

# ELECTRIC DOUBLE LAYER CAPACITOR

## SAFETY 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 3 below.

**Note:** This product is an "Article" under the U.S. Federal OSHA Hazard Communication Standard (29 CFR 1910.1200), 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.

## SECTION 1 – PRODUCT IDENTIFICATION

### Representative Product Image



|   |   |
|---|---|
| <b>Product Identifier:</b>                      | Electric Double Layer Capacitor   |
| <b>Synonyms, Other Means of Identification:</b> | EDLC, Supercapacitor, Ultracapacitor  |
| <b>Description:</b>                             | Commercial Product  |
| <b>Manufacturer:</b>                            | <b>Maxwell Technologies Korea Co., Ltd.</b><br>17, Dongtangiheung-ro 681 Beon-gil,<br>Giheung-gu, Yongin-si, Gyeonggi-do,<br>17102, Republic of Korea |
| <b>Global Headquarters</b>                      | <b>UCAP POWER, Inc.</b><br>6155 Cornerstone Court East, Suite 210<br>San Diego, CA 92121, USA   |
| <b>Emergency Phone Number:</b>                  | CHEMTREC<br>+82-31-289-0721<br>+1 (833) UPOWER 1  |

## SECTION 2 – HAZARDS IDENTIFICATION

This ultracapacitor is a manufactured electronic product that contains primarily non-hazardous materials, including metal and plastic. Ultracapacitors are sealed, metal containers (steel or aluminum), which enclose layers of activated carbon that is saturated with an electrolyte solution. The electrolyte solution contains a quaternary ammonium salt compound (tetraethylammonium tetrafluoroborate or other proprietary salt) dissolved in the solvent acetonitrile. Assembled layers of activated carbon are inserted into a metal outer container, are saturated with the above electrolyte solution and are then sealed and stored in an electrically uncharged state. If the contents of these ultracapacitors remain sealed in the outer shell and they are kept uncharged, persons handling these products will avoid the risks associated with the hazardous components of the electrolyte. Accordingly, precautions should be taken to avoid rupture or overheating the sealed metal containers.

**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 and/or absorbed by the activated carbon layers.

**HEALTH HAZARDS:** This product is considered a manufactured article and presents negligible health hazards under typical use conditions. Misuse of this product, such as deliberate destruction, overcharging or heating, may release internal components contained within the sealed case. Skin contact with the carbon may cause mild irritation.

**FLAMMABILITY HAZARDS:** The internal components of this product are flammable and may be ignited if a rupture occurs and they are exposed to an ignition source or if subjected to direct flame. If an ultracapacitor is involved in a fire, the chemicals contained in the case may thermally decompose and produce toxic gases (e.g. nitrogen oxides, carbon oxides, hydrogen cyanide, hydrogen fluoride and other miscellaneous fluoride and boron compounds). During a fire involving this product, care should be taken to avoid inhalation of fumes or vapors. Misuse of this product, such as overcharging, may cause the article to vent, which could then cause a release of these toxic fumes as well.

**REACTIVITY HAZARDS:** Negligible.

**ENVIRONMENTAL HAZARDS:** Negligible.

**EMERGENCY CONSIDERATIONS:** Emergency responders must wear proper personal protective equipment (and have appropriate fire-suppression equipment) suitable for the situation to which they are responding. Appropriate precautions should be taken in the event of a container rupture under emergency conditions including fire.

## SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

This product is a solid article consisting of an opaque plastic and metal casing filled with activated carbon saturated with an electrolyte solution. The following information is for the components of the ultracapacitor. As manufactured and under normal use conditions, exposure to individual electrolyte components is not expected. If this product is heated, cut or otherwise manipulated in such a way that releases the internal components or produces fumes or vapors, exposure to these internal components is possible.

| CHEMICAL NAME  | CAS #                       | EUROPEAN EINECS # | JAPANESE MITI #  | KOREAN ECL # | CHINESE IECSC 2007 INVENTORY | NEW ZEALAND NZIoC | % w/w   | EU CLASSIFICATION FOR COMPONENTS                                      |
|--|-----------------------------|-------------------|------------------|--------------|------------------------------|-------------------|---------|---|
| Acetonitrile   | 75-05-8                     | 200-835-2         | 2-1508           | KE-00067     | Listed                       | HSR001071         | 10-30%  | HAZARD CLASSIFICATION: See below                                      |
| Activated Carbon   | 7440-44-0                   | 231-153-3         | Mineral Excepted | KE-04671     | Listed                       | HSR001271         | 5-25%   | HAZARD CLASSIFICATION: Not applicable<br>RISK PHRASES: Not applicable |
| Tetraethylammonium tetrafluoroborate   | 429-06-1                    | 207-055-1         | Unlisted         | KE-05-1249   | Listed                       | HSR004712         | 0-15%   | HAZARD CLASSIFICATION: See below                                      |
| Proprietary Tetrafluoroborate Salt   | Confidential                | Unlisted          | Unlisted         | Unlisted     | Unlisted                     | Unlisted          | 0-15%   | HAZARD CLASSIFICATION: Non-hazardous                                  |
| Aluminum   | 7429-90-5                   | 231-072-3         | -                | -            | Listed                       | -                 | 25-70%  | HAZARD CLASSIFICATION: Not applicable<br>RISK PHRASES: Not applicable |
| Paper  | -                           | -                 | -                | -            | -                            | -                 | 0-10%   | HAZARD CLASSIFICATION: Not applicable<br>RISK PHRASES: Not applicable |
| Cellulose  | 9004-34-6                   | 232-674-9         | -                | -            | -                            | -                 | 0-5%    | HAZARD CLASSIFICATION: Not applicable<br>RISK PHRASES: Not applicable |
| Cellulose/Acrylic Fiber  | 9004-34-6/<br>Not disclosed | 232-674-9/<br>NA  | -                | -            | -                            | -                 | 0-5%    | HAZARD CLASSIFICATION: Not applicable<br>RISK PHRASES: Not applicable |
| Other minor components that comprise the balance of the capacitor (e.g. elastomers, plastic, etc.) |                             |                   |                  |              |                              |                   | Balance | HAZARD CLASSIFICATION: Not applicable<br>RISK PHRASES: Not applicable |

### Hazardous Ingredients according to Regulation (EC) No. 1272/2008

| Component  | Classification   | Concentration |
|--|--|---------------|
| <b>Acetonitrile</b><br>CAS No. 75-05-8<br>EC No. 200-835-3<br>Index No. 608-001-00-3<br>Registration No. 01-2119471307-38-XXXX             | Flam. Liq. 2; Acute Tox. 4; Eye Irrit. 2; H225, H302, H332, H312, H319                   | 20 – 30%      |
| <b>Tetraethylammonium tetrafluoroborate</b><br>CAS No. 429-06-1<br>EC No. 200-835-3<br>Index No. Not listed<br>Registration No. Not listed | Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2; STOT SE 3; H302, H332, H312, H315, H319, H335 | 5 – 15%       |

See Section 16 for full text of the H-Statements mentioned in this Section.

## SECTION 4 – FIRST AID INFORMATION

Damaged ultracapacitors may release electrolyte containing acetonitrile, and TEABF<sub>4</sub> or other salts. Acetonitrile is moderately toxic by inhalation and/or skin adsorption. If necessary, physicians should refer to Section 16 (Toxicological Information) in the event there is a severe inhalation, skin contact or ingestion exposure to the electrolyte solution. Under these circumstances, take a copy of this SDS to the physician or health care professional with the exposed individual. First-aid measures applicable to contamination with the electrolyte solution are as follows:

**RECOMMENDATIONS TO PHYSICIANS:** Eliminate exposure and treat symptoms.

**SKIN EXPOSURE:** If skin exposure to electrolyte occurs, flush contaminated area liberally with water. Seek medical attention if any adverse effects occur after flushing.

**EYE EXPOSURE:** If liquid, vapors, or fumes from the electrolyte contained in this product contaminate the eyes, rinse eyes under gently running water. Use sufficient force to open eyelids and then "roll" eyes while flushing. Minimum flushing is for 20 minutes. Seek medical attention.

**INHALATION:** If vapors or fumes from the electrolyte contained in this product are inhaled, remove exposed person to fresh air. If necessary, use artificial respiration to support vital functions and seek medical attention.

**INGESTION:** In the unlikely event that the electrolyte contained in this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, DO NOT INDUCE VOMITING. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. If victim is convulsing, maintain an open airway and obtain immediate medical attention.

**ELECTRIC SHOCK:** Victim should not be touched if a connection to the product still exists. Once the victim is no longer in contact with the device and if electric shock from the device has resulted in cessation of breathing, immediately begin cardiopulmonary resuscitation (CPR). If no person that is trained in CPR is available, obtain immediate medical advice on how to perform CPR. If the heart has stopped, a qualified person should begin CPR. Immediate medical attention should be sought while attempts to revive the victim are ongoing. If an automatic external defibrillator (AED) is available, immediately begin treatment with AED.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** No medical conditions are known to be aggravated by exposure to this product.

## SECTION 5 – FIRE-FIGHTING MEASURES

**SUITABLE FIRE EXTINGUISHING MATERIALS:** The following fire extinguishing materials are suitable for fires involving this product:

**Water Spray:** OK (cooling only and only if products are uncharged)

**Dry Chemical:** OK

**Carbon Dioxide:** OK

**Foam:** OK

**Halocarbons:** OK

**Other ABC Type:** OK

**UNSUITABLE FIRE EXTINGUISHING MATERIALS:** None known.

**FIRE AND EXPLOSION HAZARDS:** This product is not flammable under normal operational and non-operational conditions; however, if this product is operated improperly, punctured, or exposed to high temperatures, as may be encountered in a fire situation, the adsorbed electrolyte may escape and ignite. Due to the small amount of electrolyte solution in each device and the presence of activated carbon, these articles contain little or no freestanding liquid and are not anticipated to pose a significant fire hazard under normal conditions of storage, use and shipment. Sealed devices involved in a fire may rupture explosively if heated for a sufficiently long period of time. If involved in a fire, the materials contained in these articles may thermally decompose and produce toxic gases (e.g. nitrogen oxides, carbon oxides, hydrogen cyanide, hydrogen fluoride and other fluoride and boron compounds).

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Air Breathing Apparatus (SCABA) and full protective equipment. Chemical resistant clothing may be necessary. Move the articles from fire area if it can be done without risk to personnel. Water spray or fog may be used by trained firefighters to disperse vapors, protect personnel and to cool fire-exposed containers in areas where dangerous electrical voltages are not present. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

## SECTION 6 – ACCIDENTAL RELEASE MEASURES

**SPILL AND LEAK RESPONSE:** Because the hazardous constituents are adsorbed on carbon media and very little free liquid is available for release to the environment, this product does not normally represent a spill hazard. If failures occur or if misuse of the product results in a release or spill of the electrolyte solution, releases should be cleaned up by trained personnel using appropriate cleanup tools and techniques. Proper personal protective equipment (PPE) should be used. Eliminate all sources of ignition before cleanup begins. Secure cleanup residue in closed containers and manage residuals properly (see Section 13 - Disposal Considerations). Call CHEMTREC (1-800-424-9300) for emergency assistance, or if in Canada, call CANUTEC (613-996-6666).

## SECTION 7 – HANDLING AND STORAGE

**GENERAL SAFE WORK PRACTICES AND GOOD HYGIENE PRACTICES:** Do not eat, drink, smoke, or apply cosmetics while handling this article. Wash hands thoroughly after handling this article or containers for this article. Avoid breathing gases generated by this article. Use in a well-ventilated location. Follow SPECIFIC USE INSTRUCTIONS supplied the manufacturer.

**STORAGE AND HANDLING PRACTICES:** Employees must be trained to properly use this article. These articles are capable of accepting, storing, or releasing an electric charge. Although these articles are shipped uncharged and operate singly at low voltages, when charged and shorted, arcing may occur and result in molten metal splattering and arc-flash hazards. Remove hand jewelry before handling these articles. Keep away from heat, sparks, and other sources of ignition. Do not charge in unventilated areas. When stacking the articles upon one another, place insulating and cushioning layers between each unit, to avoid damage and short-circuiting. Do not use organic solvents other than recommended chemical cleaners. Store in a cool, dry, well-ventilated place away from combustible materials and away from material with which it is incompatible (see Section 10, Stability and Reactivity). Post warning and "NO SMOKING" signs in storage and use areas as appropriate. Have appropriate fire extinguishing and spill response equipment in the storage area (i.e., sprinkler system, portable fire extinguishers, sorbents, etc.). Inspect all incoming packages before storage to ensure that ultracapacitors are properly labeled and not damaged.

## SECTION 8 – EXPOSURE CONTROLS/ PERSONAL PROTECTION

**NORMAL USE:** NOT APPLICABLE – Finished commercial product; Article.

**FOR OPENED UNITS:** As an intact, sealed, manufactured article, exposure to individual components is not possible. If this product leaks, fails, is cut, or is otherwise manipulated in such a way that the contents are released, exposure to the internal components is possible. The only internal component that is dispersible is the electrolyte; therefore, the following information applies to the electrolyte solution only.

| Chemical Name                        | CAS #        | Applicable Exposure Limits |              |            |          |            |           |          | Other   |
|--------------------------------------|--------------|----------------------------|--------------|------------|----------|------------|-----------|----------|---|
|                                      |              | OSHA-PELs                  |              | ACGIH-TLVs |          | ACGIH-RELS |           |          |   |
|                                      |              | TWA ppm                    | STEL ppm     | TWA ppm    | STEL ppm | TWA ppm    | Skin Note | IDLH ppm |   |
| Acetonitrile                         | 75-05-8      | 40                         | 60 (15 min.) | 20         | NE       | 20         | Skin      | 500      | DFG MAKs (skin) (vacated TWA = 20 ppm (skin) 1989 PEAK = 2 ppm MAX 15 min, average value, 1-hr interval, 4 PEL) per shift<br>DFG MAK Pregnancy Risk Classification: C<br>Carcinogen: EPA-CBD, EPA-D, TLV-A4 |
| Tetraethylammonium tetrafluoroborate | 429-06-1     | NE                         | NE           | NE         | NE       | NE         | NE        | NE       |   |
| Proprietary salt                     | Confidential | NE                         | NE           | NE         | NE       | NE         | NE        | NE       |   |

NE = Not Established

## SECTION 9 – PHYSICAL and CHEMICAL PROPERTIES

**Appearance (color, physical form, shape):** Finished commercial product. Various sizes and shapes.

**Volatile Organic Compound (VOC) Content:** Not applicable - Product not regulated for VOC Content at State or Federal level

## SECTION 10 – STABILITY AND REACTIVITY

**STABILITY:** Stable under condition of normal temperature.

**DECOMPOSITION PRODUCTS:** *Combustion:* Products of thermal decomposition can include toxic gases (e.g. nitrogen oxides, carbon oxides, hydrogen cyanide, hydrogen fluoride and other miscellaneous fluoride and boron compounds).

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** Electrolyte Solution: Strong reducing agents, strong oxidizers, strong acids, diphenyl sulfoxide, trichlorosilane, n-fluoro compounds, nitrating agents.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**CONDITIONS TO AVOID:** Avoid exposure to or contact with sparks, flames, or other sources of ignition, extreme temperatures, and incompatible chemicals.

## SECTION 11 – TOXICOLOGICAL INFORMATION

This product is a finished commercial product. It is classified as an “Article” and exempt under the federal OSHA Hazard Communication Standard.

**Chronic Effects:** No chronic health effects reported.

**Target Organs:** No target organ effects reported.

**Carcinogenicity:** This finished consumer product is not carcinogenic.



## SECTION 12 – ECOLOGICAL TOXICITY ENVIRONMENTAL FATE AND TRANSPORT

**ENVIRONMENTAL STABILITY:** This product is not expected to decompose in the environment. The following environmental data are available for components of the electrolyte solution.

**MOBILITY:** This product has not been tested for mobility in soil. The following information is available for the Acetonitrile component. Acetonitrile is expected to have high mobility in soil and to adsorb weakly to soils as predicted by its KOC value. Removal occurs primarily by volatilization and leaching into groundwater (HSDB1994). Volatilization from moist soil surfaces is expected to be an important fate process. Acetonitrile has a vapor pressure of 88.8 mm Hg and would be expected to volatilize from dry soil surfaces. Volatilization from surface waters is slow due to the high-water solubility, moderate vapor pressure, and low Henry's law constant(HSDB 1994). The water solubility of acetonitrile suggests that dissolution into clouds and raindrops may occur leading to possible removal in rainfall (U.S. EPA 1985).

**PERSISTENCE AND BIODEGRADABILITY:** The metal and plastic case of this product will persist in the environment for extended periods of time. The following information is available for the Acetonitrile component of the electrolyte solution.

- **Air:** If released to air, acetonitrile will exist solely as a vapor in the ambient atmosphere. Vapor-phase acetonitrile will be degraded in the atmosphere by reaction with photochemically produced hydroxyl radicals and ozone. The half-life for the reaction with hydroxyl radicals ranges from 0.6 to 20 days. The half-life for the reaction with ozone is somewhat slower and ranges from 54 to 76.4 days. Acetonitrile is not expected to be susceptible to direct photolysis by sunlight as it absorbs light only in the far UV region.
- **Soil:** Acetonitrile is removed from soil by microbial degradation (U.S. EPA 1985). *Nocardia rhodochrous* LL100-21 and *Aeromonas* sp. BN 7013 isolated from soils are capable of utilizing acetonitrile as a sole carbon and nitrogen source (CHEMFATE 1994; U.S. EPA 1985). The chemical is enzymatically hydrolyzed by a strain of the fungus *Fusarium solani* (U.S. EPA 1985). Evaporation and leaching are also important in removing acetonitrile from soils (U.S. EPA 1985). Biodegradation studies of acetonitrile with mixed cultures of microorganisms from activated sludge and sewage show that degradation proceeds slowly without acclimatization of microorganisms.
- **Water:** If released into water, acetonitrile is not expected to adsorb to suspended solids and sediment based upon its KOC value. Acetonitrile is removed from water by biodegradation, with decomposition occurring about five times faster following acclimation of the microorganisms (U.S. EPA 1985; CHEMFATE 1994). Decomposition of the chemical in the Ohio River (0.1 to 25 mg/L) was 20% in 5 days and 40% in 12 days (HSDB 1994). Degradation occurs by *Corynebacterium nitrilophilus* isolated from activated sludge (U.S. EPA 1985; CHEMFATE 1994). Enzymatic hydrolysis is accomplished by *Pseudomonas* sp. capable of utilizing acetonitrile as a sole carbon source (U.S. EPA 1985). Calculated volatilization half-lives from a typical pond and river are 11 days and 6 days, respectively (U.S. EPA 1985). Although slow, loss by volatilization may become more important in shallow waters (HSDB 1994). Volatilization from water surfaces is expected to be an important fate process based upon this compound's Henry's Law constant. Hydrolysis is not expected to be an important environmental fate process since this compound lacks functional groups that hydrolyze under environmental conditions.

**BIOACCUMULATION POTENTIAL:** The metal and plastic case of this product will not bioaccumulate. An estimated BCF of 3 was calculated for Acetonitrile, using a log  $K_{OW}$  of -0.34 and a regression-derived equation. According to a classification scheme, this BCF suggests that the potential for bioconcentration in aquatic organisms is low.

**AQUATIC TOXICITY:** The release of a significant amount of electrolyte solution to an aquatic environment is unlikely. Acetonitrile has low acute toxicity to aquatic organisms; toxicity values are greater than 1000 mg/L. The 96-hour Median Tolerance Limit (TLM) values for *Pimephales promelas* (fathead minnow) in hard and soft water are 1020 mg/L and 1000 mg/L, respectively (Verschuere 1983). For *Lepomis macrochirus* (bluegill) and *Lebistes reticulatus* (guppy), the TLM values in soft water are 1850 mg/L and 1650 mg/L, respectively (Verschuere 1983). Tetraethylammonium tetrafluoroborate (TEABF<sub>4</sub>) may be toxic to aquatic organisms. Although data is lacking, available data suggests that TEABF<sub>4</sub> is toxic to aquatic ecosystems. Additionally, quaternary ammonium compounds generally are aquatic toxins, and boron compounds tend to be toxic to aquatic organisms, particularly invertebrates. Do not allow TEABF<sub>4</sub> or proprietary salt residues to enter storm drains or waterways.

## SECTION 13 – DISPOSAL CONSIDERATIONS

These articles are not exempt from government solid and hazardous waste regulations. As solid, intact articles, they are not specifically listed as, nor do they exhibit any characteristics of a hazardous waste; however, they do contain materials that may become an environmental concern if disposed improperly. The primary material of potential concern is the electrolyte, which contains acetonitrile and tetraethylammonium tetrafluoroborate or a similar proprietary salt. These articles should be disposed only in facilities suitable for accepting industrial waste that do not allow ultracapacitor components to be released into the environment, and not into municipal solid waste landfills. Check state and local regulations for any additional requirements, as these may be more restrictive than federal laws and regulations.

**USEPA (RCRA) HAZARDOUS WASTE NUMBER:** None

**EUROPEAN WASTE CODES:** 16 02 Wastes from Electrical and Electronic Equipment: 16 02 13: Discarded Equipment Containing Hazardous Components Other Than Those Mentioned in 16 02 09 to 16 02 12

## SECTION 14 – TRANSPORTATION INFORMATION

**U.S. DEPARTMENT OF TRANSPORTATION:** This product is listed in the DOT Hazardous Materials Regulation (HMR) 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 HMR and do not need to be shipped as hazardous material when they are packaged according to the requirements of 49 CFR §173.176. Specifically, they must be 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 hazardous materials, per U.S. DOT regulations. Proper DOT Shipping name: UN3499, Capacitor, electric double layer, 9, PGIII. Note that all Maxwell/Nesscap ultracapacitor cells currently have an energy storage capacity of 10 Wh or less.

**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, PGIII. (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, PGIII. (See 36-12)

## SECTION 15 – REGULATORY INFORMATION

### UNITED STATES REGULATIONS:

**SARA REPORTING REQUIREMENTS:** The components of these products are subject to reporting requirements under Sections 302, 304, 311, 312 and 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA), as indicated below:

- **SARA Section 302:** None of the components of Maxwell ultracapacitors has a Threshold Planning Quantity listed in the implementing regulations for SARA Section 302 contained in Appendix A to 40 CFR Part 355.
- **SARA Section 304:** The CERCLA release reporting threshold for acetonitrile is 5,000 pounds.
- **SARA SECTIONS 311/312:** The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs. (4,540 kgs) applies to acetonitrile, per 40 CFR §370.20. For Product As Manufactured: ACUTE: No; CHRONIC: No; FIRE: No; REACTIVE: No; SUDDEN RELEASE: No. For Electrolyte Solution: ACUTE: Yes; CHRONIC: No; FIRE: Yes; REACTIVE: No; SUDDEN RELEASE: No
- **SARA Section 313:** Acetonitrile is listed in 40 CFR §372.65. Persons who “otherwise use” acetonitrile in quantities >10,000 lbs./year are required to report releases to the environment on EPA Form R.

**CERCLA REPORTABLE QUANTITY (RQ):** Acetonitrile = 5000 lbs. (2270 kg)

**TOXIC SUBSTANCE CONTROL ACT (TSCA) INVENTORY STATUS:** This product meets the definition of an "Article" under TSCA as defined at 40 CFR §704.3. Articles that contain chemical substances that are not intended to be removed or released and have no separate commercial purpose are generally exempt from TSCA.

**OTHER U.S. FEDERAL REGULATIONS:** This product meets the definition of an "Article" under the Federal OSHA Hazard Communication Standard and is exempt from MSDS/SDS requirements pursuant to §1910.1200(b)(6)(v). Specifically, the §1910.1200(c) defines an "Article" as follows: *Article* means a manufactured item other than a fluid or particle: (i) which is formed to a specific shape or design during manufacture; (ii) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and (iii) which under normal conditions of use do not release more than very small quantities, e.g., minute or trace amounts of a hazardous chemical, and does not pose a physical hazard or health risk to employees.

Acetonitrile has requirements under the following U.S. Federal regulations.

**CLEAN AIR ACT:** Acetonitrile is listed as a Hazardous Air Pollutant (HAP).

**CLEAN WATER ACT REQUIREMENTS:** Acetonitrile is designated as a Toxic Pollutant pursuant to section 307(a)(1) of the Federal Water Pollution Control Act and is subject to effluent limitations.

**CERCLA:** Persons in charge of vessels or facilities are required to notify the National Response Center (NRC) immediately, when there is a release of a designated hazardous substance, in an amount equal to or greater than its reportable quantity. Acetonitrile has a RQ of 5000 lbs. or 2270 kgs. The toll-free number of the NRC is (800) 424-8802. Notification requirements are set forth in 40 CFR §302.6.

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):** No component of this product is on the CA Proposition 65 Lists.

**ANSI LABELING (Z129.1):** This is a manufactured article; no label information is required under OSHA 29 CFR 1910.1200 or ANSI Z400.1 to address the chemical hazards.



## EU REGULATIONS:

### Authorizations and/or restrictions on use:

**Authorizations:** Not regulated

**Restrictions on use:** Not regulated **Other**

**EU regulations:** Not regulated

## KOREA REGULATORY INFORMATION

### Occupational Safety and Health Regulation:

- Aluminum: Occupational exposure limits listed, Administration subject listed, Health examination agent (12 months), Work environment monitoring listed (6 months)
- Cellulose: Occupational exposure limits listed
- Acetonitrile: Occupational exposure limits listed, Administration subject listed, Health examination agent (12 months), Work environment monitoring listed (6 months)

### Toxic Chemical Control Act:

- Activated Carbon: Existing Chemical Substance (KE-04671)
- Aluminum: Existing Chemical Substance (KE-00881)
- Cellulose: Existing Chemical Substance (KE-05339)
- Acetonitrile: Existing Chemical Substance (KE-00067)
- Tetraethylammonium tetrafluoroborate: Existing Chemical Substance (KE-05-1249), Toxic Chemicals (97-1-377)
- Other substances: Existing Chemical Substance

### Dangerous Material Safety Management Regulation

- Activated Carbon: Non-dangerous goods
- Aluminum: Metal powder class 2
- Acetonitrile: Petroleum class 4-1 (water soluble liquid-400L)

**Wastes Control Act:** Not regulated

**Persistent Organic Pollutants Acts:** Not regulated

## JAPAN REGULATORY INFORMATION

### Chemical Substances Control Law:

- Acetonitrile: (2)-1508
- Tetraethylammonium tetrafluoroborate: (1)-46 (Fluoroboric acid), (2)-186 (Tetraalkyl (C1-7) ammonium salt)

### Poisonous and Deleterious Substances Control Act:

- Acetonitrile: Deleterious Substances
- Tetraethylammonium tetrafluoroborate: Deleterious Substances

### Industrial Safety and Health Act:

- Acetonitrile: Regulated (>1%)

### Air Pollution Control Law:

- Acetonitrile: Hazardous Air Pollutants
- Tetraethylammonium tetrafluoroborate: Hazardous Air Pollutants

### Water Pollution Control Law:

- Tetraethylammonium tetrafluoroborate: Regulated (10mg/L (B,Non-marine), 230mg/L (B,Marine))

### Soil Contamination Countermeasures Act:

- Tetraethylammonium tetrafluoroborate: Regulated Class 2

## CHINA REGULATORY INFORMATION

### Inventory of Existing Chemical Substances Produced or Imported in China (IECSC):

- Activated Carbon: Present [34023]
- Aluminum: Present [23567]
- Cellulose: Present [35364]
- Acetonitrile: Present [39036]

- Tetraethylammonium tetrafluoroborate: Present [33168]

#### **Catalog of Hazardous Chemicals (2015):**

- Aluminum: Present
- Acetonitrile: Present

#### **CANADA REGULATORY INFORMATION**

##### **Canada management information Domestic Substances List (DSL):**

- Activated Carbon: Present
- Aluminum: Present
- Cellulose: Present
- Acetonitrile: Present

##### **Canada management information Non-Domestic Substances List (NDSL):**

- Tetraethylammonium tetrafluoroborate: Present

**Substance of Rotterdam Protocol:** Not regulated

**Substance of Stockholm Protocol:** Not regulated

**Substance of Montreal Protocol:** Not regulated

#### **FOREIGN INVENTORY STATUS**

- **Activated Carbon**

Australia management information Inventory of Chemical Substances (AICS): Present Philippines

management information Inventory of Chemicals and Chemical Substances (PICCS): Present

New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval: HSR001271

- **Aluminum**

Australia management information Inventory of Chemical Substances (AICS): Present Philippines

management information Inventory of Chemicals and Chemical Substances (PICCS): Present

New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval: HSR001263

(coated, PGII); HSNO Approval: HSR001471, HSR001473 (coated, PGIII); HSNO

Approval: HSR001474 (pyrophoric); HSNO Approval: HSR001472 (uncoated, PGII)

- **Cellulose**

Australia management information Inventory of Chemical Substances (AICS): Present Philippines

management information Inventory of Chemicals and Chemical Substances (PICCS): Present

New Zealand management information Inventory of Chemicals (NZIoC): May be used as a single component chemical under an appropriate group standard.

- **Acetonitrile**

Australia management information Inventory of Chemical Substances (AICS): Present Philippines

management information Inventory of Chemicals and Chemical Substances (PICCS): Present

New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval: HSR001071

- **Tetraethylammonium tetrafluoroborate**

Australia management information Inventory of Chemical Substances (AICS): Present Philippines

management information Inventory of Chemicals and Chemical Substances (PICCS): Present

New Zealand management information Inventory of Chemicals (NZIoC): HSNO Approval: HSR004712

## SECTION 16 – DOCUMENT AND OTHER INFORMATION

### Full text of H-Statements referenced under Section 3

H225 Highly flammable liquid and vapor  
 H302 Harmful if swallowed  
 H312 Harmful in contact with skin  
 H315 Causes skin irritation  
 H319 Causes serious eye irritation  
 H332 Harmful if inhaled  
 H335 May cause respiratory irritation

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Product dimensions are for reference only unless otherwise identified. Product dimensions and specifications may change without notice. Please contact Maxwell Technologies directly for any technical specifications critical to application. Products and related processes may be covered by one or more U.S. or international patents and pending applications. Please see [www.maxwell.com/patents](http://www.maxwell.com/patents) for more information.

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