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Safety Data Sheet

1. Product Identification

1) Product Name

HPC (Hybrid Pulse Capacitor)

Chemical System: based on Lithium Ion, Voltage up to 3.6V or 3.9V

Model	Diameter (mm)	Height (mm)	Capacity (As) (Watt Hour)
HPC1520	20.0mm	15.1mm	140Asec. (0.14Wh @3.67V, 0.28Wh @3.90V)
HPC1530	27.0mm	15.1mm	300Asec. (0.30Wh @3.67V, 0.55Wh @3.90V)
HPC1550	50.3mm	15.1mm	840Asec. (0.84Wh @3.67V, 1.40Wh @3.90V)

2) Manufacturer Name: COROS Battery Co., Ltd.

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3) Emergency Contact

International: +82-31-214-4078

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2. Composition and Information on Ingredients

Substance	CAS No.	Formula	% of Weight
Lithium Cobalt Nickel Manganese Oxide		LiMnxOy、LiCoO2、LiNixCo1-xO2	
Graphite and Carbons	7782-42-5 1333-86-4	C, C6	10-20
Ethylene carbonate	96-49-1	C4H6O3	3-12
Dimethyl carbonate	616-38-6	C3H6O3	3-12
Diethyl Carbonate	105-58-8	C5H10O3	3-12
Lithium Hexaflouro Phosphate	21324-40-3	LiPF6	1-2
Polyvinylidene Fluoride (PVDF)	24937-79-9	-(C2H2F2)n-	<1
Cooper	7440-50-8	Cu	7-15
Aluminum	7429-50-8	Al	5-10
Steel, nickel and inert components	N/A	N/A	Balance

3. Hazard Identification

Hybrid Pulse Capacitor described in this SDS is hermetically sealed unit, which are not hazardous when used according to the recommendations of the manufacturer and provide that the integrity the cells is maintained.

Health Hazards (Acute and Chronic)
These chemicals are contained in a sealed Al foil. Risk of exposure occurs only if the battery is mechanically or electrically abused. Contact of electrolyte with skin and eyes should be avoided.

Sign/Symptoms of Exposure
A shorted battery can cause thermal and chemical burns upon contact with the skin. Maybe there is a reproductive hazard.

4. First Aid Measures

Eye Contact: Flush eye with plenty of water for at least 15 minutes. Seek medical attention.

Skin Contact: Flush skin with plenty of running water for at least 15 minutes. Seek medical attention.

Inhalation: Remove to fresh air. If necessary, administer oxygen and seek medical attention.

Ingestion - Wash mouth with plenty of water and drink plenty of water. Seek medical attention

5. Fire Fighting Measures

Flash Point
N/A

Extinguishing Media
Dry chemical type extinguishers, or CO2 extinguishers or water extinguishers and dry sand can be used effectively for burning batteries. Water-based foam or copious quantities of water can be used to cool down burning cell.

Special Fire-Fighting Procedures
Wear the self-contained breathing apparatus (SCBA) to avoid breathing of irritant fumes. Wear protective clothing and equipment to prevent body contact with electrolyte solution. The Lithium

metal in batteries reacts with water and generates Hydrogen gas. Since vapor, generated from burning batteries may make eyes, nose and throat irritates, be sure to extinguish the fire on the wind word side. DO NOT re-enter the area until it has been thoroughly ventilated (purged) of fire vapors and from extinguishing agent.

Unusual Fire and Explosion Hazards
Battery may explode or leak potentially hazardous vapors when subject to: excessive heat (above 150ºC), fire, recharged, over-discharged (discharge below 0V), punctured and crushed. Burning battery emit acrid smoke, irritating fumes, and toxic fumes of hazardous oxides of carbons, hydrofluoric acid and other toxic by-products. Damaged or opened batteries can result in rapid heating and release of flammable vapors.

Hazardous Combustion Products
Carbon monoxide, carbon dioxide, lithium oxide fumes and other toxic by-products (e.g., lithium oxide, aluminum, aluminum oxide, cobalt oxide, nickel oxide, copper, copper oxide, phosphorus pentafluoride, etc.).

6. Accidental Release Measures

Steps to be Taken in case Material is Released or Spilled
In the case of electrolyte leakage from a battery, the leaked materials should be removed using protective glass and protective gloves. Do not inhale the gas as much as possible. In addition, avoid touching the material as much as possible. Remove personnel from area until fumes dissipate. Avoid skin and eye contact or inhalation of vapors. If skin has come into contact with the electrolyte, it should be washed thoroughly with water. Damaged batteries that are not hot or burning should be placed in a sealed plastic bag or container, adding some chalk (CaCO3) or lime (CaO) powder or Vermiculite. The removal of the cells should be dealt carefully using protective glasses and protective gloves.

Waste Disposal Method
It is recommended to discharge the battery to the end, handing in the abandoned batteries to related department unified, dispose of the batteries in accordance with approved local, state, and federal requirements. Consult state environmental protection agency and/or federal EPA.

7. Handling and Storage

The HPC cells are not designed to be recharged from external power source besides a dedicated Lithium Thionyl Chloride or Sulfuryl chloride cells. Connecting to any other power

supply can result in fire or explosion. The battery 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. Do not short circuit, over charge, puncture, incinerate, crush, immerse in water, force discharge, or expose to temperatures above the temperature range of the battery. Do not crush or puncture the battery, or immerse in liquids. Risk of fire and explosion.

Precautions to be taken in Handling and Storing
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.

Other Precautions
The battery may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.

8. Exposure Controls and Personal Protection

Respiratory Protection
Under battery venting, provide as much ventilation as possible. Avoid confined areas with venting cell cores. None necessary under normal use. In case electrolyte leakage from cells, protect hand with chemical resistant rubber gloves. If cells are burning, leave the area immediately. In all fire situations, use contained breathing apparatus.

Ventilation
Not necessary under conditions of normal use. In case of abuse, use adequate mechanical ventilation (local exhaust) for battery that vent gas or fumes.

Protective Gloves
Not necessary under conditions of normal use. In case of spill, use chemical resistant rubber gloves.

Other Protective Clothing or Equipment
Not necessary under conditions of normal use. Personal Protection is recommended for venting battery: Respiratory protection, Protective gloves, protective clothing and safety glass with side shields.

9. Physical Characteristics

Appearance	Cylindrical Solid Object		
Odor	No odor. If leaked, giving off organic odor		
pH	N/A	**Vapor Pressure**	N/A
Vapor Density	N/A	**Boiling Point**	N/A
Flammability	N/A	**Melting Point**	Solid
Ignition Temperature	N/A	**% Volatiles**	N/A
Flash Point	N/A	**Density (gr/cc)**	> 1.5 gr/cc
Solubility in Water	N/A	**Explosion properties**	N/A

10. Stability and Reactivity

Stability
Stable under hermetically sealed type, storage and usage in recommended conditions

Condition to Avoid
Mechanical abuse such as forcing, crushing, piercing, disassembly
Electrical abuse such as short-circuit, charging, over-discharging
Heat above 85'C, exposure to open flame and incineration

Hazardous Decomposition Products
No hazardous decomposition during normal operating conditions.
If cell opens:
- Thermal decomposition during fire produces hazardous oxides of carbon (mainly CO and other VOC's) and phosphorous, hydrofluoric acid and other toxic byproducts.
- Metallic compounds such as oxides of nickel, cobalt and copper.
- Electrolyte with water: Hydrofluoric acid (HF).

* Thermal decomposition over 150'C: Hydrochloric acid (HCl) and Sulfur dioxide (SO_2)

Hazardous Polymerization
N/A

11. Toxicological Information

Not Applicable

In the event of rupture or leakage, Inhalation, skin contact and eye contact are possible when the battery is opened. Exposure to internal contents, the corrosive fumes will be very irritating to skin, eyes and mucous membranes. Overexposure can cause symptoms of non-fibrotic lung injury and membrane irritation.

12. Ecological Information

When properly used and disposed, the battery does not present environmental hazard. Some materials within the batteries are bioaccumulative, so do not bury or throw out into the environment.

13. Disposal Considerations

Appropriate method of disposal of substance or preparation.

Do not incinerate, or subject cells to temperatures in excess of 85℃. Such abuse can result in loss of seal, leakage, and/or cell explosion. Dispose of in accordance with appropriate local regulations.

14. Transportation

1) Product Category: Lithium Ion Batteries
- Model: HPC-1520, HPC-1530, HPC-1550

2) UN ID No. UN3480 or 3481
- Lithium Ion Batteries, UN3480
- Lithium Ion Batteries Contained in Equipment, UN3481
- Lithium Ion Batteries Packed with Equipment, UN3481

3) Regulation

A. Air Transportation: IATA 64th Edition 2023, Dangerous Goods Regulations

Small lithium ion batteries are not subject to all of the provisions of the DGR provided that they comply with all of the requirements set out in Section II of Packing Instructions 965, 966 and 967 for lithium ion batteries

- Lithium Ion Batteries, ≤ 20 Wh
  * UN3480, PI965-1B, Section II (≤ 2.7Wh, Package ≤ 10kg)

* UN 38.3 Test Approval
* 2.5kg per package, Cargo Aircraft only, Caution Label only
* Package exceeds section II Limits or more than 1 package –Cargo Aircraft only, Class 9, Caution label

- Lithium Ion Batteries Contained in Equipment, ≤ 20 Wh
* UN3481, PI970, Section II
* UN 38.3 Test Approval
* 5kg per package, Caution Label only
* Available to passenger cargo and aircargo craft

- Lithium Ion Batteries Packed with Equipment, ≤ 20 Wh
* UN3481, PI969, Section II
* UN 38.3 Test Approval
* 5kg per package, Caution Label only
* Available to passenger cargo and aircargo craft

B. Sea Transportation: IMDG – Code 2018

Special Provision 188 (Exception)
Cells and batteries offered for carriage are not subject to other provisions of ADR if they meet the following:
For a lithium ion cell, the Watt-hour rating is not more than 20 Wh;

* UN 38.3 Test Approval
* Max 30kg rigid package, Caution label

C. Road or Rail Transportation: ADR / RID 2015

Special Provision 188 (Exception)
Cells and batteries offered for carriage are not subject to other provisions of ADR if they meet the following:
For a lithium ion cell, the Watt-hour rating is not more than 20 Wh

* UN 38.3 Test Approval
* Max 30kg rigid package, Caution label

15. Regulatory Information

As shown in above.

16. Other Information

For further information, please contact to COROS Battery Co., Ltd.