



浙江天能能源科技股份有限公司

ZHEJIANG TIANNENG ENERGY TECHNOLOGY CO., LTD.

V1.0

产品规格书

Product Specification

型号: MODEL NO.: TNL-IFP090170227-25

3.2V 25Ah

制定(PREPARED BY):日期 DATE:

审核(CHECKED BY):日期 DATE:

批准(APPROVED BY):日期 DATE:

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1、概述 Summarize

1.1 本规格书适用于浙江天能能源科技有限公司制作的软包装 TNL-IFP090170227-25 锂离子电池。

The specification is suitable to the Al-plastic film package battery TNL-IFP090170227-25 by ZHEJIANG TIANNENG ENERGY TECHNOLOGY CO.,LTD.

1.2 本电池是磷酸铁锂材料电池。

This battery is made from lithium iron phosphate (LiFePO_4)

1.3 本电池属环保电池，主要化学组份为： LiFePO_4 和 C（碳），无化学汞和镉等成份。

This battery is environment friendly, the main chemical composition is LiFePO_4 and Carbon, there are no Hg and Cd.

2、产品测试要求及标准 Test requirement and Standard

2.1 环境要求 The requirement of environment

除非另有规定，本规格书中各项试验应在标准大气条件下进行：温度：23℃~27℃；相对湿度：15%~90%；

Unless having additional statement, All tests in this specification will be done under standard atmosphere conditions: temperature:23℃~27℃； relative humidity: 15%~90%；

大气压力：86 kPa~106 kPa

atmospheric pressure:86 kPa~106 kPa

2.3 产品执行标准 The standard performed

公司企业标准；UL、CE、GB/T31484-2015、GB/T31485-2015 、GB/T31486-2015 相关标准

Company's standard, UL, CE, GB/T31484-2015, GB/T31485-2015 and GB/T31486-2015 relative standard

3. 基本特性 Basic characteristics

3.1 常规特性 Normal performance

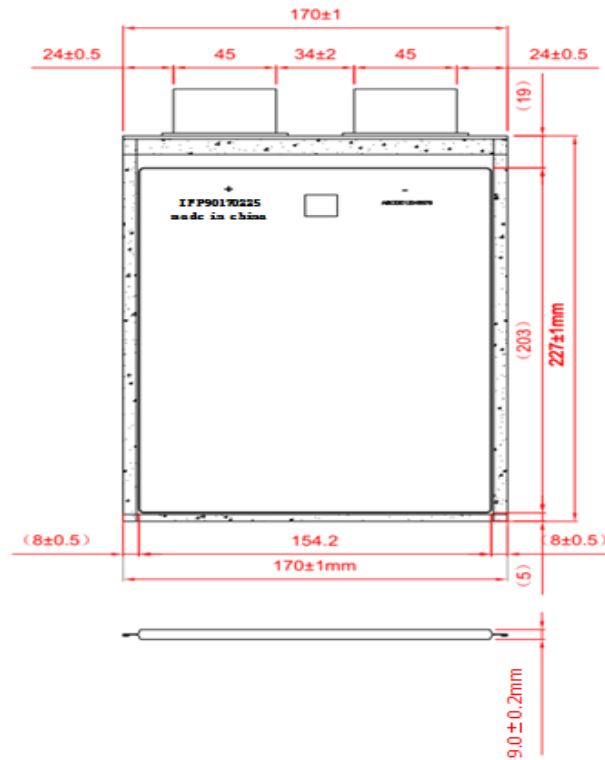
测试项目 Test item	单位 Unit	规格 Specification	测试方法 Test method
额定容量 Rated Capacity	Ah	25	充电：标准充电； 放电：0.5C 放电容量 Charge: standard charge, Discharge:0.5C discharge
最小容量 Minimum Capacity	Ah	25	充电：标准充电； 放电：0.5C 放电容量 Charge: standard charge, Discharge:0.5C discharge
标称电压 Nominal voltage	V	3.2	
内阻 Internal Resistance	mΩ	≤1.0	标准充电后搁置 1~4h，测量电池交流内阻 Rest 1-4h after standard charge, test the AC internal resistance of the battery
大约重量 Weight(Approximately)	g	620±10	
循环寿命 Cycle life	次	≥2000 (80%)	标准充电，搁置 30min，12.5A 放电至 2.0V Rest 30min after standard charge, discharge at 12.5A to 2.0V





外形尺寸 Dimension	mm	厚度 Thickness: 9.0 ± 0.20 宽度 Width: 170 ± 2 高度 Length: 227 ± 2	用卡尺测量 by Caliper
外观 Appearance		无变形、无爆裂、无漏液 No distortion, no explode, no leakage	目测 by eyeballing
储存要求 Storage performance		$-20^{\circ}\text{C} \sim 60^{\circ}\text{C}$ $-15^{\circ}\text{C} \sim 30^{\circ}\text{C}$ $-10^{\circ}\text{C} \sim 25^{\circ}\text{C}$	短期 short term(one month) 中期 medium term (three month) 长期 long term(within one year)

电池的尺寸如下图所示:



3.2 充电特性 Charge performance

测试项目 Test item	单位 Unit	规格 Specification	备注 Remarks
充电方式 Charge mode		CC/CV	标准 standard
充电电流 Charge current	mAh	0.5C	标准 standard
连续充电电流 Continuous Charge current	mAh	2C	最大 Max.
充电截止电压 Charge Cut-off Voltage	V	3.6	标准 standard
充电截止电流 Charge Cut-off current	mA	0.05C	标准 standard





充电时间 Charge time	min	120-180	标准 standard
环境温度 Ambience temperature	°C	0~45	

3.3 放电特性 Discharge performance

测试项目 Test item	单位 Unit	规格 Specification	备注 Remarks
放电电流 Discharge current	mAh	0.5C	标准 standard
最大持续放电电流 Maximum continuous discharge current	mAh	10C	最大 Max
最大瞬时放电电流 Max instant discharge current	A	25C	≥5s
放电截止电压 Discharge Cut-off Voltage	V	2.0	标准 standard
环境温度 Ambience temperature	°C	-20 ~55	

3.4、环境性能

测试项目	单位	规格	备注
低温性能 (-20°C)	%	≥55%	标准制度充电后, -20°C搁置 24h, 0.5C 放电至 2.0V
高温性能 (55°C)	%	≥98%	标准制度充电后, 55°C搁置 5h, 0.5C 放电至 2.0V
荷电保持 capacity retention	%	≥96%	标准充电后, 开路搁置 28 天, 0.5C 放电至 2.0V After standard charge, rest 28days at open voltage, discharge to 2.0V at 0.5C
荷电恢复 capability resume		≥98%	放电后标准充电, 0.5C 放电至 2.0V (允许循环 3 次) After standard charge, discharge to 2.0V at 0.5C(allow 3cycles)





温度变化	N/A	不漏液、不爆炸、 不起火 No explosion, no rust, no fire and no leakage	标准充电后。从常温 $25 \pm 2^\circ\text{C}$ 在 60min 内恒速率降温至 -40°C ，并保持 90min，再 60min 内恒速率升温至 $25 \pm 2^\circ\text{C}$ ，继续 90min 内恒速率升温至 $85 \pm 2^\circ\text{C}$ 后保持 110min，然后 70min 内温度降至 $25 \pm 2^\circ\text{C}$ ，连续以上温度变化步骤循环 5 次，观察 1h After standard charge, Decrease the temperature to $-40 \pm 2^\circ\text{C}$ with 60min and keep 90min, then increase the temperature to $25 \pm 2^\circ\text{C}$ with 60min, then increase the temperature to $85 \pm 2^\circ\text{C}$ with 90min and keep 110min, then decrease the temperature to $25 \pm 2^\circ\text{C}$ with 70min, repeat these steps above for 5 times, observe 1h
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4、安全性 safety

测试项目 Test	单位 Unit	技术要求 Specification	条件 Condition
过充电 Overcharge	N/A	不爆炸、不起火 No explosion and no fire	标准充电后，以 1C 恒流充电至电压达到 5.5V 或充电时间达 1h 后停止充电，观察 1h After standard charge, constant current charge until the voltage up to 5.5 V or charging 1h at 1C, observe 1h
外部短路 External Short Circuit	N/A	不爆炸、不起火 No explosion and no fire	标准充电后，用内阻小于 $5\text{m}\Omega$ 的线路短路电池，观察 1h After standard charge, short circuit by line (internal resistance less than $5\text{m}\Omega$), observe 1h
过放电 Over discharge	N/A	不爆炸、不起火、 不漏液 No explosion、no fire and no leakage	标准充电后，以 1C 放电 90min，观察 1h After standard charge, discharge 90min at 1C, observe 1h
加热 Heating	N/A	不爆炸、不起火 No explosion and no fire	标准充电后，以 $5 \pm 2^\circ\text{C}/\text{min}$ 升温至 $130 \pm 2^\circ\text{C}$ ，此温度下保持 30min After standard charge, Increase the temperature to $130 \pm 2^\circ\text{C}$ at $5 \pm 2^\circ\text{C}/\text{min}$ and keep 30min, observe 1h
挤压测试 Extrusion	N/A	不爆炸、不起火 No explosion and no fire	标准充电后，用 R 75mm 半圆柱体垂直于极板方向挤压电池，挤压速度 $(5 \pm 1)\text{mm}/\text{s}$ ，直至电压达到 0V 或形变量达 30% 或挤压力达 200kN 后停止，观察 1h. After standard charge, extruding the battery with semi cylinder(R 75mm) perpendicular to the direction of plate until the voltage to 0V or the deformation degree to 30% or increasing the pressure to 200kN, observe 1h





海水浸泡 seawater immersion	N/A	不爆炸、不起火 No explosion and no fire	标准充电后, 将电池浸入 3.5%NaCl 溶液 (质量分数, 模拟常温下的海水成分) 中 2h, 水深应完全没过电池 After standard charge, the battery is immersed in 3.5% NaCl solution (mass percent, simulated ambient water composition) for 2h, water depth should be completely above battery.
自由跌落测试 Free falling(drop)	N/A	不爆炸、不起火、 不漏液 No explosion, no fire and no leakage	标准充电后, 正负端子向下, 电池从 1.5m 高度自由跌落到水泥板面, 观察 1h After standard charge, the battery fall on cement floor freely from the least height of 1.5m in the direction of positive and negative pole once for each direction. observe 1h
低气压 low pressure	N/A	不爆炸、不起火、 不漏液 No explosion, no fire and no leakage	标准充电后, 将电池放入低气压箱中, 调节试验箱气压为 11.6 kPa, 温度为室温, 静置 6h, 观察 1h After standard charge, the battery is put into the low pressure box with 11.6kPa for 120min., observe 1h.

5、注意事项 PRECAUTIONS

- 1、电池长时间搁置期间, 每隔 3 个月进行一次充放电

Please charge and discharge every 3 months according to following method in long term storage.

恒压 3.6V 限流 0.5C, 截止电流为 0.05C, 搁置 30 分钟, 然后用 0.5C 放电至每颗电池 2.0V, 搁置 30 分钟, 0.5C 充电 1.2 小时。

Constant voltage: 3.65V, limit current: 0.5C, cut-off current: 0.05C, rest for 30min, then discharge to 2.0V at 1C, rest for 30min, then charge 1.2h at 0.5C.

- 2、在使用新电池前, 或者长期存放后第一次使用电池, 在使用前请将电池充满电

When using a new battery for the first time or after long term storage, please fully charge the battery before use

- 3、充电方法请参考我们的技术手册

For charging methods, please refer to our technical handbook

- 4、使用 Li-ion 专用充电器

Use the correct charger for Li-ion batteries

- 5、不要对电池进行反充电

Do not reverse charge battery

- 6、不要将电池短路, 那可能永久的损坏电池

Do not short circuit batteries, permanent damage to batteries may result

- 6、不要燃烧或毁坏电池, 可能导致有毒气体释放或爆炸

Do not incinerate or mutilate batteries, may burst or release toxic material

- 7、不要直接对电池进行焊接

Do not solder directly to cells or batteries





8、不要让电池处于不利环境中，比如极端的温度，深度循环，或者经常过充/过放电

Do not subject batteries to adverse condition such as extreme temperature, deep cycling and excessive overcharge/over-discharge.

9、将电池贮存在阴凉干燥处

Store batteries in a dry place

10、不要将我公司电池与其他品牌的电池或者不同种类的电池，比如碱性锌电池混用

Do not use our batteries together with other battery brands or batteries of a different chemistry such as alkaline and zinc carbon

11、不要将新旧电池混用,可能会导致过放电

Do not mix use new batteries with semi-used batteries, over-discharge may occurred

12、当把电池放入充电器中时，注意保证极性正确

When charging the battery with charger, ensure correct polarity

13、如果出现噪音，温度异常，或者漏液,请停止使用

If find any noise, excessive temperature or leakage, please stop use

14、如果电池发烫，请勿触摸，直至冷却

When the battery is very hot, please do not touch and handle it until it cool down

15、不要把电池（电池组）的外套去除

Do not remove the outer sleeve from a cell(or battery pack)

16、电池使用时发现功率下降，请关闭用电器开关以防止电池过放

When finding battery power down during use, please switch off the device to avoid over-discharge

17、当电池不使用时，请把它从装置上取下

When not using a battery, take out from the device

18、电池使用后，如果电池发热，再次充电前，请在通风环境中冷却

After use, if the battery is hot, before recharging it, should cool the battery in a well-ventilated place.

19、不要将电池放入水中或海水中

Never put a battery into water or seawater

20、不要尝试分离，挤压，撞击电池，电池会发热或起火.电池中的碱液对皮肤和眼睛有害，而且会损伤衣服

Do not attempt to take batteries apart, extrusion or impact. Heat may be generated or fire may result. The alkaline electrolyte in battery will be harmful to eyes and skin, and it may damage clothing

23、要使电池远离儿童.如发现吞食，立即联系医生

Keep away from children. If swallowed, contact a physician at once

6、产品责任书 products responsibility

消费者必须严格遵守本规格书的要求使用电池，由于误用会引起电池过热，发生火灾或爆炸，对于没有按照规格书进行操作所造成的任何意外事故，浙江天能能源科技股份有限公司不负任何责任。

All users should use our battery according to this specification strictly. Zhejiang Tian neng Energy Technology Co.,Ltd will not be responsible to battery's heat generation, fire, exploration.

