Product Specification	Product Type	Rechargeable nickel-metal hydride battery	Document Number	**TRQNB80-20200409**
	Specifications Model	**TRQNB80**		Version: Controlled /A

1.0 Scope

This specification is suitable for the development and production of the nickel-metal hydride button rechargeable battery by Henan Troily new energy technology Co.,LTD.

2.0 Essential Characteristic

2.1	Battery model	TRQNB80
2.2	Nominal Voltage (V)	1.2V
2.3	Open-circuit voltage	Discharge state：≥1.2V； Charge state：≥1.25V
2.4	Nominal Capacity (mAh)	80 mAh±5%
2.5	Standard Charge	16 hours at the constant current of 0.1CmA
2.6	Rapid Charge	7.5 hours at the constant current of 0.2CmA
2.7	Trickle Charge	0.02CmA～0.05CmA
2.8	Discharge cut-off Voltage	1.0V
2.9	Maximum continuous discharge current	0.5CmA
2.10	Dimensions	Diameter:15.5±0.3mm height:6.4±0.5mm
2.11	Weight (g)	About 3.3g
2.12	Cosmetic requirements	The battery should be free from deformation, leakage, rust and other appearance problems
2.13	Operating Temperature	Standard charging temperature: 0ºC～45ºC; Fast charging temperature: 10ºC～45ºC; Trickle charging temperature:–10ºC～45ºC; Discharge charging temperature:–20ºC～45ºC
2.14	Storage Temperature	Within 2 years:–20ºC～35ºC; 1to 6 months:–20ºC～45ºC; Within 1 year：–20ºC～55ºC
2.15	Relative Humidity	65±20%

3.0 Performance Test

3.1 Test conditions:

1. The test environment: Temperature: 15～25ºC Relative Humidity: 45%～75%
   Atmospheric Pressure: 86～106Kpa
2. The test battery is a product received by the user within one month.
3. 0.1CmA＝8mA

3.2 Test tools:

Tool	Accuracy requirement
caliper	0.02mm
Volt meter	Magnitude 0.5 or greater, internal resistance is more than 10 k Ω/V
galvanometer	Magnitude 0.5 or greater, the total resistance is less than 0.01 Ω

Resistance meter	Ac 1000HZ sine wave 4 terminal measuring device
Testing cabinet	**High precision secondary battery detection device with a range of 200mA (maximum range of 500mA)**

3.3 Test methods and standards

Number	Item	Test Method	Requirements
3.3.1	Appearance	Visual inspection	The battery should be free from deformation, leakage, rust and other appearance problems
3.3.2	Dimensions	Caliper measurement	Diameter:15.5±0.3mm height:6.4±0.5mm
3.3.3	Insulation resistance	The degree of insulation between battery packaging and electrodes is measured by megohm meter	≥10MΩ
3.3.4	Open-circuit voltage	After standard charging, the battery is stored at room temperature for 28 days	≥1.25v
3.3.5	Charging voltage	The battery is discharged with 0.2CmA up to an cut-off voltage of 1.0V, and then the standard charge is carried out. The voltage is measured 5min before the end of charging	＜1.55V
3.3.6	Capacity	The standard charged battery is discharged with 0.2CmA up to an cut-off voltage of 1.0V. The experiment is allowed to carry out 5 cycles. When one cycle ends meet the requirements, the test can be stopped.	Meet nominal capacity requirements
3.3.7	Cycle Life	GBT22084.2-2008	≥500 cycles
3.3.8	Self-discharge	The battery is discharged with 0.2CmA up to an cut-off voltage of 1.0V, and then the standard charge is carried out. The standard charged battery is stored for 28 days in the test environment. And then the remaining capacity was measured with 0.2CmA discharge	≥75%
3.3.9	Overcharge Characteristic	The battery is discharged with 0.2CmA up to an cut-off voltage of 1.0V. Charge is conducted continuously for 48h at 20℃ -30℃ with the constant current of 0.1CmA. And then the battery capacity was measured with 0.2CmA discharge	No appearance deformation, no leakage Greater than or equal to rated capacity
3.3.10	Vibration Test	The standard charged battery shall be stored for more than 24h. Then the battery is vibrated under the following conditions. The characteristic changes of the battery before and after vibration are measured. Amplitude: 4 mm Frequency: 1000 times /min	There was no obvious change in appearance. Open circuit voltage change within 0.02 V and the change of resistance within 5m Ω

		Time: 60 min	
3.3.11	Drop Test	The standard charged battery shall be stored for more than 1d. Drop the battery vertically. The characteristic changes of the battery before and after dropping were measured. Drop height: 100cm Drop surface: hard board Number of drops: 3 times	There was no obvious change in appearance Open circuit voltage change within 0.02 V and the change of resistance within 5 m Ω
3.3.12	Short circuit test	Use a wire to short-circuit the positive and negative electrodes of the standard charged battery. Conductor cross section: 0.75mm^2 Wire length: distance between positive and negative poles Short circuit time: 0.5h	Leakage, deformation and package breakage are allowed. Non-explosive phenomenon

4.0 Typical characteristics

Fig.1:Charging Curve(20±5℃)

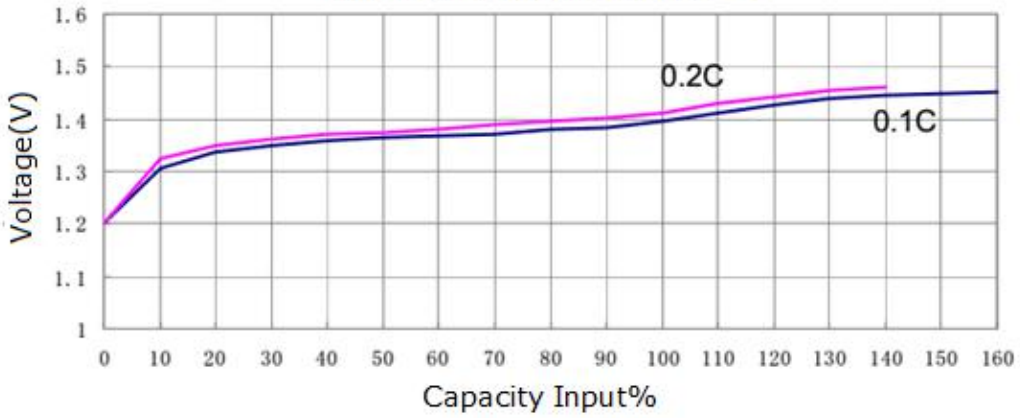
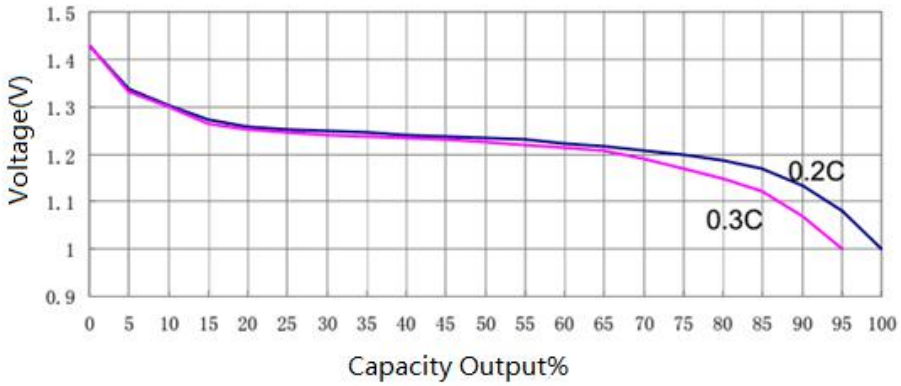
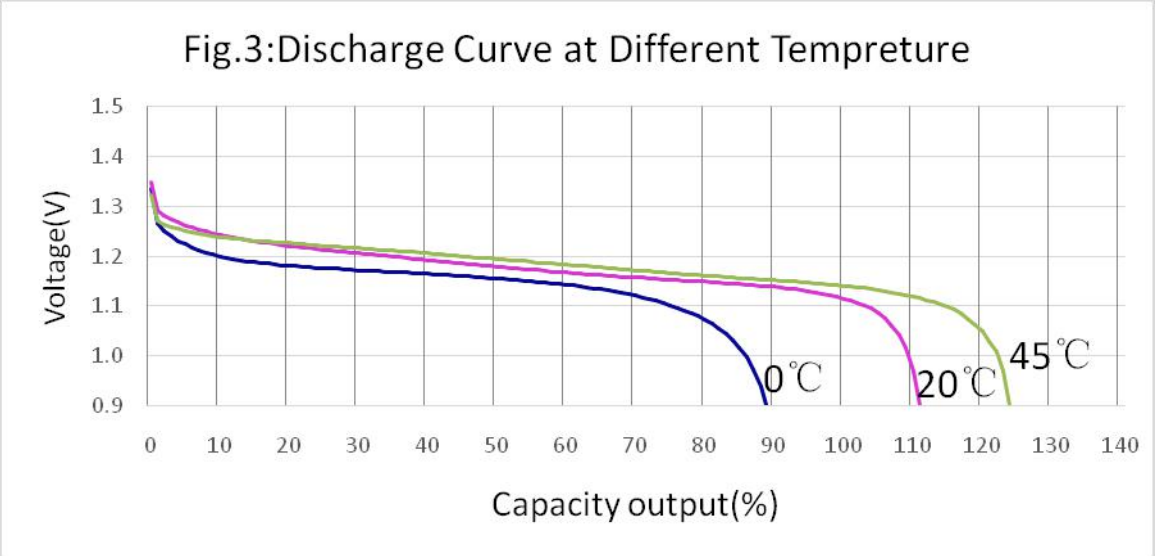
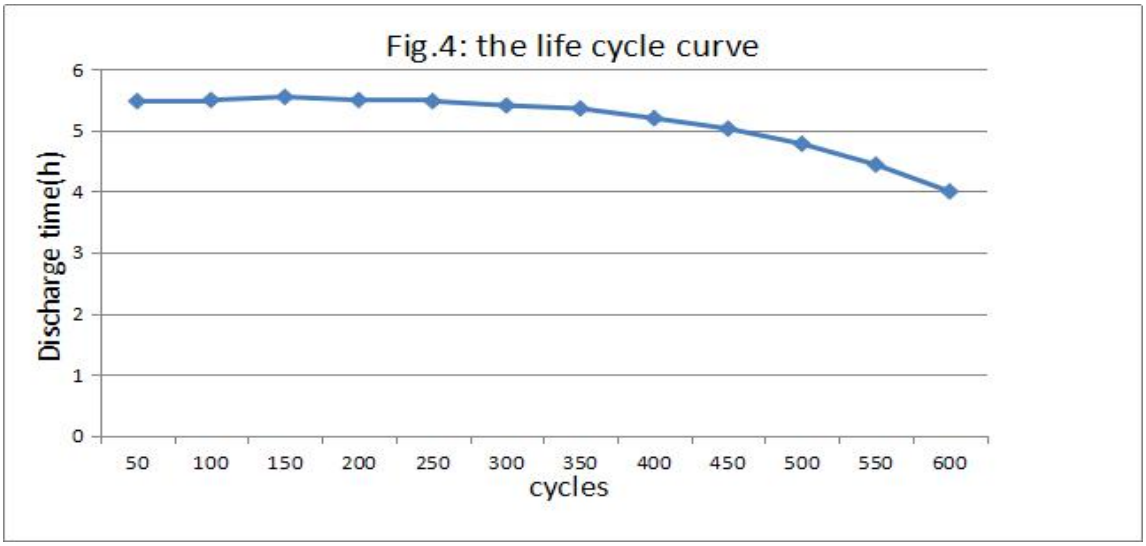


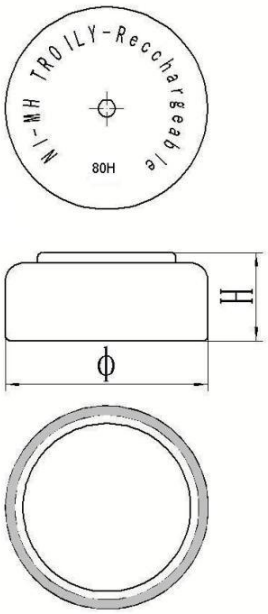
Fig.2: Discharge Curve(20±5℃)







5.0 Battery draw



6.0 Routine inspection and delivery inspection

1. The routine inspection. According to the relevant standards, the provider and the receiver discuss and decide the content of the routine.
2. The provider and the receiver discuss and decide the content of the delivery inspection.
3. During the test, the charging protection voltage was 1.6V and the discharging protection voltage was 0.8V.

7.0 Use the installation and the matters needing attention

7.1. Not short circuit.

7.2. Do not place battery in a device with the (+) and (-) in the wrong way around.

7.3. The battery can not store in damp, high temperature, corrosion deposit environment.

7.4. Avoid overly charge or discharge.

7.5. Due to the corrosive solution inside the battery, don't try to dissect or turn on the battery, and arbitrarily discarded.

7.6. Batteries of different specifications are not allowed to be mixed, and old and new batteries are not allowed to be mixed.

7.7. In the storage and transportation, the battery should be able to do:

(1) Handle with care, after unpacking inspection, and placed desiccant in batteries within one hour, sealed plastic bags and boxes.Batteries placed in dry and suitable temperature warehouse environment;

(2) For unpacking inspection or other reasons, when unpacking the case, the extraction of the battery should be take out in sequence, the battery can not be randomly placed in bags or other containers, especially metal containers, so as to avoid the battery short-circuit.

7.8. The battery at the scene of the production should pay attention to:

(1) Take out in sequence, the battery can not be dumped in any container or work surface, can't wrong mix placed, in order to avoid short circuit batteries, only from the factory packing tray, in turn, absorb use;

(2) The abnormal battery should be returned to the original packaging tray, can't wrong mix placed, returned factory and collect;

(3) When the battery is soldering tin, make sure that soldering tin only touches the tip of the battery

conductive plate, shall not contact or drop to the cell surface, soldering can drip on the battery, especially batteries are negative junction, these could lead to short circuit batteries, serious will be an explosion. When used, the lead tip can be dipped with a little soldering tin, and the welding gun cannot touch the battery for a long time. Because the high temperature will cause the battery heating, damage cell and influence the battery self-discharge.

7.9 The battery should follow the principle of "first in, first out". The battery shelved for a long time can lead to internal plate surface passivation, which needs to be activated by charging, but will affect the capacity.

7.10. The finished product packaging battery should pay attention to moistureproof.

8.0 Suggestions on battery usage and testing methods

8.1 The voltage and current of a single battery can be measured in series or single test.

8.2 Ensure a good contact between the battery and the detection device, avoid virtual connection or battery surface, device surface unclean phenomenon.

8.3 Ensure the current meets the requirement of 3.0. Avoid charging and discharging the battery with high current.

8.4 The battery should be used first in and first out.