LITHIUM COIN CELL SPECIFICATION / MODEL : CR2032

1 Scope

This technology specification covers lithium/manganese dioxide coin cells of Model CR2032

2 Technologyparameters

Item		Unit	Specification	Condition
Nominal voltage		V	3.0	CR series
Nominal capacity		mAh	230	Continuously discharged under 15kΩ
Burst short-circuit current		mA	≥300	time≤0.5′
Open-circuit voltage		V	3.25-3.60	CR series
Storage temperature		℃	0-40	CR series
Operating temperature		℃	-20-60	CR series
Standard weight		g	2.85	CR2032
Self-discharge rate		%/year	2	CR2032
Quick test service life	Initial	h	≥120	Flash light continuous discharge for 100times/mins
	After 12 months	h	≥117.6	

3 Characteristics and test

Test item	Test method	Quality standard
1.Contour dimension	Measured with vernier caliper of which accuracy no less than 0.02 ㎜, test with inculations on the surface,avoid short-circuit.	diameter（㎜）：20.0（-0.15） height（㎜）：3.20（-0.20）
2.Open-circuit voltage	Measured with digital multimeter of which the accuracy is no low than 0.25%、internal resistence is> 1 MΩ	3.25-3.60
3.Burst short-circuuit current	Measured with arch culverts multimeter, testing time is< 0.5′, retest should after more than 0.5 hours	≥300mA
4.Appearance	Test by eyes	Clean and tidy, with clear mark, no transformation, rusting and leakage.
5.Quick discharge capacity	Under 20±2℃, humidity≤75%, load 3kΩ, flash light continuous discharge under 100times/mins	≥1,200,000 times
6.Vibration test	Vibration fruquency is 100-150 times/mins for 1 hour.	Stable performance
7.High temperature and leakage-proof performance	Under 45±2℃ for more than 30 days	Leakage rate≤0.05%
8.Over discharge and leakage-proof performance	Continuous discharge for 5 hours till the voltage is 2.0v	No leakage

Note：

1.The above test had been proved by lots of experiments.

2.Can adopt special test method according to clients' requirements.

3.1 Dimensions:

3.2 Off-load voltage:

The samples shall be kept standing open for 24h or longer at a temperature of 25℃, and the voltage between both terminals at the same temperature shall be measured with a voltmeter specified in subparagraph 4.3. The result must conform to table 1.

3.3 On-load voltage:

The samples shall be kept standing open for 24h or longer at a temperature of25℃, and the voltage between both terminals at the same temperature shall be measured with a voltmeter specified in subparagraph 4.3 while a exactitude resistance value 15k Ω (including resistance throughout external circuits) is connected between both terminals at the same temperature as specified. The result must conform to table 1.

3.4 Duration:

The samples shall be kept for 24h or longer at a temperature of 25℃, and shall then be continuously discharged at 25℃ under 15k Ω load to 2.0V end-voltage. The result must conform to table 1.

3.5 Appearance: The appearance of batteries shall be inspected by visual means. The superficies of the cells are clean and slippery. The mark is clear. The batteries shall have no deformation, dent, stain or camber.

3.6 Terminals:

The terminals have a nicer electroconductibility. There is no rust or leakage within the term of recommend use.

3.7 Leakage characteristics:

The samples shall be stored for 48hours at a temperature of 60 ℃ and a relative humidity of 90%, then take a view of them at a temperature of 25 ℃, a relative humidity of 65%±20%, there must be no leakage cells.

3.8 Storage characteristics:

The samples shall be stored for 12 month at a temperature of 25℃, a relative humidity of 65%±20%. Then the samples shall be continuously discharged at 25℃ under 15k Ω load to 2.0V end-voltage.

Self-discharging rate is to be calculated using the formula:

$$\text{Self-discharging rate (\%)} = \frac{A1-A2}{A1} \times 100$$

A1——Average initial discharge life.

A2——Average discharge life after storage.

The result must conform to table 2.

3.9 Vibration durability:

The sample is to be subjected to simple harmonic motion with an amplitude of 0.8mm (1.6mm total maximum excursion). The frequency is to be varied at the rate of 1 hertz per minute between 10 and 55 hertz, and return in not less than 90 nor more than 100 minutes. The sample is to be tested in three mutually perpendicular directions. After the test, the sample must conform to table 1.

3.10 Drop durability:

The samples are dropped ten times from a height of 1.9m onto a concrete floor. The samples are to be randomly oriented when released to obtain impacts in several positions. There is no distortion, no leakage, no explosion, no fire. The sample must conform to table 1.

3.11 Short-circuit durability :

Each test sample cell is to be short-circuited by connecting the positive and negative terminals of the battery with a minimum length of Φ 1.3mm^2 copper wire. The battery is to discharge until it is completely discharged and the battery case temperature returned to near 55℃±2℃. There is no explosion, no fire.

4 Condition of testing

4.1 Initial Test:

Means the test begin in three months after the cell produced.

4.2 Temperature、humidity:

As for as there is no special requirement, testing should be placed under normal temperature 25℃and Relative humidity of 60%±20%.

4.3 Test facility: 4.3.1 Outer micrometers: Instruments which tolerance shall be ± 0.02mm or below and those having equal or better accuracy shall be used.

4.3.2 DC voltmeters: Precision is 0.25 rate or better and the input resistor shall be 10MΩ or more.

4.3.3 Exactitude resistance: Relative error is 0.5% or below.

4.3.4 Resistance box: Relative error is 0.5% or below.

4.3.5 Electrical drying box : Tolerance shall be ±2℃ or below.

5 Mark

5.1 Battery type: CR2032

5.2 Nominal voltage: 3.0V

5.3 Polarity: +

5.4 Manufacturing marks: The year and month of production shall be marked on negative terminal when needed.

6 Others

6.1. Caution: Please read the caution carefully before used.

Fire and burn hazard. Do not recharge, disassemble, heat or incinerate. Keep battery out of reach of children and in original package until ready to use. Installed the cell correctly. Dispose of used batteries promptly. If swallowed contact physician immediately.

6.2. About the technology specification modified： This technology specification may be modified when needed.

6.3. Forestall notify: We will notify our customers when the plant or materials or technology is modified.

CR2032 Characteristics table

Table 1

Project	Condition	Test temperature	Characteristics	
Off-load voltage	Off-load	25℃	>3.05v	
		0℃5	>3.05v	
On-load voltage	15kΩ load after 0.8S	25℃	>3.05v	
		0℃	>3.05v	
service output	Continuously discharged under 15kΩ load till 2.0V end-voltage	25℃	Standard	1000h
			Min value	800h
		0℃	Standard	850h
			Min value	680h

Table 2

Project	Condition	Characteristics

Thermal durability	Kept for 48 hours at 60℃, then continuously discharged under 15k Ω load till 2.0V end-voltage	Standard	935h
		Min value	748h
Self-charging rate	Stored for 12 month at normal temperature, then continuously discharged under 15k Ω load till 2.0V end-voltage	Less than 10%	
	Stored for 24 month at normal temperature, then continuously discharged under 15k Ω load till 2.0V end-voltage	Less than 30%	

7 Inspection rules

7.1 Deliver inspection: Depending on GB2828

Table 3

Number	Test	Item	IL	AQL
1	Dimensions	3.1	S-2	0.4
2	Appearance	3.5	II	1.0
3	Terminals	3.6	II	0.4
4	On-load voltage	3.3	II	0.4

7.2 Routine inspection: Depending on GB2829 and QB/T2389

7.3 Inspection for service output

7.3.1 9 samples shall be tested for service output

7.3.2 If the average value is equal to or more than the value of table 1, and if the number of batteries showing a value less than 80% of the value of table 1 is 1 or less. The batteries are considered to conform to the requirement.

7.3.3 If the average value is less than the value of table 1, or if the number of batteries showing a value less than 80% is 2 or more, the test shall be repeated with other 9 pieces. At the second test, if the average value is equal to or more than the value of table 1, and if the number of batteries showing a value less than 80% of the value of table 1 is 1 or less, these batteries are considered
to conform to the requirement.

7.3.4 At above second test, if the average value is less than the value of table 1, or if the number of batteries showing a value less than 80% of the value of table 1 is 2 or more, the batteries are considered not to conform to the requirement. A third test shall not be performed.

Discharge curve

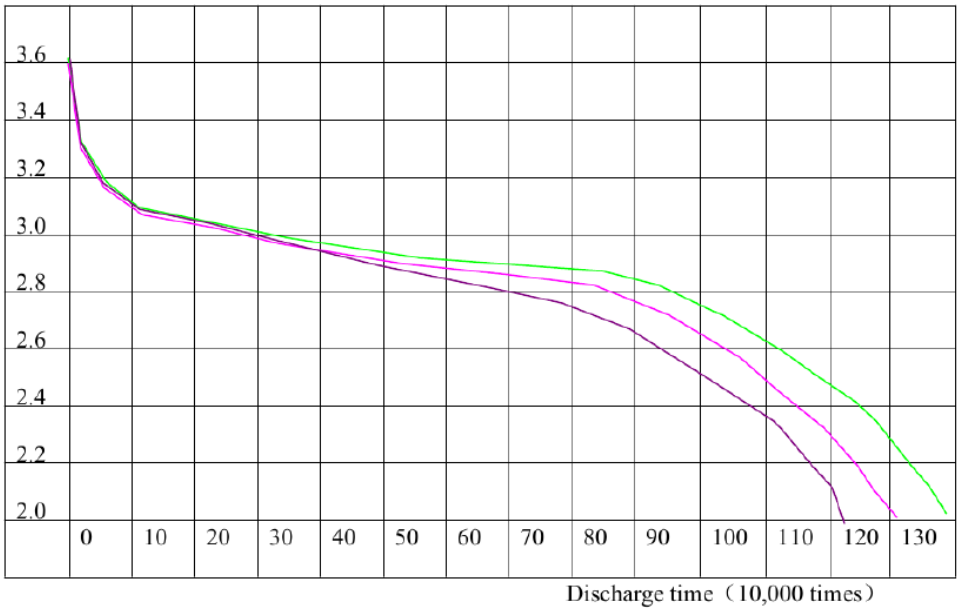
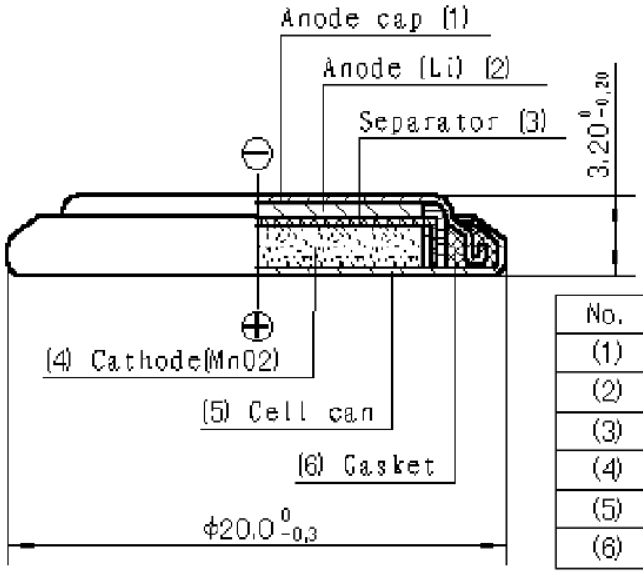


Fig.1

CR2032 Cross section view



No.	Name
(1)	Anode Cap
(2)	Anode
(3)	Separator
(4)	Cathode (MnO2)
(5)	Cell Can
(6)	Gasket