

### 1. APPLICABILITY

This specification is applicable to GP Ultra Alkaline grade batteries (GP model no. :GP1604AU).

### 2. TYPE

2.1 Six layers built alkaline manganese batteries.

2.2 Nominal weight : 48g.

### 3. NOMINAL VOLTAGE

9 Volts.

### 4. TERMINALS

Nickel-plated miniature snap fasteners.

### 5. SHELL

Printed metal jacket.

### 6. IDENTIFICATION

Expiry code of 6 digits (MM-YYYY) will be printed on the bottom of each battery.

### 7. QUALITY REQUIREMENT

#### 7.1 Conventions:

n = Number of batteries to be tested.

c = Permissible number of defects.

k = Actual number of defects.

x = Average of (n-k) good result.

N0 = Test within 3 months of ex-factory.

N12 = Test within 12 months of manufacture code.

N36 = Test within 36 months of manufacture code.

N60 = Test within 60 months of manufacture code.

#### 7.2 Test conditions:

7.2.1 All tests (Voltage, Storage, Service life etc) shall be performed at ambient temperature of  $25 \pm 2^\circ\text{C}$  and relative humidity of  $60 \pm 15\%$  RH.

7.2.2 Voltmeter shall has a resolution of  $\pm 0.01$  V and with internal impedance of  $1 \text{ M}\Omega$  minimum.

7.2.3 Unless otherwise stated, samples for acceptance testing shall be selected per MIL-STD-105E, LEVEL II normal inspection.

#### 7.3 Shelf life : 5 years as below conditions,

##### 7.3.1 Open circuit voltage [OCV]

(\*Storage performance are estimated)

	Minimum voltage (V)	AQL
N0	9.55	0.65%
N12	9.30	0.65%
N36*	9.10	0.65%
N60*	8.90	0.65%



## Product Specifications

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7.3.2 Closed circuit voltage [CCV] (Load 47ohm for 0.3 seconds).

(\*Storage performance are estimated)

	Minimum voltage (V)	AQL
NO	8.65	0.65%
N12	8.00	0.65%
N36*	7.70	0.65%
N60*	7.30	0.65%

7.3.3 Service life (Batteries tested shall comply with either one of the following requirements.)

7.3.3.1 Requirements (\* Storage performance are estimated)

Resistance	Discharge duration	End Voltage	SPECIFICATIONS (Hrs), Mean			
			NO	N12	N36*	N60*
270ohm	1hr/day	5.40V	20.5	20.2	18.7	16.7
620ohm	2hrs/day	5.40V	49.0	47.5	45.0	44.0
10Kohm background 24 h/d, 620 ohm 1s/h pulse		7.50V	SPECIFICATIONS (days), Mean			
			20.0	19.5	18.5	17.5

7.3.3.2 n=10, c=1. In case of k=2, one retest is allowed.

## 7.4 External leakage

7.4.1 No battery shall leak during the service life tests before the end point voltage is reached.

7.4.2 No leakage during storage for 30 days under 45+/- 2 °C, 70 % RH.

7.4.3 For undischarged batteries.

	AQL
NO	0.65%
N12	0.65%
N18	0.65%

## 7.5 Appearance

	AQL
Major defects	0.65%
Minor defects	0.65%

- |               |                                      |
|---------------|--------------------------------------|
| Major defects | 1) Loose or damaged terminals        |
|               | 2) Incorrect polarity.               |
|               | 3) Visible rust on metal parts.      |
| Minor defects | 1) Substandard appearance.           |
|               | 2) Heavy scratches.                  |
|               | 3) Serious deformation.              |
|               | 4) Serious displacement of artworks. |



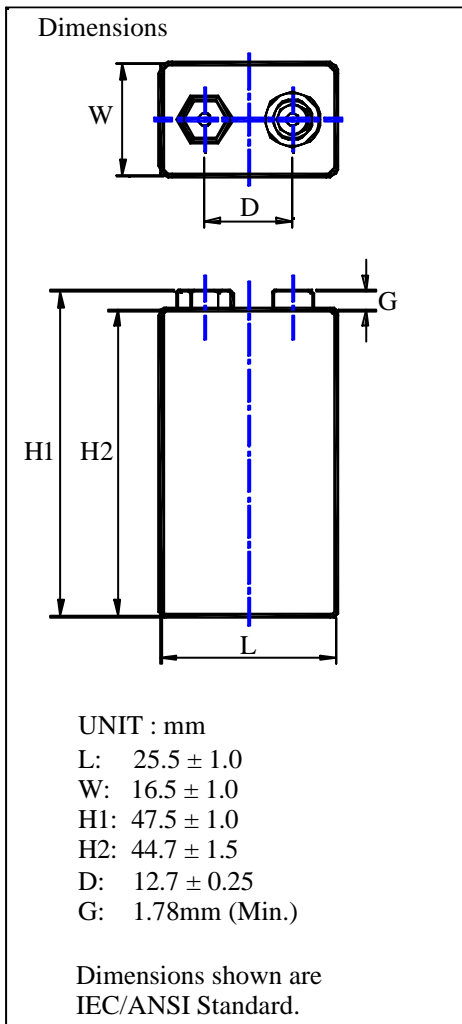
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## 8 MERCURY FREE AND CADMIUM FREE

8.1 Mercury - 1ppm maximum per battery weight.

8.2 Cadmium - 3ppm maximum per battery weight.

## 9 BATTERY DIMENSIONS



## 10 OPERATING AND STORAGE TEMPERATURE

10.1 Operating Temperature : -20 ~ 60 °C, 65 % RH Max

10.2 Storage Temperature : 15 ~ 25 °C, 45 ~ 75 % RH

