

### Product Identifier (Product Names)

DC2412-UPS  
DC2412-UPSP2  
DC2412-UPS-LD  
UPSIC-1205  
UPSIC-2403  
UPSI-2415DP2  
UPSI-2406R2DP2MB  
UPSI-2406DP2  
UPSI-2412DP2  
UPSI-1208DP2  
UPSIC-1205D  
UPSIC-2403D  
DC2412-UPSD  
DC2412-UPSDP2  
BP-SUC-1020  
BP-SUC-1645  
BP-SUC-1645D  
BP-SUC-10066  
BP-SUC-10066D  
BP-SUC-16090  
BP-SUC-16090D  
BP-SUC-30090  
BP-SUC-30090D

### Cells Used

**Vinatech:** VEC 3R0 387 QG / VEC3R0367QG / VEC3R0107QG

**LS Mtron:** LSUC 003R0S 0380F EA / LSUC 003R0S 0480F EA

**Eaton:** XT3560-3R0377-R

**Sam Wha Electric:** DA0U367W35060HA200 / DA0U487A35070HA200 / DA0U487C35070HA200

### **Information about the manufacturer:**

Bicker Elektronik GmbH  
Ludwig-Auer-Strasse 23  
86609 Donauwörth  
Germany

Website: [www.bicker.de](http://www.bicker.de)

Email: [info@bicker.de](mailto:info@bicker.de)

Phone: +49 906 70595-0

### **Emergency number:**

Counseling center Giftnotruf München (poison emergency call munich): +49 89 19240  
(24/7 emergency phone number)

# Green-Cap(EDLC) Transportation Regulations (UN 3499)

**SAMWHA ELECTRIC**

# Green-Cap(EDLC) Transportation Regulations (UN 3499)

- Transport of EDLC (Electric Double Layer Capacitor)
  - All SAMWHA Green-cap(EDLC) follows UN No. 3499, 'Capacitor, electric double layer'
- General Information
  1. UN Number: UN3499
  2. Proper Shipping Name : Capacitor, electric double layer  
(with an energy storage capacity greater than 0.3Wh)  
Note : Capacitors not exceeding 0.3Wh are not subject to DGR  
(Dangerous Goods Regulations)
  3. Packing Instruction Number : PI 971
  4. Applicable Special Provision Number : 361 (A186 in ICAO / IATA & 173, 176 US DOT)
  5. Types: Capacitor and Capacitor in Module.

# Green-Cap(EDLC) Transportation Regulations (UN 3499)

There are two transport categories, capacitor or module itself and capacitor

| Class            | Rated Voltage (V <sub>R</sub> ) | Rated Capacitance (F) | Energy Capacity (Wh)* | Less than 0.3Wh | ~10Wh | 10Wh~ | Contained in equipment | Dangerous Goods |
|------------------|---------------------------------|-----------------------|-----------------------|-----------------|-------|-------|------------------------|-----------------|
| 1<br>(capacitor) | 2.5                             | 3 ~ 200               | 0.003 ~ 0.174         | ○               |       |       |                        | N/A**           |
|                  | 2.7                             | 3 ~ 200               | 0.003 ~ 0.203         | ○               |       |       |                        | N/A**           |
|                  | 3                               | 3 ~ 200               | 0.003 ~ 0.250         | ○               |       |       |                        | N/A**           |
|                  | 5.4                             | 1.5                   | 0.006 ~ 0.020         | ○               |       |       |                        | N/A**           |
| 2<br>(capacitor) | 2.7                             | 300 ~ 3000            | 0.304 ~ 3.038         |                 | ○     |       |                        | Y               |
|                  | 3                               | 300 ~ 3000            | 0.375 ~ 3.750         |                 | ○     |       |                        | Y               |
| 3<br>(module)    | 16.2                            | 200~ 500              | 7.29 ~ 18.23          |                 |       |       | ○                      | Y               |
|                  | 48.6                            | 66.6 ~ 166.6          | 21.85~ 54.65          |                 |       |       | ○                      | Y               |
|                  | 75                              | 36                    | 28.125                |                 |       |       | ○                      | Y               |
|                  | 90                              | 10                    | 11.250                |                 |       |       | ○                      | Y               |
|                  | 129.6                           | 62.5                  | 145.800               |                 |       |       | ○                      | Y               |

\* Energy storage capacity was calculated from the equation of  $E(Wh) = 0.5CVR^2 / 3600$

\*\* EDLCs which energy capacity is not exceeding 0.3Wh are not subject to Dangerous Goods Regulations.

# Green-Cap(EDLC) Transportation Regulations (UN 3499)

| Class            | Rated Voltage (V <sub>R</sub> ) | Rated Capacitance (F) | Energy Capacity (Wh)* | Drop                                                | Protection                                                                                                  | Pressure differential                                                |
|------------------|---------------------------------|-----------------------|-----------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| 1<br>(capacitor) | 2.5                             | 3 ~ 200               | 0.003 ~ 0.174         | SAMWHA EDLC is designed to withstand 1.2m drop test | SAMWHA EDLC or module is protected against short circuit or fitted with a metal strap connecting terminals. | SAMWHA EDLC is designed to withstand a 95 kPa pressure differential. |
|                  | 2.7                             | 3 ~ 200               | 0.003 ~ 0.203         |                                                     |                                                                                                             |                                                                      |
|                  | 3                               | 3 ~ 200               | 0.003 ~ 0.250         |                                                     |                                                                                                             |                                                                      |
|                  | 5.4                             | 1.5                   | 0.006 ~ 0.020         |                                                     |                                                                                                             |                                                                      |
| 2<br>(capacitor) | 2.7                             | 300 ~ 3000            | 0.304 ~ 3.038         |                                                     |                                                                                                             |                                                                      |
|                  | 3                               | 300 ~ 3000            | 0.375 ~ 3.750         |                                                     |                                                                                                             |                                                                      |
| 3<br>(module)    | 16.2                            | 200 ~ 500             | 7.29 ~ 18.23          | -                                                   |                                                                                                             |                                                                      |
|                  | 48.6                            | 66.6 ~ 166.6          | 21.85 ~ 54.65         |                                                     |                                                                                                             |                                                                      |
|                  | 75                              | 36                    | 28.125                |                                                     |                                                                                                             |                                                                      |
|                  | 90                              | 10                    | 11.250                |                                                     |                                                                                                             |                                                                      |
|                  | 129.6                           | 62.5                  | 145.800               |                                                     |                                                                                                             |                                                                      |

- Not more than 10Wh energy capacity
  - Not subject to other provisions when capable of withstanding a 1.2m drop test unpackaged on an unyielding surface without loss of contents.
- Capacitors contained in equipment
  - Not subject to other provisions provided the equipment is packed in a strong outer packaging constructed of suitable material and of adequate strength and design in relation to the packaging intended use and in such a manner as to prevent accidental functioning of capacitors during transport.

15, UNAM-RO, DEOKJIN-GU, JEONJU CITY, 54853, SOUTH KOREA

TEL: +82 63 715 3020

FAX: +82 63 715 3021

Email: [hycap@vina.co.kr](mailto:hycap@vina.co.kr)<http://www.vinatech.com>

Ref. No. : VN20240108-001

8<sup>th</sup> January 2024

To: Valued customers and partners

From: VinaTech Co., Ltd.

Subject: **Supercapacitor Transportation Regulations**

Dear valued customers,

We would like to confirm that all supercapacitor products from VinaTech follow UN3499, 'Capacitor, electric double layer, 9.' as below:

| Category                              | Item        | Standard           | Marking                                                         |
|---------------------------------------|-------------|--------------------|-----------------------------------------------------------------|
| Energy storage capacity < 0.3wh       | 0.5F - 100F | Not subject to DGR | Capacitor must be marked with the energy storage capacity in Wh |
| 0.3wh < Energy storage capacity ≤10wh | 360F - 500F | UN3499             |                                                                 |
| 10wh < Energy storage capacity        | Module      | UN3499             |                                                                 |

VinaTech supercapacitors are designed to withstand 1.2m drop test.

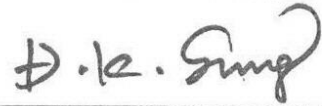
VinaTech supercapacitors or modules are fully discharged and protected against short circuit or fitted with a metal strap connecting terminals.

**Transportation Information:**

**INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):** This product is listed in the IATA Dangerous Goods Regulation under the listing for capacitor, electric double layer with an energy storage capacity greater than 0.3 Wh. However, electric double layer capacitors with an energy storage capacity of 10 Wh or less, including when configured in a module, are not subject to other provisions of the Dangerous Goods Regulation and do not need to be shipped as dangerous goods when they are packaged in a manner that protects them from short circuits or fitted with a metal strap connecting the terminals. Cells with a storage capacity greater than 10 Wh must be shipped as dangerous goods, per IATA regulations. Proper IATA shipping name: UN3499, capacitor, electric double layer, 9. (See A186, SP361)

**INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:** This product is listed in the IMO Dangerous Goods Regulation (IMDG) under the listing for capacitor, electric double layer with an energy storage capacity greater than 0.3 Wh. However, electric double layer capacitors with an energy storage capacity of 10 Wh or less, including when configured in a module, are not subject to other provisions of the IMDG regulations and do not need to be shipped as dangerous goods when they are packaged in a manner that protects them from short circuits or fitted with a metal strap connecting the terminals. Cells with a storage capacity greater than 10 Wh must be shipped as dangerous goods, per IMO regulations. Proper IMO IMDG shipping name: UN3499, capacitor, electric double layer, 9. (See 36-12)

VINA TECH CO., LTD.



---

D.K.SUNG / President

**VINA TECH CO., LTD.**

## LS Materials Ultracapacitor Transportation Regulations

1st, Jan, 2021

EDLC products manufactured by LSMaterials are not subject to Dangerous Goods or Hazardous Materials transportation regulations on the grounds of UN 3499

### Transport of EDLC (Electric Double Layer Capacitor)

1. UN Number: UN3499 CAPACITOR, electric double layer  
(with an energy storage capacity greater than 0.3Wh)
2. Proper Shipping Name : Capacitor, electric double layer
3. Packing Instruction Number: PI 971
4. Applicable Special Provision Number: 361 (A186 in ICAO / IATA & 173, 176 US DOT)  
\* NOT regulated as Dangerous Goods
5. Types: Capacitor and capacitors in a module.

### Compliance to UN 3499 with Special Provision 361 (A186)

- Single capacitor must contain no more than 10Wh energy capacity.
- Each capacitor must have Wh rating mark on.
- Each capacitor must be designed to withstand 95 kPa pressure differential.
- Each capacitor must have a vent or weak point to relieve pressure for safety.
- Each capacitor must withstand a drop from a height of 1.2meters.
- Capacitor or modules must be protected against short circuit or fitted with a metal strap connecting terminals.
- Capacitors (modules) must be packed in a strong outer packaging constructed of suitable material and of adequate strength to prevent accidental functioning of capacitors during transport.

**All capacitors manufactured by LS Materials are satisfied with applicable requirements, and therefore, may not be considered as dangerous goods under existing transportation regulation.**

# EDLC Transport Regulation (UN3499)

## ECOLOGICAL INFORMATION

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

## DISPOSAL CONSIDERATIONS

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

## TRANSPORT INFORMATION

| (1)  | (2)                                                                                    | (3) | (4) | (5) | (6) | (7a) | (7b) | (8)  | (9) | (10) | (11) |
|------|----------------------------------------------------------------------------------------|-----|-----|-----|-----|------|------|------|-----|------|------|
| 3499 | CAPACITOR, electric double layer (with an energy storage capacity greater than 0.3 Wh) | 9   |     |     | 361 | 0    | E0   | P003 |     |      |      |

Customers should consult the UN regulations 3499 (SP361), IATA Dangerous Goods Regulations(A186) 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              | B, PB, HB, PHB<br>HV, PHV, KR,<br>KVR, KVV, KW,<br>M, PM, TV,TVA<br>PTV series series | No restrictions                                                         | No restrictions                                                                                  |
| Cells<br>≥0.3Wh,<br><10Wh | XV, XT, XVM,<br>XL60, XLHV,<br>XLR                                                    | Shipped uncharged.                                                      | Must be protected against short circuit or be fitted with a metal strap connecting the terminals |
| Cells ≥10Wh               |                                                                                       | UN3499, Class 9. Must be shipped uncharged and shorting strap connected | Must be shipped with a shorting strap connected                                                  |

In accordance with the regulations, all Eaton products (XB, XV, XVM, XT, XTM, XLHV, XLM, XLR, and XL60 series) 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 XT, XV, XTM, XVM, XLM, XLR and XL60 series capacitors when installed in equipment, only need to meet the following (excerpted from UN3499, note 361):

“Capacitors installed in equipment and containing an electrolyte meeting the classification criteria of any class or division of dangerous goods, are not subject to other provisions of these Regulations provided the equipment is packaged in a strong outer packaging constructed of suitable materials and of adequate strength and design, in relation to the packaging’s intended use and in such a manner as to prevent the accidental functioning of capacitors during transport.”

DOT Hazard Class (ground): Non-regulated

IATA (Air): Non-restricted according to UN3499 (A186,SP361)

IMDG (Marine): Non-restricted according to UN3499 (A186,SP361)

## REGULATORY INFORMATION

OSHA hazard communication standard (29 CFR §1910.1200)

☐ Hazardous ☒ Non-Hazardous