



A NEW BREED OF TALL TUBULAR BATTERIES



*Golden & Diamond
series*

DEEP CYCLE FOR SOLAR USE

www.proton-s.net

PROTON-S tubular batteries are designed to deliver consistent and reliable power every time. Their plates are engineered to provide higher efficiency while maximizing battery life, which also ensures that the **PROTON-S** tubular battery price is completely worth it, as the battery can complement both grid & solar based setups.

Golden series



PXT - 3000+
CAPACITY 12V 100AH @ C20



PXT - 4000+
CAPACITY 12V 200AH @ C20



PXT - 5000+
CAPACITY 12V 220AH @ C20



PXT - 6000+
CAPACITY 12V 240AH @ C20

Diamond series



PXD - 2000+
CAPACITY 12V 55AH @ C10



PXD - 4000
CAPACITY 12V 200AH @ C10



PXD - 6000
CAPACITY 12V 250AH @ C10

Check your warranty online!



You can now conveniently check your battery's warranty online. Visit our website to find out the warranty details and terms. For any questions, our customer support team is here to assist you.



MODERN TERMINAL DESIGN

TERMINAL CONFIGURATION: -
TERMINAL TYPE: -L
TERMINAL HEIGHT: 31-
TORQUE VALUE: 10-8- N.M
BOLT TYPE: -MB

TOP VENTILATION FOR SAFE CHARGING

Easy gas release during charging
Reduce gas acculturation
Greater product safety

MODERN TERMINAL DESIGN

Prevents from external short circuit
Terminal orientation changes
New robust design first time in the industry

7.3mm
PLATE

ROBUST GRID DESIGN

With special additives

PV ENVELOP SEPARATOR

A perfect separation medium
Enhances decimation resistance
Increase product life

HIGH PURITY LEAD

Higher cycle time
Low self discharging rate
Low topping up

THICKER PLATE

For extra life

DEEP CYCLE

Flat negative plate with special additives
Expanders for better charge
Deeper discharge cycle



Description

A kind of tubular type lead carbon battery positive plate material and preparation method

Technical field

The present invention relates to a kind of lead-acid battery.

Background technology

Along with national requirements for environmental protection is more and more stricter, therefore we are also increasing to the demand of clean energy resource. Plumbous carbon battery is as a kind of novel green electrokinetic cell, in its negative pole, add the absorbent charcoal material of high-specific surface area, in battery, form ultracapacitor, simultaneously also can eliminate the impact of negative plate sulfation on cycle performance adding of material with carbon element, therefore the having extended cycle life of plumbous carbon battery, high-rate performance are good. But its positive plate grid can expand in cyclic process in corrosion, the easy softening and shedding of active material, has affected plumbous carbon battery long circulation life and used, and common tubular type battery positive plate internal resistance is large, can not meet the high-rate performance requirement of plumbous carbon battery.

Summary of the invention

The object of this invention is to provide a kind of lead carbon battery tubular positive plate material and preparation method.

Technical scheme of the present invention is that a kind of tubular type lead carbon battery positive plate material, is mixed by the raw material of following weight portion proportioning: lead powder: 100; The sub-titanium oxide of conductive nano pottery: 1~0.1; Conductive carbon fibre: 0.5~0.1; Red lead: 10~1.

A preparation method for tubular type lead carbon battery positive plate, comprises the following steps:

- (1) load weighted lead powder, the sub-titanium oxide of conductive nano pottery, red lead, conductive carbon fibre are poured in container and stirred, each component is mixed;
- (2) above-mentioned raw materials being poured into cover has in the anode plate grid of comb, and seals end cover;
- (3) immerse in dilution heat of sulfuric acid and soak 4~1 hour;
- (4) put into curing room and be cured dryly, make positive plate.

The present invention has following technique effect, owing to all having added the sub-titanium oxide of conductive nano pottery, conductive carbon fibre in positive plate, after battery discharge, recharge in process, the conductive carbon fibre being dispersed in positive plate has played conducting matrix grain effect, charging rate and the high rate during charging-discharging of battery are improved, in battery, form ultracapacitor, improved greatly the cycle performance of battery simultaneously. More than the specific energy of battery reaches 45Wh/kg, normal temperature %80DOD cycle life exceeds 1400 times.

Embodiment 1

A kind of tubular type lead carbon battery positive plate, takes by weight:

Lead powder: 100; The sub-titanium oxide of conductive nano pottery: 0.2; Conductive carbon fibre: 0.4; Red lead: 5

- (1) load weighted lead powder, the sub-titanium oxide of conductive nano pottery, red lead, conductive carbon fibre are poured in container, stirred 15~10min, each component is mixed;
- (2) pouring into cover has in the anode plate grid of comb, and seals end cover
- (3) immerse in 1.4g/ml dilution heat of sulfuric acid and soak 2 hours.
- (4) put into curing room and be cured dryly, make tubular type lead carbon battery positive plate.

A kind of tubular type lead carbon battery negative plate, takes by weight:

Lead powder: 100; Sulfuric acid: 9.5; Barium sulfate: 0.8; Nanometer electric capacity carbon: 0.5; Conductive nano carbon fiber: 0.5; Graphene: 0.5; Humic acid: 0.1; Polyester fiber: 0.25; Water: 14; Lignin: 0.3; Barium stearate: 0.1;

Prepare tubular type lead carbon battery negative plate by common valve control battery negative plate production method. Control apparent density of lead paste at 4.5-3.8g/ml.

Tubular type lead carbon battery positive plate and negative plate are assembled into battery, and battery separator uses AGM dividing plate, adds quantitative dilute sulfuric acid electrolyte. Make the plumbous carbon battery of tubular type by battery being internalized into discharge and recharge.

Plumbous the tubular type of above-mentioned preparation carbon battery is tested by the method for testing of the partial state of charge (PSOC) of the European car research and development committee (EUCAR). PSOC testing procedure is as follows:

- (1) test battery 2hr capacity C 2;
- (2) battery be full of to electricity and use 2hr current discharge to %60SOC;
- (5) (3C 2electric discharge 18s;
- (4) leave standstill 18s;
- (4.5) (5C 2charging 4s;
- (2.5) (6C 2charging 8s;
- (1) (7C 2charging 54s;
- (8) leave standstill 18s
- (9) loop above-mentioned 8-3 step, cut-ff voltage is 1.7V.

The tubular type lead carbon battery specific energy that the present embodiment is made reaches 48Wh/kg, and normal temperature %80DOD cycle life reaches 1450 times. PSOC the cyclic lifetime test results is as table 1.

Embodiment 2

A kind of tubular type lead carbon battery positive plate, takes by weight:

Lead powder: 100; The sub-titanium oxide of conductive nano pottery: 0.5; Conductive carbon fibre: 0.1; Red lead: 7.

Concrete preparation method is with embodiment 1

A kind of tubular type lead carbon battery negative plate, takes by weight:

Lead powder: 100; Sulfuric acid: 10; Barium sulfate: 1.0; Nanometer electric capacity carbon: 0.5; Conductive nano carbon fiber: 0.5; Expanded graphite: 1.0; Humic acid: 0.3; Polyester fiber: 0.25; Water: 14; Lignin: 0.1; Barium stearate: 0.1;

Prepare tubular type lead carbon battery negative plate by common valve control battery negative plate production method. Control apparent density of lead paste at 4.7-3.8g/ml.

Lead carbon battery tubular positive plate and negative plate are assembled into battery, and battery separator uses AGM dividing plate, adds quantitative dilute sulfuric acid electrolyte. Make the plumbous carbon battery of tubular type by battery being internalized into discharge and recharge. Battery specific energy reaches 45Wh/kg, and normal temperature %80DOD cycle life reaches 1550 times, and PSOC the cyclic lifetime test results is as table 1.

Embodiment 3

A kind of lead carbon battery tubular positive plate, takes by weight:

Lead powder: 100; Conductive carbon fibre: 0.5; Red lead: 9.

Concrete preparation method is with embodiment 1

A kind of lead carbon battery negative plate, takes by weight:

Lead powder: 100; Sulfuric acid: 10; Barium sulfate: 1.0; Nanometer electric capacity carbon: 0.2; Conductive nano carbon fiber: 1.0; Expanded graphite: 0.5; Humic acid: 0.3; Polyester fiber: 0.25; water, 14; lignin, 0.1; barium stearate: 0.1;

Prepare tubular type lead carbon battery negative plate by common valve control battery negative plate production method. Control apparent density of lead paste at 4.7-3.6g/ml.

Lead carbon battery tubular positive plate and negative plate are assembled into battery, and battery separator uses AGM dividing plate, adds quantitative dilute sulfuric acid electrolyte. Make the plumbous carbon battery of tubular type by battery being internalized into discharge and recharge. Battery specific energy reaches 44Wh/kg, and normal temperature %80DOD cycle life reaches 1520 times, and PSOC the cyclic lifetime test results is as table 1.

Embodiment 4

A kind of lead carbon battery tubular positive plate, takes by weight:

Lead powder: 100; The sub-titanium oxide of conductive nano pottery: 0.8; Conductive carbon fibre, 0.2; Red lead: 5.

Concrete preparation method is with embodiment 1

A kind of lead carbon battery negative plate, takes by weight:

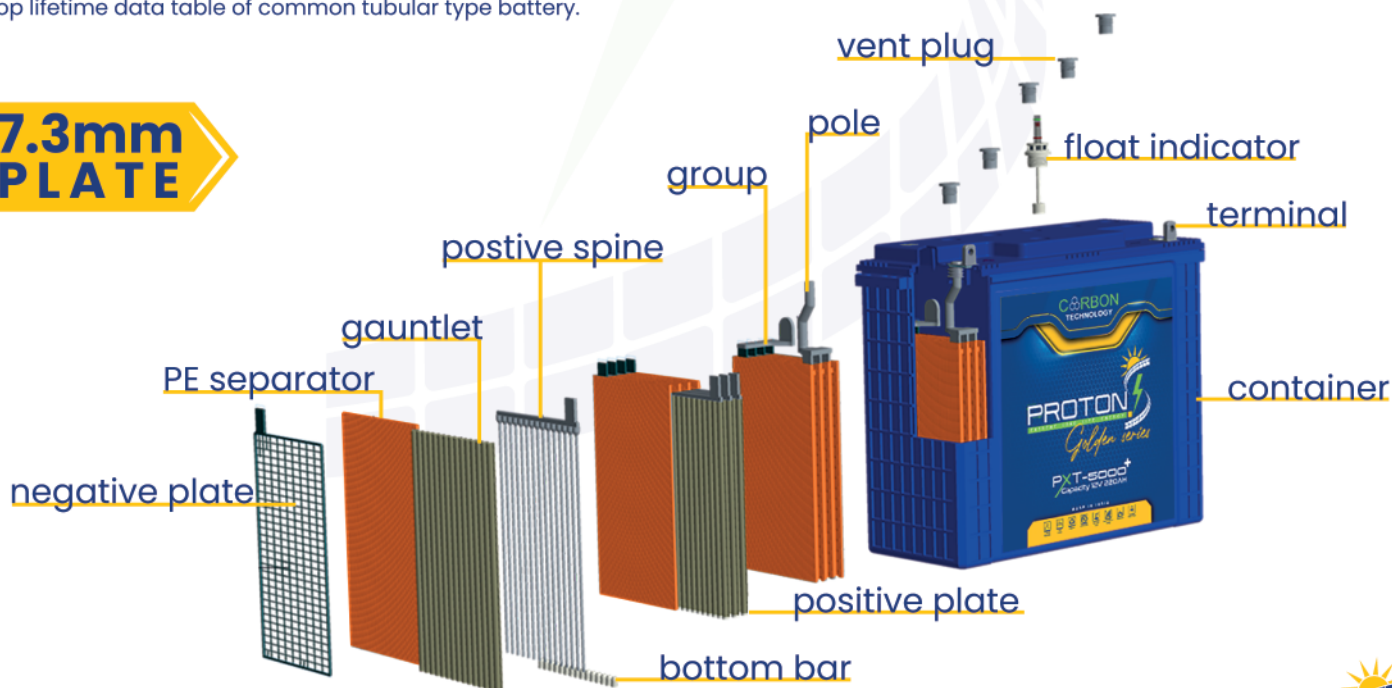
Lead powder: 100; Sulfuric acid: 10; Barium sulfate: 1.0; Nanometer electric capacity carbon: 1.0; Conductive nano carbon fiber: 0.7; Expanded graphite: 0.5; Humic acid: 0.1; Polyester fiber: 0.25; Water: 14; Lignin: 0.2; Barium stearate: 0.1;

Prepare tubular type lead carbon battery negative plate by common valve control battery negative plate production method. Control apparent density of lead paste at 4.5-3.6g/ml.

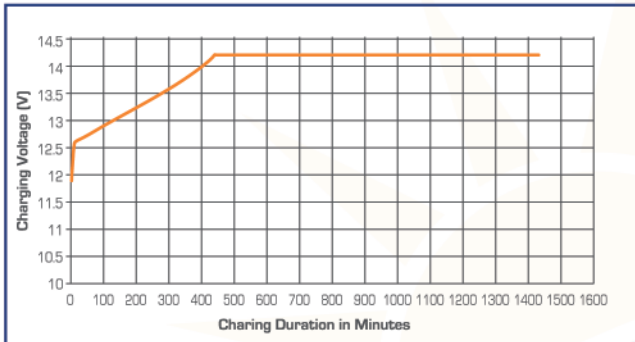
Lead carbon battery tubular positive plate and negative plate are assembled into battery, and battery separator uses AGM dividing plate, adds quantitative dilute sulfuric acid electrolyte. Make the plumbous carbon battery of tubular type by battery being internalized into discharge and recharge. Battery specific energy reaches 45Wh/kg, and normal temperature %80DOD cycle life reaches 1500 times, and PSOC the cyclic lifetime test results is as table 1.

The plumbous carbon battery of tubular type prepared by table 1 embodiment of the present invention and the partial state of charge state test loop lifetime data table of common tubular type battery.

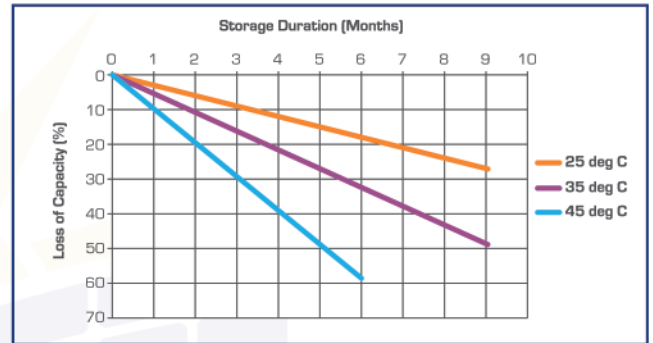
**7.3mm
PLATE**



Charging Profile



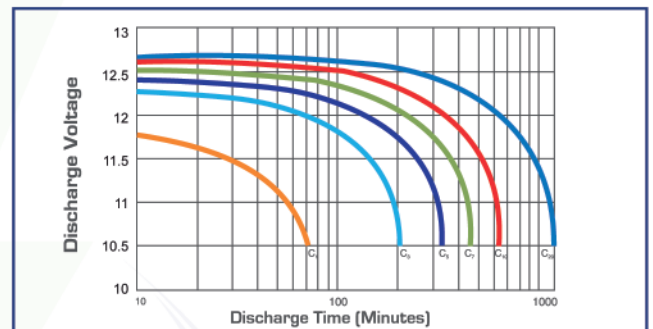
Self Discharge Characteristics @ Different Temperature



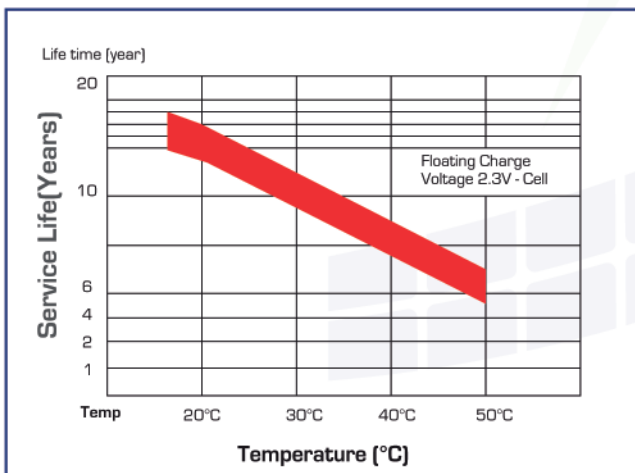
State Of Charge Measure Of Open-circuit Voltage @ 27°C

State of Charge	Specific Gravity	Voltage
100%	NA	12.90/13.10-V
75%	NA	≤ 12.75V
50%	NA	≤ 12.45V
25%	NA	≤ 12.1V
0%	NA	11.9V

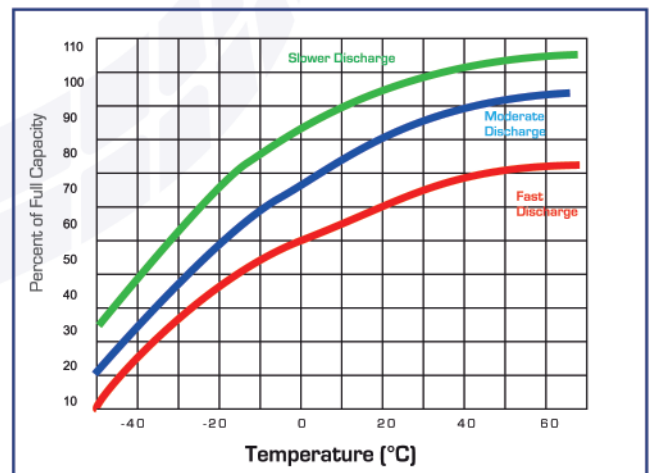
Discharging Characteristics at Various Rates @ 27°C



Service (Float) Life and Temperature



Expected Capacity vs Temperature



CHARGING MODE: NC + TT

Step	Name	Voltage	Current	Condition To Go Next Step
1	Bulk	Approx. 13.6	Approx. 11A*	Battery Voltage cross to 13.6V
2	Boost	14.6V ± 0.2V	Approx. 11A*	Battery Voltage reached to boost voltage i.e. 14.6 V ± 0.2V
3	Taper	14.6V ± 0.2V	Reducing up to 3-4A	Either 2hrs or current goes below 3A
4	Float	13.8V ± 0.2V	< 3 A	Battery Charge declared and current goes below 1A
5	Pulse	13.8V ± 0.2V	< 1 A	Continous up to no interrupt like Grid not available or not in limit

CHARGING MODE: NC + FT

Step	Name	Voltage	Current	Condition To Go Next Step
1	Bulk	Approx. 13.6	Approx. 11A*	Battery Voltage cross to 13.6V
2	Boost	14.2V ± 0.2V	Approx. 11A*	Battery Voltage reached to boost voltage i.e. 14.2 V ± 0.2V
3	Taper	14.2V ± 0.2V	Reducing up to 3-4A	Either 2hrs or current goes below 3A
4	Float	13.2V ± 0.2V	< 3 A	Battery Charge declared and current goes below 1A
5	Pulse	13.2V ± 0.2V	< 1 A	Continous up to no interrupt like Grid not available or not in limit



We Deliver Worldwide!

At **PROTON-S**, we are pleased to offer worldwide delivery services for our high-quality batteries. Whether you're located locally or internationally, you can count on us to deliver our products right to your doorstep.

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www.proton-s.net



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