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Strategic
Partner

危险物品
DANGEROUS GOODS

航空运输条件鉴别报告书

Identification and Classification Report for Air Transport of Goods



报告编号: PEKGZ20190105883GA130001

Issued No.:

签发日期:

2019.01.05

Issued Date:

委托单位: 建迪企业股份有限公司

Applicant: CHIEN TI ENTERPRISE CO., LTD.

物品名称: 可充式锂离子电池组 NCR18650PF-4P7S

Name of Goods: Rechargeable Lithium ion Battery NCR18650PF-4P7S

北京迪捷姆空运技术开发有限公司

Beijing DGM Air Transport Technology Development Co., Ltd.

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检测
TESTING
CNAS L4065



Report No.:
报告编号: GNGF20181019U02

检测报告

TEST REPORT

NAME OF SAMPLE: Rechargeable Lithium ion Battery

产品名称: 可充式锂离子电池组

CLIENT: CHIEN TI ENTERPRISE CO.,LTD.

委托单位: 建迪企业股份有限公司

CLASSIFICATION OF TEST: Commission test

检测类别: 委托检测

广州邦禾检测技术有限公司

Guangzhou MCM Certification and Testing Co., Ltd





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BATTERY EVALUATION LETTER

Applicant: **CHIEN TI ENTERPRISE CO.,LTD.**
Equipment Name: **Rechargeable Lithium ion Battery**
Type designation: **NCR18650PF-4P7S**
Capacity **25.2V/11000mAh/277.2Wh(min.)**
25.2V/11600mAh/292.32Wh(typ)

Standard ☒ **UN38.3**
☐ Other: _____

| | Test Items | Clause | Note(s): PASS |
|----------|---------------------------------------|------------|---------------|
| UN 38.3 | | | |
| 1. | Altitude simulation test procedure | UN 38.3/T1 | V |
| 2. | Thermal test procedure | UN 38.3/T2 | V |
| 3. | Vibration test procedure | UN 38.3/T3 | V |
| 4. | Shock test procedure | UN 38.3/T4 | V |
| 5. | External short circuit test procedure | UN 38.3/T5 | V |
| 6. | Impact test procedure | UN 38.3/T6 | V |
| 7. | Crushing test procedure | UN 38.3 T6 | N/A |
| 8. | Overcharge test procedure | UN 38.3/T7 | V |
| 9. | Forced discharge test procedure | UN 38.3/T8 | V |
| Comment: | | | |

Issued Date: **2018-11-30**

Director :



SPORTON INTERNATIONAL INC. EMC & SAFETY GROUP
14 FI-2, No. 186, Jianyi Road, Zhonghe District, New Taipei City, Taiwan



Technology & Service
Guangzhou MCM Certification & Testing Co., Ltd.



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INSPECTION
CNAS IB0551



Report No.: GNGF20181019MSDS02

MATERIAL SAFETY DATA SHEET

Product Name: Rechargeable Lithium ion Battery

Type/ Model: NCR18650PF-4P7S 25.2V
11000mAh / 277.2Wh(min)
11600mAh / 292.32Wh(typ)

Revision Date: Nov.19, 2018

Compiler: *Huang Yining*

Reviewer: *Tang Mingao*

Approver: *Xu Hongbin*



广州邦禾检测技术有限公司

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BATTERY MSDS CONFIRMATION LETTER

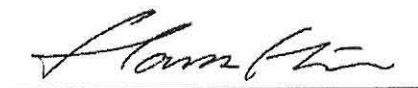
Applicant: CHIENTI ENTERPRISE CO.,LTD.
Equipment Name: Rechargeable Lithium ion Battery
Type designation: NCR18650PF-4P7S
Capacity 25.2 V/11000 mAh/277.2 Wh(min.)
25.2 V/11600 mAh/292.32 Wh(typ)

Confirmation item: Material Safety Data Sheet

| Section | Items | Note(s): check |
|----------|--|----------------|
| 2. | Hazards identification | V |
| 3. | Composition/Information on ingredient | V |
| 4. | First aid measures | V |
| 5. | Fire fighting measures | V |
| 6. | Accidental release measures | V |
| 7. | Handling and storage | V |
| 8. | Exposure controls, personal protection | V |
| 9. | Physical and chemical properties | V |
| 10. | Stability and reactivity | V |
| 11. | Toxicological information | V |
| 12. | Ecological information | V |
| 13. | Disposal considerations | V |
| 14. | Transport information | V |
| 15. | Regulatory information | V |
| Comment: | | |

Issued Date: 2018-12-04

Director :



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CNAS IB0561



Certification No.:
GNGF20181019M502

货物海运条件鉴定报告书

Certification for Safe Transport of Goods by sea
危险品 Dangerous Goods

货物名称: 可充式锂离子电池组: NCR18650PF-4P7S

Name of Goods: Rechargeable Lithium ion Battery:
NCR18650PF-4P7S

委托单位: 建迪企业股份有限公司

Commission by: CHIEN TI ENTERPRISE CO.,LTD.

生产厂: 珠海格力能源环境技术有限公司

Factory: GREE Energetic & Environmental Technologies Co.,
Ltd. of Zhuhai

广州邦禾检测技术有限公司

Guangzhou MCM Certification and Testing Co., Ltd

Consideration is to be given to the following Conditions of Acceptability when these components are employed in the end-use equipment:

1. Tubing shall not be used where it is feasible to employ a standard insulating conductor (e.g., appliance wiring material) intended specifically for the purpose.
2. Unless indicated in the Individual Recognitions, the tubing has not been investigated for use in contact with sharp edges, corners, projections or burrs, or where subject to tension, compression, abrasion, repeated flexing or where exposed to ultraviolet radiation or oil contamination.
3. Tubing shall be used in dry and damp locations only as defined in ANSI/NFPA 70, "National Electrical Code."
4. The minimum wall thickness and the published ratings of the tube shall be considered in the end-product investigation.
5. The tubing has not been investigated with respect to its resistance to ignition from electrical sources.
6. Tubing marked with an Oil Resistance class has been investigated for intermittent or occasional contact with oil.

Additional Conditions of Acceptability may be included in the Report available from the manufacturer.

REQUIREMENTS

The basic standard used to investigate products in this category is ANSI/UL 224, "Extruded Insulating Tubing."

UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. UL shall not incur any obligation or liability for any loss, expense or damages, including incidental or consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Guide Information.

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YDPU2.GuideInfo Tubing, Extruded Insulating - Component

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[Tubing, Polymeric - Component] Tubing, Extruded Insulating - Component

[See General Information for Tubing, Polymeric - Component](#)

The products covered under this category are incomplete in certain constructional features or restricted in performance capabilities and are intended for use as components of complete equipment submitted for investigation rather than for direct separate installation in the field. THE FINAL ACCEPTANCE OF THE COMPONENT IS DEPENDENT UPON ITS INSTALLATION AND USE IN COMPLETE EQUIPMENT SUBMITTED TO UL

USE

This category covers insulating tubing, usually round in cross-section, that consists of extruded compounds whose characteristic constituents are thermosetting, elastomeric or thermoplastic polymers and with or without meltable inner liners.

This insulating tubing is typically used for applications where the following considerations are essential:

| Tubing Material | TI | Rating V |
|---|------------|-----------------|
| PVC | 90 or 105 | 300 or 600 |
| Shrinkable PVC | 90 or 105 | 300 or 600 |
| Polyolefin - Flexible | 105 | 300 or 600 |
| Polyolefin - Semi-rigid | 125 | 300 or 600 |
| Shrinkable Polyolefin - Flexible | 105 or 125 | 150, 300 or 600 |
| Shrinkable Polyolefin - Semi-rigid | 125 | 150, 300 or 600 |
| PTFE or FEP | 200 | 150, 300 or 600 |
| Shrinkable PTFE or FEP | 200 | 150, 300 or 600 |
| Shrinkable PVF ₂ - Rigid | 150 | 600 |
| Shrinkable Modified Fluoropolymer - Rigid | 150 | 600 |
| Shrinkable Polyolefin | 75 or 90 | 600 |
| Silicone Rubber | 150 or 200 | 300 or 600 |
| Shrinkable Silicone Rubber | 150 or 200 | 300 or 600 |

This tubing is intended for use as part of the internal wiring of electrical devices and appliances. The tubing may be intended for insulating one or more uninsulated or partially insulated conductors, busbars, component leads, terminal lugs or assemblies of electronic components.

The suitability of the tubing parameters shall be determined in accordance with the applicable end-product construction and requirements. The individual Recognitions indicate the limits of the test parameters, which have the following significance:

- Tubing marked "Oil Resistant" (or "Oil Res") followed by the class (01, 02 or 03) has been investigated for intermittent or occasional contact with oil.
- Tubing marked "VW-1" has been investigated using a fine wire support in conducting the flammability test.

CONDITIONS OF ACCEPTABILITY

**IMPROVED CERTIFICATIONS
SEARCH TOOL. REGISTER NOW!**[LEARN MORE](#)**YDPU2.E310532****Tubing, Extruded Insulating - Component**[Page Bottom](#)**Tubing, Extruded Insulating - Component**[See General Information for Tubing, Extruded Insulating - Component](#)**DONGGUAN VAST (WEISHIDA) INSULATION MATERIALS CO LTD****E310532**

13TH FENGPIING RD JINLONG INDUSTRIALS

AREA SANZHONG VILLAGE

QINGXI TOWN

DONGGUAN, GUANGDONG 523651 CHINA

| Cat. No. | Max V rms | Max Oper Temp, °C | Color Recognized | Oil-resistance Class[a] | VW-1 Rated[b] |
|--|-----------|-------------------|------------------|-------------------------|---------------|
| Not heat shrinkable Polyvinyl chloride (PVC) | | | | | |
| VAST-300 | 300 | 105 | All | None | Yes |
| VAST-600 | 600 | 105 | All | None | Yes |

[a] - Tubing is considered to comply with the optional Oil Resistance requirements only if authorized in the above table and marked "Oil Resistant" (or "Oil Res"), followed by the class (01, 02 or 03).

[b] - Tubing is considered to comply with the optional VW-1 flammability requirements only if authorized in the above table and if so marked.

Marking: Company name or tradename "E310532", catalog designation, inside diameter (before and after recovery for heat-shrinkable tubing), voltage rating, temperature rating in degrees Celsius and date of manufacture (or traceable code) printed on tags attached to both ends of the tubing or printed on the shipping spool label or smallest unit container in which the product is packaged.

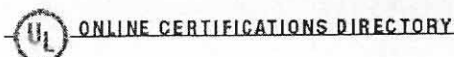
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**YDPU8.E310532****Tubing, Extruded Insulating Certified for Canada - Component**[Page Bottom](#)**Tubing, Extruded Insulating Certified for Canada - Component**[See General Information for Tubing, Extruded Insulating Certified for Canada - Component](#)**DONGGUAN VAST (WEISHIDA) INSULATION MATERIALS CO LTD**

E310532

13TH FENGPIG RD JINLONG INDUSTRIALS

AREA SANZHONG VILLAGE

QINGXI TOWN


DONGGUAN, GUANGDONG 523651 CHINA

| Cat. No. | Max V, rms | Max Oper Temp, °C | Col Recognized | Oil-resistance Class* | VW-1 Rated# |
|---|---------------|----------------------|-------------------|--------------------------|----------------|
| Not Heat Shrinkable Polyvinyl chloride (PVC) | | | | | |
| VAST-300 | 300 | 105 | ALL | — | Yes |
| VAST-600 | 600 | 105 | ALL | — | Yes |

* Tubing is considered to comply with the optional oil resistant requirements only if it is so marked.

Tubing is considered to comply with the optional VW-1 flammability requirements only if it is so marked.

Marking: Company name or file number "E310532" and catalog designation, inside diameter (before and after recovery for heat-shrinkable tubing),

voltage rating, temperature rating in degrees C, date of manufacture and the Recognized Component Mark for Canada  to be printed on tags attached to both ends of the tubing or on the shipping spool label or smallest unit container in which the product is packaged.

Last Updated on 2010-08-26

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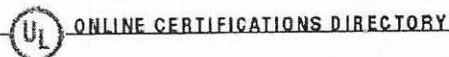
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**YDPU2.E310532**
Tubing, Extruded Insulating - Component[Page Bottom](#)**Tubing, Extruded Insulating - Component**[See General Information for Tubing, Extruded Insulating - Component](#)

DONGGUAN VAST (WEISHIDA) INSULATION MATERIALS CO LTD
13TH FENGPING RD JINLONG INDUSTRIALS
AREA SANZHONG VILLAGE
QINGXI TOWN
DONGGUAN, GUANGDONG 523651 CHINA

E310532

| Cat. No. | Max V, rms | Max Oper Temp, °C | Col Recognized | Oil-resistance Class* | VW-1 Rated# |
|---|---------------|----------------------|-------------------|--------------------------|----------------|
| Not Heat Shrinkable Polyvinyl chloride (PVC) | | | | | |
| VAST-300 | 300 | 105 | ALL | — | Yes |
| VAST-600 | 600 | 105 | ALL | — | Yes |

* Tubing is considered to comply with the optional Oil Resistance requirements only if it is so marked.

Tubing is considered to comply with the optional VW-1 flammability requirements only if it is so marked.

Marking: Company name or file number "E310532", catalog designation, inside diameter (before and after recovery for heat-shrinkable tubing), voltage rating, temperature rating in degrees C and date of manufacture on tags attached to both ends of the tubing or on the shipping spool label or smallest unit container in which the product is packaged.

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**YDPU8.E321827****Tubing, Extruded Insulating Certified for Canada - Component**

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Tubing, Extruded Insulating Certified for Canada - Component[See General Information for Tubing, Extruded Insulating Certified for Canada - Component](#)**GUANGZHOU KAIHENG NEW MATERIAL CO LTD****E321827**

CHANG'AN #148

GUANGSHAN RD

LUOGANG DISTRICT


GUANGZHOU, GUANGDONG 510520 CHINA

| Cat. No. | Max V, rms | Max Oper Temp, ° C | Col Recognized | Oil-resistance Class* | VW-1 Rated# |
|--|---------------|-----------------------|-------------------|--------------------------|----------------|
| Flexible Heat Shrinkable Polyolefin tubing. | | | | | |
| K-102 (+) | 600 | 125 | All except CL | None | Yes ## |
| K-102 (CB) | 300 | 125 | All except CL | None | Yes |

* Tubing is considered to comply with the optional oil resistant requirements only if it is so marked.

Tubing is considered to comply with the optional VW-1 flammability requirements only if it is so marked.

Marking: Company name or trade name or trademark, catalog designation, inside diameter (before and after recovery for heat-shrinkable tubing), voltage rating, temperature rating in degrees C, date of manufacture and the Recognized Component Mark

for Canada  to be printed on tags attached to both ends of the tubing or on the shipping spool label or smallest unit container in which the product is packaged.

Last Updated on 2008-06-04

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| | |
|-------------|-----------------------------------|
| 急毒性: 无 | Rapid virulence: No |
| 局部效应: 无 | Part effect: No |
| 致敏感性: 无 | Cause hypersusceptibility : No |
| 慢毒性或长期毒性: 无 | Slowly or long-term virulence: No |
| 特殊效应: 无 | Special effect: No |

十二、生态学信息 Ecological Information:

可能之环境影响/环境流: 该产品不会在自然界分解, 对动植物及水生物不会产生危害。Perhaps environment effect: The production can't decompose at nature condition, so it can't hazard the animal and plant.

十三、废弃处置 Disposal Considerations:

废弃处置方法: 这些物品将统一收集给废品收购站, 作相应环保处理。
Trash disposal: Collect and treat for the environment.

十四、运输信息 Transport Information:

| | |
|---|------------------------------------|
| 国际运送规定: 无 | World wild transportation rule: No |
| 联合国编号: 无 | U.N. code: No |
| 国内运送规定: 无 | Transportation in china rule: No |
| 特殊运送方法及注意事项: 避免挤压变形, 利器损伤。 Special transportation method and notice: Avoid extrusion distortion, edge tool hurt. | |

十五、法规信息 Regulatory Information:

适用法规: UL224 Comply rule or law: UL224

十六、其他信息 Other Information:

備註: 无

(以上内容如有歧义以中文为准 If the Chinese and English content are different, the Chinese content is right)

Special condition, perhaps hazard: If has fire, the production can be fired for a moment and produce a little smoke.

应避免之状况: 高温放置会收缩。

Please avoid the condition: At heat temperature condition the production will shrink.

应避免之物质: 火种 Please avoid the condition: Fire.

危害分解物: 烟雾。 Hazard decompose material: Smoke.

十一、毒理学信息 Toxicological Information:

六、泄露应急处理 Accidental Release Measures :

| | |
|------------|------------------------|
| 个人应注意事项: 无 | Person notice: No |
| 环境注意事项: 无 | Environment notice: No |

清理方法: 无 Cleaning method: No special method

七、操作和储存 Handling and Storage:

| |
|--|
| 操作: 用烘箱和热风枪加热即可收缩。 |
| Handling: Using oven or heating gun and it will shrink. |
| 储存: 常温下用纸箱包装好放置在阴凉处。 |
| Deposit: At normal temperature paper box package, no sun straight shine. |

八、接触控制和个人防护措施 Exposure Controls/Personal Protection:

| | |
|-----------|-------------------------------|
| 接触控制: 无危害 | Exposure Controls: No danger. |
| 个人防护措施: 无 | Dependence: No |

九、理化特性 Physical and Chemical Properties :

| ITEM | | | TESTING METHOD | REQUIREMENT |
|------------|---------------------------------|------|-------------------|------------------------|
| Physical | Tensile strength /MPa | | GB/T 1040 | ≥10.4 |
| | Elongation/% | | GB/T 1040 | ≥200 |
| | Ensile strength after aging/MPa | | UL224; 158℃×168h | ≥7.3 |
| | Elongation after aging/% | | UL 224; 158℃×168h | ≥100 |
| | Cold Blend | | UL 224; -30℃×1h | No cracking |
| Electrical | Dielectric | 300V | UL224 | No Breakdown for 1500V |
| | Withstand | 600V | UL224 | No Breakdown for 2500V |
| | Dielectric Strength KV/mm | | GB/T1408 | ≥15 |
| | Volume resistance /Ω•cm | | GB/T1410 | ≥1×10 ¹⁴ |
| Chemical | Anti Corrosion | | UL 224; 158℃×168h | PASS |
| | Copper stability | | UL 224; 158℃×168h | PASS |
| | Flammability | | UL224 | ☆ |

注: ☆表示黄色和白色阻燃性能要特别注明, 其他颜色阻燃性能能够达到要求。

Note: yellow and white flame retardant performance needs to be improved, the other can reach the required color flame retardant properties

十、稳定性和反应活性 Stability and Reactivity :

| | |
|---------------------------------------|-------------------------|
| 稳定性: 不能分解。 | Stability: No decompose |
| 特殊状况下可能之危害反应: 有火的话, 此种产品会短时间燃烧, 产生烟雾。 | |

KAIHENG K&S CO., LTD

| | |
|--|---|
| 最重要的危害项目 KEY HAZARD ITEM | 健康危害效应: 点燃后在短时间内会熄灭, 有少量烟雾产生, 对人体呼吸道产生轻微伤害。Health hazard note: Be fired for a moment and will be flameout, it will produce a little smoke, the smoke will hazard breath a little. |
| | 环境影响: 危害空气。 Environment hazard note: If be fired and pollute the air |
| | 物理性及化学性危害: 常态是管状, 在 70-125℃ 预热收缩。 Physics and chemistry characteristic: it normal is pipe and will shrink at 70-125℃, that perhaps is harmful. |
| | 特殊危害: 如果火烤、烟熏, 烟雾会冲击眼睛、呼吸系统, 对人体产生伤害。 Specific hazard: if be fired or sootiness, it will produce smoke and hurt eyes breath. |
| 主要症状: 眼睛流泪, 喷嚏, 咳嗽, 在呼吸新鲜空气会减轻相应症状。 Mostly symptom: lachrymation, sneeze, cough. It will be good after breathing fresh air. | |
| 物品燃烧危险: 点燃时会短时间燃烧。 Fireproofing characteristic: It flames out for a moment after leaving fire. | |

四、急救措施 First Aid Measures :

| |
|---|
| 不同暴露途径之急救方法: First-aid measures: 吸入: 在正常操作下没有吸入的危险。 Normal it is not harmful for breath. 皮肤接触: 正常接触时对皮肤无损伤。由于此管易划伤, 建议操作时戴手套。 Skin touch: Normal it is not harmful for skin 眼睛接触: 无影响 Normal it is not harmful for eyes. 食入: 不能食用。 It can't be eaten. |
| 最重要及危害效应: 吸入燃烧烟雾, 冲击呼吸系统。 Key symptom: Be fired, the smoke choke the breath. |
| 对急救人员之防护: 配戴呼吸防护装置。 First aid defend: Get on gas mask |
| 对医师之提示: 对呼吸系统严重症者, 应不断吸入新鲜空气来减轻症状。 Doctor suggest: If breath a lot of smoke, must breath more fresh air, it can help you to reduce the symptom. |

五、消防措施 Fire Fighting Measures:

| |
|--|
| 适用灭火剂: 不能长时间燃烧, 使用粉末灭火器。 Fire fighting material medical: Dust farina powder . |
| 灭火时可能遭遇之特殊危害: 燃烧可产生少量烟雾, 冲击人体呼吸系统。 During fire-fighting, special hazard: Be fired, produce a little smoke, and it can choke the breath. |
| 特殊灭火程序: 无。 Special fire-fighting program: No special program. |
| 消防人员之特殊防护设备: 正常消防设备。 Fire-fighter special dependence: Normal fire-fighting device. |

KAIHENG K&S CO., LTD

物质安全资料表

MATERIAL SAFETY DATA SHEET

一、化学品名称和制造商信息 Chemical Product & Company Information :

| |
|---|
| 物品名称: 环保热缩套管 Article: K-102 Heat Shrinkable tubing |
| 规格型号: 全系列规格 Spec: All Spec. |
| 供货商名称: GUANGZHOU KAIHENG K&S CO., LTD 地址及电话: KAIHENG TECHNOLOGY INDUSTRY PARK, NO. 148 HANGAN, GUANGZHOU CHINA 020-22098486 |
| 二、化学组成信息 Composition/Information on Ingredients : |

| 原料名称 Raw Material Name | | | 使用目的 Using aim | 含量 Content | 供应商 Manufacturer | CAS. NO. |
|------------------------|---|-------------------------------------|-------------------------------------|---------------|---|------------|
| 中文 | 英文 English Name | 分子式 | | | | |
| 乙烯-醋酸乙 烯共聚物 | Ethylene-viny l acetate copolymer | $(CH_2-CH_2)_m-(CH_2-CH-COOCH_3)_n$ | 主剂 Main Material | 50% | 北京有机 China Sinopec | 24937-78-8 |
| 氢氧化镁 | Magnesium Hydroxide | $Mg(OH)_2$ | 阻燃剂 Flame-Retard ant Material | 35% | 锦昊辉 Jinhaohui Material Co., Ltd. | 1309-42-8 |
| 磷系阻燃剂 | Phosphorus | P | 阻燃剂 Flame-Retard ant Material | 10% | 上海海以 Shanghai Haiyi Co., Ltd | 7723-14-0 |
| 色母粒 | Pigment | 色母+填充剂 | 着色剂 Colorant Material | 5% | 华万彩 Huawangcai Co., Ltd | — |
| 油墨 | Printing Ink | — | 印字 Printint ink | — | 信华 Xinhua Co., Ltd | — |

三、危害信息 Hazards Identification :

PVC TUBE 材料安全资料表(MSDS)

Material Safety Data Sheet

| 项目/Items | | 材料安全资料表(MSDS)(Material Safety Data Sheet) |
|----------|----------------|---|
| 物品与厂商资料 | 物品名称 | PVC TUBING(PVC 套管) |
| | 物品编号 | PVC 300V; 600V |
| | 供应商名称 | 东莞市伟仕达绝缘材料有限公司 |
| | 供应商地址 | 东莞市清溪镇三中金龙工业区凤平路 13 号 |
| | 供应商电话 | 0769-87383129 87306185 87306186 |
| | 邮编 | 523651 |
| 成份辨识资料 | PVC 胶粒 | 名称 聚氯乙烯粉 安定剂 润滑剂 阻燃剂 增塑剂 色粉 |
| | | Name PVC resin Tranquilizer Lubricant Retardant Plasticizer Pigment |
| | | % 96 A-300 1801 Sb ₂ O ₃ TOTM Optional |
| | 重金属部分 | 名称 多溴联苯 多溴联苯醚 镉 铅 汞 铬 |
| | | Name PBBs PBDEs Cd Pb Hg Cr6+ |
| | | PPM <5PPM <5PPM <5PPM ≤5PPM <5PPM <5PPM |
| 危害辨识资料 | 健康危害 | 不可食用/Not to be eatable |
| | 环境影响 | 环保产品,低铅低镉,符合 RoHS 标准 |
| | 物理及化学性危害 | 受热分解或者燃烧发出有毒气体 |
| | 主要症状 | 误食后会引发呕吐,腹胀或轻微中毒现象 |
| | 救治措施 | 立即到医院就医 |
| 灭火措施 | 适用灭火剂 | 水,二氧化碳,干粉 |
| | 灭火时造成的危害 | 燃烧后产生的气体会造成空气污染 |
| 储运资料 | 储放要求 | - 20℃+60℃保持产品原包装方式,保持存放地点通风 |
| | 搬运要求 | 运输过程中不能有碰撞及挤压 |
| | 特殊情况下可能产生的危害反应 | 如外被绝缘脆化,绝缘性能下降,造成漏电现象 |
| | 应避免之物质 | 避免类似化学物质长期紧密接触,不可与油类,有机类生态物质长期接触 |
| 废物处理 | 废物处理办法 | 出售或回收再利用 |

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| Title | Specifications of Lithium Ion battery (Cylindrical Type) | page | 13/13 |
|---|--|--|-------|
| <p>16. Battery Warranty Period</p> <p>The warranty period is limited to one year from date of shipment. SANYO will replace batteries if it is clear that there was a defect in SANYO's manufacturing process and that the battery was not misused.</p> <p>17. Battery Safety Requirements</p> <p>In order to ensure the safety of the battery, please contact SANYO to discuss the application design from a mechanical or a electrical viewpoint. Also, if there are special conditions (For example: lager current load, a quick charge method or an unique usage pattern), please contact SANYO to check the conditions before the product specification is fixed.</p> <p>18. Document Terms (Only Tentative Specification)</p> <p>(1) The expiration period for this document is 6 months.</p> <p>(2) If a new document is released, please return or dispose the old one.</p> <p>(3) This document is still preliminary. The contents are not fixed completely.</p> | | | |
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| | | | |
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| Title | Specifications of Lithium Ion battery (Cylindrical Type) | page | 12/13 |
| 13. Warranty Exemptions <ul style="list-style-type: none"> SANYO will not be liable for any damages that are caused by violations of the precautions in this specification. SANYO will not be liable for any problems caused by design defects of the battery packs, Electric Motor Cycle and/or chargers. SANYO will not accept any abnormal cells that were caused due to any incorrect assembly process. | | | |
| 14. Other Remarks <ul style="list-style-type: none"> If there are problems in this specification, SANYO will take them into consideration. SANYO can discuss specs or precautions that are not described in this specification. Do not use the provided cells for other applications. | | | |
| 15. Standard Charging Method <ol style="list-style-type: none"> The standard charge condition is 1.35A/cell - 4.20V/cell (Constant current-constant voltage).The charging process should be discontinued when either time, the, OCV or current, reach certain values. In case of the over discharge state (For example: Battery voltage is less than 2.0V/cell), the battery should be charged by a pre-charge system in order to prevent FET's heat generation in a circuit. The pre-charging current should be approximately 0.27A. Once, the battery voltage reaches more than 2.4V/cell, the charger can resume the standard charging method. The pre-charging should have a cut-off timer and if the voltage doesn't recover over 2.4V/cell in the set time, the charging should be stopped. The current interrupt device (CID) may work if the battery is charged continuously after fully-charged and/or is charged at high temperature. Please consult SANYO for charging method instructions. | | | |
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|---|--|--|-------|
| <p>11. Storing Condition</p> <p>11-1 Storage Temperature and Humidity (Within 3 months)</p> <ul style="list-style-type: none"> Cells should be stored between -20°C to +40°C in a low humidity condition (less than 70 %RH) without any corrosive gases. No condensation on the cell <p>11-2 Long Duration Storage</p> <ul style="list-style-type: none"> Cells should be stored between -20°C to +20°C in a low humidity condition (less than 70%RH) without any corrosive gases. We recommend the discharged state or partially charged state SANYO shipped out for the long duration storage. No condensation on cells. <p>12. Handling Precautions for Lithium Ion Cells</p> <ul style="list-style-type: none"> This section describes handling precautions for SANYO lithium ion cells which will be assembled as Electric Motor Cycle's battery packs with Shenzhen Syren Energy Technology Co.,Ltd.. This battery pack consists of NCR18650PF. <p>12-1 Series Connections Precautions</p> <ul style="list-style-type: none"> When cells are connected in series, make sure the lot number, the shipping charge date, and capacity rank match. Please do not mix cells with different lot numbers, shipping charge date, and capacity rank. Also, the voltage variability should be within 20mV. * Lot number on carton label. <p>12-2 Inspection of the Battery Pack before Shipping</p> <p>All battery packs shall be inspected for:</p> <ul style="list-style-type: none"> Voltage Internal impedance Function of protection circuit Thermistor resistance Thermal fuse <p>12-3 Abnormal Cells</p> <ul style="list-style-type: none"> Do not use damaged cells by dropping, and/or short circuit and cells with electrolyte smell and any other damaged cells. | | | |
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| <ul style="list-style-type: none"> • The battery pack should be designed so the protection circuit functions can be inspected during the assembly process. • The battery pack should be designed so electrolyte cannot reach to the protection circuit board even if electrolyte leak out of the cells. • The cells should be fixed by a tape or a glue in the case. If the battery pack is dropped, the cells should be protected against dents, deformations and other mechanical stresses. • Plastic cases should be closed with glue. If an ultra sonic welding method is applied to the case sealing, SANYO will not take any responsibilities for any defects. • The pack shall be designed so end users cannot remove or disassemble the cells. <p>(2) Protection Circuit</p> <p>The following protection circuit should be equipped in the battery pack:</p> <ul style="list-style-type: none"> • Overcharge protection We recommend the overcharge protection works when cell voltage reaches more than 4.25V/cell. Then, the current shall be shut down. • Over discharge protection If cell voltage reaches approximately 2.0V/cell, we recommend the over discharge protection will shut down the discharge current and the circuit consumption current will be set to less than 1μA. • Over current protection If discharge current exceeds approximately 10A/cell, the over current protection will shut down the current. <p>(3) Electric circuit</p> <ul style="list-style-type: none"> • To avoid over discharge mode during long storage times, the consumption current of the battery pack's protection circuit should be set as low as possible. <p>(4) Cell connection</p> <ul style="list-style-type: none"> • The cells should not be connected using a soldering process. In order to avoid any damages, cells should be connected to lead plates by a spot welding method. <p>(5) Precautions on label</p> <ul style="list-style-type: none"> • The rating label should indicate required information and precautions. The precautions should be based on the information in section 2. | | | |
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| <p>10. Precautions for Designing of Electric Motor Cycles, the Chargers and the Battery Packs</p> <p>10-1. Precautions for Designing of Electric Motor Cycle and the Charger.</p> <p>(1) Charge</p> <ul style="list-style-type: none"> The battery is charged by a method of constant current-constant voltage. Regarding NCR18650PF, the charging current should not exceed 1.35A /cell. The charging voltage should not exceed 4.20V /cell. <p>The charging voltage is required to be set to less than 4.23V/cell with considering the accuracy of charger. Even if the charger is failed, the total safety shall be secured.</p> <ul style="list-style-type: none"> The charger shall be equipped with a pre-charge system. <p>If battery voltage goes down to less than 2.4V/cell, the battery should be charged by pre-charge current of maximum 0.27A. Once, the battery reached more than 3.0V/cell by the pre-charging, the charger can resume the standard charging method. However, if the battery voltage never recovers more than 2.4V/cell, the charger must be stopped and turned off.</p> <ul style="list-style-type: none"> The charger shall be equipped a full charge detection. <p>The charger shall detect the full-charged state by a timer, current detection or open circuit voltage detection. When the charger detects the full-charge, the charger shall stop charging. Do not apply the continuous charging (trickle charging) method.</p> <ul style="list-style-type: none"> The charging temperature range should be set between +10°C to +45 °C. <p>(2) Discharge</p> <ul style="list-style-type: none"> The discharge current should not exceed 10A/cell. The discharge temperature should be between -20°C to +60 °C. The discharge end voltage should be more than 2.5V/cell. <p>(3) Over discharge</p> <ul style="list-style-type: none"> Do not discharge the battery less than 2.0V/cell. <p>(4) Design of Electric Motor Cycles and chargers.</p> <ul style="list-style-type: none"> The cells should be kept away from heat generating electronic parts in order to avoid deterioration of battery performance. <p>10-2. Precautions for Battery Pack Design.</p> <p>(1) Shape, mechanism and material of battery packs</p> <ul style="list-style-type: none"> The battery pack should be designed so it does not connect with to unauthorized chargers. The battery pack should be designed so it cannot connect with unauthorized equipment and/or devices. The terminal shape should be designed to avoid short circuit issues. In addition, the battery pack should be equipped with an over current protection function in order to prevent from external short circuit issues. The terminal shape and structure should be designed so it does not connect in backwards. The battery pack should be designed to prevent static electricity, electrolyte or water ingress issues. | | | |
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| 6.6 Storage at Full Discharged State | After fully charged at 25°C, the battery is discharged by the Item 6.2.②. Then, the battery is stored for 10 days at 60 °C. After the storage, the battery is set in 25°C for 3 hours. Then, the discharge time is measured by Item 6.2.② at 25°C. | More than 48min. | |
| 6.7 Drop | After fully charged at 25°C, the cell is dropped 3 times in random direction from a height of 1 m onto a flat surface of concrete. | No rupture, no fire | |

STANDARD TEST CONDITIONS:

The testes shall be implemented with new batteries that were delivered within the last 7 days.

The tests shall be performed at 25±2 °C (The standard temperature of second grade is specified by JIS Z 8703 (Standard Test Conditions)), 65±20 % (The standard humidity of twentieth grade is specified by JIS Z 8703 (Standard Test Conditions)). The grade of voltmeter and ammeter in the tests shall be higher than Class 0.5 which is specified by JIS C 1102 (Electric Indicator).

7. Design and Dimensions

The battery design is shown in the following documents or drawings.
(Drawing No. TBD)

8. Appearance

The battery should not have the following appearance issues at delivery:

- Scratch
- Rust
- Discoloration
- Dirt
- Deformation
- Leakage

The battery should be in good condition.

9. Shipping Charge

The battery is shipped out with the approximately 48%* charged state.

*The 48% capacity is the condition in which SANYO ships the battery but it's not the condition when Shenzhen Syren Energy Technology Co.,Ltd. receives the battery.

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| Title | Specifications of Lithium Ion battery (Cylindrical Type) | page | 7/13 |
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| 6. Electrical Characteristics | | | |
| Items | Conditions | Criteria | |
| 6.1 Full Charge | The battery is charged with 1.35A constant current until the voltage reaches 4.20V. Then, the current is reduced in order to keep the constant voltage of 4.20V. The total charging time is 4.0 hours at 25 °C. | | |
| 6.2 Capacity | ① Within 1 hour, after fully charged at 25°C, the battery is discharged with 0.54A continuously until 2.5V of end voltage at 25°C. | More than 300min. | |
| | ② Within 1 hour, after fully charged at 25°C, the battery is discharged with 2.70A continuously until 2.5V of end voltage at 25°C. | More than 54min. | |
| 6.3 Cycle Life | The battery is repeated 300 times of Charge and Discharge cycles, (Charged by CC-CV of 1.35A-4.20V for 4.0 hours, Discharged by CC of 2.70A to 2.5V (E.V.)) at 25°C. After the 300 cycles, the discharge time is measured by the Item 6.2.②. | More than 38min. | |
| 6.4 Temperature Characteristics | ① Within 1 hour, after fully charged at 25°C, the battery is stored at 0 °C for 3 hours. After that, the discharge time is measured Item 6.2.② at 0 °C. | More than 30min. | |
| | ② Within 1 hour, after fully charged at 25°C, the battery is stored at 60 °C for 3 hours. After that, the discharge time is measured Item 6.2.② at 60 °C. | More than 50min. | |
| 6.5 Storage at Fully Charged State | After fully charged at 25°C, the battery is stored for 20 days at 60 °C. After the storage, the battery is set in 25°C for 3 hours. Then, the discharge time is measured Item 6.2.②. | More than 30min. | |
| | Then, the same battery is fully charged again and checked the second discharge time by the Item 6.2 ② at 25 °C. | More than 40min. | |
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3. Extent of the Application

This specification is applied to SANYO Lithium Ion Battery of NCR18650P-H03VA for Electric Motor Cycle with Shenzhen Syren Energy Technology Co.,Ltd..

For special applications in which quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or cause threat of personal injury such as for weapon, aircraft and aerospace equipment, aircraft electronics equipment, medical equipment (a part of class 2 equipment, class 3 or more equipment), or cause large-scale system troubles, explosion-proof equipment, this specification shall not be applied.

4. Battery Classification and Type

| | |
|----------------------------|---------------------------|
| 4.1 Battery Classification | SANYO Lithium Ion Battery |
| 4.2 SANYO Model No. | NCR18650P-H03VA |
| 4.3 Cell Type | NCR18650PF |

5. Nominal Specifications

| Items | | Specifications | Notes |
|-------|---|-----------------------|---|
| 5.1 | Rated Capacity | 2700mAh | 0.54A discharge at 20°C |
| 5.2 | Capacity | Minimum ^{※1} | 2750mAh |
| | | Typical | 2900mAh |
| 5.3 | Nominal Voltage | 3.6V | Reference only 0.54A discharge at 25°C |
| 5.4 | Discharging End Voltage | 2.5V | |
| 5.5 | Charging Current (Std.) | 1.35A | |
| 5.6 | Charging Voltage | 4.20±0.03V | |
| 5.7 | Charging Time (Std.) | 4.0 hours | |
| 5.8 | Continuous Discharging Current (Max.) ^{※2※3※4} | 10A | 0 ~ +40°C |
| 5.9 | Internal Resistance | less than 35mΩ | AC Impedance 1 kHz |
| 5.10 | Weight | less than 47.0g | |
| 5.11 | Operating Temperature | Charge | +10 ~ +45°C |
| | | Discharge | -20 ~ +60°C |
| 5.12 | Storing Conditions | less than 1 month | Percentage of recoverable capacity 80% ^{※5} |
| | | less than 3 months | |
| | | less than 1 year | |

※1 Nominal capacity is measured by the discharge at 0.54A until end voltage of 2.5V after fully charged at 25°C as described in the specification.

※2 Discharge at high rate or high temperature environment will accelerate the degradation of the battery capacity.

※3 The maximum discharge current for a single cell use. However after the battery pack assembly, there will be a limitation of maximum discharge current due to a protection circuit or a protection device.

※4 Maximum cell surface temperature :The cell temperature must not exceed 70°C

※5 Percentage of recoverable capacity

= (Discharging time after storage / Initial discharging time) ×100

The discharging time is measured by the discharge current of 0.54A until 2.5V of end voltage after the battery is fully charged at 25°C.

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| <div style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">! C a u t i o n</div> <ul style="list-style-type: none"> ● Use under Direct Sunlight Do not use or leave the battery in excessive heat such as in a car in direct sunlight. The battery may catch on fire, smoke, explode, or cause heat generation. Also, it might cause a deterioration of battery's characteristics and battery life. ● Static Electricity The battery pack has a protection circuit. Do not use the battery where it generates static electricity (more than 100V) that might damage the protection circuit. If the protection circuit is broken, the battery may catch on fire, smoke, explode, or cause heat generation. ● Charging Temperature Range Charging temperature range is regulated between 0°C and 45°C. Do not charge the battery out of the specified temperature range. Otherwise, it may cause heat generation, leakage or a serious damage. Also, it might cause deterioration of the battery's characteristics and battery life. ● Manual Please read the manual before usage. Please save the manual for future reference. ● Charging Method Please read the charger's manual for the charging method. ● First Time Use Please contact the supplier if the battery has unusual odor, heat generation or rusts during the first usage. ● Use by Children Parents must explain how to use the system and the battery. Please check back periodically to ensure children are using the system and the battery correctly. ● Inflammable Materials Please keep away from flammable materials during the charge and the discharge. It may catch on fire, smoke, explode, or cause heat generation. ● Leakage If electrolyte leak from the battery and adhere to the skin or clothes, immediately flush it with water. Otherwise, it may cause skin irritation. ● Insulation If lead wires or metal objects come out from the battery, please seal and insulate them completely. Otherwise, the battery may cause a short circuit and catch on fire, smoke, explode, or cause heat generation. ● Recycle Please recycle the battery according to local rules or regulations after use. | | | |
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| <div data-bbox="279 434 608 501" style="border: 1px solid black; padding: 5px; text-align: center; margin-bottom: 10px;">! W a r n i n g</div> <ul style="list-style-type: none"> ● Ingestion <i>"Keep away from infants"</i> The battery should be kept away from infants. In case of swallowing the battery, see a doctor immediately. ● Storing <i>"Do not put the battery in the microwave or other cooking appliances"</i> The battery may on fire, smoke, explode, or cause heat generation due to heat or the electrical impact from the microwave. ● Mixed Use <i>"Do not mix the battery with other batteries."</i> The battery should not be used with other batteries with different capacity, chemistry or manufacturer. Do not connect with other batteries or mix with other batteries. The battery may catch on fire, smoke, explode, or cause heat generation. ● Rust, Changing Color and Deformities <i>"Do not use abnormal batteries."</i> Please stop using the battery if there are noticeable abnormalities such as abnormal smell, heat, deformities, or discoloration. The battery may have a defect and may catch fire, smoke, heat generation or explode if used continuously. ● Charging Time <i>"Stop charging if the charging process cannot be finished."</i> If the battery can not finish the charging process within the specified time, please stop the charging process. The battery may catch on fire, smoke, explode, or cause heat generation. ● Leakage① <i>"Do not use a leaking battery near flames"</i> If the battery or liquid leaking from the battery has a pungent odor, the battery should keep away from flames. The battery may ignite and explode. ● Leakage② <i>"Do not touch a leaking battery"</i> If the liquid leaking from the battery gets into eyes, it will cause significant damage. If the leaking liquid gets into your eyes, please flush eyes immediately with pure water. Please consult a physician immediately. If the liquid remains in the eyes it will cause significant damage. ● Transport <i>"Pack the battery tightly during transport"</i> To prevent short-circuit or damages, please tightly pack the battery into a case or a carton box. | | | |
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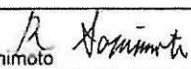
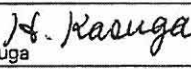
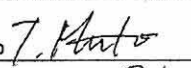

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| Title | Specifications of Lithium Ion battery (Cylindrical Type) | page | 3/13 |
|--|--|--|------|
| <ul style="list-style-type: none"> ● Inappropriate Use with Other Equipment <i>"Do not adapt the battery to unspecified applications."</i> If the battery is used for unspecified applications or systems, the battery may get damaged or catch on fire, smoke, explode, or cause heat generation. ● Incineration and Heat <i>"Please keep the battery away from heat and fire"</i> The battery materials will get damaged and may catch on fire, smoke, explode, or cause heat generation. ● Short-Circuit <i>"Do not make a short-circuit."</i> Do not connect the + and - terminals with conductive material. Do not carry or store the battery with metal objects (such as wire, necklace or hairpins). If the battery is in a short-circuit, excessive large current will flow and may catch on fire, smoke, explode, or cause heat generation. ● Impact <i>"Avoid unnecessary impact to the battery"</i> Unnecessary impact may cause the battery to leak, heat generation, smoke, fire or explode. Also, the protection circuit may break and that will lose the function of the battery's protection system. ● Penetration <i>"Do not penetrate with a nail or strike with a hammer"</i> The battery cell may get destroyed or damaged. And the battery's protection circuit may get damaged and cause an internal short-circuit. Additionally, the battery may catch on fire, smoke, explode, or cause heat generation. ● Soldering <i>"Do not directly solder the battery"</i> The insulator could melt or the gas release vent might get damaged from the heat. Additionally, the battery may catch on fire, smoke, explode, or cause heat generation. ● Disassemble and Reconstruction <i>"Do not disassemble the battery"</i> If the protection circuit gets damaged, the battery will not be protected. Then, the battery may catch on fire, smoke, explode, or cause heat generation. ● Charge near High Temperatures <i>"Do not charge the battery near high temperatures"</i> If the battery is charged near high temperatures, the battery may not be able to charge due to the activation of the protection circuit. In these conditions, the protection circuit may break and the battery may catch on fire, smoke, explode, or cause heat generation. | | | |
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| | | | |
|--|--|--|------|
| Title | Specifications of Lithium Ion battery (Cylindrical Type) | page | 2/13 |
| 2. Safety Instructions Prohibited Actions <p>The cell contains flammable objects such as organic solvents. If the battery is mishandled, it may cause fire, smoke or an explosion and the battery's functionality will be seriously damaged. Please read and check the following prohibited actions. Also, please equip a protection in the application so the application troubles don't affect the battery. Additionally, SANYO highly recommends embedding these instructions into the owner's manual.</p> <div style="border: 1px solid black; padding: 5px; text-align: center; margin: 10px 0;"> ! D a n g e r </div> <ul style="list-style-type: none"> ● Immersion <i>"Do not immerse the battery with liquid such as water, sea water or soda."</i> If the protection circuit in the battery is broken with liquid, the battery cannot be protected and may on fire, smoke, explode, or cause heat generation. by unexpected electrical load. ● High Temperature <i>"Do not use or place the battery near fire, a heater or a high temperatures (more than 80°C)."</i> The battery's polyolefin separator may get damaged from the heat and could cause an internal short circuit. This may cause the battery to catch on fire, smoke, explode, or cause heat generation. ● Charger and Charge Condition <i>"Do not use unauthorized chargers."</i> If the battery is charged under unacceptable conditions (For example: usage in restricted temperature ranges, over voltage, or over current with unauthorized chargers) the battery may catch on fire, smoke, explode, or cause heat generation. ● Reverse Polarity <i>"Do not force a reverse-charge or a reverse-connection."</i> The battery has correct polarity. If the battery doesn't fit, please check the battery's orientation and do not force into the battery mount. If the battery is forced to set with a different polarity, the battery may catch on fire, smoke, explode, or cause heat generation. ● Direct Connection <i>"Do not connect the battery with AC plug (outlet) or car plugs."</i> The battery requires a specific charger. If the battery connects with the outlet directly, the battery may catch on fire, smoke, explode, or cause heat generation. | | | |
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| | | | | | |
|---|--|--|-------------------|------|---|
| Title | Specifications of Lithium Ion battery (Cylindrical Type) | | | page | 1/13 |
| 1. Publication Record | | | | | |
| No. | Date | Class | Items | | |
| (0) | 2013/3/25 | — | Issue (Tentative) | Dft. | R. Gomimoto  |
| | | | | Chk. | H. Kasuga  |
| | | | | Chk. | T. Muto  |
| | | | | App. | A. Watanabe  |
| | | | | Dft. | |
| | | | | Chk. | |
| | | | | Chk. | |
| | | | | App. | |
| | | | | Dft. | |
| | | | | Chk. | |
| | | | | Chk. | |
| | | | | App. | |
| | | | | Dft. | |
| | | | | Chk. | |
| | | | | Chk. | |
| | | | | App. | |
| *Key to Class abbreviations : A for Added, D for Deleted, R for Revised | | | | | |
| File No. | NCR18650-281 | Energy Company, SANYO Electric Co., Ltd. Smart Energy Systems Business Unit | | | |

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| 9. Shipping Charge | 8 |
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TENTATIVE

File No. NCR18650-281

Issue Date: 2013/3/25

**SANYO LITHIUM ION
BATTERY SPECIFICATION**

BATTERY CLASSIFICATION LITHIUM ION BATTERY

BATTERY TYPE NCR18650P-H03VA

CLIENT Shenzhen Syren Energy Technology Co., Ltd.

【 The client's agreement 】

Signature: _____

Name in block letters: _____

Date: _____

*If there is no reply within 30 days after the delivery, This document shall be presumed valid.

Energy Company of Panasonic Group
Energy Company, SANYO Electric Co., Ltd.

Smart Energy Systems Business Unit
Market Development Group
EV Battery Market Development Team

| | |
|------|--------------------|
| Dft. | <i>R. Honimh</i> |
| Chk. | <i>H. Kasuga</i> |
| Chk. | <i>T. Muto</i> |
| App. | <i>[Signature]</i> |

- Forbidden to use modified or damaged charger. /禁止使用改装或已损坏的充电器。
- Forbidden to charge over 24 hours for battery. /禁止充电超过 24 小时。
- Charge current: can not surpass the biggest charge current specified by battery specification.
充电电流：不能超过在规格书规定的最大充电电流。
- Charge voltage: can not surpass the highest charge voltage specified by battery specification.
充电电压：不能超过在规格书规定的最高电压。
- Charge temperature: The battery should be charged within proper temperature range specified in specification. 充电温度：电池必须在规格书规定的环境温度范围内进行充电。
- Forbidden of reverse charge: The battery should be connected correctly, the polarity has to be confirmed before wiring in case of the battery is connected improperly, the battery can not be charge. Simultaneously, the reverse charge may cause damaging to the battery which may lead to deGLadation of battery performance and damage the battery safety, and could cause heat generation or leakage.
禁止反充：电池应当正确连接，配线前就要确认极性，万一连接不正确，电池将不能充电。同时，反充可能会损坏电池，会导致电池性能下降，破坏电池安全性，还可能导致发热或泄漏。

8.3 Discharge/放电:

- Discharge current: can not surpass the biggest discharge current specified by battery specification.
放电电流：不能超过在规格书规定的最大放电电流。
- Discharge temperature: The battery should be discharged within proper temperature range specified by specification.
放电温度：电池必须在规格书规定的环境温度范围内进行放电。
- Over-discharge: it should be noted that the battery would be at over-discharged state by its self-self-discharge characteristics in case the battery is not used for long time. To prevent over-discharge, the battery shall be charged periodically to maintain between 25.2V and 25.9V.
过放：需要注意的是，在电池长期未使用期间，它可能会因其自放电特性而处于某种过放电状态。为防止过放电的发生，电池应定期充电，将其电压维持在 25.2V 到 25.9V 之间。

8.4 Disposal/处置:

The disposal of battery should meet the local law.
电池的处理应当符合当地法律。

9. Warranty Period /保质期

Unless special declaration in product specification, the warranty period of battery is 12 months from the day of battery manufacture.

除在产品规格书中特别声明，电池保质期自制造之日起 12 个月内有效。

10. Note/注释

Any other items which are not covered in this specification shall be agreed with both parties.
任何其他不包括在本规范的项目，应由双方协商决定。

6.5 Parts list/元器件清单

| 序号 NO. | 物料名称/供应商 Description/vendor | 代号 Symbol | 型号/规格 Model/Spec. | 单位 unit | 数量 Q'ty | 备注 |
|-----------|--------------------------------|---------------------------------|---|------------|------------|----|
| 1 | 贴片 IC/SH | U1 | SH367007-AAC, TSSOP-28L | PCS | 1 | |
| 2 | 贴片 MOS | Q2 Q5 Q7 Q9 Q18 Q19 Q24 ~ 31 | SSF6808/硅能, TO-252 (备选) NCE6080K/新洁能, TO-252 | PCS | 16 | |
| 3 | 贴片电阻/大毅 | R24-2 R24-5 R24-6 R24-7 | 2512, 0.010Ω, ±1%, 2W | PCS | 4 | |
| 4 | NTC/ZL | R31 | ZL103JCXH070(电子线 70mm) 10K+/-5% B3435 | PCS | 1 | |
| 5 | 温控开关/BK | F1 | BW-BCP 常开 65 度 线长 70mm 普通型 15*7*3.5 | | | |
| 6 | PCB | PCB | JH22A2324ND0, 双层无铅喷锡, 120*50*1.6mm; 白字蓝油。 | PCS | 1 | |

7. Storage and Transportation/储存和运输

7.1 Storage/储存:

- The Li-ion battery should be stored in a cool, dry and well-ventilated area, and should be far from the fire and the high temperature.
锂离子电池组应储存在阴凉、干燥、通风良好的地方。并应远离火和高温。
- The best capacity in storage is 30%-50% (voltage between 25.2-25.9V).
保持储容量最好是在 30%-50% (在 25.2-25.9V 之间的电压)。
- The battery should be stored within the proper temperature and humidity range specified by specification.
电池应储存在产品规格书规定的温度和湿度范围内。
- If stored for more than six months or longer, the battery will be suggested to charge.
如果电池存放时间超过六个月以上或更长, 建议对电池进行充电。

7.2 Transportation/运输:

- Forbidden to mix battery with other goods. /禁止将电池与其他货物混装。
- Forbidden to immerse battery into liquid such as water or soak it with liquid. /禁止将电池浸入水中或弄湿。
- Forbidden to deposit battery over 1.5meters or upside-down. /禁止电池堆放超过 1.5 米或倒立。
- The highest temperature during battery transportation should be lower than 60℃. /电池运输过程中最高温度应低于 60℃。

8. Use Attentions/使用注意事项

Because the lithium-ion battery is packed in soft package, to ensure its better performance, it's very important to carefully handle the lithium-ion battery./由于锂电池属于软包装, 为保证电池的性能不受损害, 必须小心对电池进行操作。

8.1 Attentions /注意事项

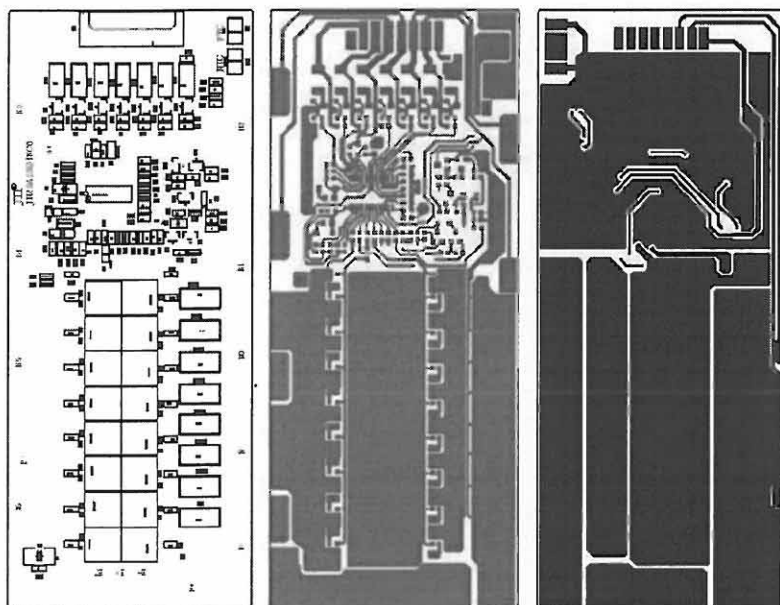
- Avoid insolation or dropping into fire. /避免暴晒或投入火中。
- Avoid shorting the battery. /避免将电池短路。
- Avoid excessive physical shock or vibration. /避免电池过度冲击或振动。
- Don't disassemble or deform the battery. /不得拆卸或扭曲电池
- Don't immerse in water. /不得浸入水中
- Don't use the battery mixed with other model or manufacturer batteries.
不要与其他型号或品牌的电池混合使用。
- Battery usage by children should be supervised. /儿童使用电池应受到监督。

8.2 Charge/充电

- Battery charge should be used appropriate charger. /电池充电必须使用专用的充电器。

| 项目 | 条件 | Min. | Typ. | Max. | Unit |
|---|--------------------------|--------|--------|--------|------|
| [检测电压]（当电池组中任意一节电池达到以下电压规格时， 电池组将执行对应保护动作） | | | | | |
| 过充保护电压 | 25℃/0. 2C ₅ A | 4. 225 | 4. 250 | 4. 275 | V |
| 过充解除电压 | 25℃/0. 2C ₅ A | 4. 100 | 4. 150 | 4. 200 | V |
| 过放保护电压 | 25℃/0. 2C ₅ A | 2. 650 | 2. 700 | 2. 750 | V |
| 过放解除电压 | 25℃/0. 2C ₅ A | 2. 900 | 3. 000 | 3. 100 | V |
| [延迟时间] | | | | | |
| 过充保护延迟时间 | 25℃/0. 2C ₅ A | 0.5 | 1.0 | 1.5 | s |
| 过放保护延迟时间 | 25℃/0. 2C ₅ A | 0. 5 | 1. 0 | 1. 5 | s |
| 过电流保护延迟时间（一级） | 25℃/3.6V | 18.0 | 22.0 | 26.0 | s |
| 过电流保护延迟时间（二级） | 25℃/3.6V | 1.0 | 2.5 | 5.0 | s |
| 短路保护延迟时间 | 25℃/3.6V | 200 | 250 | 300 | us |
| 短路保护解除条件 | 断开负载 | | | | |
| [阻值] | | | | | |
| 保护板内阻 | 25℃/3.6V | / | 55 | 85 | mΩ |
| [电流参数] | | | | | |
| 静态电流 | 25℃/3.6V | / | 15 | 40 | uA |
| 充电过电流保护电流 | | 6 | 8 | 10 | A |
| 放电过电流保护电流（一级） | 25℃/3.6 V | 39 | 45 | 46 | A |
| 放电过电流保护电流（二级） | 25℃/3.6 V | 50 | 55 | 60 | A |
| 持续电流 | 25℃/3.6V | / | | 38 | A |
| [平恒参数] | | | | | |
| 平恒启动电压 | 25℃ | 4. 155 | 4. 180 | 4. 205 | V |
| 平恒恢复电压 | 25℃ | 4. 145 | 4. 170 | 4. 195 | V |
| 平恒电流 | 25℃/3. 9V | 20 | 30 | 40 | mA |
| 温度参数 | | | | | |
| 充电保护温度 | | 46℃ | 50℃ | 54℃ | ℃ |
| 放电保护温度 | | 61℃ | 65℃ | 69℃ | ℃ |

6.4SMT drawing/贴片图



| | | | |
|---|---|--|--|
| 1 | Appearance 外观 | By sight 目测 | No flaw, crack, rust, leakage. 无凹陷、裂纹、锈蚀、渗漏等缺陷。 |
| 2 | Open-Circuit Voltage 开路电压（出货 电压） | The open-circuit voltage shall be measured within 24 hours after standard charge. 开路电压是在标准充电后 24 小时内测量。 | $\geq 24.5V$ |
| 3 | Impedance 内阻 | AC Impedance Resistance 交流阻抗电阻 | $\leq 200m\Omega$ |
| 4 | Nominal Capacity 额定容量 | 0.2CA discharge 0.2CA 放电容量 | Discharge Capacity/放电容量 $\geq 11.0Ah$ |
| 5 | Cycle Life 循环寿命 (0.2 CsA) | Test condition: temperature: 测试条件: 温度: $23\pm 5^{\circ}C$ First step: 0.2C CC/CV to 29.4V 第 1 步: 0.2C 恒流恒压充电至 29.4V Second step: Static 10 min 第 2 步: 静置 10 分钟 Third step: 0.2C CC to 19.4V. 第 3 步: 0.2C 恒流放电至 19.4V Fourth step: Static 10 min 第 4 步: 静置 10 分钟 Fifth step: Repeat first step to fourth step 300cycles, record 300cycle then compare with first cycle value. 第 5 步: 重复第 1 步至第 4 步 300 次, 记录 300 周循环后容量与第 1 次循环容量的比值. Sixth step: end 第 6 步: 结束 | Higher than 80% of the Initial Capacities of the Cell 高于 80% 的电池初始容量 |

5.3 Safety Performance/安全性能

GLEE product's safety performance is confirmed to GB_31241-2014 standard.

格力新能源产品安全性能遵循 GB_31241-2014 标准。

6. PCM Specification/保护板规格

6.1 Environment request/环境要求: RoHS.

6.2 Function description/功能描述:

Over charge protection, Over discharge protection, Over current protection, Short circuit protection

过充电保护, 过放电保护, 过电流保护, 短路保护

6.3 Electric features/电气特性

| | | | |
|----|---|--|------------------------------|
| 4 | Max. Charge Voltage/最大充电电压 | 29.4V | |
| 5 | AC Impedance /电池阻抗 | ≤200 mΩ | AC 1KHz |
| 6 | Standard Charge/标准充电 | 0.2C/2200mA CC/CV→ 0.01C/110mA cutoff | Charge time/充电时间: 约 6.0h. |
| 7 | Standard Discharge/标准放电 | 0.2C/2200mA CC→19.4V cutoff | |
| 8 | Fast Charge/快速充电 | 5000mA CC/CV → 0.01C/110mA cutoff | Charge time/充电时间: 约 4h. |
| 9 | Maximum Continuous Charge Current/ 最大持续充电电流 | 5000mA | |
| 10 | Over-Current Charge Protection /充电 保护电流 | 6A~10A | |
| 11 | Charging Temperature Protection / 充电保护温度 | 50℃±4 | |
| 12 | Maximum Continuous Discharge Current/最大持续放电电流 | ≤38A | |
| 13 | Over-Current Discharge Protection (OCDP1)/放电过流保护 (1 级) | 39~49A | 18~26S |
| 14 | Over-Current Discharge Protection (OCDP2)/放电过流保护 (2 级) | >50A | 1~5S |
| 15 | Discharging Temperature Protection /放电保护温度 | 65℃±4 | |
| 16 | 自耗电 Normal current consumption | 50uA (MAX) | |
| 17 | Operation Temperature Range 工作温度范围 | Charge 充电: 0~45℃ | Humidity /湿度 60±25% |
| | | Discharge 放电: -20~50℃ | |
| 18 | Storage T/H Range 存储温度、湿度范围 | 20~35℃/60±25% | |
| 19 | Weigh/重量 | Approx/大约:1900g | |
| 20 | Product Dimension/ 产品尺寸 | 长度 Length:243.8max | Initial dimension 初始尺寸 |
| | | 宽度 Width: 89.7max | |
| | | 厚度 Thickness: 90.5max | |

5. Product Performance/产品性能.

5.1 Standard Testing Conditions/标准测试环境

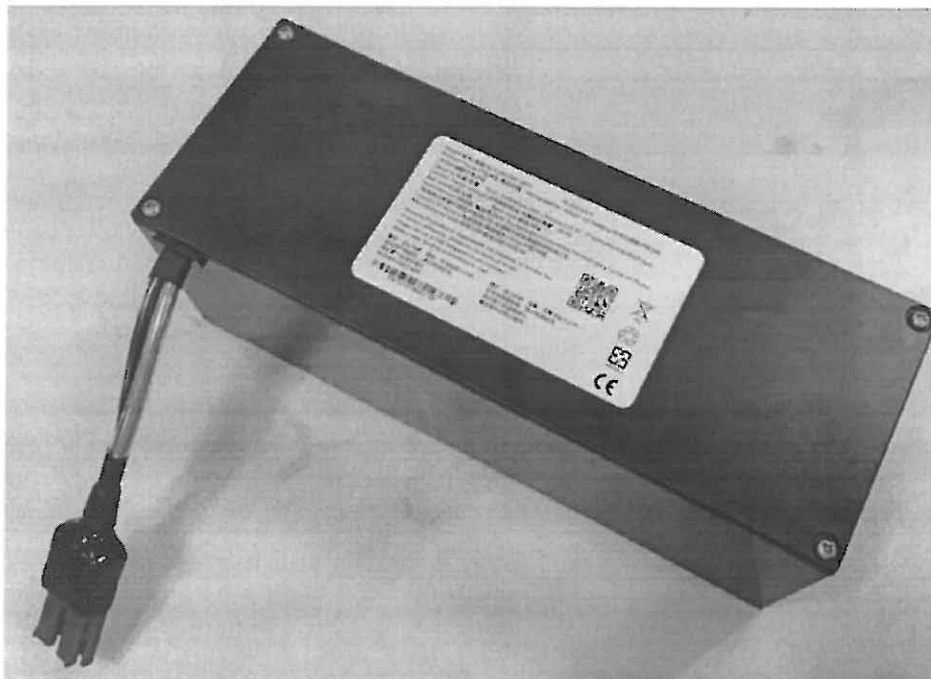
Temperature/温度: 25±5℃

Humidity Range /湿度: 25 ~ 85% 范围内进行。

5.2 Test method and request/检测方法 with 要求

| No. 序号 | Items /项 目 | Test Method /检测方法 | Request/要 求 |
|-----------|------------|-------------------|-------------|
|-----------|------------|-------------------|-------------|

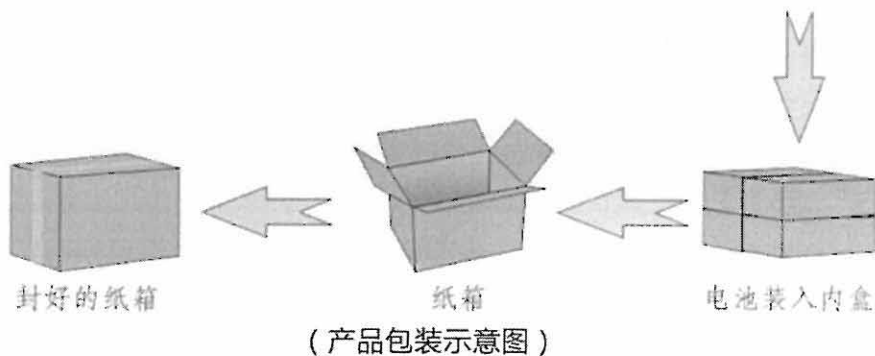
实物图片



注：
 塑胶原料符合 94V-0 防火等级，外壳满足 94V-2 防火等级。电池成品不得私自拆卸，不得浸水，如有拆卸，浸水，成品电池不在保修范围内。电池外壳内部需打胶固定。

打包图

备注：1PCS 电池装 1 个内箱，
 1 个外箱装 4 个内箱，共 4PCS 电池/外箱。
 重量大概 9kg
 内箱尺寸长 255*宽 120*高 105
 外箱尺寸长 270*宽 260*高 250



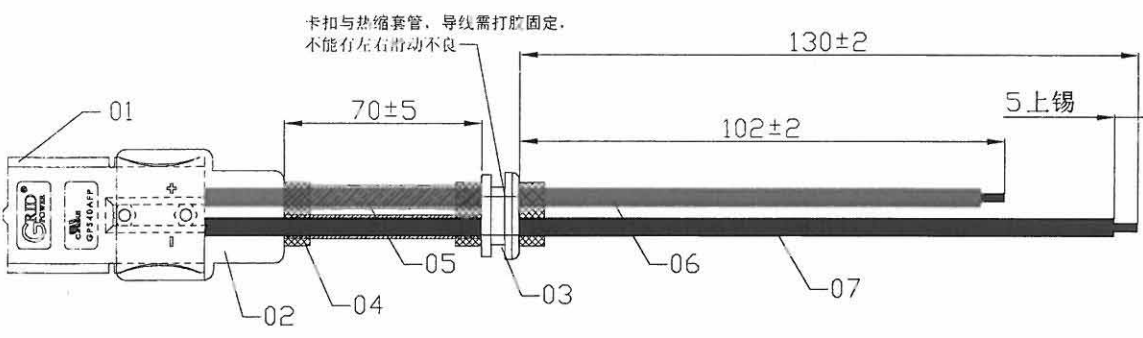
4.Product Specification/产品规格

Table 1

| No. 序号 | Items/项目 | Rated Performance/额定性能 | Remarks/备注 |
|-----------|-----------------------------|---------------------------|--|
| 1 | Capacity/容量 | 11.0AH (min) ,11.6Ah(typ) | Discharge at 0.2C ₅ A after standard charge fully. 按 0.2C ₅ A 标准完全放电。 |
| 2 | Nominal Voltage/标称电压 | 25.2V | |
| 3 | Standard Discharge/标准放电限制电压 | 19.4V | |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|------|--|----|----|------|------|----|----|-----------|------|-------------------|----------------|---------------------|------|-------------------|----------------|---------------------|----|-----|-----|----|---|-----|-----|---|
| 1 | 2 | 3 | 4 | | | | | | | | | | | | | | | | | | | | | |
| A |  | | | A | | | | | | | | | | | | | | | | | | | | |
| B | <p>条码规格: SN/201810000001 SN/固定不变, 201810为生产日期, 以实际生产日期为准 000001为六位流水码, 10进制排列, 不得重码。</p> <p>二维码内容: GR NCR18650PF-4P7S 25.2 11600 2018 10 1. GR代表格力能源环境技术有限公司 2. NCR18650-4P7S为电池型号 3. 25.2, 电池标称电压为25.2V 4. 11600, 电池容量为11600mAh 5. 2018 10为生产年月, 如此类推</p> <p>技术要求:</p> <ol style="list-style-type: none"> 1、材料: 消银龙, 覆膜, 单面背胶, 强粘; 2、颜色: 银底黑字; 3、尺寸: L100.0×W60.0×T0.1±0.2mm 4、外观: 不可有油污、露线、斑点、色差等印刷缺陷; 5、SN码及条形码: Code128, 600dpi条形码, 扫描枪可正常识别。条码内容不得出现重复。 6、符合ROHS要求。 | | | B | | | | | | | | | | | | | | | | | | | | |
| C | <p>检测标准:</p> <ol style="list-style-type: none"> 1、标签材料要符合RoHS, 重量必须达标。 2、文字要清晰, 不能有重影, 整体画面平整, 不能有气泡, 无划痕。 3、耐刮性: 用5H以上的酒精棉球擦拭表面, 50g的力垂直擦拭15次(一个来回为一次), 要求文字清晰无变化, 能正常识别。 4、耐磨性: 用84C酒精擦拭175g的力垂直擦拭15次(一个来回为一次), 进行3次后, 要求文字清晰无变化。 5、耐水性: 将样品放入100℃水中, 浸泡24小时后取出, 要求文字清晰无变化。 6、耐弯折性: 将样品放入100℃水中, 浸泡24小时后取出, 要求文字清晰无变化。 | | | C | | | | | | | | | | | | | | | | | | | | |
| D | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">项目名称</td> <td style="width: 20%;">物料编码</td> <td style="width: 20%;">日期</td> <td style="width: 20%;">设计</td> <td style="width: 20%;">审核</td> <td style="width: 20%;">批准</td> <td style="width: 20%;">版本</td> <td style="width: 20%;">A0</td> <td style="width: 20%;">1000~2000</td> <td style="width: 20%;">±2.0</td> <td style="width: 20%;">名称: 18650-4P7S 标签</td> <td style="width: 20%;">物料代码: 11100044</td> <td style="width: 20%;">文件编号: Q/NHJ11100044</td> <td style="width: 20%;">件数</td> <td style="width: 20%;">单位</td> <td style="width: 20%;">比例</td> <td style="width: 20%;">mm</td> <td style="width: 20%;">无</td> <td style="width: 20%;">共 张</td> <td style="width: 20%;">第 张</td> </tr> </table> | | | 项目名称 | 物料编码 | 日期 | 设计 | 审核 | 批准 | 版本 | A0 | 1000~2000 | ±2.0 | 名称: 18650-4P7S 标签 | 物料代码: 11100044 | 文件编号: Q/NHJ11100044 | 件数 | 单位 | 比例 | mm | 无 | 共 张 | 第 张 | D |
| 项目名称 | 物料编码 | 日期 | 设计 | 审核 | 批准 | 版本 | A0 | 1000~2000 | ±2.0 | 名称: 18650-4P7S 标签 | 物料代码: 11100044 | 文件编号: Q/NHJ11100044 | 件数 | 单位 | 比例 | mm | 无 | 共 张 | 第 张 | | | | | |

插头线:



| | | | | |
|----|---------------|----------------------------|---|--|
| 07 | 黑线/Black Wire | 3135#12硅胶线 | 1 | |
| 06 | 红线/Red Wire | 3135#12硅胶线 | 1 | |
| 05 | 透明套管 | | 2 | |
| 04 | 黑色热缩套管 | | 2 | |
| 03 | 卡扣 | HJ-180855 | 1 | |
| 02 | 黑色护套 | GPS40黑色护套(需印有V0字样) | 1 | |
| 01 | 插头/Connector | GPS40AFP-G3011G2 红色/S361G2 | 1 | |

技术要求:

- 1 所用材质需符合RoHS要求
- 2 接线方式见图, 端子接线处需牢固
- 3 公插与母插需配合良好
- 4 各导线之间长度公差±2
- 5 每条线外露导体上锡量为5±1mm

| | | | | |
|--------------------|-----------------------|-------------------------------|--------|------------|
| 序号/No. | 零件名称/Part appellation | 型号/Model | 数量/Qty | 图号/Dwg No. |
| ※※以上物料均需符合ROHS要求※※ | | | | |
| 设计 | 样品确认 | 物料代码: 13410057 GPL45插头 | | |
| 绘图 | 复核 | | | |
| 审核 | 版本 | | | |
| 批准 | 日期 | | | |

| | | |
|------------------------|----|-------|
| 珠海格力能源环境技术有限公司 GREE | | |
| 单位 | 重量 | 比例 |
| mm | | 1:1.5 |
| 第 1 张 | | |
| Q/NHJ13410057 | | |

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AMENDMENT RECORDS

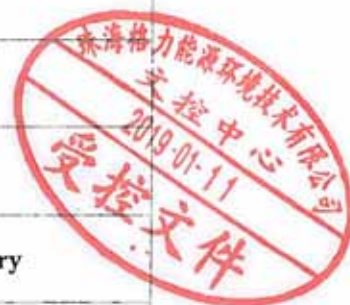
修改记录

[illegible]

Lithium Ion Battery Specification

锂离子电池规格书

| | |
|-----------------------------|-----------------------|
| 文件编号 File No | Q/NHJ0212CH1302810013 |
| 文件版本 Version | A0 |
| 制订日期 Date | 2019-01-07 |
| 客户名 Customer's Name | CH130281 |
| 产品类别 Production Type | Lithium Ion Battery |
| 产品型号 Production Model | NCR18650PF-4P7S |
| 制 订 Draft | 柯德可 |
| 审 核 Checked | 杜玉 |
| 批 准 Approved | 冯锦深 |
| 质控 批准 QC Approved | 彭 斌 |
| 客户确认 Customer's Approval | |



| 文件下发受控部门 | | | | | | | |
|----------|-----|---------------|-----|--------|-----|--|--|
| 文控: | 1 份 | PACK 车间 IPQC: | 1 份 | 技术工艺部: | 1 份 | | |

Note (注意):

1. Kindly please sign specification back to us, if the sample has been approved.
如果样品已确认, 请回签规格书给我司。
2. Kindly please contact us as soon as possible if the sample has not been approved. Thanks!
如果样品未确认, 请尽快与我司联系, 谢谢!



Tel: +86-756-2609776 Fax: +86-756-2609756

Add: No.6 Huaguan Road, Jinding Technology Industrial Park, Zhuhai, Guangdong, China

地址: 广东省珠海市金鼎科技工业园华冠路 6 号

2019-01-16