SAETY DATA SHEET (SDS)

This document is prepared as a courtesy to provide persons using this product with additional safety and regulatory information. Users are also encouraged to access the applicable SDS for the internal components referenced in Section 1 below.

Note: This product is an "article" under the U.S. Federal Occupational Safety and Health Administration (OSHA) Hazard Communication Standard (29 CFR 1910.1200), European Union (EU) Directives, Japanese, Chinese and Korean regulations and the Canadian Workplace Hazardous Materials Standard. Refer to Section 15 (Regulatory Information) for specific regulatory citations. As an article, this product presents negligible health and physical hazards under reasonably anticipated conditions of use. Accordingly, a Safety Data Sheet (SDS) is not required for this product under the standards cited above.

Prepared using U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian NOHSC, Japanese, Chinese, and European Union Standards as a guide.

Electrochemical Double Layer Asymmetric Capacitors, Product Families:

HS series, HSL series, HSH series

1. COMPOSITION INFORMATION (Internal Chemicals Only)

HAZARDOUS INGREDIENTS	%	CAS NUMBER
Lithium Hexafluorophosphate(LiPF6)	1.5~2.8%	21324-40-3
Ethylene Carbonate(EC)	2.9~5.8%	96-49-1
Propylene Carbonate(PC)	2.5~5.0%	108-32-7
Dimethyl Carbonate（DMC）	2.2~4.5%	616-38-6
Diethyl Carbonate（DEC）	2.3~4.8%	105-58-8
Ethyl Methyl Carbonate(EMC)	2.1~4.4%	623-53-0

Note: Under normal use and handling the customer has no contact with the internal components of the capacitor or the chemical hazards. Under normal use and handling, these capacitors do not emit regulated or hazardous substances.

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

Product Description: 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 by the internal capacitor layers.

GENERAL SAFETY CONSIDERATIONS

- Cells may vent/rupture if overcharged, reverse charged, incinerated or heated above 150ºC.
- Do not crush, mutilate, nail penetrate or disassemble.
- High case temperature may result from abuse of the cell.

Note: No effect under routine handling and use of capacitor. If the outer casing of the cell is damaged, exposure to small amounts of internal materials within the cell may occur.

PRIMARY ROUTES OF ENTRY

By inhalation (vapor), skin, eyes and ingestion.

SYMPTOMS OF EXPOSURE

Skin contact: Causes irritation. Contents may be absorbed through skin producing effect similar to those described for inhalation.

Eye contact: Irritant. Can cause redness and pain.
Inhalation: Contents can cause respiratory tract irritation. Exposure to high concentrations of vapor can cause headache, nausea, vomiting, respiratory depression, weakness, irregular heart beat, and abdominal pain.
Ingestion: May cause irritation and symptoms similar to those described for inhalation.

REPORTED AS CARCINOGEN

NA

3. FIRST AID MEASURES

Under normal use and handling of cell:

Inhalation: Not a health hazard.
Eye Contact: Not a health hazard.
Skin Contact: Not a health hazard.
Ingestion: If swallowed, obtain medical attention immediately.

Note: If the outer casing of the cell is damaged, and exposure to internal materials within the cell occurs, the following actions are recommended:

Inhalation: Remove to fresh air. If necessary, administer oxygen and seek medical attention.
Eye Contact: Rinse eyes with water for 15 minutes and seek medical attention.
Skin Contact: Immediately flush the contaminated skin with water. If this chemical penetrates the clothing, immediately remove the clothing and flush the skin with water. Seek medical attention.
Ingestion: Rinse mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Seek medical attention.

4. FIRE FIGHTING MEASURES

SUITABLE FIRE EXTINGUISHING MATERIALS:

Water Spray: OK (cooling only and only if products are	**Dry Chemical:** OK	**Carbon Dioxide:** OK
Foam: OK	**Halon:** OK	**Other ABC Type:** OK

SPECIAL FIREFIGHTING INSTRUCTIONS

Use NIOSH/OSHA approved full-face self-contained breathing apparatus (SCBA) with full protective gear.

Use non-sparking tools and equipment

5. ACCIDENTAL RELEASE MEASURES

PERSONAL PROTECTION

Always wear recommended personal protective equipment. Eliminate sources of ignition and ensure adequate ventilation.

METHOD FOR CLEANUP AND DISPOSAL

Place material into a tightly closed chemical waste container and dispose of as hazardous waste.

6. HANDLING AND STORAGE

Handling: No special protective clothing required for handling individual cells. Do not puncture or crush the capacitor.
Storage: Store in a cool, dry place.

7. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS

Keep away from heat and open flame. Store in a cool, dry place.

PERSONAL PROTECTION

Respirator:	Not required during normal operations.
Eye/Face Protection:	Not required beyond safety practices of employer.
Gloves:	Not required for handling of cells.
Foot Protection:	Steel-toed shoes recommended for large container handling.

8. STABILITY AND REACTIVITY

Reactivity: None
Incompatibilities: None during normal operation,Avoid exposure to heat, open flame and corrosives.
Hazardous Decomposition Products: None during normal conditions.
Conditions to Avoid: Avoid exposure to heat and open flame. Do not puncture, crush or incinerate.

9. PHYSICAL AND CHEMICAL PROPERTIES

State:	Solid
Odor:	NA
pH:	NA
Vapor Pressure:	NA
Vapor Density:	NA
Boiling Point:	NA
Solubility in Water:	Insoluble
Specific Gravity:	~2.5

10. TOXICOLOGICAL INFORMATION

This product is not toxic during routine handling and use.

Sensitization:	No
Teratogenicity:	No
Reproductive Toxicity:	No
Acute Toxicity:	No

Note: If cells are opened through misuse or damage, discard immediately.

11. ECOLOGICAL INFORMATION

Under normal conditions, cells pose no risk to persons or the surrounding environment.

12. DISPOSAL CONSIDERATIONS

Do not dispose in trash. Disposal should be done in accordance with Federal, state or local regulations.

13. TRANSPORT INFORMATION

(1)	(2)	(3a)	(3b)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9a)	(9b)	(10)	(11)
3508	CAPACITOR, ASYMMETRIC (with an energy storage capacity greater than 0.3Wh)	9	M11		9	372	0	E0	P003				

Customers should consult the UN regulations 3508 (SP372), IATA Dangerous Goods Regulations(A196) or USDOT (CFR49 Part 171) for details. There are 3 definitions under the new classification, each with their own shipping requirements. Eaton products only fall within the first two classifications.

Classification	Eaton Products	Cells	Capacitor shipped in Modules
Cells <0.3Wh	HS, HSL,HSH	No restrictions	No restrictions
Cells ≥0.3Wh, <20Wh	HSH	Capacitors or modules shall be protected against short circuit.	Packaging in a strong outer packaging constructed of suitable material, and of adequate strength and design, in relation to the packaging's intended use and in such a manner as to prevent accidental functioning of capacitors during carriage
Cells ≥20Wh		UN3508, Class 9.	

In accordance with the regulations, Eaton products (HSH greater than 0.3Wh) meet the following provisions also required by the new regulation: withstand 95 kPa pressure differential, designed with a safety pressure relief valve, are marked with the energy storage capacity in Wh and can withstand a 1.2m drop test.

Further note that capacitors HSH series capacitors when installed in equipment, only need to meet the following (excerpted from UN3508, note 372; IATA A196):

"Capacitors installed in equipment and containing an electrolyte meeting the classification criteria of any class of dangerous goods, are not subject to other provisions of ADR provided that the equipment is packaged in a strong outer packaging constructed of suitable material, and of adequate strength and design, in relation to the packaging's intended use and in such a manner as to prevent accidental functioning of capacitors during carriage. Large robust equipment containing capacitors may be offered for carriage unpackaged or on pallets when capacitors are afforded equivalent protection by the equipment in which they are contained."

14. REGULATORY INFORMATION

IATA Dangerous Goods Regulations (DGR) 66th Edition:
The product is not classified in explosives and flammable substance.

15. DOCUMENT INFORMATION

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