

1. APPLICABILITY

This specification is applicable to GP Ultra Plus Alkaline grade batteries (GP model no.: GP1604AUP).

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 ± 0.01 V and with internal impedance of 1 M Ω 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%



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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. |



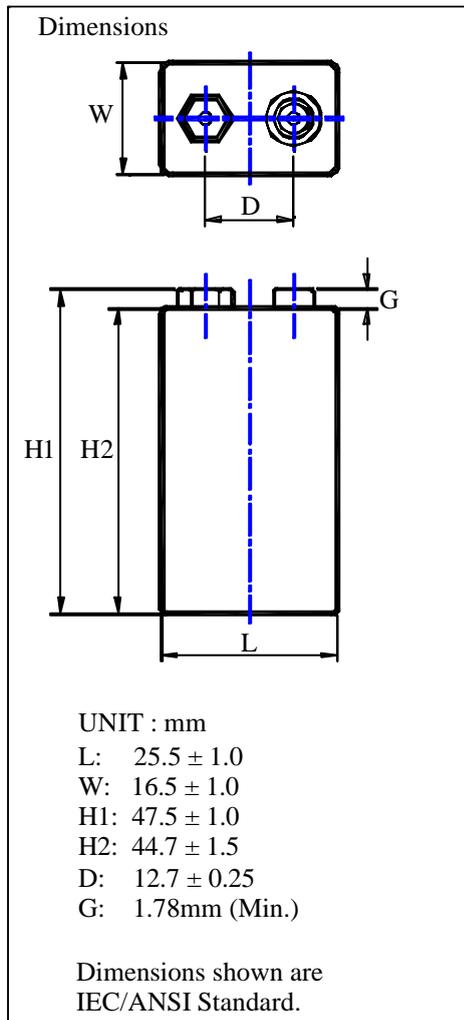
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8 MERCURY FREE AND CADMIUM FREE

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

