CHUNG PAK

SPECIFICATIONS

FOR ZINC CHLORIDE DRY BATTERY

TYPE SUM1/GP (EXTRA HEAVY DUTY)

RECEIVED BY：

Prepared by _____

Approved by _____

CHUNG PAK

(DATE：AUGUST 2004)

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Zinc Chloride Dry Battery R20

1. *Scope*

This specification is applicable to the "VINNIC" brand Zinc Chloride Mercury Free Dry batteries supplied by CHUNG PAK BATTERY WORKS, LTD.

2. *Technical Specification*

2.1 Name (Designation) : SUM1/GP (EXTRA HEAVY DUTY)
(IEC Designation) : R20P

2.2 Dimensions:
Diameter : 34.2mm
Height : 61.5mm

2.3 Weight (approx) : 100g

2.4 Nominal voltage : 1.5V

2.5 Typical capacity : 6500mAh at 3.9Ω 1hrs/day (E.V.0.9V)

2.6 Typical duration : 1280min at 3.9Ω 1hrs/day (E.V.0.9V)
55 hrs at 10Ω 4hrs/day (E.V.0.9V)

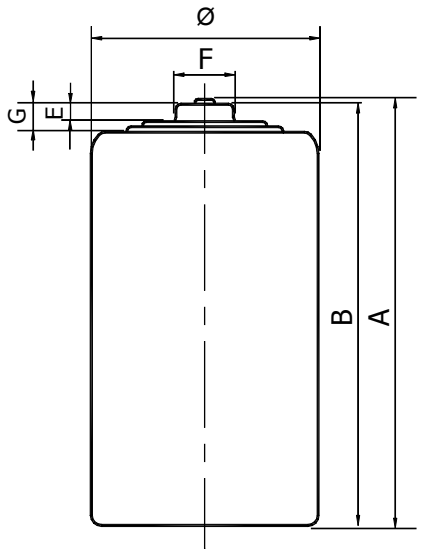
2.7 Retention : 90% after 12 months storage(20℃)
85% after 24 months storage(20℃)

2.8 Outside shape dimensions and terminals:

Dimensions of Zinc Chloride Dry Battery R20

Unit:mm

	Max	Min
A	61.5	59.5
B		59.5
C		16.0
E	1.0	
F	9.5	
G		1.5
Ø	34.2	32.2



Remarks
A: Overall height of battery
B: Height between contact terminals without pip
C: Outer diameter of negative terminal Contact area
E: Depression of negative terminal from outer casing
F: Diameter of positive terminal within The specified projection height
G: Height of projected area of positive terminal, exclusive part
Ø: Diameter of battery

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3. *Performance (For all test method, refer to Appendix 1)*

3.1 Open-circuit voltage:

Initial	1.600 to 1.720V
After 12 months storage	1.530 to 1.680V
After 24 months storage	1.500 to 1.630V

3.2 Service out-put:

Load resistance	2.2Ω	3.9Ω	3.9Ω	2.2Ω	10Ω
Discharge method	1hrs/day	1hrs/day	Continuous	**	4hrs/day
End –point voltage	0.8V	0.9V	0.9V	0.9V	0.9V
Minimum duration (Initial)	680 min	1080 min	860 min	500 min	50 hrs
Minimum duration (After 12 months storage)	612 min	972 min	774 min	450 min	45 hrs
Minimum duration (After 24 months storage)	578 min	918 min	731 min	425 min	43 hrs

**: 4 min beginning at hourly intervals for 8hrs per day.

The word “initial” is applicable to the products elapsed one month or less after production , including those , to which tests have been started in less than three month after production.

3.3 Overdischarge electrolyte leakage resistance:

No deformation and no external electrolyte leakage shall be observed.

3.4 High temperature electrolyte leakage resistance:

No deformation and no external electrolyte leakage shall be observed.

3.5 Expiry period : 2 years after manufactured

3.6 Expiry date representation

The expiry date is represented by means of the following adriged notation on the bottom of a completed battery.

12-2005 (manufactured in Dec, 2003)

4. *Brand and packaging*

Both OEM and ODM orders are welcome. Any specific design and packaging requirements will be accommodated as required

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Appendix 1 : Test

1. Storage and test conditions for samples

Unless otherwise specified, the storage and test conditions for samples shall be , as a general rule , at the temperature of 20±2℃ and the humidity of 65±20%.

2. Measuring instruments and devices

2.1 Voltmeter : The accuracy of the voltmeter shall be within 0.005V for each 1.5V.
The resistance of the measuring instrument shall be at least 10 times the discharge resistance but with a minimum of 1 M ohms per volt of the scale.

2.2 Load resistance : The load resistance shall include all of the external circuit, and its allowance shall be within ±0.5%.

2.3 Caliper : The caliper shall be the one having precision of 0.05 minimeters or the one having the same or superior prcision to this.

3. Test method

3.1 Dimensions : Measurements shall be made by use of the calipers.

3.2 Appearance : Examination shall be carried out by visual inspection.

3.3 Open-circuit voltage: Measurements shall be carried out before the start of discharge of the sample by use of the voltmeter.

3.4 Service output

Discharge start time: After leaving in an atmosphere at a temperature of 20±2℃ for at least 8 hours or more.

Discharge temperature and humidity: 20±2℃, 65±20%.

Discharge method : As defined in 3.2. However discharge shall be effected for more than 5 days during 7 days and when discharge is made twice a day, an interval of 4 hours shall be elapsed between two discharges.

Discharge end-point: The instant when the closed-circuit voltage has reached below the end-point voltage (as defined in 3.2, Page 2).

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3.5 Overdischarge electrolyte leakage resistance

The following conditions shall be adopted for the test.

(a) Discharge start point: After keeping at the temperature of 20±2℃ for at least 8 hours or more

(b) Test temperature and humidity: 20±2℃, 65±20%

(c) Load resistance : 2.2Ω

(d) Test method : Continuous discharge for 48hours.

3.6 High temperature electrolyte leakage resistance

The following conditions shall be adopted for the test

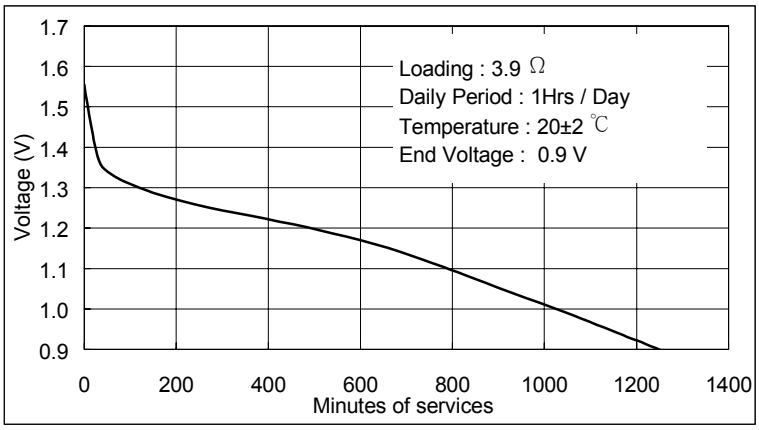
(a) Test temperature and humidity: 45±2℃, below70%

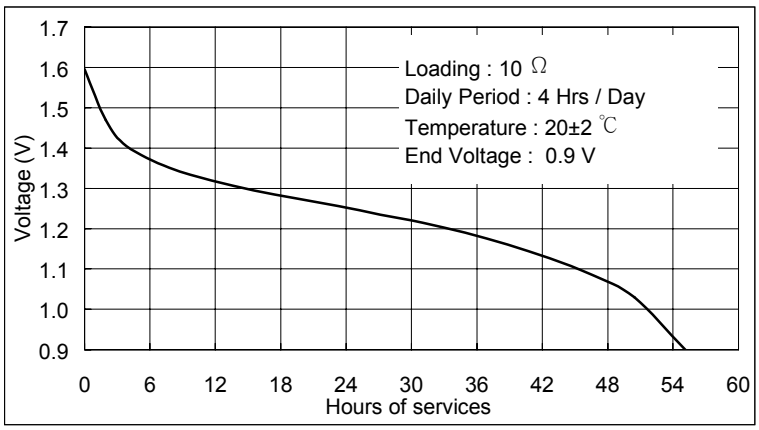
(b) Test period : 30 days

(c) Test method : Leave to stand still.

Appendix 2: Discharge characteristics

STANDARD DISCHARGE CURVE:





TEMPERATURE CHARACTERISTICS:

(Discharge continuously at various resistance)