3.0V



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

- Page 13-15 (3 pages of EUT photos)

Summary of testing:

Unless otherwise stated, the charging procedure for test purposes is carried out in an ambient temperature of $20\pm 2^{\circ}\text{C}$, using the method declared by the manufacturer.

Tests performed (name of test and test clause):

- 6.4 Tests for intended use
 - 6.4.1 Test A: Altitudeⁱ
 - 6.4.2 Test B: Thermal cycling
 - 6.4.3 Test C: Vibration
 - 6.4.4 Test D: Shock
- 6.5 Tests for reasonably foreseeable misuse
 - 6.5.1 Test E: External short-circuit
 - 6.5.2 Test G: Crush
 - 6.5.4 Test H: Forced discharge
 - 6.5.5 Test I: Abnormal charging
 - 6.5.6 Test J: Free fall
 - 6.6.7 Test K: Thermal abuse

Testing location:

Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch
No. 96, Guantai Road (Houjie Section), Houjie Town, Dongguan City, Guangdong Province, 523942, People's Republic of China

Summary of compliance with National Differences (List of countries addressed): N/A



Copy of marking plate:

The artwork below may be only a draft.



Notes:

1. The safety sign should be on contrasting background. The background should cover at least 50 % of the area of the pictogram.
2. The size of the safety sign should be 6 mm in diameter or larger.
3. If the text KEEP OUT OF REACH OF CHILDREN is used, it should contrast with the background color on which it is printed.



Test item particulars	
Classification of installation and use Built-in and use in the fit battery compartment	
Supply Connection..... Positive negative connection	
Possible test case verdicts: - test case does not apply to the test object..... : N/A - test object does meet the requirement : P (Pass) - test object does not meet the requirement..... : F (Fail)	
Testing	
Date of receipt of test item 2024-03-26	
Date (s) of performance of tests..... 2024-04-01 to 2024-04-31	
General remarks: "(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. Throughout this report a ☐ comma / ☒ point is used as the decimal separator.	
Name and address of factory (ies)..... 1. Guizhou Pak Ko Energy Technology Co., Ltd. Building A3, First Industrial Park, Xiaoba Town, Jinhaihu New District, Bijie City, Guizhou Province, P.R. China 2. Si Hui Pak Ko Batteries Co., Ltd. No. 88 Ji Guang Lu, Cang Feng Da Dao, Cheng Zhong Qu, Si Hui, Zhao Qing, Guangdong, China	
General product information and other remarks: (1) The equipment under test (EUT) is a primary coin cell. (2) The battery Standardized chemical system letter is C, Chemical System is Lithium-Manganese Dioxide. (3) IEC designation is CR2032, Common Designation: 2032. (4) Dimension of the cell: (Φ) 20.0mm by (H) 3.2mm max. (5) The cell weight approx.: 2.905g.	
Report history:	
BAT2511WDG0014 (Project No.: CPDO-WDG-P25110014)	
Remark 1	This report is based on the earlier Test Report Ref. No.: BAT2403WDG0342, dated on 2024-06-05.
Remark 2	The modification applied on this report is: - Updated the standard from IEC 60086-4: 2019, EN IEC 60086-4: 2019 to IEC 60086-4: 2025.
Remark 3	For the above "Remark 2" described change, no tests need to be considered.



IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict
4	REQUIREMENTS FOR SAFETY		P
4.1	Design		P
	a) Abnormal temperature rise above the critical value prevented	Considered.	P
	b) Temperature increases in the battery controlled	Will be considered by the end battery manufacturers, distributors, users, and equipment designers.	P
	c) Lithium cells and batteries designed to relieve excessive internal pressure or to preclude a violent rupture under conditions of transport, intended use and reasonably foreseeable misuse	The edge of packing which next to the terminals was considered as the pressure relief mechanism, which can release the pressure during the abnormal operation.	P
	If, in particular cases, this design concept cannot be implemented, the organisational requirements described in Annex G shall apply.		P
4.2	Quality plan		P
	Manufacturer prepared and implemented a quality plan defining the procedures for the inspection of materials, components, cells and batteries during the course of manufacture, to be applied to the total process of producing a specific type of battery		P
	Manufactures understood their process capabilities and instituted the necessary process controls as they relate to product safety		P
5	TYPE TESTING AND SAMPLING		P
5.1	Validity of testing		P
5.2	Test samples		P
6	TESTING AND REQUIREMENTS		P
6.1	General		P
6.1.1	Test application matrix		P
	s: cell or single cell battery	Coin Cell.	P
	m: multi cell battery	Coin Cell.	N/A
6.1.3	Ambient temperature (°C).....	20 °C ± 5 °C.	P
6.1.4	Parameter measurement tolerances	Both normal and foreseeable misuses are evaluated in the report. All control and measure values were within the tolerances.	P
6.1.5	Predischarge		P



IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict
6.1.6	Additional cells	Complied.	P
6.2	Evaluation of test criteria		P
6.2.1	Short-circuit		P
6.2.2	Excessive temperature rise		P
6.2.3	Leakage		P
6.2.4	Venting		P
6.2.5	Fire		P
6.2.6	Rupture		P
6.2.7	Explosion		P
6.3	Tests and requirements – Overview		P
6.4	Tests for intended use		P
6.4.1	Test A: Altitude	(See appended table 1)	P
6.4.2	Test B: Thermal cycling	(See appended table 1)	P
6.4.3	Test C: Vibration	(See appended table 1)	P
6.4.4	Test D: Shock	(See appended table 1)	P
6.5	Tests for reasonably foreseeable misuse		P
6.5.1	General	Complied.	P
6.5.2	Test E: External short-circuit.....	(See appended table 1)	P
6.5.3	Test F: Impact	Coin Cell.	N/A
6.5.4	Test G: Crush	(See appended table 1)	P
6.5.5	Test H: Forced discharge	(See appended table 1)	P
6.5.6	Test I: Abnormal charging	(See appended table 1)	P
6.5.7	Test J: Free fall	(See appended table 1)	P
6.5.8	Test K: Thermal abuse	(See appended table 1)	P
6.5.9	Test L: Incorrect installation		N/A
6.5.10	Test M: Overdischarge		N/A
6.6	Information given in the relevant specification		P
	a) Predischage current or resistive load and end-point voltage specified by the manufacturer.....	Standard discharge with load 15kΩ. End-point voltage: 2.0V.	P
	b) Method to measure the energy of an explosion, if any	It will not penetrate a wire mesh screen (annealed aluminium wire with a diameter of 0,25mm and grid density of 6 to 7 wires per cm) placed 25 cm away from the cell.	P



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Clause	Requirement + Test	Result - Remark	Verdict
	c) Shape: prismatic, flexible, coin or cylindrical Diameter: less than 18 mm or not less than 18 mm	Coin Cell	P
	d) Maximum continuous discharge current specified by the manufacturer for test H.....	The maximum continuous discharge current declared in spec is 1mA.	P
	e) Rated capacity specified by the manufacturer for test H.....	The EUT capacity is 210mAh.	P
	f) Abnormal charging current declared by the manufacturer for test I	The abnormal charging current declared in spec is 5mA.	P
	g) Normal capacity specified by the manufacturer	Normal capacity of EUT is 210mAh.	P
	h) Normal reverse current declared by the manufacturer which applied to the battery during its operating life.....	The abnormal charging current declared in spec is 5mA.	P
7	INFORMATION FOR SAFETY		P
7.1	Safety precautions during design of equipment	Provided in the battery specification, which will be considered during the end battery manufacturers, distributors, users, and equipment designers.	P
7.1.1	General	See below.	P
7.1.2	Charge protection	Provided in the battery specification, which will be considered during the end battery manufacturers, distributors, users, and equipment designers.	P
7.1.3	Parallel connection	Provided in the battery specification, which will be considered during the end battery manufacturers, distributors, users, and equipment designers.	P
7.2	Precautions during handling of batteries	Provided in the battery specification, which will be considered during the end battery manufacturers, distributors, users, and equipment designers.	P
7.3	Additional information for safety of coin cells		N/A
7.4	Packaging		N/A



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Clause	Requirement + Test	Result - Remark	Verdict
7.5	Handling of battery cartons		N/A
7.6	Transport	It meet the relevant transport rule.	P
7.6.1	General	Complied.	P
7.6.2	Air transport	Complied.	P
7.6.3	Sea transport	Complied.	P
7.6.4	Land transport	Complied.	P
7.7	Display and storage	Provided in the battery specification, which will be considered during the end battery manufacturers, distributors, users, and equipment designers.	P
7.8	Disposal	Provided in the battery specification, which will be considered during the end battery manufacturers, distributors, users, and equipment designers.	P
8	INSTRUCTIONS FOR USE		P
9	MARKING AND PACKAGING		P
9.1	General	See the Copy of marking plate	P
9.2	Marking of batteries too small to accommodate all markings		P
9.3	Additional requirements for Swallowable coin cells and batteries	 " " require marking on the immediate packaging. Considered in packaging.	N/A
9.4	Safety pictograms		P
ANNEX A	(INFORMATIVE) GUIDELINES FOR THE ACHIEVEMENT OF SAFETY OF LITHIUM BATTERIES		N/A
ANNEX B	(INFORMATIVE) GUIDELINES FOR DESIGNERS OF EQUIPMENT USING LITHIUM BATTERIES		P
ANNEX C	(INFORMATIVE) ADDITIONAL INFORMATION ON DISPLAY AND STORAGE		P
ANNEX D	(INFORMATIVE) SAFETY PICTOGRAMS		P
D.1	General	Complied.	P
D.2	Pictograms	use "KEEP OUT OF REACH OF CHILDREN" label on the cell	P



IEC 60086-4			
Clause	Requirement + Test	Result - Remark	Verdict
D.3	Instruction for use	Complied.	P
ANNEX E	(NORMATIVE) CHILD RESISTANT PACKAGING OF COIN CELLS		N/A
E.1	General		N/A
E.2	Applicability		N/A
E.3	Packaging tests		N/A
E.3.1	General		N/A
E.3.2	Test items		N/A
E.3.3	Test procedure		N/A
E.3.4	Criteria		N/A
ANNEX F	(INFORMATIVE) USE OF THE KEEP OUT OF REACH OF CHILDREN SAFETY SIGN		P
F.1	General	Complied.	P
F.2	Safety sign	Complied.	P
F.3	Marking the packaging	Complied.	P
F.4	Marking the cell	Complied.	P
ANNEX G	(NORMATIVE) MEASURES AGAINST MISUSE OF BATTERIES NOT INTENDED FOR CONSUMER REPLACEMENT		P
G.1	Background		P
G.2	Additional measures for the prevention of confusion of primary batteries not intended for consumer replacement with secondary batteries		P



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Clause	Requirement + Test	Result - Remark	Verdict
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6.4.1 – 6.5.9	TABLE 1 (clause 6.4.1 – 6.5.9)				P
Tests	Cell / battery type	Discharge state	Number of test sample	Test result	Verdict
A to E	Cells or single cell batteries	Undischarged	10	NL, NV, NC, NR, NE, NF (Test A, B, C and D); NT, NR, NE, NF (Test E)	P
		Fully discharged	10	NL, NV, NC, NR, NE, NF (Test A, B, C and D); NT, NR, NE, NF (Test E)	P
	Multi-cell batteries	Undischarged	4	--	N/A
		Fully discharged	4	--	N/A
F	Cells or single cell batteries	Undischarged	5	--	N/A
		Fully discharged	5	--	N/A
	Multi-cell batteries	Undischarged	5 component cells	--	N/A
		Fully discharged	5 component cells	--	N/A
G	Cells or single cell batteries	Undischarged	5	NT, NE, NF	P
		Fully discharged	5	NT, NE, NF	P
	Multi-cell batteries	Undischarged	5 component cells	--	N/A
		Fully discharged	5 component cells	--	N/A
H	Cells or single cell batteries	Fully discharged	10	NE, NF	P
	Multi-cell batteries	Fully discharged	10 component cells	--	N/A
I to K	Cells or single cell batteries	Undischarged	5	NE, NF (Test I and K); NV, NE, NF (Test J)	P
	Multi-cell batteries	Undischarged	5	--	N/A
L	Cells or single cell batteries	Undischarged	20	--	N/A



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Clause	Requirement + Test	Result - Remark	Verdict
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M	Cells or single cell batteries	50 % predischarged (CR)	10	--	N/A
		Fully discharged (CR)	10	--	N/A
		50 % predischarged (FR)	20	--	N/A
		Fully discharged (FR)	20	--	N/A

Supplementary information:

NC: No short-circuit

NE: No explosion

NF: No fire

NL: No leakage

NR: No rupture

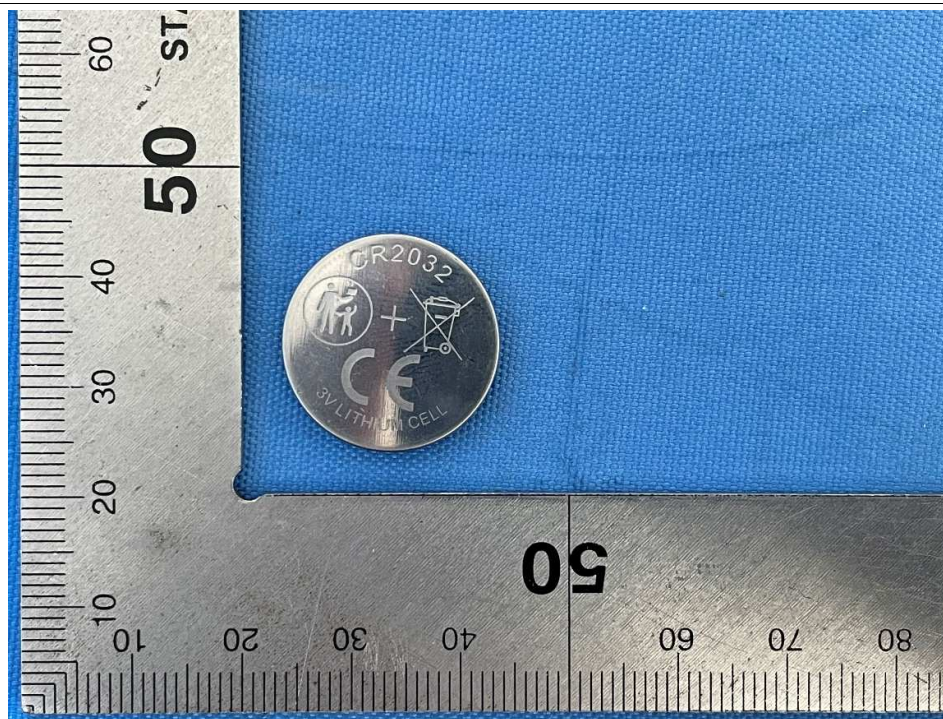
NT: No excessive temperature rise

NV: No venting

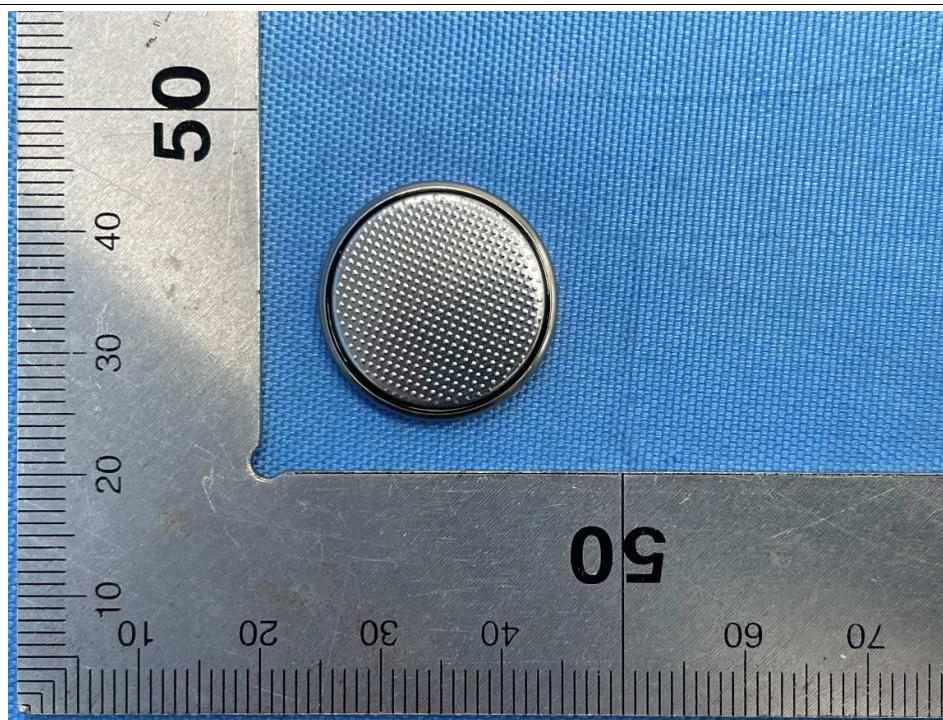


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Cap view of cell-1



Case view of cell-1



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General view of cell-3



General view of cell-4



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General view of cell-5



General view of cell-6