

# Safety Data Sheet

Product Identifier: ELECTRIC DOUBLE LAYER CAPACITOR

SDS ID: 00233410

## \*\*\*Section 1 - IDENTIFICATION\*\*\*

**Product Identifier:** ELECTRIC DOUBLE LAYER CAPACITOR

**Trade Names/Synonyms**

ULTRACAPACITOR; SUPERCAPACITOR

**Recommended Use**

Energy storage device that is positioned between conventional electrolytic capacitor and rechargeable batteries.  
Similar use with secondary cell.

**Restrictions on Use**

None known.

**Manufacturer Information**

LS Mtron  
6F, LS Mtron Hi-Tech Center, LS-Ro, 116 beon-gil,  
Dongan-Gu, Anyang-Si, Gyeonggi-Do,  
431-831, Korea

Telephone Number:  
82-31-8045-9567

Fax Number: 82-31-8045-9544

**Product Description**

This product is considered an article; therefore, there are no significant adverse effects when used as directed.  
The information in this SDS is provided for situations where this article may be deformed, creating dusts or fumes which may be potentially hazardous.

## \*\*\*Section 2 - HAZARD(S) IDENTIFICATION\*\*\*

**Classification in accordance with 29 CFR 1910.1200.**

Combustible dust  
Acute Toxicity (Dermal), Category 3 (65% unknown)  
Acute Toxicity (Oral), Category 4 (40% unknown)  
Skin Corrosion / Irritation, Category 2  
Eye Damage / Irritation, Category 1  
Germ Cell Mutagenicity, Category 2  
Carcinogenicity, Category 1A  
Specific Target Organ Toxicity - Single Exposure, Category 1 (central nervous system and respiratory system)  
Specific Target Organ Toxicity - Repeated Exposure, Category 1 (lungs and skeletal system)  
Specific Target Organ Toxicity - Repeated Exposure, Category 2 (central nervous system, circulatory system, kidneys, liver, and respiratory system)

**GHS LABEL ELEMENTS**

**Symbol(s)**



**Signal Word**

DANGER

**Hazard Statement(s)**

May form combustible dust concentrations in air (during handling or processing).

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Toxic in contact with skin  
Harmful if swallowed  
Causes skin irritation  
Causes serious eye damage  
Suspected of causing genetic defects  
May cause cancer  
Causes damage to central nervous system and respiratory system.  
Causes damage to lungs and skeletal system through prolonged or repeated exposure.  
May cause damage to central nervous system, circulatory system, kidneys, liver, and respiratory system through prolonged or repeated exposure.

## Precautionary Statement(s)

### Prevention

Do not breathe dust. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Do not eat, drink, or smoke when using this product. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.

### Response

IF exposed or concerned: Get medical advice/attention. IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/physician if you feel unwell. If skin irritation occurs: Get medical advice/attention. Take off immediately all contaminated clothing. Wash contaminated clothing before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician. IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth.

### Storage

Store locked up.

### Disposal

Dispose in accordance with all applicable regulations.

### Hazard(s) Not Otherwise Classified

None known.

## \*\*\*Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS\*\*\*

CAS	Component	Percent
7429-90-5	Aluminum	30-45
75-05-8	Acetonitrile	25-30
7440-44-0	Carbon, activated	15-25
429-06-1	Tetraethylammonium tetrafluoroborate	<15
9004-34-6	Cellulose	<5

### Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Aluminium compounds, Aluminum, welding fumes, Cyanide compounds, Graphite, synthetic.

## \*\*\*Section 4 - FIRST-AID MEASURES\*\*\*

### Description of Necessary Measures

#### Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

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## Skin Contact

Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

## Eye Contact

Immediately flush eyes with plenty of water for at least 60 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.

## Ingestion

If swallowed, get medical attention. Rinse mouth.

## Most Important Symptoms/Effects

### Acute

Toxic in contact with skin, Harmful if swallowed, skin irritation, eye burns, central nervous system damage, respiratory system damage

### Delayed

mutagenic effects, cancer, lung damage, bone damage, central nervous system damage, circulatory system damage, kidney damage, liver damage, respiratory system damage

## Indication of Immediate Medical Attention and Special Treatment Needed, If Needed

Treat symptomatically and supportively.

## \*\*\*Section 5 - FIRE-FIGHTING MEASURES\*\*\*

### Suitable Extinguishing Media

Use extinguishing agents appropriate for surrounding fire.

### Unsuitable Extinguishing Media

None known.

### Special Hazards Arising from the Chemical

Negligible fire hazard. Avoid generating dust; fine dust dispersed in air in sufficient concentrations, and in the presence of an ignition source is a potential dust explosion hazard.

### Hazardous Combustion Products

**Combustion:** cyanides, hydrogen fluoride, oxides of aluminum, oxides of boron, oxides of carbon, oxides of nitrogen

### Fire Fighting Measures

Move container from fire area if it can be done without risk. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas.

### Special Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

## \*\*\*Section 6 - ACCIDENTAL RELEASE MEASURES\*\*\*

### Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8. Avoid release to the environment.

### Methods and Materials for Containment and Cleaning Up

Keep unnecessary people away, isolate hazard area and deny entry. If sweeping of a contaminated area is necessary, use a dust suppressant agent. Collect spill using a vacuum cleaner with a HEPA filter or wet and scoop up dry spills. Avoid sweeping spilled dry material. Eliminate ignition sources including sources of electrical, static or frictional sparks. Collect spilled material in appropriate container for disposal.

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## \*\*\*Section 7 - HANDLING AND STORAGE\*\*\*

### Precautions for Safe Handling

Do not breathe dust. Wear protective gloves/clothing and eye/face protection. Wash thoroughly after handling. Do not eat, drink, or smoke when using this product. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Avoid significant deposits of material, especially on horizontal surfaces, which may become airborne and form combustible dust clouds and may contribute to secondary explosions. Use methods to minimize dust.

### Conditions for Safe Storage, including any Incompatibilities

Store and handle in accordance with all current regulations and standards. Store locked up. See original container for storage recommendations. Keep separated from incompatible substances.

**Incompatibilities** acids, bases, combustible materials, halocarbons, halogens, metal carbide, metal oxides, metal salts, metals, oxidizing materials, peroxides, reducing agents

## \*\*\*Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION\*\*\*

### Component Exposure Limits

#### Aluminum (7429-90-5)

**ACGIH:** 1 mg/m<sup>3</sup> TWA (respirable fraction)

**NIOSH:** 10 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable dust)

**OSHA:** 15 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable fraction)

**OSHA (Vacated):** 15 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable fraction)

#### Acetonitrile (75-05-8)

**ACGIH:** 20 ppm TWA

Skin - potential significant contribution to overall exposure by the cutaneous route

**NIOSH:** 20 ppm TWA; 34 mg/m<sup>3</sup> TWA

**OSHA:** 40 ppm TWA; 70 mg/m<sup>3</sup> TWA

prevent or reduce skin absorption (related to Cyanide compounds)

**OSHA (Vacated):** 60 ppm STEL; 105 mg/m<sup>3</sup> STEL

40 ppm TWA; 70 mg/m<sup>3</sup> TWA

#### Cellulose (9004-34-6)

**ACGIH:** 10 mg/m<sup>3</sup> TWA

**NIOSH:** 10 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable dust)

**OSHA:** 15 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable fraction)

**OSHA (Vacated):** 15 mg/m<sup>3</sup> TWA (total dust); 5 mg/m<sup>3</sup> TWA (respirable fraction)

### Component Biological Limit Values

There are not biological limit values for any of this product's components.

### Appropriate Engineering Controls

Provide local exhaust or process enclosure ventilation system. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment). Ensure compliance with applicable exposure limits.

### Individual Protection Measures, such as Personal Protective Equipment

#### Eyes/Face Protection

Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

#### Skin Protection

Wear appropriate chemical resistant clothing.

#### Glove Recommendations

Wear appropriate chemical resistant gloves.

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## Respiratory Protection

No respirator is required under normal conditions of use.

Under conditions of frequent use or heavy exposure, respiratory protection may be needed.

## \*\*\*Section 9 - PHYSICAL AND CHEMICAL PROPERTIES\*\*\*

<b>Physical State:</b>	Solid	<b>Appearance:</b>	solid
<b>Physical Form:</b>	solid	<b>Odor:</b>	Not Available
<b>Odor Threshold:</b>	Not available	<b>pH:</b>	Not available
<b>Melting/Freezing Point:</b>	Not available	<b>Boiling Point:</b>	Not available
<b>Flash Point:</b>	Not available	<b>Decomposition temp.:</b>	Not available
<b>Evaporation Rate:</b>	Not available	<b>LEL:</b>	Not available
<b>UEL:</b>	Not available	<b>Vapor Pressure:</b>	Not available
<b>Vapor Density (air = 1):</b>	Not available	<b>Density:</b>	Not available
<b>Spec. Gravity (water = 1):</b>	Not available	<b>Water Solubility:</b>	Not available
<b>Log KOW:</b>	Not available	<b>Auto Ignition temp.:</b>	Not available
<b>Viscosity:</b>	Not available	<b>Volatility:</b>	Not available
<b>Flammability (solid, gas):</b>	Not flammable		

## Other Property Information

None known.

## \*\*\*Section 10 - STABILITY AND REACTIVITY\*\*\*

### Reactivity

No reactivity hazard is expected.

### Chemical Stability

Stable at normal temperatures and pressure.

### Possibility of Hazardous Reactions

Will not polymerize.

### Conditions to Avoid

Avoid accumulation of airborne dusts. Avoid heat, flames, sparks and other sources of ignition. Protect from physical damage and heat. Avoid contact with incompatible materials.

### Incompatible Materials

acids, bases, combustible materials, halocarbons, halogens, metal carbide, metal oxides, metal salts, metals, oxidizing materials, peroxides, reducing agents

### Hazardous Decomposition

**Combustion:** cyanides, hydrogen fluoride, oxides of aluminum, oxides of boron, oxides of carbon, oxides of nitrogen

## \*\*\*Section 11 - TOXICOLOGICAL INFORMATION\*\*\*

### Acute Toxicity

#### Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

#### Acetonitrile (75-05-8)

Dermal LD50 Rabbit 390 mg/kg; Inhalation LC50 Rat 26.8 mg/L 4 h (mist); Oral LD50 Rat 160 mg/kg

#### Carbon, activated (7440-44-0)

Oral LD50 Rat >10000 mg/kg

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## Cellulose (9004-34-6)

Oral LD50 Rat >5 g/kg; Inhalation LC50 Rat >5800 mg/m<sup>3</sup> 4 h

## RTECS Acute Toxicity (selected)

The components of this material have been reviewed, and RTECS publishes the following endpoints:

### Acetonitrile (75-05-8)

**Inhalation:** 7551 ppm/8 hour Inhalation Rat LC50; 7500 ppm Inhalation Rat LC50; 17100 ppm/4 hour Inhalation Rat LC50

**Oral:** 4891 mg/kg Oral Rat LD50; 2460 mg/kg Oral Rat LD50

**Skin:** 980 mg/kg Skin Rabbit LD50

### Cellulose (9004-34-6)

**Inhalation:** >5800 mg/m<sup>3</sup>/4 hour Inhalation Rat LC50

**Oral:** >5 gm/kg Oral Rat LD50

**Skin:** >2 gm/kg Skin Rabbit LD50

## Acute Toxicity Level

### Acetonitrile (75-05-8)

**Toxic:** dermal absorption

**Moderately Toxic:** inhalation, ingestion

## Information on Likely Routes of Exposure

### Inhalation

central nervous system damage, kidney damage, lung damage, respiratory system damage, cancer

### Ingestion

central nervous system damage

### Skin Contact

irritation

### Eye Contact

burns

## Immediate Effects

Toxic in contact with skin, Harmful if swallowed, skin irritation, eye burns, central nervous system damage, respiratory system damage

## Delayed Effects

mutagenic effects, cancer, lung damage, bone damage, central nervous system damage, circulatory system damage, kidney damage, liver damage, respiratory system damage

## Medical Conditions Aggravated by Exposure

Alzheimer's disease, central nervous system disorders, heart or cardiovascular disorders, kidney disorders, liver disorders, respiratory disorders, skin disorders and allergies

## Irritation/Corrosivity Data

skin irritation, eye burns

## RTECS Irritation

The components of this material have been reviewed, and RTECS publishes the following endpoints:

### Acetonitrile (75-05-8)

100 uL/24 hour Eyes Rabbit moderate; 500 mg/open Skin Rabbit mild

## Local Effects

### Acetonitrile (75-05-8)

**Irritant:** inhalation, eye

## Target Organs

### Acetonitrile (75-05-8)

blood

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## Respiratory Sensitization

No data available.

## Dermal Sensitization

No data available.

## Germ Cell Mutagenicity

Available data characterizes this substance as mutagenic.

## RTECS Mutagenic

The components of this material have been reviewed, and RTECS publishes the following endpoints:

### Acetonitrile (75-05-8)

131 ppm Drosophila melanogaster; 5 gm/L hamster; 47600 ppm Saccharomyces cerevisiae

## Carcinogenicity

### Component Carcinogenicity

#### Aluminum (7429-90-5)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

#### Acetonitrile (75-05-8)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

Aluminum itself has not been evaluated by IARC. However, aluminum production has been evaluated as IARC Group 1 (Human Sufficient Evidence). There is sufficient evidence that certain exposures occurring during aluminum production cause cancer.

## Reproductive Toxicity

No data available for the mixture.

## RTECS Reproductive Effects

The components of this material have been reviewed, and RTECS publishes the following endpoints:

### Aluminum (7429-90-5)

1260 mg/kg Oral Mouse TDLo (Multigeneration); 67.5 mg/kg Unreported Rabbit TDLo (pregnant 2-27 day(s))

### Acetonitrile (75-05-8)

8000 ppm Inhalation Hamster TCLo (1 hour, pregnant 8 day(s)); 5000 ppm Inhalation Hamster TCLo (1 hour, pregnant 8 day(s)); 300 mg/kg Oral Hamster TDLo (pregnant 8 day(s)); 400 mg/kg Oral Hamster TDLo (pregnant 8 day(s)); 390 mg/kg Oral Rabbit TDLo (pregnant 6-18 day(s)); 1800 ppm Inhalation Rat TCLo (6 hour, pregnant 6-20 day(s)); 2 mg/kg Oral Rat TDLo (pregnant 10 day(s))

### Carbon, activated (7440-44-0)

167 mg/kg Subcutaneous Rat TDLo (pregnant 8 day(s))

## Specific Target Organ Toxicity - Single Exposure

central nervous system, respiratory system

## Specific Target Organ Toxicity - Repeated Exposure

lungs, skeletal system, central nervous system, circulatory system, kidneys, liver, respiratory system

## Aspiration Hazard

No data available.

## \* \* \*Section 12 - ECOLOGICAL INFORMATION\* \* \*

### Component Analysis - Aquatic Toxicity

#### Acetonitrile (75-05-8)

Fish: 96 Hr LC50 Pimephales promelas: 1600 - 1690 mg/L [flow-through]; 96 Hr LC50 Pimephales promelas: 1000 mg/L [static]; 96 Hr LC50 Lepomis macrochirus: 1850 mg/L [static]; 96 Hr LC50 Poecilia reticulata: 1650 mg/L [static]

### Persistence and Degradability

No data available for the mixture.

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## Bioaccumulation Potential

No data available for the mixture.

## Mobility in Soil

No data available for the mixture.

## Other Ecological Information

No data available.

### \*\*\*Section 13 - DISPOSAL CONSIDERATIONS\*\*\*

#### Disposal Methods

Dispose in accordance with all applicable regulations.

#### Disposal of Contaminated Packaging

Dispose in accordance with all applicable regulations.

#### Component Waste Numbers

##### Acetonitrile (75-05-8)

RCRA: waste number U003 (Ignitable waste, Toxic waste)

### \*\*\*Section 14 - TRANSPORT INFORMATION\*\*\*

#### US DOT Information

**Shipping Name:** Capacitor, Electric Double Layer (with an energy storage capacity greater than 0.3 Wh)

**UN/NA #:** UN3499 **Hazard Class:** 9

**Not regulated as dangerous goods. Special Provisions : 361**

#### Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Acetonitrile	75-05-8	DOT regulated marine pollutant (mixtures or solutions, related to Cyanide compounds)

#### IMDG Information

**Shipping Name:** Capacitor, Electric Double Layer (with an energy storage capacity greater than 0.3 Wh)

**UN #:** UN3499 **Hazard Class:** 9

**Required Label(s):** 9

**Not regulated as dangerous goods. Special Provisions : 361**

#### Component Marine Pollutants (IMDG)

This material does not contain any chemicals listed in Chapter 3.2 - Dangerous Good List - required by IMDG to be identified as a marine pollutant.



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## \*\*\*Section 15 - REGULATORY INFORMATION\*\*\*

### U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Sections 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

#### Aluminum (7429-90-5)

SARA 313: 1.0 % de minimis concentration (dust or fume only)

#### Acetonitrile (75-05-8)

SARA 313: 1.0 % de minimis concentration

CERCLA: 5000 lb final RQ; 2270 kg final RQ

### SARA 311/312 Hazardous Categories (40 CFR 370 Subparts B and C)

Acute Health: Yes Chronic Health: Yes Fire: No Pressure: No Reactive: No

### U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS #	CA	MA	MN	NJ	PA
Aluminum	7429-90-5	Yes	Yes	Yes	Yes	Yes
Acetonitrile	75-05-8	Yes	Yes	Yes	Yes	Yes
Cellulose	9004-34-6	No	Yes	Yes	Yes	Yes

Not regulated under California Proposition 65

### Chemical Inventory Listings

All the components of this substance are listed on or are exempt from the TSCA inventory listing.

### Component Analysis - Inventory

Component	CAS #	US	MITI	KOREA
Aluminum	7429-90-5	Yes	No	Yes
Acetonitrile	75-05-8	Yes	Yes	Yes
Carbon, activated	7440-44-0	Yes	No	Yes
Tetraethylammonium tetrafluoroborate	429-06-1	Yes	Yes	Yes
Cellulose	9004-34-6	Yes	Yes	Yes

## \*\*\*Section 16 - OTHER INFORMATION\*\*\*

### Summary of Changes

New SDS: 5/19/2015

NFPA Ratings: Health: 3 Fire: 0 Reactivity: 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

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### Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of Lists™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

### Other Information

None known.

End of Sheet 00233410