

Lithium Manganese Battery Technology Specification

| Customer | |
|-----------|---------------------------|
| Part name | Lithium Manganese Battery |
| Model No | CR2032 210mAh 3.0V |
| Part No | CR2032 HP2D |
| Date | 2021-08-04 |

1 Scope

The specification applies to CR2032 HP2D (Li/MnO_2) battery supplied by AKYGA Battery

2 Characteristics and Performance

2.1 Battery type: CR20322.2 Nominal voltage: 3.0 V

2.4 Operating temperature range: $-20\text{--}60\,^{\circ}\!\text{C}$

2.5 Storage temperature range: $25\pm15^{\circ}$ C

2.6 Normal weight: 3.0g

2.7 Structure and Outside dimensions : Figl.

2.8 Performance:

Table 1 .

CR2032 Performance

| Item | Condition | Test temperature | Characteristic | |
|-------------------------|---|---------------------|----------------|-------|
| Open circuit voltage | No load | 23℃±3℃ | 3. 05-3. 45V | |
| | | | 3. 05-3. 45V | |
| Load voltage | $15 \mathrm{k}\Omega$, after $5\mathrm{s}$ | 23℃±3℃ | 3. 00-3. 45V | |
| | | | 3. 00-3. 45V | |
| Discharge Capacity | Continually discharge at 15kΩ resistance to cutoff voltage 2.0V | 23°C±3°C | Normal | 1100h |
| | | | The lowest | 1000h |

Table 2.

| Item | Condition | Characteristic |
|----------------------------|--|----------------|
| Fast Discharge Capacity | Continually discharge at $3k\Omega$ resistance to cut-off voltage 2.0V | 210h |
| Self-discharge rate | The normal temperature and humidity under normal storage for 12 months | Less than 5% |

3 Test

3.1 Conditions:

Temperature: $25\pm15^{\circ}$ C, Relative Humidity: $65\pm10^{\circ}$ Pressure: 1.0atm, (unless otherwise specified)

3.2 Measure Instrument:

- 3.2.1 Dimensional measurement: Caliper with accuracy of ± 0.02 mm.
- 3.2.2 Voltmeter: this has an accuracy of $\pm\,0.2\%$ and impedance of above $10M\,\Omega_{\odot}$
- 3.2.3 Exactitude resistance: tolerance should be $\pm 0.5\%$.
- 3.2.4 Resistance box: tolerance should be $\pm 0.5\%$
- 3.2.5 Constant temperature oven: tolerance should be $\pm 2^{\circ}$ C

3.3 Initial test:

Cells should be tested in the first 3 months after production

3.4 Outside dimensions:

The measuring instrument as specified 3.2.1 is used. The result should meet the requirement of 2.7

3.5 Open circuit voltage:

Cells should be stored for not less than 24 hours at the normal conditions as specified 3.1, at the same circumstance use voltmeter specified in 3.2.2 to measure voltage between "+" and"-". Results should meet the requirement of table 1

3.6 Load voltage:

Cells should be stored for not less than 24 hours at the normal conditions as specified 3.1, at the same circumstance, Parallel connect meter and $15k\,\Omega$ resistance specified in 3.2.2 to measure voltage between "+" and "-". Result should meet the requirement of table 1

3.7 Discharge capacity:

Cells should be stored for not less than 24 hours at the normal conditions as specified 3.1, Continually discharge at $15k\,\Omega$ resistance to cut-off voltage 2.0v. Results should meet the requirement of table 1

3.8 Appearance:

No scathe, no crackle, no rust, no dirty spots, and mark clearly

3.9 Terminal arrangement:

Have good conduction performance, no deformation and leakages

3.10 Leakage proof characteristic

Store sample cells 30 days at 45 ± 3 °C, relative humidity below 70%, then check appearance at normal temperature and normal humidity with naked eyes. Cells should be no leakage.

3.11 Self-discharge rate

Self-discharge rate can calculated as below equation, result should meet the requirement of table $2\,$

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

Al —— Cell average discharge capacity in initial period

A2 — average discharge capacity after storage

3.12 Vibration Test:

The battery is to be subjected to simple harmonic motion with amplitude of 0.8mm. The frequency is to be varied at the rate of 1 Hz per minute between 10 and 55 Hz, and return back between 90 and 100 minutes. The battery is to be tested in three mutually perpendicular directions

3.13 Drop Test:

Cell should be dropped 10 times from the height of 1.9m onto cement ground. Result should be no leakage, no fire and no explosion

3.14 Short- circuit test:

The cell is to be short-circuited by connecting the positive and negative terminals of the cell with copper wire having a resistance about 0.1Ω . Cell is to be completely discharged or its surface temperature has returned to ambient temperature. During the process, cell should be no fire and no explosion

4 Mark

4.1 Cell type: CR2032

4.2 Nominal voltage: 3V 4.4

Polarity: +

5 Inspection rules

5.1 Deliver inspection: Depending on GB2828

Table 3

| Number | Test | Item | IL | AQL |
|--------|----------------------|------|-----|-----|
| 1 | Dimensions | 3. 4 | S-2 | 0.4 |
| 2 | Appearance | 3.8 | II | 1.0 |
| 3 | Open circuit voltage | 3. 6 | II | 0.4 |
| 4 | Discharge capacity | 3. 7 | | |
| | | | | |

5.2 Routine inspection: Depending on GB2829 and QB/T2389

6. Inspection for service output

- 6.1 9 samples shall be tested for service output
- 6.2 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.
- 6.3 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.
- 6.4 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. third test shall not be performed.

7 Disply and storage

- 7.1 Batteries shall be stored in well-ventilateddry and cool conditions
- 7.2 Battery cartons should not be piledup in severa layers, or should not exceed a specified height
- 7.3 Batteries should not be exposed to direct sun ray for a long time or placed in areas where they get wet by rain.
- 7.4 Do not mix unpacked batteries so as to avoid mechanical damage and/ or short circuit among each other

8 Storage life

Storage life of batteries are two years long at $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and RH $60 \pm 15\%$

9 Warnings and Cautions

- 9.1 Do not short circuited, recharge, heat, disassemble nor dispose in fire.
- 9.2 Do not force-discharge.
- 9.3 Do not make the anode and the cathode reversed
- 9.4 Do not solder directly
- 9.5 Keep battery out of children's reach 9.6 Do not store or use in the environment of over 85° C.

10 Note

According to the need, this technical specification may be modified at any time. For more information, please consult with us.

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Fig1. Structure of CR2032 HP2D

