

**TECHNICAL SPECIFICATION
FOR
MANGANESE DIOXIDE LITHIUM BATTERY
TYPE: CR2032**

Prepared by:

Approved by:

Spec. No.:

Date:

Penzel Comércio Exterior Ltda

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1. Scope

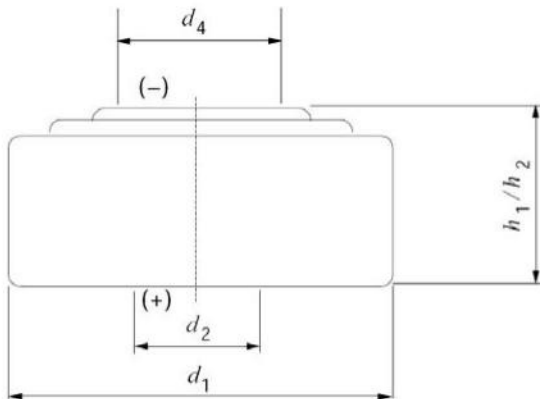
This specification is applicable to the Manganese Dioxide Lithium Battery CR2032 supplied by Penzel Comércio Exterior Ltda

2. Designations

IEC: CR2032

Other: ----

3. Dimensions



Symbols	Specification (mm)	
	Maximum	Minimum
h_1/h_2	3.2	3.0
d_1	20.0	19.7
d_2		-
d_4		8.0

Note: h_1 maximum overall height of the battery
 h_2 minimum distance between the flats of the positive and negative contacts
 d_1 maximum and minimum diameters of the battery
 d_2 minimum diameter of the flat positive contact
 d_4 minimum diameter of the flat negative contact

4. Technical Specifications

4.1 Chemical system: Lithium-Manganese Dioxide (Organic electrolyte)

4.2 Average weight: 3.0g

4.3 Nominal voltage: 3.0V

4.4 Nominal capacity: 210mAh/0.63Wh (Continuously loading at 15K Ω resistance till the voltage down to 2.0V)

4.5 Recommended continuous drain: 0.2mA

Recommended pulse drain: 15mA

4.6 Working temperature range: -20 $^{\circ}$ C - 60 $^{\circ}$ C

Storage conditions: Temp.: 0 $^{\circ}$ C - 35 $^{\circ}$ C RH: 45% - 85%

5. Performance

5.1 Test conditions

Unless otherwise specified, the test conditions shall be, as a general rule, at the temperature of $20 \pm 2^{\circ}$ C and the relative humidity of $65 \pm 15\%$.

5.2 Electrical characteristics

Storage period	Off-load voltage (V)	On-load voltage (V)	Sampling plan
Initial	3.00 - 3.40	3.00 - 3.40	MIL-STD-105E, General Inspection Lever II, Single Sampling, AQL=0.4
12 months @ RT	3.00 - 3.40	3.00 - 3.40	

Remark: On-load voltage: 15K Ω / 1 second.

The initial samples shall be tested within 30 days after delivery.

5.3 Service output

Discharge conditions			Minimum average duration	
Load resistance	Daily period	End point voltage	Initial	12 months at RT
15K Ω	24h/d	2.0V	1000hrs	960hrs

Remark: The initial samples shall be tested within 30 days after delivery.

5.4 Temperature characteristics

Discharge conditions:			Minimum average duration	
Load resistance	Daily period	End point voltage	$0 \pm 2^{\circ}\text{C}$	$60 \pm 2^{\circ}\text{C}$
15K Ω	24h/d	2.0V	850hrs	980hrs

5.3 & 5.4 Acceptance test:

- 1) 9 pieces of battery will be tested for each discharging method.
- 2) The average discharging time from each discharging method shall be equal to or greater than the specified figure, and no more than one battery has a service output less than 80% of the specified figure.
- 3) One retest is allowed to confirm the results if the first test didn't meet the requirements.

5.5 Electrolyte leakage resistance

Item	Test method	Requirements	Acceptance standard
Over-discharge	Continuously discharge at 15K Ω to 1.2V.	No leakage, no deformation	N=9, Ac=0, Re=1
High Temp. storage	Storage the samples at 60°C , RH below 70% for 30 days.	No leakage	N=40, Ac=1, Re=2

5.6 Safety characteristics

Item	Test method	Requirements	Acceptance standard
Short circuit test	Short circuit at 55°C . Continued the test at least 1 hour after the cell external case temperature has returned to 55°C .	No explosion, no fire	N=5, Ac=0, Re=1

5.7 Warranty

One year after delivery under normal storage conditions.

6. Packing and Marking

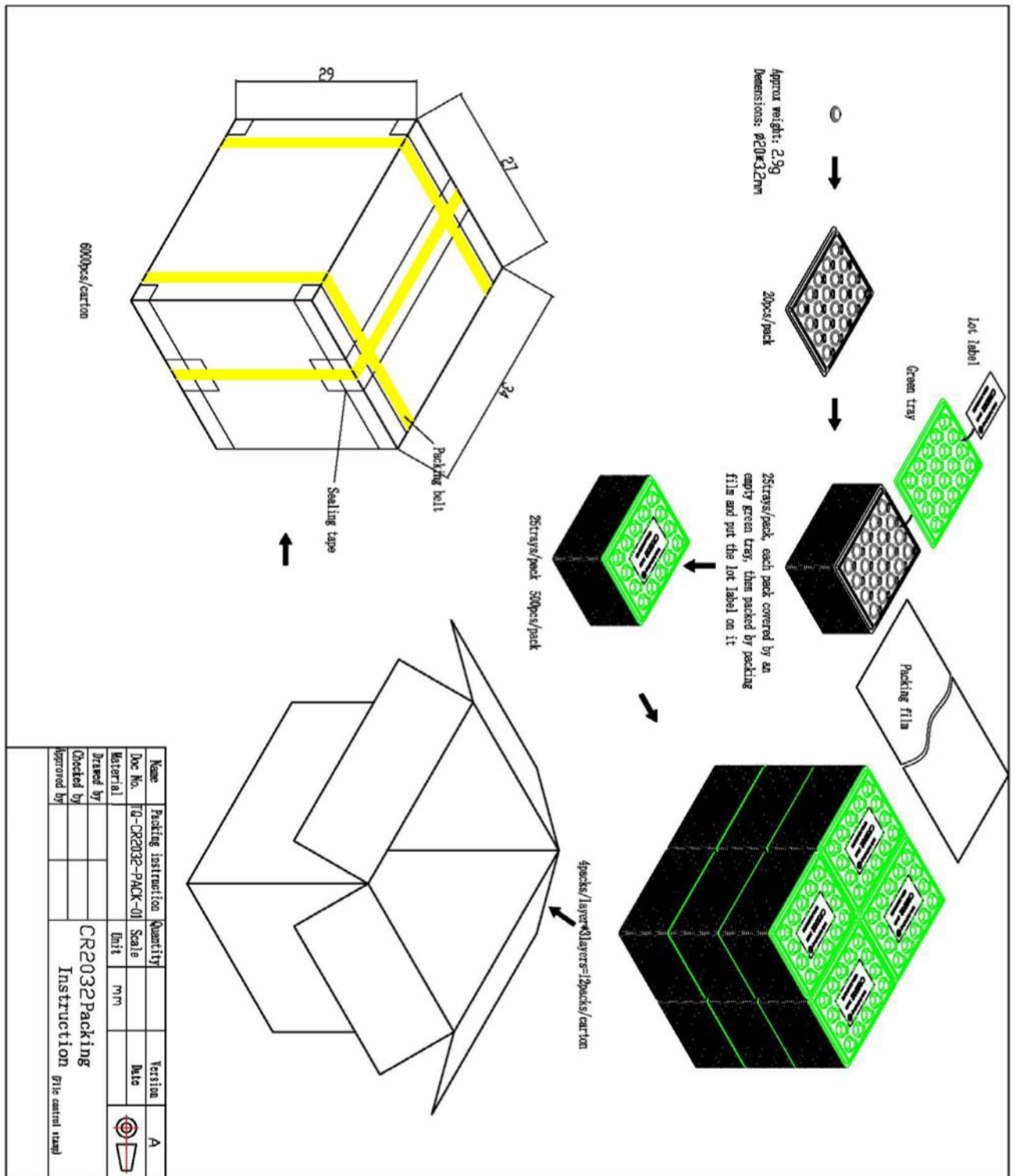
Any specific design and packing requirements will be accommodated as required. But as a general, the following markings will be printed, stamped or impressed on the body of the battery:

6.1 Marking design

- 1) Designation: CR2032.
- 2) Chemical system: Lithium Cell
- 3) Polarity Marking: "+" and/or "-".



6.2 Packing



Name	Packing Instruction	Quantity	Version
Doc No.	Q-CR2032-PACK-01	Scale	Date
Material		Unit	mm
Drawn by	CR2032Packing		
Checked by	Instruction		
Approved by	(for central usage)		

7. Caution for Use

- 1) Since the battery is not designed to be charged, there are risks of electrolyte leakage or causing damage to the device if the battery is charged.
- 2) The battery shall be installed with its "+" and "-" polarity in correct position, otherwise may cause the battery to be charged or over-discharged.
- 3) Short-circuiting, heating, disposing of in fire and disassembling the battery are prohibited.
- 4) Battery cannot be forced discharge, which lead to excess internal gas generation and, may result in bulging, leakage and explosion.
- 5) New and used batteries cannot be mix used at the same time, when replaced batteries, it is recommend to replace all and with the same brand type.
- 6) Exhausted batteries should be removed from compartment to prevent over-discharge, which cause leakage and damage to the device.
- 7) Direct soldering is not allowed, which will damage the battery.
- 8) Keep the battery out of the reach of children to prevent swallow, in case of accident should contact physician at once.
- 9) The battery should not be dismantled and deformed.

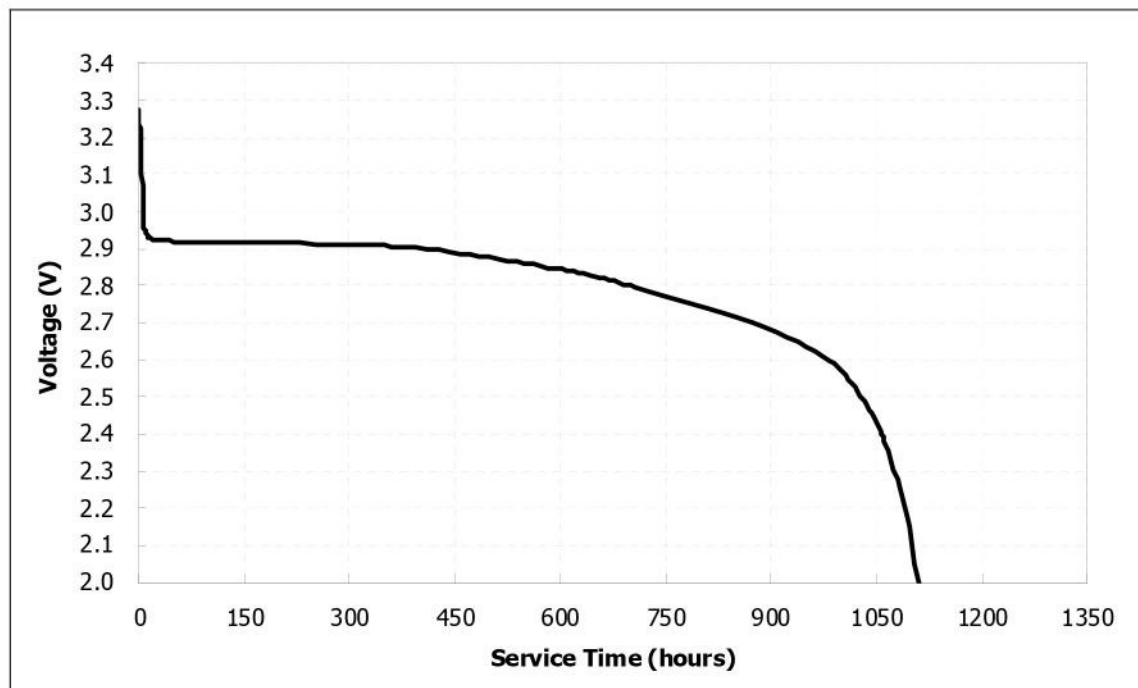
8. Referenced Standards

IEC 60086-1:2011 –Primary Batteries –Part 1: General

IEC 60086-2:2011 –Primary Batteries –Part 2: Physical and electrical specifications

IEC 60086-4:2007 –Primary Batteries –Part 4: Safety of lithium batteries

9. Discharge Curves



Discharge method: 15K Ω , 24 hours/day

Temperature: 20 \pm 2 $^{\circ}$ C