

MATERIAL SAFETY DATA SHEET

The Attached MSDS, represents the chemical construction of the manufactured cells used within Hawkwoods Lithium-Ion battery listed below.

Model:

GR-100

Description:

100W 14.4V 15mm Bar Lithium-Ion Battery System

Chemical Product and Company Identification

Product Information: Lithium-Ion Battery (All models manufactured by Hawkwoods.)

Manufacturer: HAWK-WOODS LTD, BRISCALL HOUSE
KINGSNORTH INDUSTRIAL ESTATE, WOTTON ROAD
ASHFORD, KENT, TN23 6LN

Emergency Tel: +44 (0)1233 638715

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

Composition Information

Lithium-Ion Cylindrical Cell Hazardous Ingredients	%	CAS Number
Aluminium Foil	2-10%	7429-90-5
Nickel compound (Proprietary)	0-25%	-
Manganese compound (Proprietary)	0-15%	-
Cobalt compound (Proprietary)	4-50%	-
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, Nickel and inert materials	Remainder	N/A

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Hazards Identification

Primary routes of entry & Symptoms of Exposure

***If exposure to internal materials within cell due to damaged outer casing, the following actions are recommended.**

Skin Contact: <i>No Effect under Rountine handling and use Not a health hazard *Wash area thoroughly with soap and water and seek Medical attention</i>	NO	Eye Contact: <i>No Effect under Rountine handling and use Not a health hazard *Rinse eyes with water for 15 minutes and seek medical attention.</i>	NO
Ingestion: <i>No Effect under Rountine handling and use If Swallowed, Obtain medical attention immediately *Drink milk/water and induce vomiting; seek medical attention.</i>	NO	Inhalation: <i>No Effect under Rountine handling and use Not a health hazard *Leave area immediately and seek medical attention.</i>	NO
Skin Absorbtion: <i>No Effect under Rountine handling and use Not a health hazard</i>	NO	Reported as carcinogen:	N/A

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:** 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.

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.
- Handling:** No special protective clothing required for handling individual cells.
- Storage:** Store in a cool, dry place.

Exposure controls / Personal protection

- Engineering controls:** Keep away from heat and open flame. Store in a cool dry place.
- 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.

MATERIAL SAFETY DATA SHEET

Physical and Chemical Properties

State	Solid	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

Stability and Reactivity

Reactivity: None.

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

Hazardous Decomposition: 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.

Physical and Chemical Properties

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

Sensitization Teratogenicity	NO
Reproductive	NO
Toxicity	NO
Acute toxicity	NO

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

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.

Disposal considerations

California regulated debris. RCRA Waste code: Non-regulated.
Dispose of according to all federal, state and local regulations.

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).

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Even classified as lithium ion batteries (UN3480), 2014 IATA Dangerous Goods Regulations 53rd edition Packing Instruction 965 Section II is applied. The Product is handled as Non-Dangerous Goods by meeting the following Requirements. (1)

100W and under

- Shippers Declaration required in net weight KG.
- UN specification packaging required (PGII standards)
- Class 9 label required
- Dangerous goods surcharge

Over 100W

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

Hawkwoods products have been tested according to the UN Manual of Tests and Criteria.

Physical and Chemical Properties

No.	Test Item	Criteria	Result
Test 1	Altitude Simulation	- No Leakage, venting, disassembly, rupture and No fire.	PASS
Test 2	Thermal test	- Measuring mass before/after each test (If M>5g, less than 0.1%)	PASS
Test 3	Vibration	- Measuring voltage before/after each test.	PASS
Test 4	Shock	(More than 90%)	PASS
Test 5	External Short Circuit	- No disassembly, rupture and fire within six hours of this test.	PASS
Test 6	Impact	- Max. Temperature should not exceed 170c	PASS
Test 7	Overcharge	- No disassembly and fire within seven days of test.	PASS