



# TECHNICAL DOCUMENT

No. of Document	<b>SSes-M24-TD-XXXXX</b>
Revision	<b>A</b>
Theme/Topic	<b>Cell SDS</b>
Product Description	<b>BATTERY ENERGY STORAGE SYSTEM</b>



**KS Exhibit 10**

## Cell SDS

### 1. Product and Company Identification USA, EU

**Important Note:** As a solid, manufactured article, exposure to hazardous ingredients is not expected with normal use. This battery is an article pursuant to 29 CFR 1910.1200 and, as such, is not subject to the OSHA Hazard Communication Standard requirement. The information contained in this Material Safety Data Sheet contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

#### Commercial product name

MODEL CM0940R0003A (94Ah capacity)

#### Use of the substance/preparation

Lithium-Ion battery

#### Company/undertaking identification

##### **Manufacturer**

SAMSUNG SDI Co. LTD

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**Responsible Department:**

Development Team

Responsible for the safety data sheet: er.bang@samsung.com

#### **Further Information**

Battery-System: Lithium-Ion (Li-ion)

Voltage: 3.68V

Anode (negative electrode): based on intercalation graphite

Cathode (positive electrode): based on lithiated metal oxide (Cobalt, Nickel, Manganese)

**Remark:**

The information and recommendations set forth are made in good faith and believed to be accurate as of the date of preparation. SAMSUNG SDI Co., Ltd. makes no warranty, expressed or implied, with respect to this information and disclaims all liabilities from reliance on it.

**2. Hazards Identification USA**

**Route(s) of Entry**

There is no hazard when the measures for handling and storage are followed.

**Signs and Symptoms of Exposure**

In case of cell damage, possible release of dangerous substances and a flammable gas mixture.

OSHA Hazard Communication: This material is not considered hazardous by the OSHA Hazard Communication Standard 29CFR 1910.1200.

Carcinogenicity (NTP): Not listed  
 Carcinogenicity (IARC): Not listed  
 Carcinogenicity (OSHA): Not listed

**Special hazards for human health and environment**

There is no hazard when the measures for handling and storage are followed.

In case of cell damage, possible release of dangerous substances and a flammable gas mixture.

**2. Hazards Identification USA, EU**

**Explication of special hazards for human health and environment**

Not classified as dangerous according to directive 1999/45/EEC

There is no hazard when the measures for handling and storage are followed.

In case of cell damage, possible release of dangerous substances and a flammable gas mixture.

**3. Composition/information on ingredients USA, EU**

**Hazardous components**

EC-No.	CAS-No.	Chemical name	Quantity	EU-Classification
215-154-6	1307-96-6	Cobalt oxide	< 30 %	Xn, N R22435053
215-202-6	1313-13-9	Manganese dioxide	< 30 %	Xn R20/22
215-215-7	1313-99-1	Nickel oxide	< 30 %	Carc. Cat. 1, T R49-43-48/23--53
231-153-3	7440-44-0	Carbon	10 - 30 %	
		Electrolyte (*)	10 - 20 %	Carc. Cat. 3, C, R10-34-40-43
	24937-79-9	Polyvinylidene fluoride (PVdF)	< 10 %	
231-072-3	7429-90-5	Aluminium foil	2 - 10 %	
231-159-6	7440-50-8	Copper foil	2 - 10 %	
		Aluminium and inert materials	5 - 10 %	

Full text of each relevant R phrase can be found in heading 16.

**Further Information**

**SAMSUNG SDI**

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**SAMSUNG SDI**

For information purposes:

(\*) Main ingredients: Lithium hexafluorophosphate, organic carbonates

Because of the cell structure the dangerous ingredients will not be available if used properly.  
During charge process a lithium graphite intercalation phase is formed.

Mercury content: Hg < 0.1mg/kg

Cadmium content: Cd < 1mg/kg

Lead content: Pb: < 10mg/kg

**4. First Aid Measures USA, EU****General information**

The following first aid measures are required only in case of exposure to interior battery components after damage of the external battery casing.

Undamaged, closed cells do not represent a danger to the health.

**After inhalation**

Ensure of fresh air. Consult a physician.

**After contact with skin**

In case of contact with skin wash off immediately with plenty of water.

Consult a physician.

**After contact with eyes**

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Seek medical treatment by eye specialist.

**After ingestion**

Drink plenty of water.

Call a physician immediately.

**5. Fire Fighting Measures USA, EU****Suitable extinguishing media**

Cold water and dry powder in large amount are applicable.

Use metal fire extinction powder or dry sand if only few cells are involved.

**Special hazards arising from the chemical**

May form hydrofluoric acid if electrolyte comes into contact with water.

In case of fire, the formation of the following flue gases cannot be excluded:

Hydrogen fluoride (HF), Carbon monoxide and carbon dioxide.

**Protective equipment and precautions for firefighters**

Wear self-contained breathing apparatus and protective suit.

Additional information

If possible, remove cell(s) from fire fighting area. If heated above 125°C, cell(s) can explode/vent. Cell is not flammable but internal organic material will burn if the cell is incinerated.

**6. Accidental Release Measures USA, EU****Personal precautions**

Use personal protective clothing.

Avoid contact with skin, eyes and clothing.

Avoid breathing fume and gas.

**Environmental precautions**

Do not discharge into the drains/surface waters/groundwater.  
 Methods for cleaning up/taking up  
 Take up mechanically and send for disposal.

**7. Handling and Storage USA, EU**

**Handling**

**Advice on safe handling**

Avoid short circuiting the cell. Avoid mechanical damage of the cell. Do not open or disassemble.  
 Advice on protection against fire and explosion  
 Keep away from open flames, hot surfaces and sources of ignition.

**Storage**

**Requirements for storage rooms and vessels**

Storage at room temperature (approx. 20°C) at approx. 20-50% of the nominal capacity  
 (OCV approx. 3.5-3.7 V).  
 Keep in closed original container.

**8. Exposure Controls/Personal Protection Exposure limit values Exposure limits USA**

**8. Exposure controls/personal protection Exposure limit values Exposure limits (EH40) EU**

CAS-No.	Chemical name	ml/m <sup>3</sup>	mg/m <sup>3</sup>	F/ml	Category	Origin
7440-44-0	Graphite, respirable	-	4	-	TWA (8 h) STEL (15 min)	WEL WEL

**Additional advice on limit values**

During normal charging and discharging there is no release of product.

**Occupational exposure controls**

No specific precautions necessary.

**Protective and hygiene measures**

When using do not eat, drink or smoke. Wash hands before breaks and after work.

**Respiratory protection**

No specific precautions necessary.

**Hand protection**

No specific precautions necessary.

**Eye protection**

No specific precautions necessary.



**Skin protection**

No specific precautions necessary.

**9. Physical and Chemical Properties USA, EU**

**Appearance**

Form: Solid  
Color: Various  
Odor: Odorless

**Important health, safety and environmental information**

Test method

pHValue:		n.a.
Flash point:		n.a.
Lower explosion limits:		n.a.
Vapour pressure:	n.a.	
Density:	n.a.	
Water solubility:		Insoluble
Ignition temperature:		n.a.

**10. Stability and Reactivity USA, EU**

**Stability**

Stable

**Conditions to avoid**

Keep away from open flames, hot surfaces and sources of ignition. Do not puncture, crush or incinerate.

**Materials to avoid**

No materials to be especially mentioned.

**Hazardous decomposition products**

In case of open cells, there is the possibility of hydrofluoric acid and carbon monoxide release.

**Possibility of Hazardous Reactions**

Will not occur

**Additional information**

No decomposition if stored and applied as directed.

**11. Toxicological Information USA, EU**

**Empirical data on effects on humans**

If appropriately handled and if in accordance with the general hygienic rules, no damages to health have become known.

**12. Ecological Information USA, EU**

**Further information**

Ecological injuries are not known or expected under normal use. Do not flush into surface water or sanitary sewer system.

**13. Disposal Considerations USA, EU**

**Advice on disposal**

For recycling consult manufacturer.

**Contaminated packaging**

Disposal in accordance with local regulations.

**14. Transport Information USA, EU**

**US DOT 49 CFR 172.101**

Proper shipping name

Lithium-ion batteries

ID Number: UN3480

Hazard Class or Division: 9

Packing group: II

Label: 9

**Land transport (ADR/RID)**

UN number: 3480

ADR/RID class: 9

Classification code: M4

Warning plate

Hazard label: 9



ADR/RID packing group: II

Limited quantity: LQ 0

Tunnel restriction code: E

Description of the goods: Lithium-ion batteries

**Other applicable information (land)**

LQ 0: No exemption under the conditions of 3.4.2.

Transport category: 2

**Marine transport**

UN number: 3480

IMDG code: 9

Marine pollutant: No

Hazard label: 9



IMDG packing group: II

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**SAMSUNG SDI**

EmS:		F-A, S-I
Limited quantity:	None	
Description of the goods		Lithium-ion batteries

**Air transport**

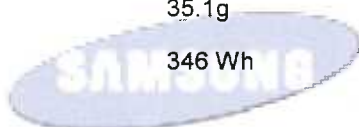
UN/ID number:	3480
ICAO/IATA-DGR:	9
Hazard label:	9



ICAO packing group:		II
Limited quantity Passenger:		-
IATA-packing instructions - Passenger:		965
IATA-max. quantity - Passenger:	5 kg G	
IATA-packing instructions - Cargo:	965	
IATA-max. quantity - Cargo:		35 kg G
Description of the goods		Lithium-ion batteries

**Other applicable information**

Lithium equivalent:	35.1g
Wh-rating per cell:	346 Wh

**15. Regulatory Information USA****U.S. Regulations****National Inventory TSCA**

SAMSUNG SDI certifies that all chemical components of the Model CM0940R0003A (94 Ah capacity) Lithium-Ion Battery are listed on the US EPA TSCA 8(b) Inventory or are exempt from listing.

**SARA**

To the best of our knowledge this product contains no toxic chemicals subject to the supplier notification requirements of Section 313 of the Superfund Amendments and Reauthorization Act (SARA/EPCRA) and the requirements of 40 CFR Part 372.

**15. Regulatory information EU****Labeling****Hazardous components which must be listed on the label**

As an article the product does not need to be labeled in accordance with EC directives or respective national laws.

**EU regulatory information**

1999/13/EC (VOC): 0 %

**16. Other Information USA****Hazardous Materials Information Label (HMIS)**

Health: 0  
 Flammability: 0  
 Physical Hazard: 0





**NFPA Hazard Ratings**

Health: 0  
Flammability: 0  
Reactivity: 0  
Unique Hazard:

**16. Other Information EU**

**Full text of R-phrases referred to under sections 2 and 3**

R10 Flammable.  
R20/22 Harmful by inhalation and if swallowed.  
R22 Harmful if swallowed.  
R34 Causes burns.  
R40 Limited evidence of a carcinogenic effect.  
R43 May cause sensitization by skin contact.  
R48/23 Toxic: danger of serious damage to health by prolonged exposure through inhalation.  
R49 May cause cancer by inhalation.  
R50 Very toxic to aquatic organisms.  
R53 May cause long-term adverse effects in the aquatic environment.

**Further Information USA, EU**

Data of sections 4 to 8, as well as 10 to 12, do not necessarily refer to the use and the regular handling of the product (in this sense consult package leaflet and expert information), but to release of major amounts in case of accidents and irregularities. The information describes exclusively the safety requirements for the product (s) and is based on the present level of our knowledge. This data does not constitute a guarantee for the characteristics of the product(s) as defined by the legal warranty regulations. "(n.a. = not applicable; n.d. = not determined)"

The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.