

Technology Specification

Model: R03(Aluminium jacket)

Document No.: QTR03A15-1

Version: QT2015-1

Date: 2015.01.01

1. Scope:

This specification defines the technical requirements for R03 (Aluminium jacket) Carbon Zinc battery supplied by Gigacell. If not otherwise specified, the technical requirements and dimensions for batteries should meet or exceed the requirements of GB/T 8897.1-2008, GB 8897.2-2008.

2. Reference documents:

2.1 GB8897.1-2008(IEC60086-1:2007,IDT) Primary batteries-Part 1:General

2.2 GB8897.2-2008(IEC60086-2:2007,MOD) Primary batteries-Part 2:Physical and technological specifications

2.3 GB8897.5-2006(IEC 60086-5:2005,MOD)Primary batteries-Part 5:Safety of batteries with aqueous electrolyte

3. Chemical systems , voltages and designation:

3.1 Chemical systems: Carbon Zinc battery(Zn/NH₄Cl-ZnCl₂-H₂O/MnO₂)

3.2 Nominal voltage: 1.5V

3.3 Designation: IEC&GB(China): R03

ANSI: AAA

JIS: UM-4



4. Battery Weight and Capacity:

4.1 Battery : Approximate 7.50g

4.2 Battery : Approximate 380mAh (75Ω,4h/d, 20°C, e.v.: 0.9V)

5. Heavy Metal Content

5.1 Mercury: max1ppm

5.2 Cadmium: max 5ppm

6. Dimension:

| No. | Min(mm) | Max(mm) |
|-----|---------|---------|
| Φ | 9.5 | 10.5 |
| A | 44.0 | 44.5 |
| C | 6.1 | 6.5 |
| F | 3.0 | 3.4 |
| G | - | 1.0 |



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7. Voltage and Short Circuit Current: (3.9Ω, 0.3S, 20±2°C)

| Item | OCV (V) | CCV (V) | SCC(A) |
|--------------------|---------|---------|--------|
| Initial (3 months) | ≥1.60 | ≥1.48 | ≥9 |
| Storage 12 months | ≥1.56 | ≥1.44 | ≥7 |

*OCV measurement: The inner resistance of Voltage Metre is above 1MΩ, Accuracy should not be less than $\pm 0.25\%$, Accuracy should not be less than the last valid value 50%.

*C.C.V. measurement: After 0.2±0.01sec by R=5.0Ω

*SCC measurement: The pointer type ampere meter, the accuracy of $\pm 0.5\%$

8. Battery Performance:

| Discharge Conditions | | | MAD (minimum average discharge time) | | |
|----------------------|----------------|-----------------|---|---------|-------------------|
| Load (Ω) | Discharge Mode | End Voltage (V) | Requirement of IEC 60086-2:2007 & GB8897.2-2008 | Initial | Storage 12 months |
| 3.9Ω | 24h/d | 0.9V | / | 35mins | 30mins |
| 5.1Ω | 4min/h,8h/d | 0.9V | 50mins | 65mins | 55mins |
| 75Ω | 4h/d | 0.9V | 20h | 21.5h | 20h |

*Initial: 60 days after production

*Test condition: 20°C±2°C and 60±15%RH

9. Leakage Resistance:

| Item | Test Conditions | Sample size | Requirements | Acceptance |
|---------------------------------------|---|-------------|--|------------|
| Over discharge | 10Ω 24h/d for 48h at 20°C±2°C, | n=9pcs | No leakage; Max of 0.35 mm height increase | Ac=0,Re=1 |
| High temperature and humidity storage | exposed to a temperature of 60°C±2°C and RH90±5% for a period of 3 weeks. | n=20pcs | No leakage | Ac=0,Re=1 |
| 45°C Dry Storage | stored for 12 weeks at 45°C | n=20pcs | No leakage | Ac=0,Re=1 |
| Item | Test Conditions | Sample size | Requirements | Acceptance |

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| | | | | |
|------------------------|--|--------|--------------------------|-----------|
| Partial Use | Stored at $45^{\circ}\text{C}\pm 2^{\circ}\text{C}$ for 30days after undischarged batteries were test discharged 3.9Ω 24h/d,EPV=1.0V | n=5pcs | No leakage, No explosion | Ac=0,Re=1 |
| Thermal shock | See the following note 1,Total 10 Cycles | n=5pcs | No explosion | Ac=0,Re=1 |
| Incorrect installation | Place three undischarged and unconditioned batteries in a series with one test sample battery reversed,Complete the circuit until vent activation or until the temperature of the reversed battery returns to ambient. | n=5pcs | No explosion | Ac=0,Re=1 |
| Free fall | Drop each undischarged battery Two times, oriented in each of three mutually perpendicular face (six total) from a height 1 meter,onto a concrete surface, see the following note 2 | n=5pcs | No explosion | Ac=0,Re=1 |
| Over discharge | Discharge one test sample, battery(C1) with 43Ω resistance load until EPV is 0.6V,Connect three undischarged batteries and the sample battery in series with a 7.5Ω resistance load(R1)as shown in note 3,Maintain the circuit until the CCV of the series string reaches 2.4V | n=5pcs | No explosion | Ac=0,Re=1 |

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10. Inspection Rules:

10.1 Deliver inspection: Depending on GB2828

| Number | Test | Item | IL | AQL |
|--------|----------------------|------|-----|-----|
| 1 | Dimensions | 5 | S-2 | 0.4 |
| 2 | Appearance | -- | II | 1.0 |
| 3 | Discharge capacity | 7 | -- | -- |
| 4 | Open-circuit voltage | 6 | II | 1.0 |

Routine inspection: Depending on GB2829 and QB/T2389

11. Inspection for capacity:

11.1 9 samples shall be tested for capacity.

11.2 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.

11.3 If the average value is less than the value of table 1, or if the number of batteries showing a value less than 80% the value of table 1 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.

11.4 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.

12. Instructions for use:

12.1 Always select correct size and grade of battery most suitable for intended use.

12.2 Replace all batteries of a set at the same time.

12.3 Clean the battery contacts and also those of the equipment prior to battery installation.

12.4 Ensure that batteries are installed correctly with regard polarity(+ and -).

12.5 Remove batteries from equipment which is not be used for an extend period of time.

12.6 Remove exhausted batteries promptly.

13. Display and storage:

13.1 Batteries shall be stored in well-ventilated dry and cool conditions.

13.2 Battery cartons should not be piled up in several layers, or should not exceed a specified height.

13.3 Batteries should not be exposed to direct sun ray for a long time or placed in areas where they get wet by rain.

13.4 Do not mix unpacked batteries so as to avoid mechanical damage and/or short circuit among each other.

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14. Storage life:

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

15. Marks:

15.1 Designation

15.2 Year and month of manufacture, which may be in code, or the expiration of a guarantee period in clear.

15.3 Polarity of terminals.

15.4 Nominal voltage.

15.5 Heavy Metal content.

15.6 Name or trade mark or manufacturer and supplier.

15.7 Cautionary advice.