



MATERIAL SAFETY DATA SHEET

This information is provided in good faith and is believed to be accurate at the date of preparation. FT-TEC Electronics GmbH makes no warranty, neither express nor implied, with respect to this information.

Battery Information

Product Name	CR17450EG-HR1
For use with	SEAANGEL SA15 Flare Valid for STANDARD MODEL as well as for varieties SURF and DIVE
Chemistry	LiMnO2
Construction	Single cell
Lithium Weight/Cell	0.83g
Total Lithium Weight	0.83g
Total Weight	23g
Nominal Voltage	3V
Manufacturer's Spec.	see attached sheet "Cell Type Specifications" by FDK

Section 1 - Manufacturer Information

Manufactured by	for
FT-TEC Electronics GmbH Werner von Siemens Strasse 5 7343 Neutal Austria Tel. +43 2618 20455 0 	FT-TEC USA Corp. 1800 SW 1 st Ave. Suite 507 Miami, FL 33129 USA Tel. +1 (786) 757 1090 

Section 2 - Hazards Identification

This is a single cell battery. As long as it stays intact there should be no danger. Should the battery be damaged to cause leakage the following hazards may result?

Caution: Battery may explode or leak if heated, disassembled, shorted, recharged, exposed to fire of high temperature. Keep original case, do not try to open, product is special ultrasonic welded and no access to battery is possible. Do not break the case with tools, etc. warranty will be void. After emergency use, send back the product to supplier. Battery will be replaced by professionals.

Ingestion	may be harmful
Inhalation	may cause respiratory problems
Skin Contact	may cause skin irritation
Eye Contact	may cause severe irritation

Refer also to section 2 of Safety Data Sheet by FDK attached to this document.

Section 3 - Ingredients

Do not open the battery or expose it to heat. This may be harmful.

Refer to section 3 of Safety Data Sheet by FDK attached to this document.

Section 4 - First Aid Measures

Refer to section 4 of Safety Data Sheet by FDK attached to this document.

Section 5 - Fire Fighting Measures

Refer to section 5 of Safety Data Sheet by FDK attached to this document.

Section 6 – Accidental Release Measures

Refer to section 6 of Safety Data Sheet by FDK attached to this document.

Section 7 – Handling and Storage

Refer to section 7 of Safety Data Sheet by FDK attached to this document.

Section 8 – Exposure Controls / Personal Protection

Refer to section 8 of Safety Data Sheet by FDK attached to this document.

Section 9 - Physical and Chemical Properties

Refer to section 9 of Safety Data Sheet by FDK attached to this document.

Section 10 – Stability and Reactivity

Refer to section 10 of Safety Data Sheet by FDK attached to this document.

Section 11 – Toxicological Information

Refer to section 11 of Safety Data Sheet by FDK attached to this document.

Section 12 – Ecological Information

Refer to section 12 of Safety Data Sheet by FDK attached to this document.

Section 13 – Disposal

Dispose of battery in accordance with applicable national regulations.

Refer also to section 13 of Safety Data Sheet by FDK attached to this document.

Section 14 – Transport Information

Refer to section 14 of Safety Data Sheet by FDK attached to this document.

Additional to that information, the transport of lithium batteries contained in the equipment is regulated as UN3090 and UN 3091 by ICAO, IATA, IMO and US DOT. However, the listed FDK battery cell is not subject to the other provisions of the regulations as long as they are packaged and marked in accordance with the existing regulations.

The lithium content of cells contained in this document is less than 1 gram.

Section 15 – Regulatory Information

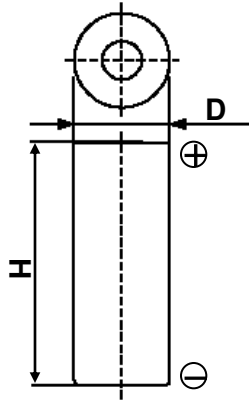
Refer to section 15 of Safety Data Sheet by FDK attached to this document.

Section 16 – Other information

Refer to section 16 of Safety Data Sheet by FDK attached to this document.

Disclaimer: This MSDS is intended to provide a short summary of our knowledge, information and guidance regarding the use of this product and material. This information is gathered by the FT-TEC Electronics GmbH and its partners and affiliates to be reliable and is accurate to the best company knowledge. It is not an all-inclusive document on worldwide hazard communication regulations. Each country may differ.

Cell Type CR17450EG Specifications



Nominal Voltage (V)		3
Nominal Capacity (mAh) ^{*1}		2400
Standard Discharge Current (mA)		5
Max. Pulse Discharge Current (mA) ^{*2}		3500
Operating Temperature Range (°C) ^{*3}		-40 ~ +85
Max. Dimensions (mm)	Diameter (D)	17.0
	Height (H)	45.0
Approx. Weight (g)		23

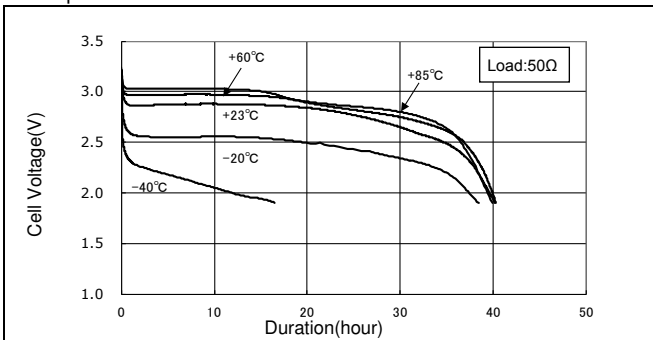
*1 Nominal capacity is determined at an end voltage of 2.0V when the battery is allowed to discharge at a standard current level at +23°C.

*2 Current value for obtaining 1.0V cell voltage when pulse is applied for 15 seconds at 50% discharge depth (50% of the nominal capacity) at +23°C.

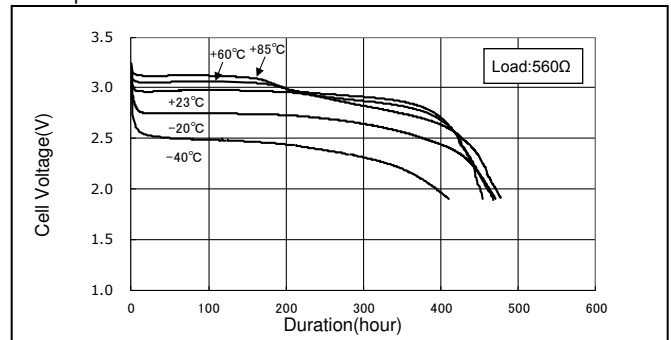
*3 Consult FDK when using batteries at temperatures exceeding the -20°C to +60°C range.

Typical Characteristics

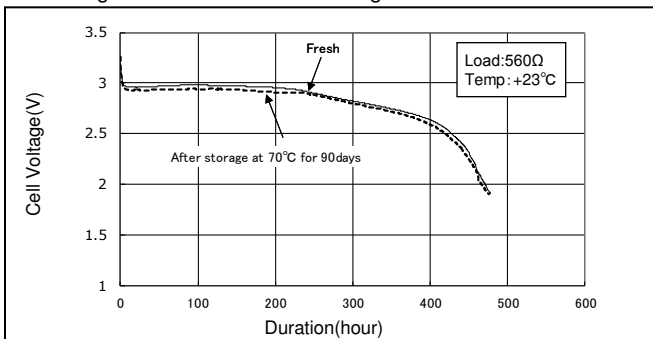
Temperature Characteristics of CR17450EG



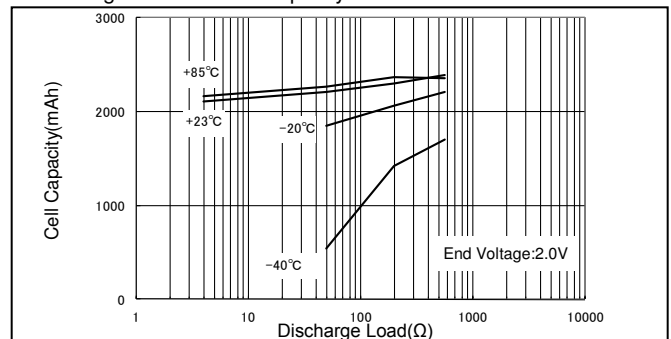
Temperature Characteristics of CR17450EG



Discharge Characteristics after storage of CR17450EG



Discharge Load vs. Cell Capacity of CR17450EG





SAFETY DATA SHEET (SDS)

1. Product and Company identification

Product Category : Manganese Dioxide Primary Lithium Battery

Nominal Voltage : 3V

Product name

Type	Lithium (g)	Type	Lithium (g)
CR17335E-R	0.57	CR17335HE-R	0.50
CR17450E-R	0.86	CR17450HE-R	0.74
CR17335E-N	0.63	CR17450HE-N	0.87
CR17450E-N	0.96	CR17450ENS	0.87
CR17335EF	0.50	CR17450EG	0.83
CR17335HEF	0.59	CR17450ES	0.83
CR17335EG	0.63	CR2	0.34
CR17335EL	0.50	CR123A	0.60

Supplier's Name : FDK CORPORATION

Supplier's Address : 1-6-41, Konan, Minato-ku, Tokyo 108-8212 Japan
 Telephone +81-3-5715-7435

Emergency Contact : CHEMTREC at (800)424-9300

Note: SDS is not applicable to the product hermetically sealed as dry battery. The battery has no risk to life and health under normal use or transportation because ingredients of battery are not leaked out by virtue of hermetical sealing with metal case.

This SDS notify possible risk of our battery under abnormal use but mainly aim to provide information about ingredients, notification of handling and transportation regulations as a useful reference.

2. Hazards identification

The important hazards and adverse effects of the chemical product	No information available
Chemical product - specific hazards	No information available
Outline of an anticipated emergency	Chemical contents are sealed in metal can. Therefore, risk of exposure never occurs unless battery is mechanically or electrically abused. Risk of explosion by fire is anticipated if batteries are disposed of in fire or heated above 100 degree Celsius. Stacking or jumbling of batteries may cause external short circuits, heat generation, in some case, allowing fire or explosion.

Note) Our battery is not classified in accordance with the GHS classification.

3. Principal Composition/ information on Ingredients

Part	Material	CAS No.	Contents
Positive electrode	Manganese Dioxide	1313-13-9	30 ~ 45 wt%
Negative electrode	Lithium metal	7439-93-2	3 ~ 4 wt%
Electrolyte	1,2-Dimethoxyethane	110-71-4	6 ~ 8.5 wt%
	Mixture of organic solvent	N/A	3 ~ 10 wt%

4. First-aid measures

Inhalation	If ingredient leaked out from inside of a battery and if inhaled it, move to a place where fresh air is provided. Refer for medical attention.
Skin contact	If ingredient leaked out from inside of a battery and stuck on skin, wash the contact areas off immediately with plenty of water and soap. If appropriate procedures are not taken, this may cause sores on the skin. Refer for medical attention.
Eyes contact	If ingredient leaked out from inside of a battery and came into eyes, flush the eyes with plenty of water for at least 15 minutes immediately without rubbing. Take a medical treatment. If appropriate procedures are not taken, this may cause an eye irritation.
Swallowing	In case of swallowing of battery, immediately refer for medical attention.

5. Fire-fighting measures

Fire extinguishing agent:

Dry chemical, alcohol-resistant foam, powder, atomized water, carbon dioxide and dry sand are effective.

Extinguishing method:

Escape batteries to safe place prevent from ignition by spreading fire.

Because packaging material of battery is paper, use water extinguisher, CO2 extinguisher or powder extinguisher as normal extinguisher.

Since vapor, generated from burning batteries may make eyes, nose and throat irritate, be sure to extinguish the fire on the windward side. Wear the respiratory protection equipment in some cases.

6. Accidental release measures

Chemical contents are sealed in metal can. But if the battery is mechanically or electrically abused, contents may leak out. In such case, take action as showing below.

Personal precautions: Temporary inhalation of odor and attaching of electrolyte to skin does not cause serious health hazard. Be sure the ventilation and washing out of electrolyte quickly.

Environmental precautions: Clean up it quickly. Specific environmental precaution is not necessary.

Method and materials for containment and methods and materials for cleaning up:

Contain and collect spillage and place in container for disposal according to local regulations.

7. Handling and storing

Handling	Do not short-circuit, disassemble, deform, heat or incinerate. Do not pile up or mingle batteries with each other. Do not place battery on metal case, metal plate or antistatic material. In case of multi cell application, replace all batteries to new at once when replacing used batteries.
Storage	Be sure to store batteries in well-ventilated, dry and cool conditions. Keep away from water, rain, snow, frost or dew condensation. Do not store batteries near source of heat or nozzle of hot air. Do not store batteries in direct sunshine. Take care not to get wet packing by dew condensation when packing is removed from cold to warm and humid condition. Enough number of fire fighting apparatuses should be installed in warehouse. Keep batteries out of reach of children.

8. Exposure controls and personal protection

There is no need of personal protective equipment on regular handling and storage. In the event, however, a large amount of electrolyte should be released by mechanical or electrical abuse, use the protections as shown below.

Respiratory protection : Mask (with a filter preferably)

Hand protection : Synthetic rubber gloves

Eye protection : Goggles or glasses

9. Physical and chemical properties

State : Solid
Shape : Cylindrical

10. Stability and reactivity

Stability: Stable on regular handling

Conditions to avoid: External short circuit of battery, deformation by crush, exposure at high temperature of more than 100 degree C (may cause heat generation and ignition), direct sunlight, high humidity

Materials to avoid: Substances that cause short circuit.

11. Toxicological information

Since chemicals are contained in a sealed can, there are no hazards.

12. Ecological information

Persistence and degradability	No information available
Mobility in soil	No information available

13. Disposal considerations

Dispose of batteries in accordance with applicable federal, state and local regulations.

For safety precaution, battery should be insulated in proper manner; covering both terminals by tape, wrapping of battery in insulative bag or packing battery in original package is recommended in order to prevent ignition or explosion due to short-circuit.

14. Transportation Information

Lithium metal cells and batteries are classified as Class 9 Dangerous Goods in the United Nations Recommendation, and given UN numbers as shown in the below table. In case of transport of lithium metal cells and batteries, compliance with all the relevant UN regulations in addition to the requirements of United Nations Recommendation is required.

Our battery (listed on section 1) and its shipping package complies with the requirement of UN Manual of Test and Criteria, Part III, subsection 38.3 as well as the requirements described below, so it is permitted to transport.

<Air Transport>

Our battery is applicable to IATA Dangerous Goods Regulations (IATA-DGR) Packing Instruction 968 section IB because it corresponds to either case that the cell – lithium content is more than 0.3g and less than 1g or the battery – lithium content is more than 0.3g and less than 2g. Our battery and its shipping package is permitted to transport as Class 9 Dangerous Goods but without using packing group II package when it complies with all requirements of the transport conditions for Section IB.

Our products can be transported by cargo aircraft only since our products are classified into lithium metal batteries. However, in the case of transporting our cells or batteries packed with or contained in equipment, such cells or batteries are permitted for carriage on passenger aircraft.

<Sea Transport>

Our battery is applicable to the International Maritime Dangerous Goods Code (IMDG-Code) Special provision 188 because it corresponds to either case that the cell – lithium content is less than 1g or the battery – lithium content is less than 2g, so it is permitted to transport as Exempted Dangerous Goods when it complies with all requirements of the transport conditions.

UN No.	Packing Instruction	Proper Shipping Name/Description
3090	968	Lithium metal batteries
3091	969	Lithium metal batteries packed with equipment
3091	970	Lithium metal batteries contained in equipment

Related regulations: Following regulations shall be cited and considered.

Transportations	Related organization / Issue documents
Air transport (by airplane)	ICAO (International Civil Aviation Organization) / TI (Technical Instruction) IATA (International Air Transport Association) / DGR (Dangerous Goods Regulations) * ¹
Maritime transport (by ship)	IMO (International Maritime Organization) / IMDG Code (International Maritime Dangerous Goods Code) * ²
Land transport (Intra-European)	RID (International Carriage of Dangerous Goods by Rail) , ADR (International Carriage of Dangerous Goods by Road)
USA / UN	USDOT (US Department of Transportation) / DOT 49 CFR (US law) UN: Recommendations on the transport of dangerous goods: Manual of Tests and Criteria 6th edition [ST/SG/AC.10/11/Rev.6]: Part III, Subsection 38.3

15. Applicable legislation

EU Directive 2006/66/EC

16. Other information

Reference

- IATA Dangerous Goods Regulations, latest edition *¹

Notes on this sheet

*1 Dangerous Goods Regulations – 58th Edition Effective 1 January 2017: International Air Transport Association (IATA)

*2 IMDG Code – 2016 Edition: International Maritime Organization (IMO)

This sheet refers to normal use of the product in question. FDK Corp. makes no warranty expressed or implied.