

SECTION 1. CHEMICAL PRODUCT AND COMPANY NAME**Lithium-Ion Rechargeable Battery Pack
BL1850B**Symbol  at the bottom of the battery.**Safety Data Sheet**Complies with the OSHA Hazard
Communication Standard :
29 CFR 1910 1200

Makita U.S.A., Inc. 14930-C Northam Street La Mirada, CA 90638	Prepared By :	Stan Rodrigues
	Date Revised:	02/25/2016

EMERGENCY CONTACT INFORMATION**Telephone Number for Information:** MAKITA: 1-510-657-9881**Emergency Response**

For Chemical Emergency
Spills, Leak, Fire, Exposure, or Accident
Call CHEMTREC Day or Night
Within USA and Canada 1-800-424-9300

SECTION 2. HAZARD IDENTIFICATION:

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.

SECTION 3. COMPOSITION, INFORMATION OR INGREDIENTS

CAS-No.	Chemical Name	Quantity
1307-96-6	Cobalt oxide	< 30 %
1313-13-9	Manganese dioxide	< 30 %
1313-99-1	Nickel oxide	< 30 %
7440-44-0	Carbon	< 30 %
	Electrolyte (*)	< 20 %
24937-79-9	Polyvinylidene fluoride (PVdF)	< 10 %
7429-90-5	Aluminum foil	2 - 10 %
7440-50-8	Copper foil	2 - 10 %
	Aluminum and inert materials	5 - 10 %

Full text of each relevant R phrase can be found in Section 16

CONTINUED: SECTION 3. COMPOSITION, INFORMATION OR INGREDIENTS

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
Wh rating:	Under 100Wh
Anode (negative electrode):	Based on intercalation graphite
Cathode (positive electrode):	Based on lithiated metal oxide (Cobalt, Nickel, Manganese)

SECTION 4. FIRST AID MEASURE

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.

SECTION 5. FIRE FIGHTING MEASURES

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 firefighting 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.

SECTION 6. ACCIDENTAL RELEASE MEASURES

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.

SECTION 7. HANDLING AND STORAGE

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 (approx. 20°C) at approx. 20- 60% of the nominal capacity (OCV approx. 3.6 - 3.9 V/cell).
Keep in closed original container.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Ingredient	Risk Codes	Safety Description	Hazard	Exposure Controls/Personal Protection
Cobalt oxide	R22, R43, R50/53	S24; S37; S60; S61	Xn (Harmful)N (Dangerous for the environment)	0.1 mg/m3 (TWA)
Manganese (VI) oxide	R20/22	S25	Xn (Harmful)	Airborne Exposure Limits: - OSHA Permissible Exposure Limit (PEL): 5 mg/m3 Ceiling for manganese compounds as Mn - ACGIH Threshold Limit Value (TLV): 0.2 mg/m3 (TWA) for manganese, elemental and inorganic compounds as Mn
Nickel oxide	R43, R49, R53	S45, S53, S61	T(Toxic)	Airborne Exposure Limits: For Nickel, Metal and Insoluble Compounds, as Ni: - OSHA Permissible Exposure Limits (PEL) - 1 mg/m3 (TWA). For Nickel, Elemental / Metal: - ACGIH Threshold Limit Value (TLV) - 1.5 mg/m3 (TWA), A5 - Not suspected as a human carcinogen. For Nickel, Insoluble Compounds, as Ni: - ACGIH Threshold Limit Value (TLV) - 0.2 mg/m3 (TWA), A1 - Confirmed human carcinogen
Carbon	R36/37/38 R36/37 R20, R10	S22; S24/25	F(Highly Flammable) Xn (Harmful) Xi (Irritant)	Airborne Exposure Limits: - OSHA Permissible Exposure Limits (PELs): activated carbon (graphite, synthetic): Total particulate = 15 mg/m3
Aluminum foil	R17, R15, R36/38, R10, R67, R65, R62, R51/53, R48/20, R38, R11,	S7/8, S43, S26, S62 S61, S36/37, S33, S29, S16, S9	F (Highly Flammable) Xn (Harmful) Xi (Irritant)	Airborne Exposure Limits: -OSHA Permissible Exposure Limit (PEL): 15 mg/m3 (TWA) total dust and 5 g/m3 (TWA) repairable fraction for Aluminum metal as Al -ACGIH Threshold Limit Value (TLV): 10 mg/m3 (TWA) Aluminum metal dusts

CONTINUED: SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Ingredient	Risk Codes	Safety Description	Hazard	Exposure Controls/Personal Protection
Copper foil	R11 R36 R37 R38	S5, S26, S16, S61, S36/37	F (Highly Flammable) N(Dangerous for the environment) Xn (Harmful) Xi (Irritant)	Copper Dust and Mists, as Cu: - OSHA Permissible Exposure Limit (PEL) - 1 mg/m3 (TWA) - ACGIH Threshold Limit Value (TLV) - 1 mg/m3 (TWA) Copper Fume: - OSHA Permissible Exposure Limit (PEL) - 0.1 mg/m3 (TWA) - ACGIH Threshold Limit Value (TLV) - 0.2 mg/m3 (TWA)
Polyvinylidene fluoride (PVdF)		S22;S24/25		
<p>Additional advice on limit values: During normal charging and discharging there is no release of product.</p> <p>Occupational exposure controls: No specific precautions necessary.</p> <p>Protective and hygiene measures: When using do not eat, drink or smoke. Wash hands before breaks and after work.</p> <p>Respiratory protection: No specific precautions necessary.</p> <p>Hand protection: No specific precautions necessary.</p> <p>Eye protection: No specific precautions necessary.</p> <p>Skin protection: No specific precautions necessary.</p>				

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	
Form:	Solid
Color:	Various
Odor:	Odourless
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.

SECTION 10. STABILITY AND REACTIVITY

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.

SECTION 11. TOXICOLOGICAL INFORMATION

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.
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SECTION 12. ECOLOGICAL INFORMATION

Further information:	Ecological injuries are not known or expected under normal use. Do not flush into surface water or sanitary sewer system.
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SECTION 13. DISPOSAL CONSIDERATIONS

Advice on disposal:	For recycling consult manufacturer.
Contaminated packaging:	Disposal in accordance with local regulations.

SECTION 14. TRANSPORT INFORMATION

- When a number of batteries are transported by ship, vehicle and railroad avoid high temperature and dew condensation.
 - Avoid transportation which may cause damage of package.
 - Lithium-ion batteries are not subject to dangerous goods regulation for the purpose of transportation by the International Maritime Dangerous Goods regulations (IMDG). For Lithium-ion batteries, the Watt-hour rating is no more than 20Wh /cell and 100Wh/ battery pack can be treated as "non-dangerous goods" by the United Nations Recommendations on the Transport of Dangerous Goods/Special Provision 188, provided that the products are prevented from being short-circuited with each other and are packaged in an appropriate condition which satisfies Packing Group II performance level.
 - IATA (International Air Transport Association): Dangerous Goods Regulation Packing Instruction 965 (Lithium-ion or lithium polymer cells and batteries without electronic equipment)
 - US Hazardous Materials Regulations 49 CFR (Code of Federal Regulations) Sections 173-185 Lithium batteries and cells.
- Section II requirements apply to lithium-ion cells with a Watt-hour rating not exceeding 20 Wh and lithium-ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that within the allowance permitted in Section II, Table 965-11.

TABLE 965-II

Contents	Lithium-ion cells and/or batteries with a Watt-hour rating of 2.7 Wh or less	Lithium-ion cells with a Watt-hour rating of more than 2.7Wh but not more than 20Wh	Lithium-ion batteries with a Watt-hour rating of more than 2.7Wh but not more than 100Wh
Maximum number of cells / batteries per package	No limit	8 cells	2 Batteries

CONTINUED: SECTION 14. TRANSPORT INFORMATION:

Contents	Lithium-ion cells and/or batteries with a Watt-hour rating of 2.7 Wh or less	Lithium-ion cells with a Watt-hour rating of more than 2.7Wh but not more than 20Wh	Lithium-ion batteries with a Watt-hour rating of more than 2.7Wh but not more than 100Wh
Maximum net quantity per package	2.5 kg	N/A	N/A

Lithium-ion cells and batteries meeting the requirements in this section are not subject to other additional requirements of these Regulations except for:

- Each cell and battery is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3;
 - cells and batteries must be manufactured under a quality management program;
 - for batteries, The Watt-hour rating must be marked on the outside of the battery case;
 - Each package must be capable of withstanding a 1.2m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each package must be labeled with a lithium battery handling label.

Section IB requirements apply to lithium-ion cells with a Watt-hour rating not exceeding 20 Wh and lithium-ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that exceed the allowance permitted in Section II, Table 965-II.

Quantities of lithium-ion cells or batteries that exceed the allowance permitted in Section II, Table 965-II must be assigned to Class 9 and are subject to all of the applicable provisions of Regulation.

Even classified as lithium batteries packed with equipment (UN3481), IATA Dangerous Goods Regulations packing instruction 966 is applied.

Even classified as lithium batteries installed in equipment (UN3481), IATA Dangerous Goods Regulations packing instruction 967 is applied.

SECTION 15. REGULATORY INFORMATION**U.S. Regulations**

National Inventory TSCA: All of the components are listed on the TSCA inventory.

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.

SECTION 16. OTHER INFORMATION**Hazardous Materials Information Label (HMIS)**

Health: 0

Flammability: 0

Physical Hazard: 0

NFPA Hazard Ratings

Health: 0

Flammability: 0

Reactivity: 0

Unique Hazard:

Full text of R-phrases referred to under Sections 2 and 3

CONTINUED: SECTION 16. OTHER INFORMATION

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

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.

SECTION 1. CHEMICAL PRODUCT AND COMPANY NAME

Lithium-Ion Rechargeable Battery Pack BL1850B

Safety Data Sheet

Complies with the OSHA Hazard
Communication Standard :
29 CFR 1910 1200

Makita U.S.A., Inc.
14930-C Northam Street
La Mirada, CA 90638

Prepared By : Stan Rodrigues

Date Revised: 02/25/2016

EMERGENCY CONTACT INFORMATION

Telephone Number for Information: MAKITA: 1-510-657-9881

Emergency Response

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Spills, Leak, Fire, Exposure, or Accident
Call CHEMTREC Day or Night
Within USA and Canada 1-800-424-9300

SECTION 2. HAZARD IDENTIFICATION

Class Name: Not applicable for regulated class

Hazard: It may cause heat generation or electrolyte leakage if battery terminals contact with other metals. Electrolyte is flammable. In case of electrolyte leakage, move the battery from fire immediately.

Toxicity: Vapor generated from burning batteries, may make eyes, skin and throat irritate.

SECTION 3. COMPOSITION, INFORMATION OR INGREDIENTS

IMPORTANT NOTE:

The battery pack should not be opened or burned since the following ingredients contained within the cell that could be harmful under some circumstance if exposed or misused.

The cell contains neither metallic lithium nor lithium alloy.

Cathode: Lithium Nickel Cobalt Oxides Manganese Oxides (active material)
Polyvinylidene Fluoride (binder)
Graphite (conductive material)

Anode: Graphite (active material)
Polyvinylidene Fluoride (binder)

Electrolyte: Organic Solvent (non-aqueous liquid)
Lithium Salt

Others: Heavy metals such as Mercury, Cadmium, Lead, and Chromium are not used in the cell.

Enclosure: Plastic (PC)

UN number: UN3480

Watt-hour rating: 90Wh for battery pack

SECTION 4. FIRST AID MEASURE

The product contains organic electrolyte. In case of electrolyte leakage from the battery, actions described below are required.

- Eye Contact:** Flush the eyes with plenty of clean water for at least 15 minutes immediately, without rubbing, and call a doctor. If appropriate procedures are not taken; this may cause an eye irritation.
- Skin Contact:** 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.
- Inhalation:** Remove to fresh air immediately, and call a doctor.

SECTION 5. FIRE FIGHTING MEASURES

- Use specified extinguishers (gas, foam, powder) and extinguishing system under the Fire Defense Law.
- Since corrosive gas may be produced at the time of fire extinguishing, use an air inhalator when danger is predicted.
- Use a large amount of water as a supportive measure in order to get cooling effect if needed. (Indoor/outdoor fire hydrant)
- Carry away flammable materials immediately in case of fire.
- Move batteries to a safer place immediately in case of fire.

SECTION 6. ACCIDENTAL RELEASE MEASURES

- Wipe off with dry cloth
- Keep away from fire
- Wear safety goggles, safety gloves as needed

SECTION 7. HANDLING AND STORAGE

- Storage:** Store within the recommended limit of -30°C to 45°C (-22°F to 113°F), well-ventilated area. Do not expose to high temperature (60°C/140°F). Since short circuit can cause burn hazard or safety vent to open, do not store with metal jewelry, metal covered tables, or metal belt.
- Handling:** Do not disassemble, alter, or solder. Do not short + and – terminals with metal. Do not open the battery pack.
- Charging:** Charge within the limits of 0°C to 40°C (32°F to 104°F) temperature. Charge with specified charger designed for this battery pack
- Discharging:** Discharge within the limits of -20°C to 60°C (-4 °F to 140°F) temperature.
- Disposal:** Dispose in accordance with applicable federal, state and local regulations.
- Caution:** Do not incinerate. Do not disassemble. Do not expose to high temperatures. (140°F/60°C) Do not impact, pierce or crush the battery. Use specified charger only. Dispose of properly.

SECTION 8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

(In case electrolyte is leaked from battery)

- Acceptable Concentration:** Not specified in ACGIH.
- Facilities:** Provide appropriate ventilation such as local ventilation system in the storage.
- Protective Clothing:** Gas mask for organic gases, safety goggle, safety glove.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Lithium-ion rechargeable cells are set in a resin case.

Average Operating Voltage : 18V

SECTION 10. STABILITY AND REACTIVITY

External short-circuit, deformation by crush, high temperature (over 100°C) exposure of the battery may cause generation of heat and ignition.

SECTION 11. TOXICOLOGICAL INFORMATION

Acute Toxicity: No information as a battery

Local Effects: No information as a battery

SECTION 12. ECOLOGICAL INFORMATION

If battery is buried in the ground, corrosion may occur on the outer plastic case of battery and the electrolyte may leak out. There is no information on environmental influence.

SECTION 13. DISPOSAL CONSIDERATIONS

When battery is disposed, isolate positive (+) and negative (-) terminals of the battery to avoid those terminals from touching each other. Batteries may be short-circuited when piled up or mixed with the other batteries. Dispose in accordance with applicable federal, state and local regulations.

SECTION 14. TRANSPORT INFORMATION

- When a number of batteries are transported by ship, vehicle and railroad avoid high temperature and dew condensation.
- Avoid transportation which may cause damage of package.
- Lithium-ion batteries are not subject to dangerous goods regulation for the purpose of transportation by the International Maritime Dangerous Goods regulations (IMDG). For Lithium-ion batteries, the Watt-hour rating is no more than 20Wh /cell and 100Wh/ battery pack can be treated as “non-dangerous goods” by the United Nations Recommendations on the Transport of Dangerous Goods/Special Provision 188, provided that the products are prevented from being short-circuited with each other and are packaged in an appropriate condition which satisfies Packing Group II performance level.
- Lata (International Air Transport Association): Dangerous Goods Regulation
Packing Instruction 965 (Lithium-ion or lithium polymer cells and batteries without electronic equipment)

Section II requirements apply to lithium-ion cells with a Watt-hour rating not exceeding 20 Wh and lithium-ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that within the allowance permitted in Section II, Table 965-11.

TABLE 965-II

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CONTINUED: SECTION 14. TRANSPORT INFORMATION

Maximum number of cells / batteries per package	No limit	8 cells	2 Batteries
Maximum net quantity per package	2.5 kg	N/A	N/A

Lithium-ion cells and batteries meeting the requirements in this section are not subject to other additional requirements of these Regulations except for:

- Each cell and battery is of the type proven to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, subsection 38.3;
 - cells and batteries must be manufactured under a quality management program;
 - for batteries, The Watt-hour rating must be marked on the outside of the battery case;
 - Each package must be capable of withstanding a 1.2m drop test in any orientation without:
 - damage to cells or batteries contained therein;
 - shifting of the contents so as to allow battery to battery (or cell to cell) contact;
 - release of contents.
- Each package must be labeled with a lithium battery handling label.

Section IB requirements apply to lithium-ion cells with a Watt-hour rating not exceeding 20 Wh and lithium-ion batteries with a Watt-hour rating not exceeding 100 Wh packed in quantities that exceed the allowance permitted in Section II, Table 965-II.

Quantities of lithium-ion cells or batteries that exceed the allowance permitted in Section II, Table 965-II must be assigned to Class 9 and are subject to all of the applicable provisions of Regulation.

Lithium batteries packed without equipment are classified under (UN3480), IATA Dangerous Goods Regulations packing instruction 965 is applied.

Lithium batteries packed with equipment are classified under (UN3481), IATA Dangerous Goods Regulations packing instruction 966 is applied.

Lithium batteries installed in equipment are classified under (UN3481), IATA Dangerous Goods Regulations packing instruction 967 is applied.

SECTION 15. REGULATORY INFORMATION

- IMDG Code: International Maritime Dangerous Goods (IMDG) Code
- ICAO TI: International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air
- IATA DGR: International Air Transport Association (IATA) Dangerous Goods Regulations

SECTION 16. OTHER INFORMATION

The information contained within is provided for your information only. The information and recommendations set forth herein are made in good faith and are believed to be accurate as of the date of preparation. However, Makita U.S.A, Inc. MAKES NO WARRANTY, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THIS INFORMATION AND DISCLAIMS ALL LIABILITY FROM RELIANCE ON IT.