

## Material Safety Data Sheet (MSDS)

### 1. PRODUCT IDENTIFICATION

Product series	: LIC
Product Identifier	: Lithium-ion Capacitors
Synonyms	: Asymmetric Hybrid Capacitor
Manufacturer	: Taiwan Zhifengwei Technology Co., Ltd.
Address	: No. 4, Jifeng Road, Wufeng District, Taichung City, Taiwan
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### 2. HAZARDS IDENTIFICATION

※ This product is a solid article consisting of an opaque plastic and metal sealed case, which is filled with an electrolyte solution that has been almost completely adsorbed and or absorbed by the activated carbon layers. If the contents of these LICs remain sealed in the outer shell and they are kept uncharged, persons handling these products will avoid most of the risks associated with hazardous components of the electrolyte. As such, precautions should be taken to avoid rupture or overheating the sealed metal containers.

Disposal Hazards	: Solid waste will be produced when discarded, and it is not easy to decompose in the natural state.
Environmental Hazards	: E-waste produced during disposal will pollute the environment and must be recycled.
Physical and Chemical Hazards	: The electrolyte contained in it will burn at high temperature (fire).
Special Hazard	: When the Lithium-ion capacitors is used under high temperature, overvoltage, overcurrent, reverse voltage, etc., the explosion-proof valve of the capacitor will open, and high-temperature gas and liquid will splash out, which will burn the eyes and skin, and irritate the respiratory tract.
The main symptoms	: Weakness, weakness, pale complexion, nausea, vomiting, abdominal pain, diarrhea, chest tightness, and chest pain; in severe cases, respiratory and circulatory system disorders, shallow, slow and irregular breathing, decreased blood pressure, thin and slow pulse, decreased body temperature, and paroxysmal convulsions ,coma.

### 3. COMPOSITION AND INGREDIENTS

Chemical Name	CAS No.	Content (%wt)
Activated Carbon	64365-11-3	5~10%
Aluminum	7429-90-5	3~8%
Cellulose	9004-65-3	5~10%
Copper	7440-50-8	10~15%
Lithium hexafluorophosphate	21324-40-3	3~5%
Carbonate	1129-41-5	5~10%
Lithium nickel cobalt manganate	7440-02-0	23~35%
Lithium	7439-93-2	/
Cobalt	7440-48-4	/
Manganese	7439-96-5	/
Carbon	7440-44-0	15~20%
Other substances	N/A	2~10%

**4. FIRST AID INFORMATION**

Skin Exposure	:	Remove contaminated clothing, wash skin thoroughly with soap and water. If you feel unwell and symptoms worsen, seek medical attention.
Eye Exposure	:	If electrolyte comes into contact with eyes, rinse carefully with water for several minutes. If wearing contact lenses, remove them at your convenience and continue flushing. If eye irritation persists, seek medical attention. Seek medical attention immediately if the capacitor pins come into contact with eyes and cause accidental injury.
Inhalation	:	When the main body is damaged, a small amount of liquid will flow out and a slight irritating smell will be produced. When inhaled, leave the scene quickly, transfer the patient to a place with fresh air, and keep the respiratory tract unobstructed. If you feel unwell, seek medical attention immediately.
Ingestion	:	Mouth should be rinsed out and seek medical attention immediately.
Electric Shock	:	For the victim who is shocked by electric equipment, the rescuer can only contact the victim after removing the victim from the relevant equipment with insulating tools. If the shock causes respiratory arrest, perform cardiopulmonary resuscitation (CPA) immediately and contact a medical institution at the same time. If the victim's heart stops, qualified personnel should immediately administer CPR and use an automatic electrical shock device (AED)

**5. FIRE-FIGHTING MEASURES**

Suitable extinguishing media	:	Alcohol-resistant foam, dry powder, carbon dioxide, sand and other fire extinguishing materials; water (only for cooling and when the product is not charged).
Unsuitable extinguishing media	:	No data.
Fire Instructions and Special Hazards	:	The capacitor contains a small amount of electrolyte and is adsorbed in activated carbon, and there is almost no free electrolyte. Under normal storage, use, and transportation conditions, the capacitor burns. However, if it is heated continuously for a long time, the sealed capacitor casing will explode and may cause the device to burn, and the internal materials will undergo thermal decomposition to produce toxic gases (such as nitrogen oxides, carbon dioxide, hydrocyanic acid, hydrogen fluoride and other fluorides, borides, etc. ).
Special protection and equipment for firefighters	:	Self-contained air breathing apparatus, protective gloves, fire suits, etc., goggles and wear when necessary. Wear chemical protective clothing. Fight fire from a safe distance or from a protected location. Unnecessary personnel must be in a safe location. Keep away from sources of ignition and extinguish fire with fire extinguishing facilities. If fire occurs in adjacent area, move containers to a safe place immediately.

**6. ACCIDENTAL RELEASE MEASURES**

Personal precautions, protective equipment and emergency procedures	:	Avoid heat, flame and other sources of ignition. Personnel must wear appropriate protective equipment (such as self-contained positive pressure respirators and anti-virus clothing), avoid direct contact with liquid and gas emitted from the capacitor, and avoid contact with eyes and skin or inhalation. Keep unrelated people away from the scene, isolate the dangerous area and prohibit personnel from entering.
Environmental precautions	:	The leakage of liquid from inside the capacitor should be prevented; the leakage should not be discharged directly into rivers and sewers.
Clean-up methods and materials	:	Absorb the leaked liquid with sand or other non-combustible materials, collect it in a suitable container, and hand it over to a manufacturer qualified for hazardous waste disposal. Clean up the ground exposed to the spill with detergent and water.

**7. HANDLING AND STORAGE****7.1 Precautions for safe handling:**

- (1) Before use, the polarity of the capacitor should be confirmed, reverse polarity use will lead to performance degradation.
- (2) When using, do not touch the terminals of the capacitor to prevent electric shock.
- (3) In the process of electrification, do not use conductors to short-circuit the positive and negative terminals of the capacitor.
- (4) During the electrification process, do not use conductive aqueous solution such as acid or alkali to cause a short circuit.
- (5) Use at rated temperature.
- (6) Do not expose to ozone, ultraviolet rays and radiation;
- (7) The precautionary measures in this MSDS and the special instructions for use of the product provided by the manufacturer should be followed.

**7.2 Storage conditions and use environment:**

Capacitors should be stored in a dry and well-ventilated environment with a temperature of 5°C~35°C and a humidity below 75%, avoiding direct sunlight. Keep away from water, acid, alkali and harmful gas.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**8.2 Facility Measures:** Use machines or local exhaust ventilation where possible.

**8.3 Protective Equipment:**

- (1) Respiratory protective equipment: Wear a gas mask.
- (2) Hand protective equipment: Wear anti-corrosion protective gloves.
- (3) Eye protection equipment: Wear goggle-type protective glasses.
- (4) Skin and body protective equipment: Wear protective clothing.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

State of matter:	Solid	Vapor Pressure:	No data
Color:	Blue	Vapor Density:	No data
Odor:	Tasteless	Specific gravity (density):	No data
PH value:	No data	Solubility:	Insoluble in water
Melting point/freezing point:	No data	Partition coefficient: n-octanol/water:	No data
Initial boiling point and boiling range:	No data	Decomposition temperature:	No data
Flash point:	No data	Other data:	——
Upper/lower flammability or explosion limits:	No data		

**10. STABILITY AND REACTIVITY**

Stability	:	Stable at normal temperature and pressure
Possibility of a hazardous reaction	:	Under improper use conditions, the explosion-proof valve of the capacitor may open, and a small amount of pungent odor and toxic gas will be released, which will cause discomfort when inhaled, and the leakage is flammable.
Conditions to avoid	:	Avoid contact with water/heat/sparks/open flames/acids and alkalis.
Incompatible material	:	Combustible, volatile.
Hazardous decomposition products	:	When the capacitor ruptures due to overheating, overvoltage, or impact, the internal materials may decompose, producing corrosive, pungent odor, and toxic gases.

**11. TOXICOLOGICAL INFORMATION**

Irritation	:	In the event of exposure to internal contents, vapour fumes may be very irritating to the eyes and skin.
Sensitization	:	Not Available.
Reproductive Toxicity	:	Not Available.
Toxicologically Synergistic Materials	:	Not Available.

**12. ECOLOGICAL INFORMATION**

General note	:	Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
Anticipated behavior of a chemical product in environment/possible environmental impact/ecotoxicity	:	Not Available.

**13. DISPOSAL CONSIDERATIONS**

Waste Treatment	:	Recycle or dispose of in accordance with government, state & local regulations
Treatment Attention for Waste	:	Deserted batteries shouldn't be treated as ordinary trash. Shouldn't be thrown into fire or placed in high temperature. Shouldn't be dissected, pierced, crushed or treated similarly. Best disposal method is recycling.

**14. TRANSPORT INFORMATION**

UN Classification	: UN3508
Proper shipping name	: Lithium-ion capacitors(Asymmetric capacitance)
Packaging and Shipping	: 1) Energy storage capacity greater than 0.3Wh but less than 20Wh. 2) Special pallets and independent packaging, no risk of short circuit. 3) It has a safety vent to safely release the pressure accumulated during use. 4) Can withstand 95 kPa differential pressure test. 5) Without packaging, it will not be damaged even if dropped from a height of 1.2 m onto a flat surface.
Special precautions	: Verify that containers are not broken or leaking. Do not collapse or drop container. Care must be taken during loading and unloading not to damage the container and to ensure that the collapse of the cargo pile is prevented. Avoid direct radiation.
Special precautions which a user needs to be aware of, or needs to comply with, in connection with transport or conveyance either within or outside their premises.(LIC series 10F~120F products, UN3508 less than 0.3Wh, not applicable.)	
IATA	: UN3508 Class9, A196
IMDG Code	: UN3508 Class9 372
Class9	: Symbol (seven vertical stripes in upper half): black;Background: white;Figure 9' underlined in bottom corner

**15. REGULATORY INFORMATION**

Acetonitrile	
EU Classification	: According to EC/1272/2008 Symbols: F, Xn
Hazard statements, including risk phrases	: R11: Highly flammable. R20/21/22: Harmful by inhalation, in contact with skin and if swallowed. R36: Irritating to eyes.
Security phrase	: S16: Keep away from ignition sources at all times - no smoking. S36/37/39: Wear suitable protective clothing, gloves, goggles and face shield.

**16. OTHER INFORMATION****16.1 Documentation Information**

File Name:	Lithium-ion capacitors Material Safety Data Sheet (MSDS)
File No:	MSDS-CDA-V07
Revision:	V07
Revision Date:	2023.09.10
Prepared Department:	Lithium-ion capacitors Division, R&D

**16.2 Abbreviations and acronyms:**

CAS# = Chemical Abstracts Service number
OSHA = European Agency for Safety and Health at work
ACGIH = American Conference of Government Industrial Hygienists

**16.3 About mention contents:**

The information contained herein is based on data available to us, which we believe to be correct. However, Taiwan Zhifengwei Technology Co., Ltd. does not make any express or implied guarantees for the accuracy of these data or the consequences of using these data. Taiwan Zhifengwei Technology Co., Ltd. will not bear any responsibility for the damage caused by the use of the products described in this article.