



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 MSDS should be retained and available for employees and other users of this product.

Commercial product name

MODEL CM0630R0002A (67 Ah capacity) - **Part of Battery Module (ELPM182-00001, ELPM182-00002)**

Use of the substance/preparation

Lithium-Ion battery

Company/undertaking identification

Manufacturer

Samsung SDI Co. LTD

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Responsible Department: R&D Team

Emergency telephone number: (001) 82 10 7205 9252 (24 h)

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Further Information

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

Voltage: 3,80V

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 | 1308-04-9 | Dicobalt trioxide | < 30 % | Xn; R22 - R43 - N; R50-53 |
| 215-202-6 | 1313-13-9 | Manganese dioxide | < 30 % | Xn R20/22 |
| 215-217-8 | 1314-06-3 | Dinickel trioxide | < 30 % | Carc. Cat. 1; R49 - T; R48/23 - R43 - R53 |
| 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

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 at approx. 20°C, 60% of the nominal capacity

(OCV approx. 3.6 - 3.9 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 ³ | mg/m ³ | 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)

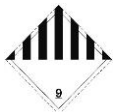
UN number: 3480

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 |
| 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: | 25.7g |
| Wh-rating per cell: | 254 Wh |

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

Samsung SDI certifies that all chemical components of the Model CM0630R0002A_(67 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: 1

Physical Hazard: 0

NFPA Hazard Ratings

Health: 0

Flammability: 1

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.