

PRODUCT SPECIFICATIONS

Carbon Zinc Dry Battery

6F22 006P 9.0V

(Mercury & Cadmium Free)

1. Scope

This specification is applicable to the cells supplied by HuaRong Battery Co., Ltd.

2. Kind of products specified.

Manganese dioxide dry cell.

3. Type and characteristics.

- 3.1. Type (FR Designation): **1604D 9.0V**
 (JIS Designation): **6F22 9.0V**
 (IEC Designation): **6F22**

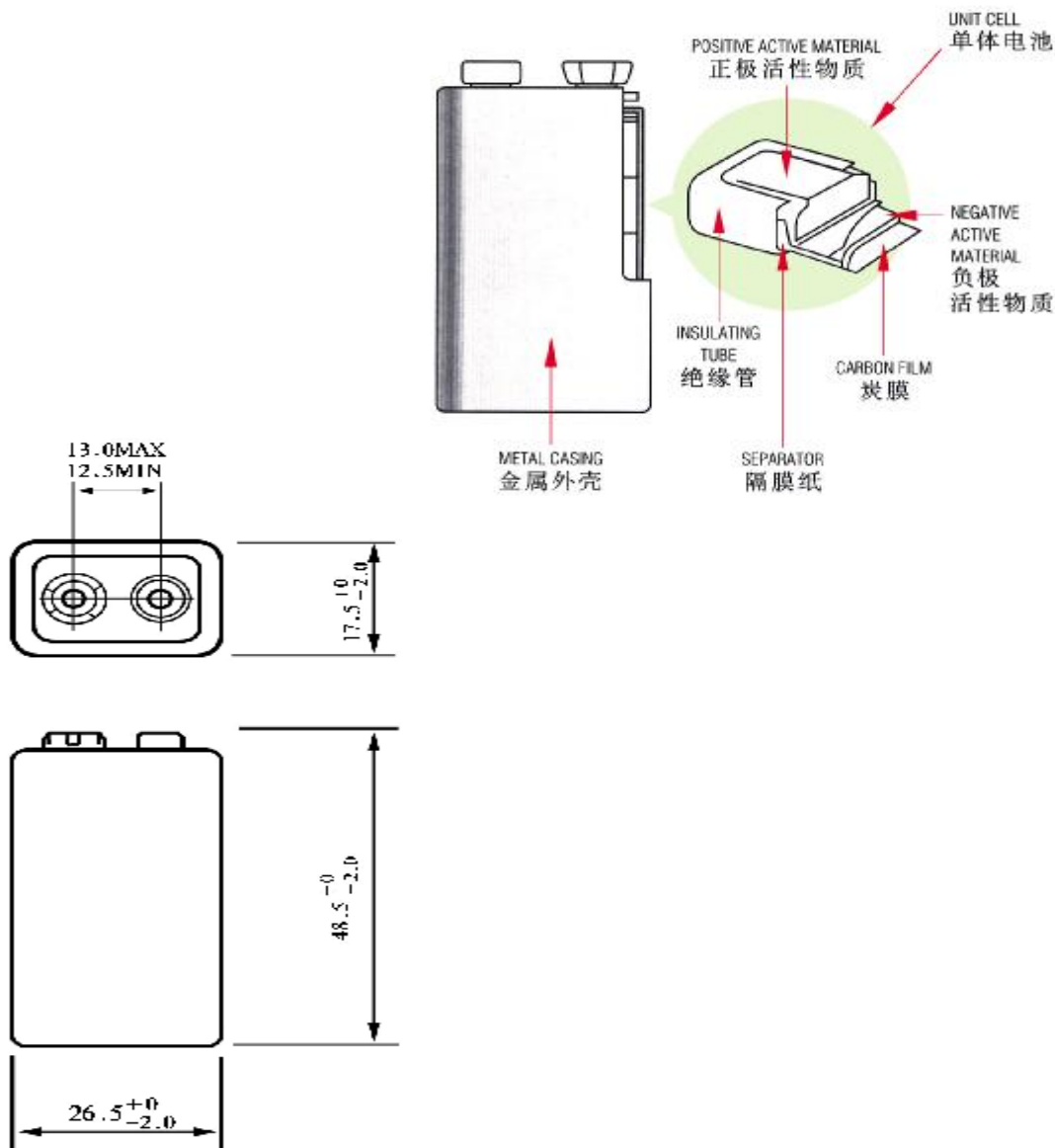
3.2. Nominal voltage : **9.0 V**

3.3. Outside shape dimensions and terminals: In accordance to the appended drawing.

3.4. Appearance: Defects, such as flaws, dirty spots, deformation, discoloration, etc, with Damage commercial values shall not be present.

3.5. Characteristic

3.5.1. Design:



- 3.5.2. Open-circuit voltage: Values shall be in agreement with that shown in Table 1.
 3.5.3. Service output: **ditto**
 3.5.4. Overdischarge electrolyte leakage resistance: **ditto**
 3.5.5. High temperature electrolyte leakage resistance: **ditto**

Table 1.

Open-Circuit Voltage:

Initial	9.8 V-10.7V
After 12 months storage	>9.2V

Load Voltage (360 Ω): 9.10V

Service Output:

Load Resistance	620W	180W
Discharge Method	2 hrs/day	30 min/day
End-Point Voltage	5.4 V	4.8V
Minimum Duration (Initial)	28 Hrs	7 Hrs
Minimum Duration (After 12 months storage)	26 hrs	6 hrs

Material Components

Average Components: 38.0 g

<i>Material Components (Specific Chemical identity, Common Name(s))</i>	<i>AEGIH TLV</i>
1) <i>Manganese Dioxide</i>	<i>48.0 wt %</i>
2) <i>Zinc Metal</i>	<i>25.5 wt %</i>
3) <i>Carbon Black</i>	<i>3.8 wt %</i>
4) <i>Zinc Chloride</i>	<i>4.7 wt %</i>
5) <i>Ammonium Chloride</i>	<i>0.3 wt %</i>
6) <i>Lead</i>	<i>0.1 wt %</i>
7) <i>Cadmium</i>	<i>10 PPM</i>

Overdischarge electrolyte leakage resistance:

No deformation and no external electrolyte leakage shall be observed.

High temperature electrolyte leakage resistance:

No deformation and no external electrolyte leakage shall be observed.

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 months after production.

4. Test

4.1. Storage and test conditions for sample cells

4.1.1. Storage conditions : Unless otherwise specified, the storage conditions for sample cells shall be, as a general rule. At the temperature of $25 \pm 2^\circ\text{C}$ and the humidity of $65 \pm 20\%$.

4.1.2. Test conditions : Unless otherwise specified, the test conditions for sample cells shall be kept at normal temperature ($20 \pm 15^\circ\text{C}$) and normal humidity ($65 \pm 20\%$).

4.2. Measuring instruments and devices

4.2.1. Voltmeter : The accuracy of the voltmeter shall be within 0.01V for each 1.5V.
The resistance of the measuring instrument shall be at least 10 times the discharge resistance but with a minimum of 500K ohms per volt of scale.

4.2.2. Load resistance: The load resistance shall include all of the external circuit, and its allowance shall be $\pm 0.5\%$.

4.2.3. Calipers : The calipers shall be the one having precision of 0.02millimeters of Minimum scale, or the one having the same or super for precision to this.

4.3. Test method

4.3.1. Dimensions : Measurement shall be made by use of the calipers defined in 4.2.3.

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

4.3.3. Open-circuit voltage: Measurement shall be carried out before the start of discharge of the cell by use of the voltmeter defined in 4.2.1.

4.3.4. Service output

(1) **Discharge start time :** After leaving in an atmosphere at a temperature of $25 \pm 5^\circ\text{C}$ for at least 8 hours or more.

(2) **Discharge temperature and humidity:** $25 \pm 5^\circ\text{C}$, $65 \pm 20\%$.

(3) **Load resistance :** According to Table 1.

(4) **Discharge method:** In accordance to Table 1. 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.

(5) **Discharge end-point:** The instant when the closed-circuit voltage has reached below the end-point voltage defined in Table 1.

4.3.5. Electrolyte leakage resistance

(1) **Overdischarge electrolyte leakage resistance**

The following conditions shall be adopted for the test.

(a) **Discharge start point :** After keeping at the temperature of $20 \pm 2^\circ\text{C}$ for at least 8 hours or more.

(b) **Test temperature and humidity:** $20 \pm 2^\circ\text{C}$, $65 \pm 20\%$.

(c) **Load resistance :** $5\ \Omega$

(d) **Test method :** Continuous discharge for 48 hours until 0.85V.

(2) **High temperature electrolyte leakage resistance**

The following conditions shall be adopted for the test.

(a) **Test temperature and humidity :** $45 \pm 2^\circ\text{C}$, below 70%.

(b) **Test period :** 30 days.

(c) **Test method :** Leave to stand still.

5. Guarantee

Guarantee period: *Within 36 months after shipped out.*