CHUNG PAK

SPECIFICATIONS

FOR ALKALINE MANGANESE DRY BATTERY

AM3/LR6

RECEIVED BY : EVERGREEN (C.P.) U.S.A. INC.

Prepared by _____

Approved by _____

Date : AUG 2010

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Alkaline Manganese Dry Battery AM3-S/EVG

1. *Scope*

This specification is applicable to the "Evergreen®" brand Alkaline Manganese Mercury Free Dry Batteries supplied by CHUNG PAK BATTERY WORKS, LTD.

2. *Technical Specification*

2.1 Name (Designation) : AM3 (Mercury free)
(IEC Designation) : LR6

2.2 Dimensions:
Diameter : 14.5mm
Height : 50.5mm

2.3 Weight (approx) : 23g

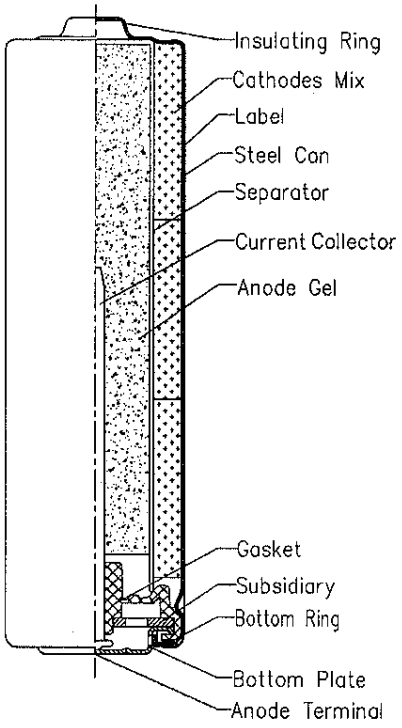
2.4 Nominal voltage : 1.5V

2.5 Typical capacity : 2450mAh at 43Ω 24hrs/day (E.V.0.9V)

2.6 Typical duration : 380min at 3.9Ω 1hrs/day (E.V.0.8V)
85 hrs at 43Ω 4hrs/day (E.V.0.9V)

2.7 Retention : 90% after 12 months storage(20℃)
85% after 24 months storage(20℃)
80% after 36 months storage(20℃)

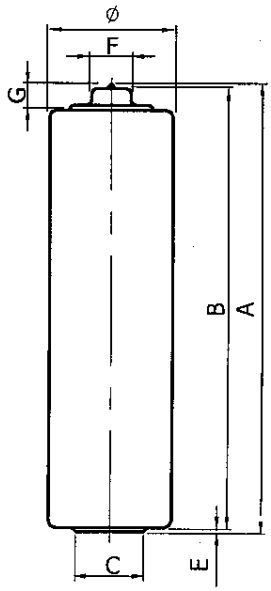
2.8 The Drawing of The Finished Battery :



Alkaline Manganese Dry Battery AM3-S/EVG

2.9 Outside shape dimensions and terminals:

Dimensions of Alkaline Manganese Dry Battery LR6



Unit : mm

	Max	Min
A	50.5	
B		49.2
C		7.0
E	0.5	
F	5.5	
G		1.0
Φ	14.5	13.5

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

Alkaline Manganese Dry Battery AM3-S/EVG

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

3.1 Open-circuit voltage:

Initial	1.600 ~ 1.720V
After 12 months storage	1.540 ~ 1.680V
After 24 months storage	1.520 ~ 1.650V
After 36 months storage	1.510 ~ 1.630V

3.2 Service out-put:

Standard	Discharge Condition			Average Minimum duration			
	Load resistance	Discharge method	End point Voltage(V)	Initial	After 12 months storage	After 24 months storage	After 36 months storage
IEC	3.9Ω	1hrs/day	0.80 V	380 min	350 min	330 min	312 min
REF	3.9Ω	24hrs/day	0.90 V	355 min	335 min	320 min	300 min
IEC	10Ω	1hrs/day	0.90 V	18.5 hrs	16.6 hrs	15.7 hrs	14.8 hrs
REF	10Ω	24hrs/day	0.90 V	18.4 hrs	16.5 hrs	15.6 hrs	14.7 hrs
IEC	24Ω	*	1.00 V	40 hrs	36 hrs	34 hrs	32 hrs
IEC	43Ω	4hrs/day	0.90 V	85 hrs	76 hrs	72 hrs	68 hrs
IEC	250mA	1hrs/day	0.90 V	6 hrs	5.4 hrs	5.1 hrs	4.8 hrs
IEC	1000mA	**	0.90 V	220 times	198 times	187 times	176 times
IEC	1500/650mW	***	1.05 V	60 times	54 times	51 times	48 times

"*" : 15 s on, 45 s off for 8h per day.

"**" : 10 s on, 50 s off for 1h per day.

"***" : 1500mW2S/650mW28S 10 times,0mW 55min.

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

Alkaline Manganese Dry Battery AM3-S/EVG

Satisfaction Standard:

1) 9 piece of battery will be tested for each discharging standard;

2) The result of the average discharging time from each discharging standard shall be equal to or more than the average minimum time requirement;and no more than one battery has a service output less than 80% of the specified requirement.

3) One re-test is allowed to confirm the previous result.

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 date : 3 years after manufactured.

3.6 Safety Test

3.6.1 Intended use tests and requirements (appendx : 1)

Test		Intended use simulation	Requirements
Electrical test A		Storage after partial use	No leakage (NL) No explosion (NE)
Environmental Tests	B-1	Transportation shock	No leakage (NL) No explosion (NE)
	B-2	Transportation vIbration	No leakage (NL) No explosion (NE)
Climatic-temperature C		Climatic-temperature cycling	No explosion (NE)

3.6.2 Reasonably foreseeable misuse tests and requirements

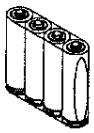
Test		Misuse simulation	Requirements
Electrical tests	D	Incorrect installation	No explosion (NE)
	E	External short circuit	No explosion (NE)
	F	overdischarge	No explosion (NE)
Environmental test G		Free fall	No explosion (NE)

All of test (3.6) are meet IEC 60086-5 & GB 8897.5-2006.

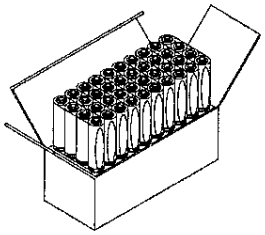
Alkaline Manganese Dry Battery AM3-S/EVG

4. Brand and packaging

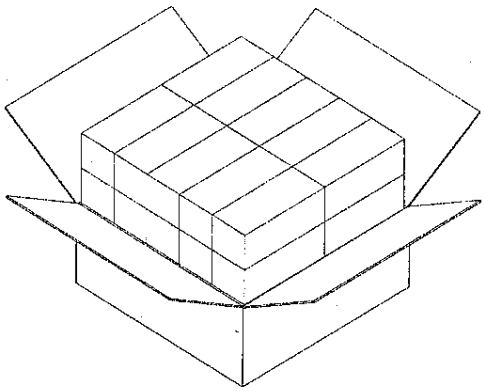
4.1 Appendix 1:Standard and packaging



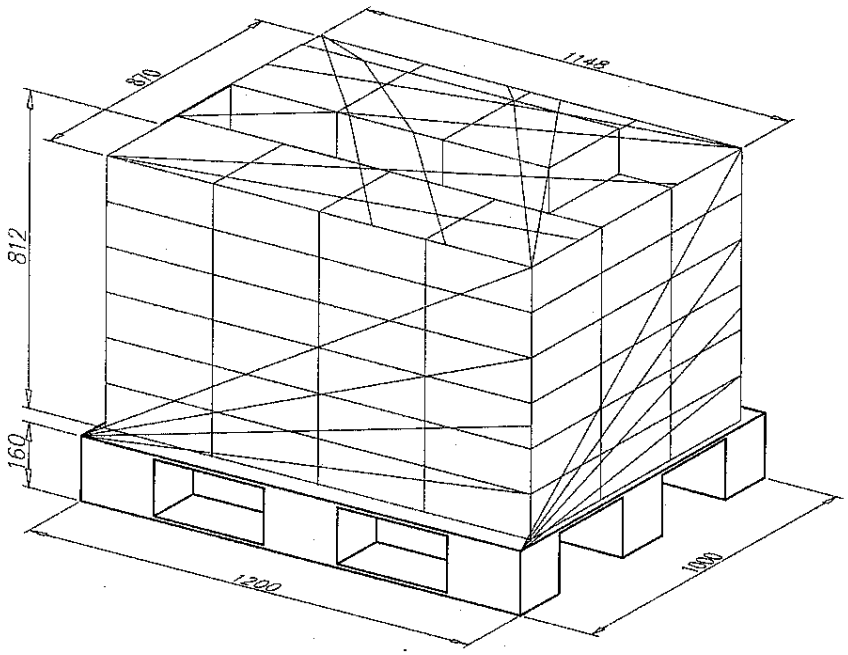
AM3-S/EVG – SP4



40 Per Display Boxes
Boxes Measure : 142X55X52 mm



800 PCS Per Display Carton
Carton Measure : 290X287X116 mm



Goods Dimension
Height : 812mm
Length : 870mm
Widrth : 1148mm

Wooden Pallet:
Pallet Height : 160mm
Pallet Measure : 1200X1000mm

Weight :
Pallet Weight : 20 kgs
Net Weight : 1440 kgs
Gross Weight With Pallet : 1500 kgs

Quantity :
1 Layer = 12 Cartons
6 Layers X 12 Cartons+7 Layers
(3 Cartons) = 75 Cartons / Pallet

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

Alkaline Manganese Dry Battery AM3-S/EVG

5. Safety instructions

Warning	Danger
Don't throw the batteries into fire or heat the batteries	This may cause the batteries to ignite or disrupt
Don't directly solder the batteries	This may damage their insulating tapes and protective installation
Don't use the batteries with the ⊕ and the ⊖ electrode inverse	This can damage the batteries for being over-charged or over-discharged, even may cause leakage, heat generation, disrupt, or ignition
Don't expose the batteries to water	This can cause heat generation or rust
Don't charge batteries	This may result in venting, leakage, explosion and/or possibly fire
Don't disassemble or damage the external tubes of the batteries or modify the batteries (stack-up batteries) etc.	This easily results in short-circuit, leakage, even ignition
Immediately stop using the batteries if leakage, discolor or etc. with them are detected	This may cause accidents to occur
Don't drop or strongly strike the batteries	This may result in leakage, heat generation, disrupt, even ignition
Be sure to use the batteries within a temperature range from 0℃ to 40℃	Charge the batteries beyond the temperature range may cause leakage, heat, generation, impaired performance, and shortening of service life of the batteries
Don't use old batteries with new ones	This may cause short-circuit or heat generation
Don't use our batteries with any other type or brand of batteries	Mixed-matching of batteries may result in leakage, heat generation and bursting
Keep the batteries out of the reach of children	To avoid being swallowed. If swallowed, please see doctor immediately

Alkaline Manganese Dry Battery AM3-S/EVG

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 1ΩM 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 precision 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 3).

Alkaline Manganese Dry Battery AM3-S/EVG

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 : 5Ω

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

3.6 High temperature electrolyte leakage resistance

The following conditions shall be adopted for the test

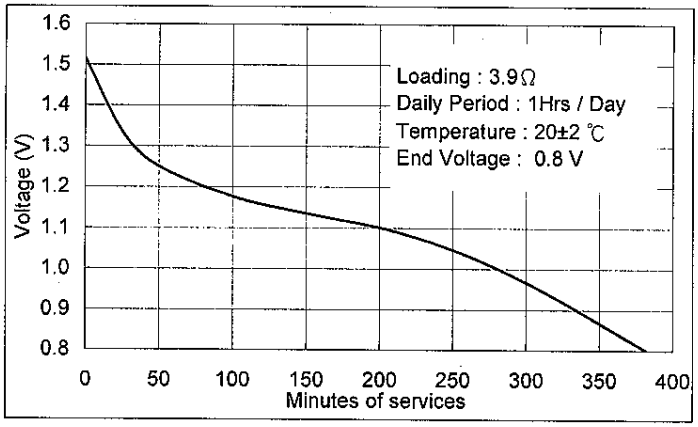
(a) Test temperature and humidity: 45±2℃, below 70% RH.

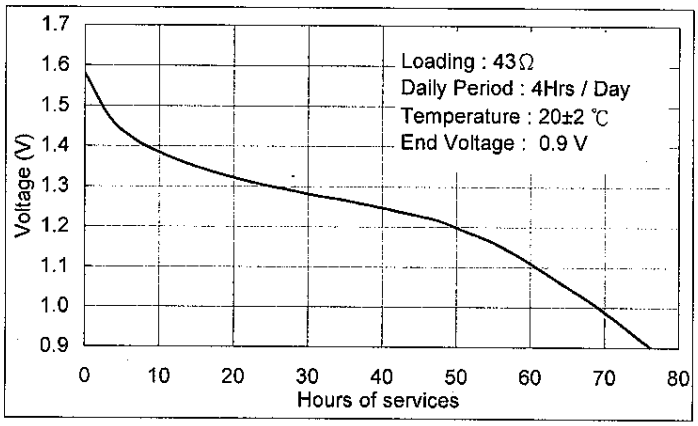
(b) Test period : 30 days

(c) Test method : Leave to stand still.

Appendix 2 : Discharge characteristics

STANDARD DISCHARGE CURVE:





TEMPERATURE CHARACTERISTICS:

(Discharge continuously at various resistance)