



BUREAU
VERITAS

Test Report No.: BAT2403WDG0342-1

Test Report No.: BAT2403WDG0342-1

Client

Name : PAK KO BATTERIES FACTORY LIMITED
Address : Unit 11, 9/F., Block A, Hoi Luen Industrial Center, No.55 Hoi Yuen Road, Kwun Tung, Kowloon, Hong Kong

Test Item : 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 60086-1:2021 in conjunction with IEC 60086-2:2021
EN IEC 60086-1:2021 in conjunction with EN IEC 60086-2:2021
Primary Battery - Part 1: General
Primary Battery - Part 2: Physical and electrical specifications

Test Result : The sample satisfies to all clauses examined.

Prepared By :

Karser Li/ Engineer

2024-06-05

Date

Approved By:

Jetter Yang/ Senior Engineer

2024-06-05

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 60086-1 & IEC/EN IEC 60086-2	
Primary Battery - Part 1: General	
Primary Battery - Part 2: Physical and electrical specifications	
Report Number. : BAT2403WDG0342-1	
Date of issue : 2024-06-05	
Total number of pages..... : 22	
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 BATTERIES FACTORY LIMITED
Address	Unit 11, 9/F., Block A, Hoi Luen Industrial Center, No.55 Hoi Yuen Road, Kwun Tung, Kowloon, Hong Kong
Test specification:	
Standard	IEC 60086-1:2021 in conjunction with IEC 60086-2:2021 EN IEC 60086-1:2021 in conjunction with EN IEC 60086-2:2021
Non-standard test method.....	N/A
Test Report Form No.....	TEST REPORT IEC/EN 60086-1 & IEC/EN 60086-2 VER.4
Test Report Form(s) Originator.....	Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch
Master TRF	Dated 2023-12
Test item description	Lithium Manganese Dioxide Coin Cell
Trade Mark	N/A
Manufacturer.....	PAK KO BATTERIES FACTORY LIMITED. Unit 11, 9/F., Block A, Hoi Luen Industrial Center, No.55 Hoi Yuen Road, Kwun Tung, Kowloon, Hong Kong
Model/Type reference	CR2032
Ratings	3.0V, 210mAh (20±2°C, 15.0kΩ, EV=2.0V)



List of Attachments (including a total number of pages in each attachment): - 3 Pages (page 20-22 of EUT photos)	
Summary of testing: Temperature: 20±5°C; Relative humidity: 60%. The test samples were pre-production samples without serial number.	
Tests performed (name of test and test clause): - CR2032 (reference 8.4.6 Category 4 – Specifications: CR2032 for test) Note: (1) Unless otherwise stated, the charging procedure for test purposes is carried out in an ambient temperature of 20±2°C, using the method declared by the manufacturer.	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 (representative)

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.



Notes:

"Keep batteries out of the reach of children" and other cautionary advice should marking on the immediate packing.



Test item particulars	
Classification of installation and use Built-in	
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 April 01, 2024	
Date (s) of performance of tests..... April 01, 2024 – May 18, 2024	
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.	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60086-2:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
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: (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 battery cell: (Φ)20mm by (H)3,2mm max. (5) The battery weight approx.: 2,905g.	



**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-1			
Clause	Requirement – Test	Result - Remark	Verdict
4	REQUIREMENTS		P
4.1	General		P
4.1.1	Design		P
	Additionally, information on equipment design can be found in Annex B	It should evaluation in the equipment designers.	N/A
4.1.2	Battery dimensions		P
	The dimensions for individual types of batteries are given in IEC 60086-2 and IEC 60086-3	Complied. (See table 8.4.6)	P
4.1.3	Terminals		P
4.1.3.1	General		P
	Terminals are in accordance with Clause 6 of IEC 60086-2	Complied. (See table 8.4.6)	P
	Their physical shape is designed in such a way that they ensure that the batteries make and maintain good electrical contact at all times	Considered.	P
	They are made of materials that provide adequate electrical conductivity and corrosion protection	Considered.	P
4.1.3.2	Contact pressure resistance		N/A
	Where stated in the battery specification tables or the individual specification sheets in IEC 60086-2, the following applies		N/A
	A force of 10 N applied through a steel ball of 1 mm diameter at the centre of each contact area for a period of 10 s does not cause any apparent deformation which might prevent satisfactory operation of the battery		N/A
4.1.3.3	Cap and base		N/A
	This type of terminal is used for batteries which have their dimensions specified according to Figures 1 to 7 of IEC 60086-2 and which have the cylindrical side of the battery insulated from the terminals	According to Figures 16 of IEC 60086-2:2021	N/A
4.1.3.4	Cap and case		P
	This type of terminal is used for batteries which have their dimensions specified according to Figures 8, 9, 10, 14, 15 and 16 of IEC 60086-2, but in which the cylindrical side of the battery forms part of the positive terminal	According to Figures 16 of IEC 60086-2:2021	P
4.1.3.5	Screw terminals	Not such terminal	N/A
	This contact consists of a threaded rod in combination with either a metal or insulated metal nut		N/A



**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-1			
Clause	Requirement – Test	Result - Remark	Verdict
4.1.3.6	Flat contacts	Not such terminal	N/A
	These are essentially flat metal surfaces adapted to make electrical contact by suitable contact mechanisms bearing against them		N/A
4.1.3.7	Flat or spiral springs	Not such terminal	N/A
	These contacts comprise flat metal strips or spirally wound wires which are in a form that provides pressure contact		N/A
4.1.3.8	Plug-in-sockets	Not such terminal	N/A
	These are made up of a suitable assembly of metal contacts, mounted in an insulated housing or holding device and adapted to receive corresponding pins of a mating plug		N/A
4.1.3.9	Snap fasteners	Not such terminal	N/A
4.1.3.9.1	General		N/A
	These contacts are composed of a combination comprising a stud (non-resilient) for the positive terminal and a socket (resilient) for the negative terminal		N/A
	They are suitable metal so as to provide efficient electrical connection when joined to the corresponding parts of an external circuit		N/A
4.1.3.9.2	Snap fastener	Not such terminal	N/A
	This type of terminal consists of a stud for the positive terminal and a socket for the negative terminal. These are made from nickel plated steel or other suitable material		N/A
	They are designed to provide a secure physical and electrical connection, when fitted with similar corresponding parts for connection to an electrical circuit		N/A
4.1.3.10	Wire	Not such terminal	N/A
	Wire leads are single or multi-strand flexible insulated tinned copper		N/A
	The positive terminal wire covering is red and the negative black		N/A
4.1.3.11	Other spring contacts or clips	Not such terminal	N/A
	These contacts are generally used on batteries when the corresponding parts of the external circuit are not precisely known		N/A
	They are made of spring brass or of other material having similar properties		N/A



**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-1			
Clause	Requirement – Test	Result - Remark	Verdict
4.1.4	Classification (electrochemical system)	Complied.	P
	Primary batteries are classified according to their electrochemical system	Standardized electrochemical systems: "C".	P
	Each system, with the exception of the zinc-ammonium chloride, zinc chloride-manganese dioxide system, has been allocated a letter denoting the particular system		P
	The electrochemical systems that have been standardized up to now are given in Table 1	Type CR2032 Lithium-Manganese dioxide system	P
4.1.5	Designation		P
	The designation of primary batteries is based on their physical parameters, their electrochemical system as well as modifiers, if needed	Complied.	P
	A comprehensive explanation of the designation system (nomenclature) can be found in Annex C	Category 4- Specifications: CR2032. (See table 8.4.6)	P
4.1.6	Marking	Complied.	P
4.1.6.1	General	Small Batteries	N/A
	With the exception of batteries too small to mark with all items (see 4.1.6.2), each battery is marked with the following information		N/A
	a) designation, IEC or common		N/A
	b) expiration of a recommended usage period or year and month or week of manufacture		N/A
	The year and month or week of manufacture may be in code		N/A
	c) polarity of the positive (+) terminal		N/A
	d) nominal voltage		N/A
	e) name or trade mark of the manufacturer or supplier		N/A
	f) cautionary advice		N/A
4.1.6.2	Marking of smaller batteries		P
	a) Some batteries, mainly category 3 and category 4 batteries have a surface too small to accommodate all markings shown in 4.1.6.1	Considered.	P
	For these batteries the designation 4.1.6.1a) and the polarity 4.1.6.1c) are marked on the battery	Considered.	P
	All other markings shown in 4.1.6.1 are given on the immediate packing instead of on the battery	Considered.	P
	b) For P-system batteries	C-system batteries	N/A



**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-1			
Clause	Requirement – Test	Result - Remark	Verdict
	4.1.6.1a) are on the battery, the sealing tab or the package		N/A
	4.1.6.1c) are marked on the sealing tab and/or on the battery		N/A
	4.1.6.1b), 4.1.6.1d) and 4.1.6.1e) are given on the immediate packing instead of on the battery		N/A
	The nominal voltage is marked either 1,4 V or 1,45 V		N/A
	c) Caution for ingestion of swallowable batteries are given.....	Considered.	P
4.1.6.3	Marking of batteries regarding method of disposal	Manufacturer declare it was provided to equipment designers which will show in the equipment use manual.	P
	Marking of batteries with respect to the method of disposal is in accordance with local legal requirements	Complied.	P
4.1.7	Interchangeability: battery voltage		P
	Voltage range 1, Ur = 1,4 V: Batteries having a standard discharge voltage $m \times U_s$ equal to or within the range of $n \times 1,19$ V to $n \times 1,61$ V	Not a new battery system	N/A
	Voltage range 2, Ur = 3,2 V: Batteries having a standard discharge voltage $m \times U_s$ equal to or within the range of $n \times 2,72$ V to $n \times 3,68$ V	Not a new battery system C systems, a nominal voltage of 3 V	P
4.2	Performance	Considered.	P
4.2.1	Discharge performance	See below.	P
	Discharge performance of primary batteries is specified in IEC 60086-2	Category 4- Specifications: CR2032. (See table 8.4.6)	P
4.2.2	Dimensional stability		P
	The dimensions of batteries are conform to the relevant specified dimensions as given in IEC 60086-2 and IEC 60086-3 at all times during discharge testing under the standard conditions	No deformation.	P
4.2.3	Leakage		P
	When batteries are stored and discharged under the standard conditions given in this document, no leakage occur	No leakage.	P
4.2.4	Open-circuit voltage limits	See below.	P
	The maximum open-circuit voltage of batteries does not exceed the values given in Table 1		P



**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-1			
Clause	Requirement – Test	Result - Remark	Verdict
4.2.5	Service output		P
	Discharge durations, initial and delayed, of batteries are meet the requirements given in IEC 60086-2		P
4.2.6	Safety	Complied.	P
	When designing primary batteries, safety under conditions of intended use and foreseeable misuse as prescribed in IEC 60086-4 and IEC 60086-5 are considered	See test report BAT2403WDG0342 issued by Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch	P
4.2.7	Validity of testing	Considered.	P
	Portable primary batteries are subjected to the tests, as required in the 60086 series. Test results remain valid until a design change or requirement revision has been made	No design changes or requirements revisions were made	P
5	PERFORMANCE – TESTING		P
5.1	Capacity testing versus application and service output testing		N/A
	For the preparation of standard methods of measuring performance (SMMP) of consumer goods, refer to Annex E		N/A
	A capacity of a primary battery is established by electrical discharge tests as detailed in D.2.3		N/A
	However, under consumer usage conditions, the capacities realised from electrical discharge test methods can vary		N/A
	The following factors/variables dramatically impact on optimum capacity realisation		N/A
	a) The current demand from the external electrical circuit/device		N/A
	b) The frequency of current demand		N/A
	c) The minimum voltage at which the device will satisfactorily operate		N/A
	d) The temperature of operation		N/A
5.2	Discharge testing	Tested according to clause 8.4.6 of IEC 60086-2	P
5.2.1	General		P
	The discharge tests in this document fall into two categories		P
	– application tests		P
	– service output tests		P
5.2.2	Application tests		P
5.2.2.1	General		P



**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-1			
Clause	Requirement – Test	Result - Remark	Verdict
	Application tests are accelerated by discharge load, daily period duty cycle, or both. The specified values for load and time intermittency are take the following factors into consideration		P
	– discharge efficiency of the battery relative to the application		P
	– typical duty cycle use patterns for the application		P
	– total time to conduct the test typically not to exceed 30 days		N/A
5.2.2.2	Application tests with multiple loads		N/A
	For application test with multiple loads, the load order during a cycle starts with the heaviest load and move to the lightest load unless otherwise specified		N/A
5.2.3	Service output tests		P
	For service output tests, the value of the load resistor are selected such that the service output approximates 30 days		P
5.3	Conformance check to a specified minimum average duration	Complied.	P
	In order to check the conformance of a battery to any discharge tests specified in IEC 60086-2 and 60086-3, the test is carried out		P
5.4	Guidance for considering proposed value of minimum average duration	Complied. (See table 8.4.6)	P
5.5	OCV testing		P
	Open-circuit voltage is measured with the voltage measuring equipment specified in 6.8.1	Complied.	P
5.6	Insulation resistance		N/A
	For batteries with insulating labels, cases or jackets, the resistance between externally exposed surfaces of the battery and either terminal is equal to or greater than 5 MΩ	Without insulating labels, cases or jackets	N/A
5.7	Battery dimensions		P
	Dimensions are measured with the measuring equipment specified in 6.8.2	Complied.	P
5.8	Leakage and deformation		P
	After the service output has been determined under the specified environmental conditions, the discharge is continued in the same way until the closed circuit voltage drops for the first time below 40 % of the nominal voltage of the battery		P



**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-1			
Clause	Requirement – Test	Result - Remark	Verdict
	The requirements of 4.1.3, 4.2.2 and 4.2.3 are met		P
6	PERFORMANCE – TEST CONDITIONS		P
6.1	Storage and discharge conditions	Only initial discharge	P
	Storage before discharge testing and the actual discharge test are carried out under well-defined conditions. Unless otherwise specified, the conditions given in Table 3 are apply	Considered.	P
6.2	Commencement of discharge tests after storage		N/A
	The period between the completion of storage and the start of a delayed discharge test is not exceed 14 days		N/A
	During this period the batteries are kept at $(20 \pm 2) ^\circ\text{C}$ and $(55 + 20 / -40) \% \text{RH}$ (except for P-system batteries where the relative humidity is $(55 \pm 10) \% \text{RH}$)		N/A
	At least one day in these conditions is allowed for normalization before starting a discharge test after storage at high temperature		N/A
6.3	Discharge test conditions		P
6.3.1	General		P
	In order to test a battery it is discharged as specified in IEC 60086-2 or IEC 60086-3 until the voltage on load drops for the first time below the specified end-point	Considered.	P
6.3.2	Compliance		P
	When IEC 60086-2 or IEC 60086-3 specify service outputs for more than one discharge test, batteries are meet all of these requirements in order to comply with this document	Considered.	P
6.4	Load resistance		P
	When formulating new tests, the resistive load is, whenever possible, be as shown in Table 4 together with their decimal multiples or sub-multiples	Manufacturer's specified method	P
6.5	Time periods		P
	The periods on-discharge and off-discharge are as specified in IEC 60086-2		P
	When formulating new tests, whenever possible, one of the following daily periods is adopted from Table 5		N/A
	Other cases are specified in IEC 60086-2, if necessary	Considered.	P
6.6	Test condition tolerances		P



**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-1			
Clause	Requirement – Test	Result - Remark	Verdict
	Unless otherwise specified, the tolerances given in Table 6 are apply	Considered.	P
6.7	Activation of 'P'-system batteries	Not P- system	N/A
	A period of at least 10 min is elapse between activation and the commencement of electrical measurement		N/A
6.8	Measuring equipment		P
6.8.1	Voltage measurement	Complied.	P
6.8.2	Mechanical measurement	Complied.	P
7	SAMPLING AND QUALITY ASSURANCE		P
	The use of production and incoming inspection sampling plans or product quality indices are agreed between the manufacturer and the purchaser		P
8	BATTERY PACKAGING	No packaging	N/A
	A code of practice for battery packaging, shipment, storage, use and disposal can be found in Annex G		N/A
A	ANNEX A (NORMATIVE) CRITERIA FOR THE STANDARDIZATION OF BATTERIES		N/A
	Batteries and electrochemical systems are meet the following requirements to justify their initial inclusion or ongoing retention in the IEC 60086 series		N/A
	a) The battery or batteries of this electrochemical system are in mass production		N/A
	b) The battery or batteries of this electrochemical system are available in several market places of the world		N/A
	c) Patent items are conform to the requirements contained in 2.14 of the ISO/IEC Directives, Part 1		N/A
	d) The battery is produced in at least two different countries or, alternatively, if produced in only one country, the battery is purchased by other international and independent battery manufacturers and sold under their company label		N/A
B	ANNEX B (INFORMATIVE) RECOMMENDATIONS FOR EQUIPMENT DESIGN		N/A
B.1	Technical liaison		N/A



**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-1			
Clause	Requirement – Test	Result - Remark	Verdict
	It is recommended that companies producing battery-powered equipment maintain close liaison with the battery industry. The capabilities of existing batteries are taken into account at design inception. Whenever possible, the battery type selected are one included in IEC 60086-2		N/A
	The equipment is permanently marked with the IEC designation, grade and size of battery which give optimum performance		N/A
B.2	Battery compartment		N/A
B.2.1	General		N/A
	The dimensions and design of compartments and contacts are such that batteries complying with this document are accepted		N/A
	The design of the negative contact are make allowance for any recess of the battery terminal		N/A
	Clearly indicate the type of battery to use, the correct polarity alignment and directions for insertion		N/A
	Use the shape and/or the dimensions of the positive (+) and negative (-) battery terminals in compartment designs to prevent the reverse connection of batteries		N/A
	Positive (+) and negative (-) battery contacts are visibly different in form to avoid confusion when inserting batteries		N/A
	Battery compartments are electrically insulated from the electric circuit and positioned so as to minimize possible damage and/or risk of injury		N/A
	Battery compartments with parallel connections are not recommended since a wrongly placed battery result in charging conditions		N/A
	Equipment designed to be powered by air-depolarized batteries of either the "A" or "P" system are provide for adequate air access		N/A
	When the battery compartment cannot be completely isolated from the equipment, it are positioned so as to minimize possible damage		N/A
	The battery compartment are clearly and permanently marked to show the correct orientation of the batteries		N/A
	Battery compartments are designed so that a reversed battery will result in no electrical circuit		N/A
	The associated circuitry do not make physical contact with any part of the battery except at the surfaces intended for this purpose		N/A



**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-1			
Clause	Requirement – Test	Result - Remark	Verdict
	Designers are strongly advised to refer to IEC 60086-4 and IEC 60086-5 for comprehensive safety considerations		N/A
B.2.2	Limiting access by children		N/A
	Apparatus are designed to prevent children from removing the battery		N/A
B.3	Voltage cut-off		N/A
	The equipment voltage cut-off is not below the battery manufacturers' recommendation		N/A
C	ANNEX C (NORMATIVE) DESIGNATION SYSTEM (NOMENCLATURE)		P
C.1	General		P
C.2	Designation system in use up to October 1990		P
C.2.1	General		P
C.2.2	Cells		N/A
C.2.3	Electrochemical system		N/A
C.2.4	Batteries		N/A
C.2.5	Modifiers		N/A
C.2.6	Examples		N/A
C.3	Designation system in use since October 1990		P
C.3.1	General		P
C.3.2	Round batteries		P
C.3.3	Non-round batteries		N/A
C.3.4	Ambiguity		N/A
D	ANNEX D (INFORMATIVE) STANDARD DISCHARGE VOLTAGE US – DEFINITION AND METHOD OF DETERMINATION		N/A
D.1	Definition		N/A
D.2	Determination		N/A
D.2.1	General considerations: the C/R-plot		N/A
D.2.2	Determination of the standard discharge resistor Rs		N/A
D.2.3	Determination of the standard discharge capacity Cs and standard discharge time ts		N/A
D.3	Experimental conditions to be observed and test results		N/A



**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-1

Clause	Requirement – Test	Result - Remark	Verdict
E	ANNEX E (INFORMATIVE) PREPARATION OF STANDARD METHODS OF MEASURING PERFORMANCE (SMMP) OF CONSUMER GOODS		P
E.1	General		P
E.2	Performance characteristics		P
E.3	Criteria for the development of test methods		P
F	ANNEX F (INFORMATIVE) GUIDANCE FOR PROPOSING VALUE OF MINIMUM AVERAGE DURATION		N/A
F.1	General		N/A
F.2	Sampling		N/A
F.3	Calculation method		N/A
G	ANNEX G (NORMATIVE) CODE OF PRACTICE FOR PACKAGING, SHIPMENT, STORAGE, USE AND DISPOSAL OF PRIMARY BATTERIES		N/A
G.1	General		N/A
G.2	Packaging		N/A
G.3	Transport and handling		N/A
G.4	Storage and stock rotation		N/A
G.5	Displays at sales points		N/A
G.6	Selection, use and disposal		N/A
G.6.1	Purchase		N/A
G.6.2	Installation		N/A
G.6.3	Use		N/A
G.6.4	Replacement		N/A
G.6.5	Disposal		N/A
H	ANNEX H (INFORMATIVE) COMPLIANCE CHECKLIST		N/A



**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-2

Clause	Requirement – Test	Result - Remark	Verdict
8	PHYSICAL AND ELECTRICAL SPECIFICATIONS		P
8.1	Category 1 batteries		N/A
8.1.1	General		N/A
8.1.2	Specifications: LR1, R1, LR8D425	Not such category.	N/A
8.1.3	Specifications: LR03, FR10G445, R03.....	Not such category.	N/A
8.1.4	Specifications: LR6, FR14505, R6P, R6S.....	Not such category.	N/A
8.1.5	Specifications: LR14, R14P, R14S.....	Not such category.	N/A
8.1.6	Specifications: LR20, R20P, R20S.....	Not such category.	N/A
8.2	Category 2 batteries		N/A
	Specifications: CR14250, CR15H270, CR17345, CR17450, BR17335	Not such category.	N/A
8.3	Category 3 batteries		N/A
	Specifications: LR9, CR11108	Not such category.	N/A
8.4	Category 4 batteries		P
8.4.1	General		P
8.4.2	Specifications: PR70, PR41, PR48, PR44, PR1154	Not such category.	N/A
8.4.3	Fit acceptance gauge for PR batteries	Not such category.	N/A
8.4.4	Specifications: LR41, LR55, LR54, LR43, LR44	Not such category.	N/A
8.4.5	Specifications: SR62, SR63, SR65, SR64, SR60, SR67, SR66, SR58, SR68, SR59, SR69, SR41, SR57, SR55, SR48, SR54, SR42, SR43, SR44	Not such category.	N/A
8.4.6	Specifications: CR1025, CR1216, CR1220, CR1225, CR1616, CR2012, CR1620, CR1632, CR2016, CR2025, CR2320, CR2032, CR2330, CR2430, CR2354, CR3032, CR2450, CR2477, BR1225, BR2016, BR2320, BR2325, BR3032	CR2032	P
8.5	Category 5 batteries		N/A
8.5.1	Specifications: 2CR13252, 4LR44, 4SR44	Not such category.	N/A
8.5.2	Specifications: 8LR932.....	Not such category.	N/A
8.5.3	Specifications: AR40, 5AR40, 6AR40, 5PR175/172, 6PR225/155	Not such category.	N/A
8.6	Category 6 batteries		N/A
8.6.1	Specifications: 4LR61.....	Not such category.	N/A
8.6.2	Specifications: CR-P2	Not such category.	N/A
8.6.3	Specifications: 2CR5	Not such category.	N/A
8.6.4	Specifications: 3R12P, 3R12S, 3LR12.....	Not such category.	N/A



**BUREAU
VERITAS**

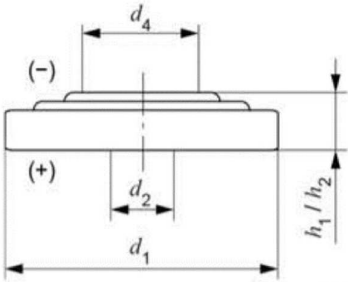
Test Report No.: BAT2403WDG0342-1

IEC/EN 60086-2

Clause	Requirement – Test	Result - Remark	Verdict
8.6.5	Specifications: AS4, AS6, AS8, AS10, AS12, PS8S, PS8P, PS10..... :	Not such category.	N/A
8.6.6	Specifications: 4R25Y..... :	Not such category.	N/A
8.6.7	Specifications: 4R25X, 4LR25X..... :	Not such category.	N/A
8.6.8	Specifications: 4R25-2, 4LR25-2..... :	Not such category.	N/A
8.6.9	Specifications: 6AS4S, 6PS4S, 6PS4P..... :	Not such category.	N/A
8.6.10	Specifications: 6F22, 6LR61, 6LP3146..... :	Not such category.	N/A
8.6.11	Configurations: Stud for 6F22, 6LR61, 6LP3146	Not such category.	N/A
8.6.12	Specifications: 6AS6P, 6AS6S, 6PS6P, 6PS6S..... :	Not such category.	N/A

ANNEX A	TABULATION OF BATTERIES BY APPLICATION		P
	Each of the Tables A.1 to A.25 lists all the batteries for which there is a discharge test given in this specification for that application	Tables A.7, Type CR2032	P
	Within each table the batteries are listed in ascending order of nominal voltage and, within each nominal voltage, in ascending order of volume		P
ANNEX B	CROSS-REFERENCE INDEX		P
	Batteries having the same physical dimensions may belong to a different electrochemical system		P
	In order to allow physically interchangeable batteries from different electrochemical systems to be compared in terms of electrical performance, a cross-reference is given in Tables B.1 to B.6	Table B.4, Type CR2032	P
	Batteries are ranked per category and in each category by chemistry and by shape/size		P
	Batteries are always ranked by voltage and in each voltage by volume		P
ANNEX C	INDEX		P
	The index in Table C.1 provides for the relation between a particular battery and its physical dimensions and application/service output test requirements		P
ANNEX D	COMMON DESIGNATION	See below	P
	The index in Table D.1 provides a cross-reference for IEC and common designations of batteries for marking purposes	Type CR2032 Common Designation: 2032	P
ANNEX E	COMPLIANCE CHECKLIST		P

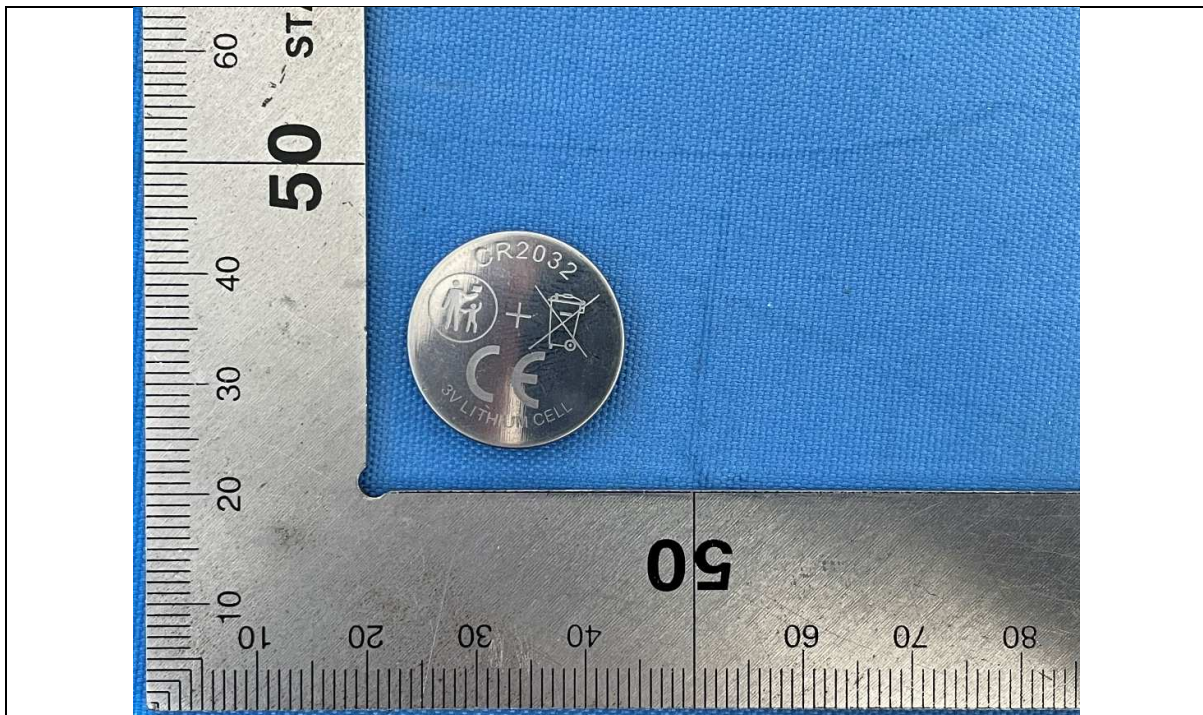


8.4.6		Category 4 – Specifications: CR2032												
Initial discharge test											P			
Lot code / date of manufacture			- / yyyy-mm-dd						March 11, 2024					
Storage conditions / duration			20 ± 2 °C, (55 ± 20) RH % / ≤ 60 d						/					
Discharge Conditions (°C, % RH)			20 ± 2 °C, (55 + 20 / - 40) % RH						/					
Date(s) of performance of tests / period			yyyy-mm-dd / -						March 26, 2024 – May 18, 2024					
OCV max. (V)			3.7						3.375-3.404					
 Figure 16 – Dimensional drawing: CR1025, CR1216, CR1220, CR1225, CR1616, CR2012, CR1620, CR2016, CR2412, CR1632, CR2025, CR2320, CR2032, CR2330, CR2430, CR2354, CR2477, CR3032, CR2450, BR1225, BR2016, BR2320, BR2325, BR3032			Dimensions (mm)		Initial	After Discharge								
						a)	b)	c)	d)	e)	f)	g)	h)	
			h1/ h2	max.	--	3.14	3.13	3.15	3.14	3.13	3.14	3.14	3.16	3.14
				min.	--									
			d1	max.	--	19.9 5	19.9 7	19.9 7	19.9 7	19.9 5	19.9 7	19.9 6	19.9 7	19.9 5
				min.	--									
			d2	min.	--	--	--	--	--	--	--	--	--	--
d4	min.	--	17.6 3	17.6 1	17.6 3	17.6 3	17.5 8	17.6 4	17.6 3	17.6 3	17.6 3			
Leakage			No	No	No	No	No	No	No	No	No			
Applications	Load	Daily Period	EV (V)	MAD ^a (Initial)					Leakage					
a) Service output test	15k Ω	24h	2.0	920h	1052.9 1004.9 1049.6	1023.0 1026.9 786.8	1030.6 1071.7	No						
b) Electronic	10mA	5s on,55s off 24h pre day	1.8	12.5h	14.9 14.4	14.7 15.4	16.0 16.3	15.8 12.9	No					
a Standard condition (see IEC 60086-1, Table 3, Initial discharge test).														
Notes:														
1. Test 8pcs samples and take the average value.														
2. Discharge time is set by customer.														
3. Test method according to the client's requirement.														

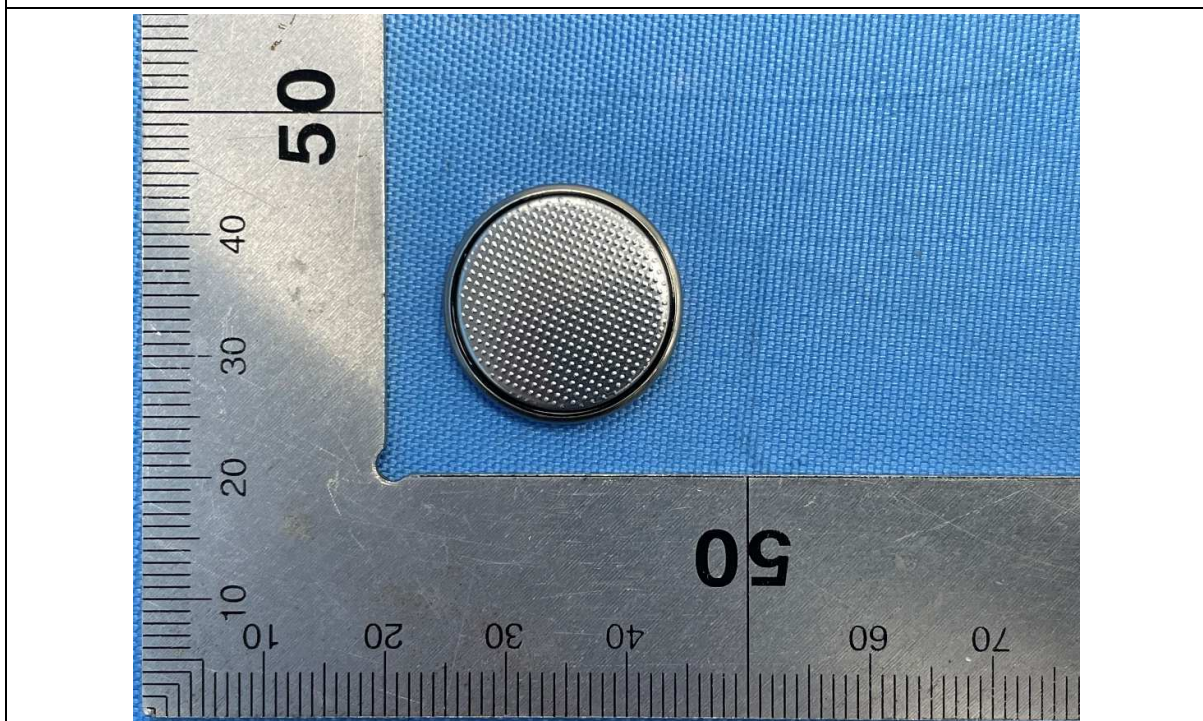


**BUREAU
VERITAS**

Test Report No.: BAT2403WDG0342-1



General view-1 of Cell



General view-2 of Cell



General view-3 of Cells



General view-4 of Cells



General view-5 of Cell



General view-6 of Cell