



QUALITY ASSURANCE GROUP  
256-41, Dugok-Li, Shinam-Myon, Yesan-Gun,  
Chung-Nam, 340-861, Korea

**TRANSPORTATION CERTIFICATE**  
**MODEL : SB-A01 (IEC : ER17500)**

**1. SCOPE**

This is to certify that VITZROCELL type **SB-A01** has been tested in accordance with the requirements of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Fourth Revised Edition as required by the –

- UN Recommendations on the Transport of Dangerous Goods Model Regulations
- IATA Dangerous Goods Regulations
- International Maritime Dangerous Goods Code (IMDG Code)
- ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air
- European Road Regulations (ADR)
- USA Hazardous Materials Regulations (49CFR 173.185)

**2. PRODUCT CERTIFICATION CENTER**

KERI (Korea Electrotechnology Research Institute)

**3. PRODUCT DESCRIPTION**

Primary(non-rechargeable), Lithium Thionyl Chloride(Li/SOCl<sub>2</sub>) single cell

Nominal Voltage	3.6V
Nominal Capacity (at 3mA at 2.0V @ 20 °C)	3,400mAh
Lithium metal content per cell	<b>0.97g</b>
Maximum continuous discharge current (to get 50% of the nominal capacity, 20 °C, 2.0V Cut-off)	60mA

**4. PRODUCT CLASSIFICATION**

Lithium cells and batteries are classified as UN 3090. Dependent on the lithium content, cells (less than 1 g) or batteries (less than 2 g) can be transported under requirements of PI 968 Section IB or Section II (when cells are equal or less than 8 cells)

Vitrocell cells and batteries successfully passed the tests of "UN Manual of Tests and Criteria, Part III, sub-section 38.3".

**5. All packages from Vitrocell complied to requirement of the 1.2m drop test in PI 968 Section II**

**6. TEST RESULTS**

No.	Designation.	Result	No.	Designation.	Result
T1	Altitude	Pass	T5	Short-circuit	Pass
T2	Thermal	Pass	T6	Impact	Pass
T3	Vibration	Pass	T7	Overcharge	-
T4	Shock	Pass	T8	Forced discharge	Pass

\* T 7 is evaluates the ability of a rechargeable battery to withstand overcharge.

**7. SIGNED ON BEHALF OF VITZROCELL**

Prepared J.M. Kim  date : Jan. 21, 2013

Checked J.D. Lee  date : Jan. 21, 2013

Approved S. K. Jang  date : Jan. 21, 2013



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TRANSPORTATION CERTIFICATE  
MODEL :SB-AA02 (IEC : ER14250)

**1. SCOPE**

This is to certify that VITZROCELL type **SB-AA02** has been tested in accordance with the requirements of the UN Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Fourth Revised Edition as required by the –

- UN Recommendations on the Transport of Dangerous Goods Model Regulations
- IATA Dangerous Goods Regulations
- International Maritime Dangerous Goods Code (IMDG Code)
- ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air
- European Road Regulations (ADR)
- USA Hazardous Materials Regulations (49CFR 173.185)

**2. PRODUCT DESCRIPTION**

Primary(non-rechargeable), Lithium Thionyl Chloride(Li/SOCl<sub>2</sub>) single cell

Nominal Voltage	3.6V
Nominal Capacity (at 1mA to 2.0V @ 20 °C)	1,200mAh
Lithium metal content per cell	<b>0.30g</b>
Maximum continuous discharge current (to get 50% of the nominal capacity, 20 °C, 2.0V Cut-off)	20mA

**3. PRODUCT CLASSIFICATION**

Lithium cells and batteries are classified as UN 3090. Dependent on the lithium content, cells (less than 1 g) or batteries (less than 2 g) can be transported under PI 968 Section II

Vitzrocell cells and batteries successfully passed the tests of "UN Manual of Tests and Criteria, Part III, sub-section 38.3".

**4. All packages from Vitzrocell complied to requirements of the 1.2m drop test in PI 968 Section II**

**5. TEST RESULTS**

No.	Designation.	Result	No.	Designation.	Result
T1	Altitude	Pass	T5	Short-circuit	Pass
T2	Thermal	Pass	T6	Impact	Pass
T3	Vibration	Pass	T7	Overcharge	-
T4	Shock	Pass	T8	Forced discharge	Pass

\* T 7 is evaluates the ability of a rechargeable battery to withstand overcharge.

**6. SIGNED ON BEHALF OF VITZROCELL**

Prepared J.M. Kim  date : Jan. 21, 2013

Checked J.D. Lee  date : Jan. 21, 2013

Approved S. K. Jang  date : Jan. 21, 2013



## MATERIAL/PRODUCT SAFETY DATA SHEET

Date: January 26<sup>th</sup>, 2015

### 1. Identification of the Substance or Preparation and Company

1.1 Product : Lithium/Thionyl Chloride(Li/SOCl<sub>2</sub>) Cells & Batteries  
/ Sulfuryl Chloride (Li/SO<sub>2</sub>Cl<sub>2</sub>) Cells & Batteries

1.2 Model : TEKCELL (Brand name)

Bobbin type	Wound type	High Temp. Type
SB Series SB-AA02,AA11,A01,C02,D02	SW Series SW- AA01,AA11,A01,C01,D02 D03	SWH,SMH and SC Seires SWH-DD01(DD- HR),SMH-DD01(DD-Mr), SC- C01,D01,DD01,Evolution Cell(FAT D)

### 1.3 Company

Name : Vitzrocell, Co. Ltd  
Address : 256-41 Dugok-ri, Sinam-myon, Yesan-gun, ChungCheong Nam-Do  
Tel : +82-41-332-8642~5  
Fax : +82-41-332-8646  
Website : www.vitzrocell.com

### 2. Composition & Information on Ingredients

Ingredient	Content (%)	CAS No.	etc
Lithium(Li)	3.0 ~ 4.5%	7439-93-2	
Carbon (C)	3.0 ~ 4.5%	1333-86-4	
Electrolyte(SOCl <sub>2</sub> )	30 ~ 45%	7719-09-7	
Aluminium Chloride(AlCl <sub>3</sub> )	2.0 ~ 4.0%	7446-70-0	
Gallium Chloride(GaCl <sub>3</sub> )	2.0~4.0%	13450-90-3	Only used for SW-D03 and SWH Series and Evolution cell(FAT D) instead of AlCl <sub>3</sub>



### 3. Hazards Identification

The batteries described in this MSDS are hermetically sealed unit, which are not hazardous when used according to the recommendations of the manufacturer. Under normal condition of use of the batteries, the electrode materials and the liquid electrolyte they contained are non-reactive provided the battery integrity is maintained. Risk of exposure exists only in case of mechanical, electrical or thermal abuse. Thus, the batteries should not short circuit, recharge, puncture, incinerate, crush, immerse in water, force discharge, or expose to above the temperature range of the cell or battery. In these cases, there is risk of fire or explosion.

### 4. First Aid Measures

Handle according to emergency measures under in case of battery rupture, explosion or leakage and evacuate personnel from contaminated area and provide good ventilation to clear out corrosive fumes, gases or the pungent odour. Seek immediate medical attention.

**Inhalation** – Remove from exposure, rest and keep warm. In severe cases, obtain medical attention

**Skin Contact** – Wash off skin thoroughly with flow water for 10~15 minutes and obtain medical attention.

**Eye Contact** – Irrigate thoroughly with Water for at least 15 minutes and obtain medical attention.

**Ingestion** – Wash out mouth thoroughly with water and give plenty of water to drink for vomit and obtain medical attention.

### 5. Fire Fighting Measures

It is effective to use cold water in order to prevent spread of fire caused by lithium cells. However, never use hot water.

Lith-X(Class D extinguishing media) is the only effective on fires involving a few lithium batteries. If the cells are directly involved in a fire, DO NOT USE WATER, SAND, CO<sub>2</sub>, HALON and DRY POWDER or SODA ASH EXTINGUISHERS.

If a fire is in adjacent area, and cells are packed in their original containers, the fire can be fought based on fuelling material, e.g. paper and plastic products.



## 6. Accidental Release Measures

Do not breathe vapours or touch liquid with bare hand. If the skin has come into contact with the electrolyte, take an action in accordance with 4. First Aid Measures.

Graphite powder should be used to absorb the exudation, seal leaking battery and graphite powder in plastic bag and dispose of Special Waste.

## 7. Handling and Storage

**Handling** – Prevent short circuit and do not use the battery above the temperature rating of battery. Do not recharge, force over-discharge (voltage below 0.0V), puncture and compress.

**Storage** – Storage preferably in cool (below 30°C) and non-elevated temperatures place. Storage in high temperatures can result in shortened battery life and degrade performance. Do not store batteries in high humidity, shock and vibration environments.

**Others** – Do not charge primary battery which is not chargeable battery. Follow manufacturer's recommendations regarding maximum recommended current and operating temperature range.

## 8. Exposure Controls & Personal Protection

The following safety measures are not necessary in normal use. They need only be applied if there is a risk that, in use or handling, the recommendations, as outlined in Section 3, have not been followed.

**Respiratory protection** – In all fire situations, use filter mask or self-contained breathing Apparatus for harmful gases or other material prevention.

**Hand protection** – In leakage situations, use specific gloves for leaking chemical substance and heat prevention.

**Eye protection** – Use safety goggles or face shield which can separate eyes and the outside for chemical substance and heat prevention.

**Other protective equipment** – Additional equipments are needed to prevent from chemical substance, harmful material and heat. (Clothes, boots etc.)



## 9. Physical and Chemical Properties

Appearance	Cylindrical shape
Odour	Odourless. If leaking, gives off a pungent and corrosive odour.
pH	Not applicable (Unless individual components exposed)
Boiling point	Not applicable (Unless individual components exposed)
Vapour pressure (mmHg,25°C)	Not applicable (Unless individual components exposed)
Relative density	Not applicable (Unless individual components exposed)
Flash point	Not applicable (Unless individual components exposed)
Flammability	Not applicable (Unless individual components exposed)
Solubility (water)	Not applicable (Unless individual components exposed)
Solubility (other)	Not applicable (Unless individual components exposed)
Physical state	Solid

## 10. Stability and Reactivity

Product is stable under conditions described in Section 7 (Handling and storage).

**Conditions to avoid** – heating and incineration above 90°C, transformation, abscission, compression, puncture, disassembly, charge, a short circuit, storage in high humidity for a long time.

**Material to avoid** – Prevent to contact Oxidizer, Strong carbonated water, Alkali solutions, Water (H<sub>2</sub>O), Aluminium, Zinc, and Electrolyte.

### Harmful materials caused by disassembly

1. Water (H<sub>2</sub>O) reacts with lithium metal to form powder such as lithium hydroxide (LiOH), lithium oxide and hydrogen gas (H<sub>2</sub>)
2. In case of heating Thionyl chloride(SOCl<sub>2</sub>) above 150°C, chlorine(Cl<sub>2</sub>), sulfur dioxide(SO<sub>2</sub>), sulphur trioxide(SO<sub>3</sub>), disulfur dichloride(S<sub>2</sub>Cl<sub>2</sub>), sulphur dichloride (SCl<sub>2</sub>), lithium oxide(Li<sub>2</sub>O) may occur.
3. Water (H<sub>2</sub>O) reacts with thionyl chloride(SOCl<sub>2</sub>) in room temperature to form hydrochloric acid(HCl) and sulphur dioxide(SO<sub>2</sub>).



## 11. TOXICOLOGICAL INFORMATION

Symptoms and Signs – None, unless battery ruptures. In the event of exposure to internal contents, corrosive fumes will be very irritating to skin, eyes and mucous membranes.

Inhalation – Lung irritant.

Skin contact – Skin irritant

Eye contact – Eye irritant

Ingestion – if swallow, it can be poisoned.

Medical condition aggravated by exposure – In the event of exposure to internal contents, eczema, skin allergies, lung injuries, asthma and other respiratory disorders may occur.

## 12. Ecological Information

When properly used or disposed the battery does not present environmental hazard.

Cells of Vitzrocell do not contain mercury, cadmium, lead and Cr<sup>6+</sup> which has a bad influence on environment.

## 13. Disposal Considerations

Do not incinerate or subject cells to temperatures in excess of 85°C. In the event of such abuse can result in loss of seal that causes explosion.

Cells should be separated after use in order to prevent short circuit terminal by using tape or other tools and dispose of in accordance with regulations.

## 14. Transportation

Compliance with IATA Dangerous Goods Regulation (DGR)



Model	D.G Class : Class 9 UN3090
SB-AA02	Section II
SB-AA11	section IB
	section II (less than 8cell)
SB-A01	section IB
	section II (less than 8cell)
SB-C02	section IA Class9
SB-D02	section IA Class9
SB-D02(Cap)	section IA Class9
SW-AA11	section IB
	section II (less than 8cell)
SW-AA01	Section II
SW-C01	section IA Class9
SW-D02	section IA Class9
SW-D03	section IA Class9
DD-HR 150(G)(SWH-DD01)	section IA Class9
DD-MR 165(SMH-DD01)	section IA Class9
SC-C01	section IA Class9
SC-D01	section IA Class9
SC-DD01	section IA Class9
Evolution Cell(FAT D)	section IA Class9

Lithium cell must pass relevant examination regardless of lithium content. Relevant regulation and examination regulation for product are as follows.

- The UN Recommendations on the Transport of Dangerous Goods, Model Regulations
- The UN recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Part III, Section 38.3

Hazard Classification: Class9

UN Number: 3090 Lithium batteries

3091 Lithium batteries contained in equipment or

Lithium batteries packed with equipment

Packing group: II





Other regulation and guideline

ADR, RID 188, 230, 310, P903

IATA A88, A99, A154, A164

IMDG code 188, 230, 310, P903

Lithium cell is restricted by transport through a passenger plane in case of air transport.

## 15. Regulatory Information

None

## 16. Other Information

TEKCELL (manufacturer: Vitzrocell) was recognized safety by UL (Underwriters Laboratories) located in Northbrook, U.S.A. (UL File No. : MH 18384)

(Some cells and batteries are not UL certified)

Vitzrocell has all authorities about this MSDS. In case of use of relevant data by outside presentation, should get permission by Vitzrocell.