DESAY 德赛电池

MATERIAL SAFETY DATA SHEET (MSDS)

NO.DS1433187200727
HUIZHOU DESAY BATTERY CO.，LTD.
MODEL: HB526488EEW

Product Name: Li-on Polymer Battery
Physical and Chemical Properties:Nominal Voltage:3.85V
Rated Capacity:4900mAh
Rated Power:18.87Wh

Issued and Revised Date: 27- Jul-2020

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Li-on Polymer Battery
Applicable Models/Sizes: All models Desay battery manufactured with the cells of CosMX （CosMX CA516487E）
Supplier Identification: Huizhou Desay Battery Co.，Ltd.
Address: No.15 Zone, Zhongkai, High&Technology Development Zone, Huizhou Guangdong CHINA
Telephone number: 86-752-2629810

2. COMPOSITION / INFORMATION ON INGREDIENTS

Information about the chemical nature of product: *1

MATERIAL OR INGREDIENT物料或原材料	PEL(OSHA)职业安全与健康标准	TLV(ACGIH)污染物排放临界值	wt%
LiCoo2钴酸锂 (CAS# 12190-79-3)	None established无定义	None established无定义	38.17%
ConductivityCarbonBlack 1 导电剂 (CAS#7440-44-0)	None established无定义	None established无定义	0.82%
Binder PVDF PVDF (CAS#24937-79-9/65239-10-3)	None established无定义	None established无定义	1.85%
CMC(CAS#9004-32-4)	None established无定义	None established无定义	0.04%
SBR(CAS#9003-55-8)	None established无定义	None established无定义	0.04%
PVP	None established无定义	None established无定义	0.24%
Graphite 石墨 (CAS#7782-42-5)	None established无定义	None established无定义	19.99%
Electrolyte 电解液 (CAS#21324-40-3/96-49-1/623-53-0/616-38-6/1120-71-4)	None established无定义	None established无定义	13.52%
Instant adhesive 热熔胶(CAS#26590-75-0)	None established无定义	None established无定义	0.015%
instant adhesive 速干胶 (CAS#'24937-78-8)	None established无定义	None established无定义	0.015%
Ink 油墨 (CAS#78-93-3)	None established无定义	None established无定义	0.01%
其它(非化品)	None established无定义	None established无定义	25.29%

3. HAZARDS IDENTIFICATION

Chemical Nature: N/A
CAS-No/EINECS NO.:N/A
INCI CTFA-Description: Lithium ion polymer rechargeable battery series
Ingestion: No effect under routine handling and use.
Inhalation: No effect under routine handling and use.
Skin contact: No effect under routine handling and use.
Eye contact: No effect under routine handling and use.
Skin absorption: No effect under routine handling and use.
Reported as carcinogen: Not applicable.

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4. FIRST-AID MEASURES

Under normal conditions of use, the battery is hermetically sealed.

Ingestion: Swallowing a battery can be harmful

Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract. If battery or open battery is ingested, do not induce vomiting or give food or drink. Seek medical attention immediately.

Inhalation: Contents of an open battery can cause respiratory irritation. Inhalation of vapors may cause irritation of the upper respiratory tract and lungs. Provide fresh air and seek medical attention.

Skin Absorption: Ethylene carbonate, diethyl carbonate and dimethyl carbonate may be absorbed through the skin causing localized inflammation.

Skin Contact: Contents of an open battery can cause skin irritation and/or chemical burns.

Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.

Eye Contact: Contents of an open battery can cause severe irritation and chemical burns. Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

Note: Acetylene black and cobalt compounds are listed as possible carcinogens by the International Agency for Research on Cancer (IARC).

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5. FIRE-FIGHTING MEASURES

5.1 Risk Analysis (electrical shock, fire, explode, population)

There was no electrical shock risk for single cell, or battery module which voltage was less than 50V DC (the safety voltage). But if the pack had the voltage was bigger than 50V DC, the electrical shock shall be protected.

During the shipment or testing process for LIB Pack or Module, there was danger factors like drop, crush, broken, metal short circuit, liquid immersion, the factors would lead the risk like electrical shock, catch fire. If pack was in well sealed box, there was gas explode risk; if the pack was in big room or fans, there was not explode risk. The released liquid was the environment population risk.

5.2 Material prepare & people training

1） **Water based sprayer fire extinguish:** 1 set of 9L or 2 sets of 6L water spray fire extinguishers per each 500KWh LIB pack or Modules. Or you could use portable electrical water sprayer or hang type water spray fire extinguisher (photo 1) . The water based spray fire extinguisher could be used for fire type ABCE = solid (A), flash point >60℃ liquid (B), gas (C), <36Kv electrical (E) fire. It was recommended to prepare water based sprayers in the trucks.

2） **Water protection sets**: raincoat, galoshes, rubber gloves. Plastic rollers. Rags.

3） **PPE**: breathing mask, safety glass, face mask, gloves for high temperature.

4） **Smoke escape**: fans in wall one per 20m or portable fans in rooms. Keep gas exchange hole in trucks.

5） **Gas explode tools**: open condition for devices & rooms. Some devices like high or low temperature ovens must be sealed, there was one copper film with the diameter 200mm & thickness 8um as the safety vent. The wall should have one fan per 20m, ⩾5000m3 per hour for flow rate.

6） **Neutralized material**: prepare 10kg Ca(OH)2 powder per 500KWh LIB pack or modules, it was used for neutralized for release electrolyte. Because electrolyte met with water, 8% HF would be created.

7） **Voltage measure**. Multimeter. Please physical block the current measure function, the mistake would lead instrument exploding.

8） **People training**: (a) turn on fans or portable fans for smoke escape. (b) wear the water protection sets . use water spray fire extinguishers . dry by cloths with rubber gloves . insulated by plastic film. (c) neutralized by Ca(OH)2 or NaOH for released electrolyte. (d) use multimeter to measure voltage. Take care of the mistake.

5.3 Fire Extinguisher Flow Chart

1） Alarm if you found the smoking or burning.

2） Wear PPE. (Breath mask, face mask. If using water, PPE should include the raincoat, galoshes, rubber gloves).

3） Turn Off power supply in devices or power supply.

4） Use any fire extinguishers for solid material fire, the recommended sequence was water or mist water, sand, fire extinguisher blanket, CO2, powder.

5） Smoke Escape by turn on fans or open air environment.

6） Dry and neutralize. Drying by fans, Neutralization by Ca(OH)2 powder if water was used.

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6. ACCIDENTAL RELEASE MEASURES

On hand: Place material into suitable containers and call local fire/police department.
In water: Low electrical shock risk when EV or battery pack in water, GM also shared the information. But H2 gas was released by the electrolyzed water, you should keep good air flow to avoid the H2 gas accumulated to prevent hydrogen explosion in enclosed space. If possible, remove from water and call local fire/police department.

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7. HANDLING AND STORAGE

One of the major risks associated with the transport of batteries and battery-powered equipment is short-circuit of the battery as a result of the battery terminals coming into contact with other batteries, metal objects, or conductive surfaces. Packaged batteries or cells must be separated in a way to prevent short circuits and damage to terminals. They must be packed in a strong outer packaging or be contained in equipment.

Handling: Do not expose the battery to excessive physical shock or vibration. Short-circuiting should be avoided; however, accidental short-circuiting for a few seconds will not seriously affect the battery.

Prolonged short circuits will cause the battery to rapidly lose energy, could generate enough heat to burn skin. Sources of short circuits include jumbled batteries in bulk containers, coins, metal jewelry, metal covered tables, or metal belts used for assembly of batteries in devices. To minimize risk of short-circuiting, the protective case supplied with the battery should be used to cover the terminals when transporting or storing the battery. Do not disassemble or deform the battery. Should an individual cell within a battery become ruptured, do not allow contact with water. When operators handle the battery which voltage more than 50v ,they must wear the insulation protection PPE.

Storage: The lithium ion battery should be between 25% and 75% of full charge when stored for a long period of time. Stored in a cool, dry, and well ventilated area. Elevated temperatures can result in loss of battery performance, leakage, or rust. Do not expose the battery to open flames.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Control: Keep away from heat and open flame. Stored in a cool dry place.

Personal Protection:

Respiratory Protection: Not necessary under normal conditions.

Eye/Face Protection: Not necessary under normal conditions. Wear safety glasses with side shields if handling an open or leaking battery.

Gloves: Not necessary under normal conditions. Use neoprene or natural rubber gloves if handling an open or leaking battery.

Foot Protection: Steel toed shoes recommended for large container handling.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	Solid	Solubility in water	Not Applicable
Color	Not Applicable	Vapor pressure	Not Applicable
Odor	Not Odor	Explosion limit	Not Applicable
Flash point	Not Applicable	Auto flammability	Not Applicable
Solubility in ethanol soluble	Not Applicable	Melting Point	Not Applicable
Boiling Point	Not Applicable	Freezing Point	Not Applicable

10. STABILITY AND REACTIVITY

Stability: Good stability at standard temperature.

Reactivity: None

Avoid contact with water and acids. Hazardous decomposition products: If Al package foil of battery is damaged, the battery should avoid to contact strong oxidizer, acids and high temperature, and the electrolyte will be formed HF.

11. TOXICOLOGICAL INFORMATION

This product does not elicit toxicological properties during routine handling and use.

12. ECOLOGICAL INFORMATION

If the battery is scrapped, it should be selected and disposed by professional company.

13. DISPOSAL CONSIDERATIONS

Do not dispose of battery into environment or sewerage. It should be recycled and disposed basing on your local legislation and regulations.

14. TRANSPORT INFORMATION

14.1 The requirement of air transportation

The lithium battery should according with the International Air Transport Association (IATA DGR 61 edition) requirements for transportation. The battery or cell should be packed and signed as following table （If the package according with PI-965 to PI-967 Section II， it is not classified as dangerous cargo）.

UN NO.	Proper Shipping Name	Power	Package requirements	Label which need to paste
UN3480	Lithium ion batteries	Cell ≤20Wh Battery ≤100Wh State or charge ≤30%rate design capcity	PI965 Section IB	Class 9 hazard label and lithium battery handling label
		Cell ＞20Wh Battery ＞100Wh State or charge ≤30%rate design capcity	PI965 Section IA	Class 9 hazard label
		Cell ≤20Wh Battery ≤100Wh State or charge ≤30%rate design capcity	PI965 Section II	lithium battery handling label

Cells and/or batteries at a SOC of greater than 30% of their rated capacity may only be shipped with the approval or the State or Origin and the State or the Operator under the written condions established by those authorities.

Packages prepared according to Section II or PI965 must be offered to the operator separately from other cargo and must not be loaded into a unit load device before being offered to the operator.

Do not damage or mishandle this package. If package is damaged, batteries must be quarantined, inspected, and repacked. Cells and batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport .Waste lithium batteries and lithium batteries being shipped for recycling or disposal are prohibited from air transport unless approved by the appropriate national authority of the State of origin and the State of the operator.

The lithium battery should pass the UN38.3 test, if the battery can not pass the testing, it can not transport, should redesign. If the battery through the test, for the lithium battery only,
follow the UN3480 and the packing requirements for PI965, for the lithium battery which installed in equipment, follow the UN3481 and the packing requirements for PI967.

The lithium battery testing meets all requirements under UN Manual of Tests and Criteria Part III subsection 38.3.

MATERIAL SAFETY DATA SHEET

No	ITEMS	RESULT	REMARKS
1	Altitude simulation	Pass	Test 1 to 5 must be conducted in sepuence on the same cell or battery
2	Thermal test	Pass	
3	Vibration	Pass	
4	Shock	Pass	
5	External short circuit	Pass	
6	Impact	Pass	
7	Forced Discharged	Pass	Only for cell

14.2 The requirement of ocean shipping

According to International Maritime Dangerous Goods Code (2018 Edition) to transport and according to the requirements of UN NO. 3480/3481 to management the goods,and require class II packaging. Firmly installation. mutual isolation. avoid short circuits.

The product is not restricted to IMO IMDG Code according to special provision 188.

The clause 188 of IMDG Code require the Watt of lithium ion batteries no more than 100 WH, and must marked the WHR ratio label. Otherwise, the battery and module should packed in a strong outer packaging or be contained in equipment.

The clause 230 of IMDG Code require the lithium battery testing should meets all requirements under UN Manual of Tests and Criteria Part III, subsection 38.3.

For more information, Call: 86-752-2629810.

15. REGULATORY INFORMATION

See ACGIH exposure limits information as noted in Section3

US: This MSDS meets/exceeds OSHA requirements.

International: This MSDS conforms to European Union (UN), the International Standards Organization (ISO) and the International Labor Organization (ILO) and as documental in ANSI (American National Standards Institute) Standard Z400.1-1993.

Air transportation: Class 9 dangerous goods, require class II packaging. According to Civil aviation industry standard MH/T1020-2009 Lithium Battery Air Transport Standard and

IATA DGR and ICAO. The international transport and commodity inspection is used this standard at the moment(IMDG CODE),

Ocean shipping: According to International Maritime Dangerous Goods Code to transport and According to the requirements of UN NO 3480/3481 to management the goods.

Land transportation: According to List of Dangerous Goods,(GB12268).

Avoid electrical shock: According to Standard for Electrical Safety in the Workplace, NFPA-70E.

16. OTHER INFORMATION

The information contained herein is furnished without warranty of any kind. Users should consider this data only as a supplement to other information gathered by them and must make independent determinations of the suitability and completeness of information form all sources to assure proper use and disposal of these materials and the safety and health of employees and customers.

Prepared and approved by

Huizhou Desay Battery Co., Ltd.