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)

Use of the substance/preparation
Lithium-Ion battery

Company/undertaking identification

Manufacturer
Samsung SDI Co. LTD
428-5 Gongse-dong, Giheung-gu, Yongin-si,
Gyeonggi-do, 446-577 Korea
Telephone: ++82 31 210 8120
Telefax: ++82 31 210 7555

Contact person: Young-chul Chang ++82 31 210 8120

Telephone:

Responsible Department: R&D Team

Emergency telephone number: (001) 82 10 7205 9252 (24 h)
Responsible for the safety data sheet: y-c.chang@samsung.com

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/m³	mg/m³	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.

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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.