MATERIAL SAFETY DATA SHEET

1. Product & Company Identification

Product Description	Li-Ion Battery	**Model Number**	BP-17
Manufacturer	SKF (U.K.) Limited	**Approximate Weight**	190g
Capacity	7.2V, 31.7 Wh	**Equivalent Lithium Content**	2.64g
Address	2 Michaelson Square, Kirkton Campus, Livingston, EH547DP, UK		
Telephone	+44 (0) 1506 470011	**Fax**:	+44 (0) 1506 470012

The battery consists of four LG ICR18650-S3 cells; for the following headings please refer to the relevant section of the attached LG ICR18650-S3 MSDS.

Section	Heading
2	**Composition/information on ingredients;**
3	**Hazards identification;**
4	**First-aid measures;**
5	**Fire-fighting measures;**
6	**Accidental release measures;**
7	**Handling and storage;**
8	**Exposure controls/personal protection;**
9	**Physical and chemical properties;**
10	**Stability and reactivity;**
11	**Toxicological information;**
12	**Ecological information;**
13	**Disposal considerations;**

14. Transport

The battery model listed has aggregate equivalent lithium content that is not more than 100Wh. And shipment contains no item listed under IATA DGR Special Provision A154 and meets all requirements under UN Manual of Tests and Criteria Part III, subsection 38.3.

No	ITEMS	RESULTS	REMARKS
1	Altitude simulation	Pass	Test 1 to 5 must be conducted in sequence on the same cell or battery
2	Thermal test	Pass	
3	Vibration	Pass	
4	Shock	Pass	
5	External short circuit	Pass	
6	Impact	Pass	
7	Overcharge	Pass	
8	Forced Discharge	N/A	Only for Cell

SKF (U.K.) Limited, Machine Health - Development & Production Centre, Industrial Market
2 Michaelson Square, Livingston, EH54 7DP, Scotland
Tel +44 1506 470011 Fax +44 1506 470012 www.skf.com/cmclivingston

MATERIAL SAFETY DATA SHEET

The product is not classified as dangerous Goods according to the 52nd edition of IATA Dangerous Goods Regulations. And not regulated by IATA DGR. This product fully conforms to IATA Shipping PI 965, section **II**. Do not damage or mishandle this package. If package is damaged, batteries must be quarantined, inspected, and repacked. For emergency information, call: +44 (0) 1506 470011.

15. Regulatory Information

See ACGIH exposure limits information as noted in Section3.
US: This MSDS meets/exceeds OSHA requirements.
International: This MSDS conforms to European Union (UN), the International Standards Organization (ISO) and the International Labor Organization (ILO) and as documental in ANSI (American National Standards Institute) Standard Z400.1-1993.

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16. Charging and labeling

Charging: This battery is made to be charged many times. Use an SKF approved battery charger. Never use a modified or damaged battery charger. The charging temperature should be between 0°C and 45°C (32°F and 113°F). The battery pack will be normally warm during charging.

Charging Voltages and Currents: Charging voltages are prevented from exceeding the specified limits by an internal battery protection circuit. Never use a battery that shows signs of a damaged protection circuit or broken case. (Such damage to the protection circuit may be indicated by voltages at the battery terminals outside of their specified ranges.) Adhere to all specified charging and discharging voltages and currents. Do not use battery if its voltage drops below the specified minimum voltage.

17. Other information

The information contained herein is furnished without warranty of any kind. Users should consider this data only as a supplement to other information gathered by them and must make independent determinations of the suitability and completeness of information form all sources to assure proper use and disposal of these materials and the safety and health of employees and customers.

Digitally signed by
Douglas Coupar
Date: 2016.09.22
15:26:18 +01'00'

Douglas Coupar, Hardware Group Leader
Livingston, United Kingdom 22nd Sep 2016

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MATERIAL SAFETY DATA SHEET

Model ICR18650S3 Lithium-Ion Battery

LG CHEMICAL LIMITED

1. Chemical Product and Company Identification

Product Identification

LGCHEM ICR18650S3 Lithium-Ion Battery

Manufacturer

LG Chemical Limited
Twin Tower
Youido-Dong, Youngdeungpo-Ku
Seoul, Korea

Emergency Telephone Number

82-2-3773-7256

2. Composition Information

Hazardous Ingredients	%	CAS Number
Aluminum Foil	2-10	7429-90-5
Nickel compound (proprietary)	10-25	
Manganese compound (proprietary)	6-15	
Cobalt compound (proprietary)	4-10	
Styrene-Butadiene-Rubber	<1	
Polyvinylidene Fluoride (PVDF)	<5	24937-79-9
Copper Foil	2-10	7440-50-8
Carbon (proprietary)	10-30	7440-44-0
Electrolyte (proprietary)	10-20	
Stainless steel and Nickel and inert materials	Remainder	N/A

* Equivalent Lithium Content: 0.66g, Cell Energy: 7.92Wh

3. Hazards Identification

Emergency Overview

May explode in a fire, which could release hydrogen fluoride gas.
Use extinguishing media suitable for materials burning in fire.

Primary routes of entry

Skin contact	:	NO
Skin absorption	:	NO
Eye contact	:	NO
Inhalation	:	NO
Ingestion	:	NO

Symptoms of exposure

Skin contact

No effect under routine handling and use.

Skin absorption

No effect under routine handling and use.

Eye contact

No effect under routine handling and use.

Inhalation

No effect under routine handling and use.

Reported as carcinogen

Not applicable

4. First Aid Measures

Inhalation
Not a health hazard.

Eye contact
Not a health hazard.

Skin contact
Not a health hazard.

Ingestion
If swallowed, obtain medical attention immediately.

IF EXPOSURE TO INTERNAL MATERIALS WITHIN CELL DUE TO DAMAGED OUTER CASING, THE FOLLOWING ACTIONS ARE RECOMMENDED ;

Inhalation
Leave area immediately and seek medical attention.

Eye contact
Rinse eyes with water for 15 minutes and seek medical attention.

Skin contact
Wash area thoroughly with soap and water and seek medical attention.

Ingestion
Drink milk/water and induce vomiting; seek medical attention.

5. Fire Fighting Measures

General Hazard
Cell is not flammable but internal organic material will burn if the cell is incinerated. Combustion products include, but are not limited to hydrogen fluoride, carbon monoxide and carbon dioxide.

Extinguishing Media
Use extinguishing media suitable for the materials that are burning.

Special Firefighting Instructions
If possible, remove cell(s) from fire fighting area. If heated above 125°C, cell(s) may explode/vent.

Firefighting Equipment
Use NIOSH/MSHA approved full-face self-contained breathing apparatus (SCBA) with full protective gear.

6. Accidental Release Measures

On Land
Place material into suitable containers and call local fire/police department.

In Water
If possible, remove from water and call local fire/police department.

7. Handling and Storage

Handling
No special protective clothing required for handling individual cells.

Storage
Store in a cool, dry place.

8. Exposure Controls / Personal Protection

Engineering controls

Keep away from heat and open flame. Store in a cool dry place.

Personal Protection

Respirator

Not required during normal operations. SCBA required in the event of a fire.

Eye/face protection

Not required beyond safety practices of employer.

Gloves

Not required for handling of cells.

Foot protection

Steel toed shoes recommended for large container handling.

9. Physical and Chemical Properties

State	Solid
Odor	N/A
PH	N/A
Vapor pressure	N/A
Vapor density	N/A
Boiling point	N/A
Solubility in water	Insoluble
Specific gravity	N/A
Density	N/A

10. Stability and Reactivity

Reactivity
None

Incompatibilities
None during normal operation. Avoid exposure to heat, open flame, and corrosives.

Hazardous Decomposition Products
None during normal operating conditions. If cells are opened, hydrogen fluoride and carbon monoxide may be released.

Conditions To Avoid
Avoid exposure to heat and open flame. Do not puncture, crush or incinerate.

11. Toxicological Information

This product does not elicit toxicological properties during routine handling and use.

Sensitization	Teratogenicity	Reproductive toxicity	Acute toxicity
NO	NO	NO	NO

If the cells are opened through misuse or damage, discard immediately. Internal components of cell are irritants and sensitizers.

12. Ecological Information

Some materials within the cell are bioaccumulative. Under normal conditions, these materials are contained and pose no risk to persons or the surrounding environment.

13. Disposal Considerations

California regulated debris

RCRA Waste Code : Nonregulated

Dispose of according to all federal, state, and local regulations.

14. Transport Information

Lithium Ion batteries are considered to be "Rechargeable batteries" and meet the requirements of transportation by the U.S. Department of Transportation(DOT), International Civil Aviation Administration(ICAO).

Even classified as lithium ion batteries (UN3480), 2010 IATA Dangerous Goods Regulations 51th edition Packing Instruction 965 Section Ⅱ is applied.
The Product is handled as Non-Dangerous Goods by meeting the following requirements. (1)

Lithium ion cells and batteries offered for transport are not subject to other additional requirements of the UN Regulations if they meet the following ; (1)–(5)

1. for cells, the Watt-hour rating is not more than 20Wh.
2. for batteries, Watt-hour rating is not more than 100Wh.
3. each cell or battery is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria Part 3 subsection 38.3.
4. each cells comply with Special Provision A154.
5. Quantity per Package shall not exceed 10kg.

15. Regulatory Information

OSHA hazard communication standard (29 CFR 1910.1200)

_____Hazardous ____✔___Non-hazardous