化学品安全技术说明书

Material Safety Data Sheet

委托单位： **Applicant:**	HLI SOLUTIONS, INC.
地址： **Address:**	123 TOWN SQUARE PLACE, PMB 817, JERSEY CITY, NJ 07310, United States of America
样品名称： **EUT Name:**	应急逆变器 UFO-LED16(内置应急电池 FHSBATL3-5-HSP, 11.1V, 5000mAh, 55.5Wh) Emergency Micro Inverter UFO-LED16 (Inside Emergency Battery FHSBATL3-5-HSP, 11.1V, 5000mAh, 55.5Wh)
样品型号： **Model Name:**	UFO-LED16
品牌名称： **Brand Name:**	DUAL LITE®
依据标准： **According to the standard:**	GB/T 16483-2008；ISO 11014-2009
签发日期： **Date of Issue:**	2026.03.16

签发方 / **ISSUED BY:**

深圳市钛和巴伦技术股份有限公司 Shenzhen BALUN Technology Co., Ltd.

主检 Tested by: 张依鸿　　审核 Checked by: 黄永强　　批准 Approved by: 章勇（CCC 总经理）

第一部分：化学品产品信息和制造商信息

Section 1-Chemical Product and Company Identification

产品名称 (Product Name): 应急逆变器 UFO-LED16(内置应急电池 FHSBATL3-5-HSP, 11.1V, 5000mAh, 55.5Wh) Emergency Micro Inverter UFO-LED16 (Inside Emergency Battery FHSBATL3-5-HSP, 11.1V, 5000mAh, 55.5Wh)

商标 (Trade Mark): DUAL LITE®

型号 (Model): UFO-LED16

额定电压 (Nominal Voltage): 11.1V

参数(Ratings): 5000mAh, 55.5Wh

制造商：北京富桦明电子科技有限公司

Manufacture: Fulham Electronic Co., Ltd.

地址：北京市昌平区科技园区双营西路 79 号院 23 号楼 6 层

Address: 6th Floor, Building #23, Champion Bio, No. 79, Shuangying West Road, Nanshao County, Changping District, Beijing, P.R. China

工厂：北京富桦明电子科技有限公司

Factory: Fulham Electronic Co., Ltd.

地址：北京市昌平区科技园区双营西路 79 号院 23 号楼 6 层

Address: 6th Floor, Building #23, Champion Bio, No. 79, Shuangying West Road, Nanshao County, Changping District, Beijing, P.R. China

邮政编码 (Post Code) : N/A 邮箱 (E-mail): liwenchao@fulham.com

紧急联系电话 (Emergency Telephone) : 021-64952777-8021

第二部分：成分组成信息

Section 2- Composition/Information on Ingredient

化学名称 **Chemical Name**	分子式 **Molecular formula**	**CAS**号 **CAS No.**	重量 **Weight (%)**
Nickel-cobalt-manganese lithium 镍钴锰酸锂	$LiNiCoMnO_2$	346417-97-8	40.6
Silicon oxide 硅氧	Si-C-O	60676-86-0	15.7
PVDF 聚偏氟乙烯	$C_2H_2F_2$	24937-79-9	0.4
CMC 羧甲基纤维素	$C_6H_{12}O_6$	9000-11-7	0.3
Carbon nanotubes 碳纳米管	C	308068-56-6	0.5
Styrene-butadiene rubber 丁苯橡胶	$(C_8H_8.C_4H_6)_x$	9003-55-8	0.4
PP 聚丙烯	$(C_3H_6)_n$	9003-07-0	4.3
Lithium hexafluorophosphate 六氟磷酸锂	$LiPF_6$	21324-40-3	1.7
Ethvlene carbonate 碳酸乙烯酯	$C_3H_4O_3$	96-49-1	2.3
Ethyl methyl carbonate 碳酸甲乙酯	$C_4H_8O_3$	623-53-0	1.1
Dimethyl carbonate 碳酸二甲酯	$C_3H_6O_3$	616-38-6	8.1
Copper 铜	Cu	7440-50-8	8.0
Aluminum 铝	Al	7429-90-5	3.8

Nickel 镍	Ni	7440-02-0	0.7
Iron 铁	Fe	7439-89-6	12.1

注: 1. CAS 号是化学文摘服务注册号码;

2. 以上仅为内置应急电池的成分组成信息。

Note: 1. CAS number is Chemical Abstract Service Registry Number;
2. The above is merely the composition/Information on Ingredient of the inside emergency battery.

第三部分：危险识别

Section 3- Hazards Identification

危险等级：根据DGR 3.9.2.6，锂电池属于第9类—杂类危险品。

入侵途径：吸入、皮肤接触、眼睛接触和摄入。

皮肤接触：皮肤接触电解液可能引起皮肤过敏。

眼睛接触：与有机溶液接触对眼睛有严重的危害风险。

吸入：吸入是有危害的。

摄入：吞咽是有危害的。

健康危害：正常条件下根据生产商的说明使用电池不会产生危害。使用不当的情况下，有破裂、火灾、发热、膨胀、漏液的风险，并可能造成意外损失。使用不当的行为包括但不限于下列情况：长时间充电、短路、投入火中，硬物猛击，尖物刺破、破裂。

环境危害：电池的组成物质对环境有危害。

爆燃危害：机械撞击的火焰、短路和高温条件情况下，电池会起火爆炸。

Fatalness grade: According to DGR 3.9.2.6, Lithium batteries are classified in Class 9 – Miscellaneous dangerous goods.

Invasion route: Inhalation, skin contact, eye contact and ingestion

Skin touch: May cause allergy by skin contact with the battery electrolyte.

Eyes touch: Risk of serious damage to the eyes when it contacts with organic solution.

Inhalation: Inhalation can be dangerous.

Ingestion: Harmful if swallowed.

Health hazards: Batteries are not hazardous when used according to the instruction of manufacturer under normal conditions. In the case of abuse, rupture, fire, heat, swelling, leakage risk, and may result in unexpected losses. Abuse includes but not limited to the following cases: charged for long time, short-circuited, put into fire, hit with hard object, punctured with acute object, crushed, and broken.

Environment hazards: The components of the battery are harmful to the environment.

Burn & burst danger: It will explode, flame when machine impinges, short-circuits and in high-temperature situation.

第四部分：急救措施

Section 4- First Aid Measures

总说明：正常情况下，不需要特别的措施。在内部物质漏出的情况，如果身体部位接触到这些物质，应采取以下措施。

皮肤接触：脱去被污染的衣物，并用大量流动的水清洗皮肤至少 15 分钟。如果有刺激、受伤或疼痛症状，请立即就医。

眼睛接触：翻起眼睑，用流动的水清洗至少 30 分钟。立即就医。

吸入：将患者立即从暴露现场转移至空气清新处，保持其呼吸道顺畅。如果有可能使用氧气袋。立即就医。

吞咽：如果患者失去意识请勿催吐，立即就医。

General information: Normally, no special measures are required. In the case of internal leakage, if the body parts are exposed to them, the following measures should be taken:

Skin touch: Remove any contaminated clothing and flush exposed skin with plenty of running water for at least 15 minutes. If irritation, injury or pain persists, seek medical attention.

Eyes touch: Lifting the upper and lower eyelids, flush the eyes with running water for at least 30 minutes. Seek immediate medical attention.

Inhalation: Remove the patient from exposure and move to fresh air immediately. Keep the respiratory tract smooth. Use oxygen if available. Get medical aid.

Ingestion: Induce vomiting unless patient is unconscious. Seek immediate medical attention.

第五部分：消防措施

Section 5- Fire Fighting Measures

危险特性：电池接触火源可能发生爆炸并释放有害的分解产物。当机械撞击产生火焰，短路或高温条件情况下，也会发生爆炸。与氧化剂接触，电池会与氧化剂反应。

有害燃烧产物：一氧化碳、二氧化碳、金属氧化物等。

消防方法：所有人员必须佩戴过滤式防毒面具(面罩)或独立的呼吸器，穿戴可防御火和有毒气体的消防防护服。尽量在上风处灭火，尽可能将容器移至空旷处。

灭火剂：泡沫，干粉，二氧化碳，砂土。

Danger characteristic: Batteries may burst and release hazardous decomposition products when exposed to a fire situation. It will explode, flame when it machine impinges, short-circuits and in high-temperature situation. It will react with oxidizer.

Hazardous combustion products: Carbon monoxide, carbon dioxide, metal oxide etc.

Fire-Fighting method: The staff must equip with filter mask (full mask) or isolated breathing apparatus. The staff must wear the clothes which can defense the fire and the toxic gas. Put out the fire in the upwind direction. Remove the container to the open space as soon as possible.

Media: foam, powder, CO_2, sandy clay.

第六部分：泄露应对措施

Section 6- Accidental Release Measures

电池内部材料的泄露，如电池电解液，依据如下方法小心处理：

人体预防：穿戴防护设备(护目镜和防护手套)转移溢出材料。尽可能的避免接触和不要吸入气体。

环境预防：禁止排放到环境中。

清理方法：把溢出物质收集于容器中。泄露区域用干的布进行清洁。

二次危害预防：避免扩散，收集的材料请勿靠近火源。

Spilled internal cell materials, such as electrolyte leaked from a battery cell, are carefully dealt with according to the followings:

Precautions for human body: Remove spilled materials with protective equipment (protective glasses and protective gloves). Do not inhale the gas as much as possible. Moreover, avoid touching with as much as possible.

Environmental precautions: Do not throw out into the environment.

Method of cleaning up: the spilled solids are put into a container. The leaked place is wiped off with dry cloth.

Prevention of secondary hazards: avoid re-scattering. Do not bring the collected materials close to fire.

第七部分：操作和储存

Section 7- Handling and Storage

操作

技术措施：

使用者暴露预防：正常使用下不需要。

火灾和爆炸预防：正常使用下不需要。远离火源和热源。

操作安全预防：不要破坏或拆除外部壳套。

安全操作注意事项：电池严禁拆开、破坏或焚烧，因为电池密封的材料可能泄露、破裂并释放到环境中。严禁将电池扔到火中或暴露于高温环境中。电池不可浸泡在水或海水中。严禁与强氧化剂放置在一起。严禁强烈的机械撞击和抛掷。不要拆卸或使其变形。如需装料，请用专用的装料机进行装料。

存储

技术措施：

存储条件：避免机械或电气滥用。存储于阴凉、干燥、通风良好并且温度变化较小的地方。避免高温条件。电池应远离发热设备，不要将电池长时间的暴露在直射的阳光下。

禁忌物：导电材料、水、海水、强氧化剂和强酸。

包装材料：建议使用绝缘材料或被证明耐用的材料。

Handling

Technical measures:

Prevention of user exposure: Not necessary under normal use.

Prevention of fire and explosion: Not necessary under normal use. Keep away from fire and heating sources.

Precaution for safe handling: Do not damage or remove the external tube.

Specific safe handling advice: The batteries should not be opened, destroyed or incinerate, since they may leak or rupture and release to the environment the ingredients that they contain in the hermetically sealed container. Never throw out battery cells in a fire or expose to high temperatures. Do not soak battery cells in water or seawater. Do not expose to strong oxidizers. Do not give a strong mechanical shock or fling. Never disassemble or deform. In the case of charging, use only dedicated charger.

Storage

Technical measures:

Storage conditions: Avoid mechanical or electrical abuse. Storage preferably in cool, dry and ventilated area, which is subject to little temperature change. Storage at high temperatures should be avoided. Do not place the battery near heating equipment, nor expose to direct sunlight for long periods.

Incompatible products: Conductive materials, water, seawater, strong oxidizers and strong acids.

Packing material: Insulative and tear proof materials are recommended.

第八部分：接触控制和个人防护措施

Section 8- Exposure Controls, Personal Protection

呼吸系统保护：工作场所保持良好的通风，工作时需佩戴合格的口罩或面罩。

眼睛保护：护目镜，装配合格和安全的淋浴或冲洗眼睛设备。

身体保护：穿工作服，注意保护裸露的皮肤。

手保护：穿戴防护手套。

其他保护：工作场所禁止吸烟、饮食。保持良好的卫生习惯。

Respiratory protection: The work place keeps well ventilated, wear qualified mask or face mask at work time.

Eyes protection: Goggles, equipped available and safety shower and wash eyes equipment.

Body protection: Wear work clothes, pay attention to protect bare skin.

Hands protection: Wear protective gloves.

Other Protections: No smoking, dining and drinking water in the workplace. Keep good habit of hygiene.

第九部分：理化性质

Section 9- Physical and Chemical Properties

形态

物理状态：固体 形状：/ 颜色：/ 气味：无味 pH：不适用

特定温度或温度范围对电池物理形态的变化：对于混合物产品没有有价值的信息。

闪点：无相关资料。

爆炸性能：机械撞击的火焰、短路和高温条件下，电池会起火爆炸。

密度：无相关资料。

溶解度：不溶于水。

Appearance

Physical state: Solid Form: / Color: / Odor: Odorless

pH: Not applicable

Specific temperatures/temperature ranges at which changes in physical state occur: There is no useful information for the product as a mixture.

Flash point: No information.

Explosion properties: It will explode, flame when machine impinges, short-circuits and in high-temperature situation.

Density: No information.

Solubility: Insoluble in water.

第十部分：稳定性和化学反应

Section 10- Stability and reactivity

稳定性：在正常温度和压力下稳定。

禁忌物：强氧化剂、酸、碱。

避免条件：高温热源、火源。

燃烧产物：一氧化碳、二氧化碳、碳氢烃类分解物、有毒烟雾。

Stability: Stable under normal temperature and pressure.

Distribution of Ban: Strong oxidizer, acid, alkali.

Conditions to Avoid: High temperature heat source, fire source.

Decomposition Products: CO, CO_2, Hydrocarbon hydrocarbon decomposition, toxic smoke.

第十一部分：毒理学信息

Section 11- Toxicological information

关于产品本身现无相关数据。电池内部材料信息如下：

钴锂锰镍氧化物

急性毒性：无相关数据。

局部影响：不可知。

致敏作用：不可知。

慢性毒性/长期毒性：不可知。

皮肤腐蚀性：虽然比较少见，但可能引起皮疹、红斑等过敏反应。

铝

局部影响：铝本身无毒。当进入到伤口时，可能导致皮炎。

慢性毒性/长期毒性：长期吸入铝粉颗粒或烟气，可能导致肺部疾病(铝肺)。

碳

急性毒性：不可知。

局部影响：进入眼睛，对眼睛有刺激作用，可能导致结膜炎、角膜增厚或浮肿的眼睑炎症。

慢性毒性/长期毒性：长期吸入高浓度的碳粉尘颗粒，可能导致肺部疾病或支气管疾病。

致癌性：研究表明，碳不是致癌物质和具有自然毒性的物质。

铜

急性毒性：普通大小的颗粒 60~100mg 可导致肠道紊乱并伴有反胃和炎症。TDLO，兔子皮下注射 375mg/kg。

局部影响：粗颗粒会刺激鼻子和气管。当进入眼睛时，有红眼疼痛症状。

致敏作用：长期或反复的皮肤接触可能导致皮肤过敏。

生殖影响：TDLO，小鼠口服 152mg/kg。

有机电解液

急性毒性：50LD，小鼠口服 2,000mg/kg 或更多。

皮肤刺激：兔子-平和

眼睛刺激：兔子-非常严重

There is no available data on the product itself. The information of the internal cell material is as follows.

Cobalt lithium manganese nickel oxide

Acute toxicity: No applicable data.

Local effects: Unknown.

Sensitization: Unknown.

Chronic toxicity/Long term toxicity: Unknown.

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

Aluminum

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

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

Carbon

Acute toxicity: Unknown

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.

Chronic toxicity/Long term toxicity: Since the long-term inhalation of high levels of carbon coarse particulate may become a cause of a lung disease or a tracheal disease.

Carcinogenicity: Carbon is not recognized as a cause of cancer by research organizations and natural toxic substance research organizations of cancer.

Copper

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

Local effects: Coarse particulate stimulates a nose and a tracheal. When it goes into one's eyes, the symptom of the reddening and the pain is caused.

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

Reproductive effects: TDLO, oral-Rat 152mg/kg.

Organic Electrolyte

Acute toxicity: 50 LD, oral-Rat 2,000mg/kg or more.

Local effects: Unknown.

Skin irritation: Rabbit-Mild.

Eye irritation: Rabbit-Very severe.

第十二部分：生态学信息

Section 12- Ecological Information

对该产品的生态学信息无相关资料。

本产品不允许排入下水道和/或河流。

流动性：无相关资料。

持久性和降解性：无相关资料。

潜在生物积累性：无相关资料。

生态毒性：对水生物有毒，可能对水生环境产生长期的不利影响。

No information is available about this product’s ecological data.

This product is not allowed to discharge into the sewer or/and rivers.

Mobility: Not available.

Persistence and degradability: Not available.

Bio-accumulative potential: Not available.

Ecotoxicity: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

第十三部分：废弃处置

Section 13- Disposal Considerations

禁止弃置于下水道或水渠。

废物：依据现有的法规回收或处理废弃物，尽可能选择有资质的废弃物回收者或公司。禁止将废弃物直接排入环境中。

污染包装：完全清空容器，并保留容器标识。选择有资质的废弃处理承保人。

Do not put into drains or waterways.

Waste: Recycle or dispose of waste in compliance with current legislation, preferably via a certified collector or company. Do not dispose of waste into the environment.

Soiled packaging: Empty container completely. Keep label(s) on container. Give to a certified disposal contractor.

第十四部分：运输信息

Section 14- Transport Information

电池已经通过了UN38.3测试。运输过程中请根据 IATA DGR第67版包装说明PI 965 Section IB / PI 966 Section II / PI 967 Section II*，IMDG CODE（inc Amdt 42-24）特殊规定188及ADR 2025执行。电池应该牢固的放置，防止短路。运输前要检查包装容器是否完整、密封，运输过程中要确保容器不泄露、不脱落、不损坏。严禁与氧化剂、酸等混装混运。运输工具必须彻底清洗、消毒，否则不得装运其他货物。运输途中应防暴晒、雨淋、高温，应远离火源。海运运输时，放置点应远离卧室和厨房，并与机舱、电源和火源处隔离。道路运输时，应按照规定的路线行驶，在居民区和拥挤区域内不要停车。严禁使用木质、水泥散装运输。

The Batteries have been tested under provisions of the UN Manual of Tests and Criteria, Part III, sub-section 38.3. Transportation should comply with the PACKING INSTRUCTION PI 965 Section IB / PI 966 Section II / PI 967 Section II* of IATA DGR 67th Edition, the special provision 188 of IMDG CODE (inc Amdt 42-24) and ADR 2025. The batteries should be securely packed and protected against short-circuits. Examine whether the package of the containers is integrated and tighten closed before

transport. Take in a cargo of them without falling, dropping, and breakage. Prevent collapse of cargo piles. Don't put the goods together with oxidizer and chief food chemicals. The transport vehicle and ship must be cleaned and sterilized otherwise it is not allowed to assemble articles. During transport, the vehicle should prevent exposure, rain and high temperature. For stopovers, the vehicle should be away from fire and heat sources. When transported by sea, the assemble place should keep away from bedroom and kitchen, and isolated from the engine room, power and fire source. Under the condition of Road Transportation, the driver should drive in accordance with regulated route, don't stop over in the residential area and congested area. Forbid to use wooden, cement for bulk transport.

UN编码及运输名称 **UN-Number and shipping name**

UN 3480, Lithium ion batteries（锂离子电池）; or

UN 3481, Lithium ion batteries packed with equipment（锂离子电池与设备包装在一起）; or

UN 3481, Lithium ion batteries contained in equipment（锂离子电池安装在设备中）

运输危险品分类 **Transport hazard class(es)**

ADR, IMDG, IATA, ICAO Class 9 Miscellaneous dangerous substances and articles.（第9类危险品）

用户特别注意事项：

警告：杂项危险物品

Special precautions for user:

Warning: Miscellaneous dangerous substances and articles

第十五部分：管理信息

Section 15- Regulatory information

法规信息：

联合国《关于危险货物运输的建议书规章范本》

国际航空运输协会：《危险品规则》

国际海事组织：《国际海运危险货物规则》

ISO 11014-2009 化学品用安全资料表 内容和排列顺序章节。

Regulatory Information:

Recommendations on the transport of dangerous goods-model Regulations

International Air Transport Association: Dangerous Goods Regulation

International Maritime Organization: International Maritime Dangerous Goods Code

ISO 11014-2009 Safety data sheet for chemical products - Content and order of sections.

第十六部分：其他信息

Section 16- Other Information

上述信息是基于现有的数据信息，在实际应用过程中，可能出现其他未预料的情况，其相应信息可能需要修改，我方不承担责任，在操作中请根据实际情况做出相应的正确处理。

The above information is based on the data of which we are aware and is believed to be correct as of the data hereof. Since this information may be applied under conditions beyond our control and with which may be unfamiliar and since data made available subsequent to the data hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

--报告结束--

--End of report--

修订记录 **CHANGE HISTORY**			
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