Jameco Part Number 244620 Ver. A

BAO TONG USA dba TYSONIC BATTERY

SPECIFICATION SHEET

FOR

9V NI-MH RECHARGEABLE BATTERY

TY-9V-200mAH

I. GENERAL INTRODUCTION

1. Main Features

1) Friendly To The Environment
Cd 0% Hg0% Pb0%

2) High Energy Density
The energy density of TYSONIC batteries is more than 55kwh/kg and 180wh/dm3.

3) Long Service Life
The cell can be expected more than 500-1000 charge/discharge cycles under normal usage.

4) High Discharge Voltage And Long Platform Time
Voltage remains above 1.2V per cell for 40-50minutes in the discharge period at 1.0C rate.

5) Excellent Performance Of High Rate Charge And Discharge
For different applications, the cell can be quick charged in 1-3hours*, it can also withstand a high rate discharge.

6) Reliable safety vent
It is 100% tested that the safety vent opens automatically when the cell internal pressure than 25atm.

7) Wide Temperature Range
Performance remains efficient over a wide temperature range -20℃ -50℃

8) Handling Performance
Maintenance-free and can be applied optionally.

9) No Memory Effect
Ni-MH battery can be recharged after partial discharge.

10)Low Internal Resistance

***Must use specified charge method, please ask for information.**

2. Main Applications

1) Telecommunication equipments, such as cordless phone, cellular phones, transceivers

2) Emergency lightings and security systems

3) Radio control toys

4) Audio and video devices, such as camcorders, walkmans, MDs, portable DVDs, VCDs, TVs

5) Information devices, such as notebook computers, PDAs, portable fax machines.

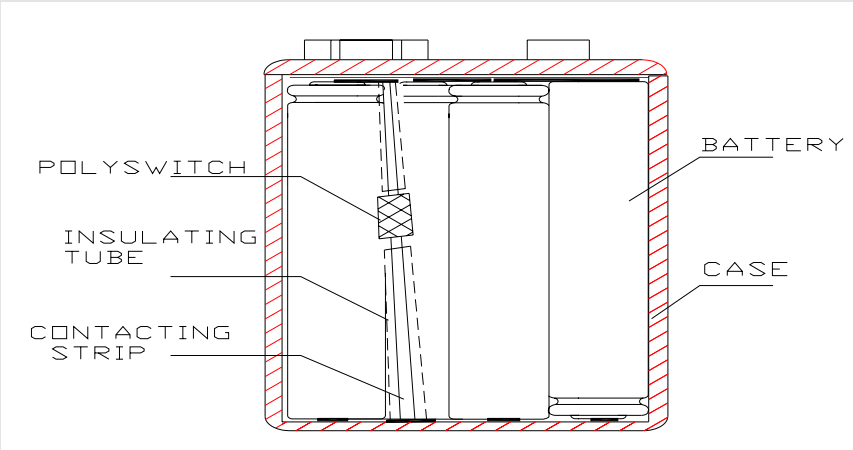
6) Power tools

7) Electric bicycles

8) Other applications, such as electric shavers, electric toothbrushes, massagers, portable vacuum cleaners, portable terminals.

3. Battery Construction

The below is the drawing of TYSONIC 9V battery.



II Data Sheet

System ---------- Sealed rechargeable Ni-MH Battery

Cd content (% cell wt) ---------- 0%

Type ---------- LH020-H7C

Specification---------- AAAAA x 7

Nominal voltage ---------- 8.4V

Dimension (including shrink sleeve/label)

Length，L ---------- 48.5 (±0.5mm)

Width， W ---------- 26.5 (±0.5mm)

Thickness，T ----------15.7 (±0.5mm)

Weight approx. ---------- 40g

Capacity (20°C, 0.2 C to 7.00V)

Typical ----------210mAh(for reference only)

Min. ---------- 200mAh

Max. discharge current (continuous)-- ---------- 600mA

Charging conditions (20°C)

Standard charge---------- 20mA15 hrs

Quick charge* ---------- 60mA5hrs

Fast charge* ---------- up to 200 mA

(dT/dt**，-ΔV controlled***)

Max. overcharge current---------- 20mA (up to 100hrs)

Permanent charge ----------5mA to 10

*ask for special info.

**1 °C /min

***-ΔV≤10mV/cell

Operation temperatures（recommended）

Storage ---------- -20 °C to +35 °C

Discharge ---------- -20 °C to +60 °C

Standard charge ---------- 0 °C to +45 °C

Fast charge ---------- +10 °C to +40 °C

Permanent charge---------- -10 °C to +35 °C

III Performance Characteristics

1. Performance Test Table

Test Items	Test Conditions	Requirements
(0) Standard test conditions	Measurements shall be carried out at 20±5℃and relative humidity of 65±20% unless otherwise specified. Accuracy of voltmeters and ammeters to be used in testing shall be equal to or better than the grade 0.5.	
(1) Standard charge	Charge shall be conducted continuously at the constant current of 0.1 It for 15 hours, after Pre-discharge at the constant current of 0.2 It until the end voltage of 1.0V/cell	
(2) Fast charge	Charge shall be conducted continuously at the constant current of 1.0It until termination by -ΔV=10mV/cell or charge capacity limited of 1.2 It, after Pre-discharge mentioned in Item (1).	
(3)Open-circuit voltage (OCV)	Voltage between the battery terminals shall be measured within 14 days after standard charge specified in Item (1).	OCV: ≥8.75 V
(4) Capacity	Discharge duration of the charged battery specified in Item (1) shall be measured at 0.2 It until the end voltage of 1.0V/cell, after rest for 1 hour. If the discharge duration does not reach the	Discharge time: ≥300 minutes

	specified value, the test may be repeated up to three times in total.	
(5) Capacity high-rate discharge	Discharge duration of the charged battery specified in Item (2) shall be measured at 1.0 I_t until the end voltage of 1.0V/cell, after rest for 1 hour. If the discharge duration does not reach the specified value, the test may be repeated up to three times in total.	Discharge time: ≥50 minutes
(6) IEC cycle life	IEC61951-2/2001 See Remark 1	≥500 cycles
(7) Over-charge	Charge at 0.1 I_t for 48 hours. Then Rest for 1 hour, and discharge duration shall be measured at 0.2 I_t until the end voltage of 1.0V/cell.	No leakage, no disrupt, no burst. Discharge time: ≥300 minutes
(8) Over - discharge	Discharge shall be conducted with constant load resistor equal to 0.2I_t for 24 hours after capacity test specified in Item (4) and discharge duration of the charged battery specified in Item (1) is measured at 0.2 I_t up to the end voltage of 1.0V/cell	Discharge time: ≥240 minutes
(9) Temperature	1) Discharge shall be conducted at 1.0It until the end voltage of 1.0V/cell for the battery stored for 3 hours under the following temperature, after the fast charge specified in Item(2) at 20℃. a) discharge temperature 0℃ b) discharge temperature 20℃ c) discharge temperature 40℃	Discharge time: ≥40minutes ≥50minutes ≥45minutes
	2) Discharge shall be conducted at 1.0It until the end voltage of 1.0V/cell for the battery stored for 3 hours under 20℃, after the fast charge specified in Item (2) at the following temperature: a) charge temperature 10℃ b) charge temperature 20℃ c) charge temperature 40℃	Discharge time: ≥50 minutes ≥50 minutes ≥45minutes

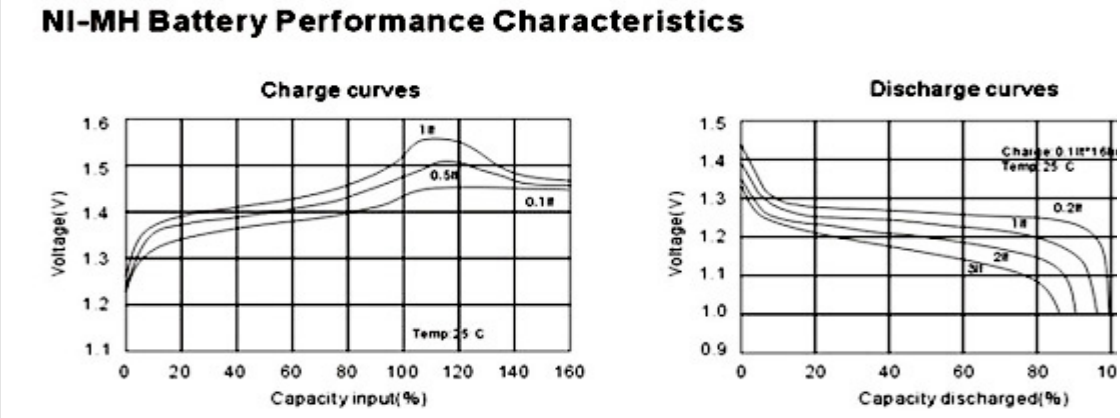
Test Items	Test Conditions	Requirements
(10) Self-discharge	The charged battery specified in Item (1) shall be stored for 28 days at 20℃ and then the duration of discharge at 0.2 I_t until the end voltage of 1.0V/cell shall be measured.	Discharge time: ≥210minutes
(11) Storage	The capacity test specified in Item (4)shall be conducted after storage of either the charged status batter or the discharged battery specified in Item (1) , for 30 days at 20℃.Then discharge duration of the charged battery specified in Item (2) shall be measured at 1.0 I_t until the end voltage of 1.0V/cell.	Discharge time: ≥300 minutes

(12) Drop test	The battery shall be subjected to a drop from the height of 100 cm to an oak board more than 20 mm thick, the test shall be carried out 3 times for each direction of the battery axis. Then after 30 mins, the resistance and voltage shall be measured. The capacity test specified in Item (4) shall be conducted too.	1. The batter shall not explode. Electrolyte leakage and deformation of battery are acceptable. 2. Discharge time: ≥300 minutes
(13) Safety	Safety vent operation The Reverse-charge is conducted for 60 minutes at the constant current of 1.0 I_t after pre-discharge at the constant current of 0.2 I_t up to the end voltage of 0V/Cell.	Safety vent shall operate. The batter shall not explode. Electrolyte leakage and deformation of battery are acceptable

*REMARK： 1.Cycle life:IEC61951-2(2001)

Cycles	Charge	rest	Discharge
1	0.1I_t×16hrs	0	0.25 I_t×2hrs 20mins
2~48	0.25 I_t×3hrs 10mins	0	0.25 I_t×2hrs 20mins
49	0.25 I_t×3hrs 10mins	0	0.25 I_t to 1.0V/cell
50	0.1 I_t×16hrs	1~4h	0.20 I_t to 1.0V/cell
Repeat 1 to 50 cycles, until the discharge time of a 50th cycle is less than 3hrs			

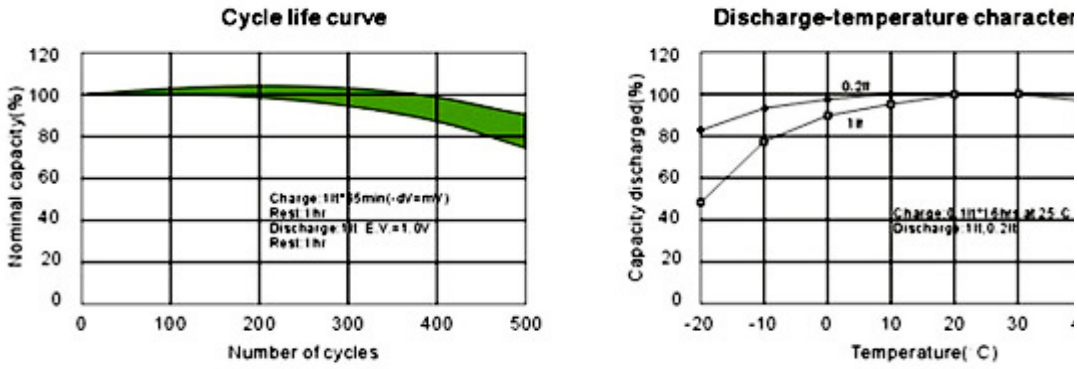
2. Performance Characteristics Curves



Charging During the process of charging, the voltage of TYSONIC Ni-MH battery will go up step by step, but at the end of the charging, it will decline bit due to heating of the battery, and keep stable at last. The ambient temperature has great effect on

charging voltage.

Discharging The voltage of TYSONIC Ni-MH battery will decline relatively as the discharging current increased. But it will keep stable around 1.2V.



Cycle life Under normal conditions, 500-1000 charge/ discharge cycles can be expected.

Temperature performance TYSONIC Ni-MH battery can be used in wider range of temperature, but the battery performance will change according to the ambient temperature, so the battery should be used within the following range of temperature:

Charge: 0 °C to +45 °C Discharge: -20 °C to +60 °C

Storage: -30 °C to +50 °C (long term storage: -30 °C to +35 °C)

Battery Handling Precautions

1. Note

- Do not dispose of cell into fire or dismantled under any condition
- Do not mix different cell types and capacities in the same battery assembly
- Charge and discharge under specified ambient temperature recommend to TYSONIC specification
- Short circuit leading to cell venting must be avoided.
- Never solder onto cell directly.
- Cell reversal should be avoided.
- Use batteries in extreme condition may affect the service life, such as: extreme temperature, deep cycle, extreme overcharge and over discharge.
- Batteries should be stored in a cool, dry place
- Once problems be found, stop using, send batteries to local agent.

2. Storage

- It is strongly recommended to stored Ni-MH batteries and cells in the temperature range from-20^{o}C to 35^{o}C,and in low humidity and no corrosive gas environment, to maintain a reasonably high capacity recovery level.
- Avoid storage higher (e.g.35^{o}C), lower temperature than -20^{o}C, or higher humidity which would result in deterioration or damage to the cells and batteries such as follows:
  1) Permanent capacity loss Electrolyte leakage resulted from the expansion or shrinkage of organic material inside the cells.
  2) Rust of metal parts.
- Up to three full cycles of charge/discharge after long-term storage may need to obtain highest capacity.