

Material Safety Data Sheet

材料安全数据表

Section 1 - Identification (of the product/manufacturer/undertaking)

第一部分 产品、制造商及使用识别

Product Name: Lithium Ion Battery

产品名称: 可充电锂离子电池组

No	Product model/产品型号	Capacity/容量	Nominal Voltage 标称电压
1	CL2543-6S1P-01A	4000mAh	21.6V

Manufacturer's Name: Suzhou Taiding Intelligent Technology Co., Ltd

制造商名称: 苏州泰鼎智能科技有限公司

Address: 187# Shengxin Road, Wujiang, Suzhou Jiangsu Province, China

地址: 江苏省苏州市吴江胜信路 187 号

Postal Code: 215000 邮政编码: 215000

Manufacturer's Name: Taiding Innovation Energy(Zhejiang) Co., Ltd

制造商名称: 泰鼎新能源(浙江)有限公司

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Recommended Use: Used in portable electronic equipment's

推荐使用: 用于便携式电子设备

Uses advised against: 限制使用:

a) Do not dismantle, open or shred secondary cells or batteries.

不可随意将电池或电池组拆开、解体。

b) Do not expose cells or batteries to heat or fire. Avoid storage in direct sunlight.

不可将电池或电池组置于高温环境或火焰之中。不可将电池或电池组置于阳光下暴晒。

c) Do not short-circuit a cell or a battery. Do not store cells or batteries haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects.

不可短路电池或电池组。请勿将电池或电池组存放于杂乱的箱柜之中, 以防其相互短路或被金属物品短路。

d) Do not remove a cell or battery from its original packaging until required for use.

在需要使用之前, 不要将电池或电池组从其原始包装中拆出。

e) Do not subject cells or batteries to mechanical shock.

不可对对电池或电池组进行机械冲击。

f) In the event of a cell leaking, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.

如果发生电池漏液, 请勿让液体接触皮肤或眼睛。一旦发生接触, 请立即用大量清水冲洗接触区域, 并求医救助。

g) Do not use any charger other than that specifically provided for use with the equipment.

请勿使用非原装适配的充电器。

h) Observe the plus (+) and minus (-) marks on the cell, battery and equipment and ensure correct use.

清楚地识别在电池、电池组或设备上的正 (+) 负 (-) 极标识, 确保正确使用。

i) Do not use any cell or battery which is not designed for use with the equipment.

请勿使用非原装电池或电池组。

j) Do not mix cells of different manufacture, capacity, size or type within a device.

不可对不同制造商生产的电池，或尺寸、容量、型号不一致的电池混装使用。

k) Battery usage by children should be supervised.

儿童在受监督下方可使用。

l) Seek medical advice immediately if a cell or a battery has been swallowed.

如果发生电池或电池组被吞咽，请立即就医。

m) Always purchase the battery recommended by the device manufacturer for the equipment.

请勿使用非原装适配的充电器。

n) Keep cells and batteries clean and dry.

请保持电池及电池组清洁干燥。

o) Wipe the cell or battery terminals with a clean dry cloth if they become dirty.

如果电池或电池组连接端脏污，请用清洁的干布擦拭。

p) Secondary cells and batteries need to be charged before use. Always use the correct charger and refer to the manufacturer's instructions or equipment manual for proper charging instructions.

二次电池和电池组在使用前需要充电，请务必使用正确的充电器。并参考制造商说明或设备手册，了解正确的充电说明。

q) Do not leave a battery on prolonged charge when not in use.

电池组不用时请勿长时间充电。

r) After extended periods of storage, it may be necessary to charge and discharge the cells or batteries several times to obtain maximum performance.

在电池或电池组超过储存延长期后，请对电池或电池组进行几次充放电以保证电池的性能。

s) Retain the original product literature for future reference.

请注意保留产品文件资料以备后续使用。

t) Use only the cell or battery in the application for which it was intended.

请购买设备制造商推荐的电池或电池组。

u) When possible, remove the battery from the equipment when not in use.

如果可以，在电池组长时间不用时建议从设备中取出。

v) Dispose of properly. 合理地处置废弃电池。

Section 2 - Hazards Identification

第二部分：有害物质鉴定

·Substance or mixture in Li-ion battery: 锂离子电池组的构成物质

Aluminum (Al) 铝

Copper (Cu) 铜

Lithium Cobaltate (LiCoO₂) 钴酸锂

Graphite 石墨

Electrolyte 电解液

Lithium hexafluorophosphate 六氟磷酸锂

Solvent 溶剂

Substances above are not on the list of SVHC29 and are non-hazardous.

以上物质不在 SVHC29 种高关注物质清单内，所以无危险性。

Section 3 - Composition, Information on Ingredients

第三部分：成份特点(圆柱电芯)

化学成份 Chemical composition	CAS 号 CAS No.	重量百分比 in % by weight
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Lithium Nickel Cobalt Manganese Oxide / 镍钴锰酸锂	182442-95-1	38.52
炭黑 Carbon Black	1333-86-4	1.23
聚偏氟乙烯树脂 Polyvinylidene fluoride(PVDF)	24937-79-9	0.73
石墨 Graphite	7782-42-5	20.45
羧甲基纤维素钠 Carboxymethyl cellulose	9004-32-4	0.32
聚苯乙烯丁二烯共聚物 Styrene butadiene rubber	9003-55-8	0.42
铝箔 Aluminum foil	7429-90-5	4.42
铜粉 Copper foil	7440-50-8	8.95
聚乙烯 Polyethylene	9002-88-4	2.32
六氟磷酸锂 Lithium hexafluorophosphate	21324-40-3	2.5
碳酸乙烯酯 Ethylene carbonate	96-49-1	5.79
碳酸二甲酯 Dimethyl carbonate	616-38-6	8.31
碳酸甲乙酯 Ethyl methyl carbonate	623-53-0	2.36
聚丙烯 Polypropylene	9003-07-0	0.33
聚对苯二甲酸乙二醇酯树脂 Poly(ethylene terephthalate)	25038-59-9	1.83
其它 Other	/	1.52
铅 Lead	7439-92-1	无 Not Detected
镉 Cadmium	7440-43-9	无 Not Detected
汞 Mercury	7439-97-6	无 Not Detected
合计 Total	-	100

成份特点(软包电芯)

化学成份 Chemical composition	CAS 号 CAS No.	重量百分比 in % by weight
Lithium Nickel Cobalt Manganese Oxide / 镍钴锰酸锂	182442-95-1	34.73%
石墨 Graphite	7782-42-5	25.05%
铜箔 Copper foil	7440-50-8	8.65%
碳酸甲乙酯 Ethyl methyl carbonate	623-53-0	8.03%
铝箔 Aluminum foil	7429-90-5	6.17%
碳酸乙烯酯 Ethylene carbonate	96-49-1	3.48%
六氟磷酸锂 Lithium hexafluorophosphate	21324-40-3	2.61%
碳酸二乙酯 Diethyl carbonate	105-58-8	2.61%
聚乙烯 Polyethylene	9002-88-4	1.75%
氧化铝 Aluminium oxide	1344-28-1	1.20%
聚对苯二甲酸乙二醇酯树脂 Poly ethylene	25038-59-9	0.90%
炭黑 Carbon Black	1333-86-4	0.79%
其它 Other	/	0.64%
勃姆石 AlOOH	1318-23-6	0.64%
聚丙烯 Polypropylene	9003-07-0	0.55%
聚偏氟乙烯树脂 Polyvinylidene fluoride(PVDF)	24937-79-9	0.54%
聚苯乙烯丁二烯共聚物 Styrene butadiene rubber	9003-55-8	0.51%
尼龙 Polyamide (PA)	25038-54-4	0.40%

羧甲基纤维素钠 Carboxymethyl cellulose	9004-32-4	0.36%
碳纳米管 carbon nanotubes(CNT)	16291-96-6	0.22%
碳酸亚乙烯酯 Vinylene Carbonate	872-36-6	0.17%
铅 Lead	7439-92-1	无 Not Detected
镉 Cadmium	7440-43-9	无 Not Detected
汞 Mercury	7439-97-6	无 Not Detected
合计 Total	-	100

• trade secret claims.

•商业保密声明

Because chemical composition involving company technology, the component ratio listed is an approximation, and for some trace amounts of harmful components not listed.

因化学成分涉及公司技术，故所列组分比例均为近似值，且对一些极微量的不对人体有害的组分未列出。

Section 4 - First Aid Measures

第四部分：急救措施

•Inhalation: Make the victim blow his/her nose, gargle. Seek medical attention if necessary

吸入：让受害者擤鼻子，漱口，必要时寻找医药救助

• Skin contact: Remove contaminated clothes and shoes immediately. Immediately wash extraneous matter or contact region with soap and plenty of water.

皮肤接触：立即脱去受污染的衣服和鞋子。立即用肥皂和大量的水清洗外部受污皮肤。

• Eye contact: Do not rub eyes. Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention.

眼睛接触：不要揉眼睛。立刻用水不断的冲洗眼部至少 15 分钟。寻找医药救助。

A battery/ cell spilled internal cell materials

电池组/电池内部的物质溢出

•Ingestion: Make the victim vomit. Immediately seek medical attention.

摄入：使食入者立即呕吐。并立即寻找医药救助。

Section 5 - Fire Fighting Measures

第五部分：消防扑救方法

•Suitable extinguishing media: Plenty of water, carbon dioxide gas, nitrogen gas, chemical powder fire extinguishing medium and fire foam.

适宜的灭火物质：大量水，二氧化碳气体，氮气，化学粉末灭火器和泡沫灭火器

Specific hazards: Corrosive gas may be emitted during fire.

请保存好产品资料以备后续参考。

•Specific methods of fire-fighting: When the battery burns with other combustibles simultaneously, take fire extinguishing method which corresponds to the combustibles.

Extinguish a fire from the windward as much as possible.

特殊的灭火方法：当电池与其他易燃物同时燃烧时，应采取与该易燃物相应的灭火措施，尽可能的在顺风向灭火。

•Special protective equipment for firefighters. Respiratory protection: Respiratory equipment of a gas cylinder style or protection-against-dust mask. Hand protection: Protective gloves. Eye protection: Goggle or protective glasses designed to protect against liquid splashes. Skin and body protection: Protective clothes.

灭火时需要保护器材。

呼吸保护：供呼吸的气筒设备或防护面具。手部保护：护手套。眼部保护：护目镜

或者其他设计用来防止液体进入眼睛。皮肤及身体保护：防护装。

Section 6 - Accidental Release Measures

第六部分：意外事故解决措施

Emergency Procedures 步骤

Minor Spills of Cell Materials 少量物质溢出

- Remove all ignition sources.

移去所有易燃的物料

- Clean up all spills immediately.

立即清除所有的溢出物

- Avoid contact with skin and eyes.

避免溢出物与眼和皮肤接触

- Control personal contact by using protective equipment.

通过使用保护设备，避免人体与其接触

- Use dry clean up procedures and avoid generating gas or volatile.

使整个过程在干燥条件下进行，并且避免产生气体或者挥发物。

- Ventilate the storage area.

使储存区保持通风

- Discharge the cell to Zero Voltage by a over 5 Ohm resistance, before place into waste container.

将电池扔进废气盒之前，先将其在电阻超过 5 欧姆的条件下放电至零压。

- Place in a suitable labeled container for waste disposal.

将废弃电池放入有对应标识的废弃盒。

Major Spills of Cell Materials 大量物质溢出

- Clean up all spills immediately.

立即清除所有的溢出物。

- Wear protective clothing, safety glasses, dust mask, gloves.

穿防护服，保护眼睛，防尘面具，手套

Section 7 - Handling and Storage

第七部分：处理和存放

Steps to be taken in Case Material is Released or Spilled: The preferred response is to leave the area and allow the batteries to cool and the vapors to dissipate. Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.

原料释放或溢出时应采取的措施：首先是离开电池组区域，让电池组冷却及蒸汽消散。避免眼睛与皮肤接触或者吸入蒸汽。用吸收剂去除溢出的液体并焚烧。

Waste Disposal Method: Open cells should be disposed of in accordance with local regulations.

废弃物的处理方法：电池处理应与相关规定相符。

Precautions to be Taken in Handling and Storing: Avoid mechanical or electrical abuse. Batteries may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.

使用和储存的预防措施：避免机械的和电气的滥用。当拆卸，撞击或者将电池挪于火中或者高温环境中时，将引起电池组爆炸或自燃，请勿短路或反极性安装。

Storage: Avoid direct sunlight, high temperature, high humidity. Store in cool place (temperature: -20 ~ 45°C, humidity: 45 ~ 85%)

储存：避免阳光直射、高温和高湿。放置在干爽的地方（温度：-20 ~ 45°C；湿度：45 ~ 85%）

Section 8 - Exposure Controls, Personal Protection

第八部分：安全控制和人员保护

Personal protective equipment 个人防护装置

Respiratory protection: Respirator with air cylinder, dust mask

呼吸保护：气筒呼吸器，防尘面具 Hand protection: Protective gloves 手部保护：防护手套

Eye protection: Goggle or protective glasses designed to protect against liquid splashes

眼部保护：护目镜或防护眼镜，防止液体飞溅

Skin and body protection: Working clothes with long sleeve and long trousers

皮肤和身体保护：带有长袖和长裤的工作服

Section 9 - Physical And Chemical Properties

第九部分：物理状态化学特性

Appearance 外观

Physical state 物理状态 Solid, 固态 Form 形状: Geometric solid 几何固体 Color: Metallic color 颜色: 金属色 Odor: No odor 气味: 无 • pH: NA pH 值: NA

• Specific temperatures/temperature ranges at which changes in physical state occur.

需明确给出发生物理状态发生变化时的温度/温度范围

There is no useful information for the product as a mixture.

因产品是混合物，所以无相关咨询

• Flash point: NA 闪点: NA

• Explosion properties: NA 爆炸特性: NA

• Density: NA 密度: NA

• Solubility, with indication of the solvent(s): Insoluble in water

溶解性（溶剂指示）：不溶于水

Section 10 - Stability and Reactivity

第十部分：稳定性和活性

Stability: Stable under normal conditions of use

稳定性：在正常使用条件下是稳定的

Conditions to Avoid: Hazardous reactions occurring under specific conditions

应避免的情况：在特殊条件下将发生危险反应

• Conditions to avoid: When cell is exposed to an external short-circuit, crushes, deformation, high temperature above 100 degree C, it will cause heat generation and ignition. Avoid direct sunlight and high humidity.

应避免的外部条件：当电池处于外部短路，压力，变形或超过 100°C 高温时将产生大量热和燃烧，避免阳光直照和高温。

• Materials to avoid: Conductive materials, water, seawater, strong oxidizers and strong acids.

应避免的材料：可导电材料：水，海水，强氧化剂和酸

• Hazardous decomposition products: Acrid or harmful gas is emitted during fire.

产品分解的危险性：着火时会有刺激性气体或有害气体产生。

Section 11 - Toxicological Information

第十一部分：毒性信息

Lithium cobalt Oxide - LiCoO₂ 钴酸锂

• Acute toxicity: No applicable data.

剧毒性：无数据

Reference 参考：cobalt: LDLo, oral - Guinea pig 20mg/kg

钴：公布的最低致死剂量，20mg/kg（口服-天竺鼠剂量）

·Local effects: Unknown.

局部的影响：未知

·Sensitization: The nervous system of respiratory organs may be stimulated sensitively.

敏感性：呼吸器官的神经系统将因受到刺激而过敏。

·Chronic toxicity/Long term toxicity: 慢性毒性/长期毒性

By the long-term inhalation of coarse particulate or vapor of cobalt, it is possible to cause the serious respiratory-organs disease. Skin reaction or a lung disease for allergic or hypersensitive person may be caused. 由于长期的吸入钴微粒或钴蒸汽，可能会引起严重的呼吸器官疾病。易过敏的或高敏感者可能会引起皮肤过敏 或者肺部疾病。

· Skin causticity: Although it is very rare, the rash of the skin and allergic erythema may result.

皮肤碱性：虽然这种情况发生的非常少，但也会引起皮疹和红斑。

Manganese 锰

·When manganese's concentration is 0.1 mg/L in water, make BOD5 reduced

水中浓度 0.1mg/L 时,使 BOD5 降低

· Mainly for chronic poisoning, damage to the central nervous system especially extrapyramidal system 主要为慢性中毒，损害中枢神经系统尤以锥体外系统突出。

LD50: 9000 mg/kg (through the rat's mouth), LC50: No data

·LD50: 9000 mg/kg(大鼠经口), LC50: 无资料

Aluminum 铝

· Local effects: Aluminum itself has no toxicity. When it goes into a wound, dermatitis may be caused.

局部影响：铝自身并无毒性。当它与伤口接触时将引起皮炎。

· Chronic toxicity/Long term toxicity: By the long-term inhalation of coarse particulate or fume, it is possible to cause lung damage (aluminum lungs).

慢性毒性/长期毒性：由于长期的吸入粗造的微粒或者浓烟，可能导致肺部受损。

Copper 铜

· Acute toxicity: 60-100mg sized coarse particulate causes a gastrointestinal disturbance with nausea and inflammation. TDLo, hypodermic - Rabbit 375mg/kg

剧毒性：60-100mg 的粗糙微粒会导致伴有恶心反胃的肠胃不适。公布的最低致死剂量，375mg/kg（皮下注射-兔子剂量）

·Local effects: 局部作用

Coarse particulate stimulates nose and tracheal. When it goes into one's eyes, reddening and pain may occur.

粗糙微粒会刺激鼻子和呼吸道，进入眼睛会疼痛

·Sensitization: Sensitization of the skin may be caused by long-term or repetitive contact.

致敏：长期性或反复接触可能会导致皮肤过敏

·Reproductive toxicity: TDLo, oral - Rat 152mg/kg

再生毒性：公布的最低致死剂量，152mg/kg（口服-老鼠剂量） Nickel 镍

· Local effects: Through the pores and sebaceous glands penetrate into the skin, causing skin allergies Inflammation. Its clinical manifestations is dermatitis and eczema

局部的影响：镍离子可以通过毛孔和皮脂腺渗透到皮肤里面去，从而引起皮肤过敏发炎，其临床表现为皮 炎和湿疹。

Graphite 石墨

·Acute toxicity: Unknown. 剧毒性：未知。

- Local effects: When it goes into one's eyes, it stimulates one's eyes; conjunctivitis, thickening of corneal epithelium or edematous inflammation palpebra may be caused.

局部作用: 当它进入眼睛后, 将刺激眼睛; 将引起结膜炎, 上皮细胞角膜增厚或者眼睑发炎浮肿。

- Chronic toxicity/Long term toxicity: Long-term inhalation of high levels of graphite coarse particulate may cause lung disease or a tracheal disease.

慢性毒性/长期毒性: 长期或高强度的吸入石墨粗粒可能引起肺部疾病或者气管疾病。

Carcinogenicity: 致癌性

Graphite is not recognized as a cause of cancer. 石墨不是认定的致癌物。

Organic Electrolyte 有机电解液 Acute toxicity: 剧毒性:

LD50, oral - Rat 2,000mg/kg or more 半数致死量, 2,000mg/kg 或更多 (口服-老鼠剂量)

60-100 毫克的铜微粒将引起胃部的恶心与发炎

• Local effects: Unknown. 局部作用: 未知

• Skin irritation study: Rabbit – Mild 皮肤刺激研究: 兔子-轻微

• Eye irritation study: Rabbit - Very severe 眼睛刺激研究: 兔子-非常严重

Section 12 - Ecological Information

第十二部分: 生态学信息

Marine Pollutant: Not Determined 海洋污染: 无

No data for Polymer Lithium-ion Battery. 没有关于聚合物锂电池组的相关资料

Kindly Reminder: 温馨提示:

- Disallow material discharge or abandon a natural environment that have no government's permission.

在没有得到政府许可的情况下, 不允许物料的排放或丢弃到环境中。废弃物的处理必须按照相关的规定。

- The lithium ion battery disposal must, in accordance with professional treatment: Enterprise treat hazardous waste and transport the waste must accord with the government and local government requirements. Don't allow individuals to burn the battery.

锂离子电池组的处置必须按照专业处理: 企业按照政府以及当地政府要求, 处理有害废弃物, 对废弃物的运输。不允许个人进行焚烧电池或电池组。

Section 13 - Disposal Considerations

第十三部分: 处理注意事项

RCRA Waste Code: Non-regulated

资源保护和回收法废物代号: 没有规定

Dispose of according to all federal, state, and local regulations.

电池废弃物的处理都可以按照联邦、州和地方政府的规定进行。

Section 14 - Transport Information

第十四部分: 运输信息

When Lithium ion batteries' containing no more than 20Wh/cell, 100Wh/battery pack and meet the package requirement of Table 965-II can be treated as "Non-dangerous goods" under the United Nations Recommendations on the Transport of Dangerous Goods, provided that packaging is strong and prevent the products from short-circuit.

根据在联合国关于危险货物的运输法规, 在包装牢固,防止产品短路的前提下, 没有超过 20Wh 的锂离子电池芯及没有超过 100Wh 锂离子电池组且包装要求符合表 965-II 的可看作“为非危险品”。

With regard to air transport, the following regulations are cited and considered:

对于空运,以下规定应被引用和遵循:

Air transportation, according to IATA-DGR 66 th Edition (Effective 1 January-31 December 2025) 空运, 依据 IATA-DGR 第 66 版 (2025 年 1 月 1 日至 12 月 31 日生效)	
UN Number + PSN UN 编号+运输专用名	UN 3480, LITHIUM ION BATTERIES UN 3480, 锂离子电池
Hazard Class 危险等级	Class 9 第九类危险品
Packaging requirement 包装要求	Strong package, packaging according to PACKING INSTRUCTION 965, section IB 坚固包装, 按照包装说明 965 IB 部分要求打包
UN Number + PSN UN 编号+运输专用名	UN 3481, LITHIUM ION BATTERIES PACKED WITH EQUIPMENT, or UN 3481, LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT UN 3481, 锂离子电池与设备一起包装, 或 UN 3481, 锂离子电池安装在设备中
Hazard Class 危险等级	Not restricted 不受限制
Packaging requirement 包装要求	Strong package, packaging according to PACKING INSTRUCTION 966-967, section II 坚固包装, 按照包装说明 966-967 II 部分要求打包

对于海运,引用并遵循以下规定:

Sea transportation, according to IMO IMDG Code (Amend 41-2022) 海运, 依据 IMO IMDG Code (Amend 41-2022)	
UN Number + PSN UN 编号+运输专用名	UN 3480, LITHIUM ION BATTERIES, or UN 3481, LITHIUM ION BATTERIES PACKED WITH EQUIPMENT, or UN 3481, LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT UN 3480, 锂离子电池 或 UN 3481, 锂离子电池与设备一起包装, 或 UN 3481, 锂离子电池安装在设备中
Hazard Class 危险等级	Not restricted, according to sp188 不受限制, 根据特殊条款 188
Package instruction 包装说明	Strong package, Packaging in accordance to corresponding requirements of sp188 坚固包装, 按照 sp188 相应要求进行包装
EmS No. 应急措施编号	F-A, S-I

Our products are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to all the applicable international and national governmental regulations, not limited to the above mentioned. We further certify that the enclosed products have been tested and fulfilled the requirements and conditions in accordance with UN Recommendations (T1~T8) on the Transport of Dangerous Goods Model Regulations and Manual of the Testes and Criteria that can be treated as "Non-Dangerous Goods"

我们的产品都有适当的分类、描述、包装、标记并标示的,根据所有适用的国际和国家政府规定,在正常情况下,运输不受上述的限制;我们进一步证明产品:已经进行过测试并满足联合国建议的(T1~T8 项目)危险货物运输中的相关条件与要求,因此可被视为非危险品。

Manual of Test and Criteria (38.3 Lithium battery) 测试和标准指南 (锂电池组 38.3 条)

No.序号	Test Item 测试项目	Test Results 测试结果	Remark 备注
T1	Altitude Simulation 高度模拟	Passed 合格的	
T2	Thermal Test 温度循环测试	Passed 合格的	
T3	Vibration 震动	Passed 合格的	
T4	Shock 加速度冲击	Passed 合格的	
T5	External Short Circuit 外部短路	Passed 合格的	
T6	Impact 重物冲击	Passed 合格的	

