roda-part.no.: 147450

MATERIAL SAFETY DATA SHEET

Manufacturer Information：
Joules Miles Co.， Ltd.
5F, No. 1-21, Kuo-Chien Rd., Chien-Chen Dist.,Kaohsiung, Taiwan.
TEL： 886-7-8157868 FAX： 886-7-8154982 www.jms.com.tw
Date: 2016/1/14 Version: B

Product Information

Product Name：	Rechargeable Lithium Ion Battery Pack
Model NO：	DS11, BDSB3A_Rev.B G735903002
Rating :	11.1V,4200mAh,46.6wh

Hazards Identification

- Health Hazard Effect：
  The battery pack interior airtight chemical substance, if the artificial/machinery/electron improper use destroys, causes the chemical substance outside or the gas leaks causes the skin/eye damage and explodes .
- Environment Influence：
  Since a battery cell remains in the environment, do not throw out it into the environment.
- Physics/Chemical damage：-----
- Special damage：-----
- Cardinal Condition：
  Disgusting, vomit, the stupor, the skin fever scalds, the position feeling barrier.
- Article damage classification：-----

Composition / Information on Ingredients

English Name： Rechargeable Lithium Ion Battery Pack

Synonymous Name：

Hazardous Ingredients：

Chemical Name	CAS NO.	Concentration/ Concentration range	Classification and Hazard labeling
Lithium Cobaltic ($LiCoO_2$)	12190-79-3	20-40%	-
Iron	7439-89-6	15-25%	-
Aluminum	7429-90-5	2-6%	-
Graphite (Natural graphite) (Artificial graphite)	7482-42-5 7740-44-0	10-20%	-
Copper	7740-50-8	5-15%	Sensitization of the skin group No.2
Organic electrolyte	-	10-20%	Inflammable liquid

Lithium equivalent content	3.78g for battery pack

First Aid Measures

Under normal conditions of use, the battery is hermetically sealed.

1. Ingestion：Swallowing a battery can be harmful Contents of an open battery can cause serious chemical burns of mouth, esophagus, and gastrointestinal tract. If battery or open battery is ingested, do not induce vomiting or give food or drink. Seek medical attention immediately.

2. Inhalation：Contents of an open battery can cause respiratory irritation. Inhalation of vapors may cause irritation of the upper respiratory tract and lungs. Provide fresh air and seek medical attention.

3. Skin Contact：Contents of an open battery can cause skin irritation and/or chemical burns. Remove contaminated clothing and wash skin with soap and water. If a chemical burn occurs or if irritation persists, seek medical attention.

4. Eye Contact：Contents of an open battery can cause severe irritation and chemical burns. Immediately flush eyes thoroughly with water for at least 15 minutes, lifting upper and lower lids, until no evidence of the chemical remains. Seek medical attention.

Fire Fighting Measures

- If fire or explosion occurs when battery are on charge， should shut off power to charger. In case of fire where lithium ion battery is present, flood the area with water. If any battery is burning, water may not extinguish them, but will cool the adjacent battery and control the spread of fire. CO_2， dry chemical, and foam extinguishers are preferred for small fires.

- extinguishers：
  water/CO_2/dry chemical/foam

Accidental Release Measures

- **personal protection**：
  1. Respiratory Protection： Not necessary under normal conditions.

  2. Eye Protection： Not necessary under normal conditions. Wear safety glasses with side shields if handling an open or leaking battery.

  3. Gloves： Not necessary under normal conditions. Use neoprene or natural rubber gloves if handling an open or leaking battery

- **Ventilation Requirements**： Not necessary under normal conditions
- Should depend on environmental protection stipulation recycle mode processing.

Handling and Storage

- Handling：
  Do not expose the battery to excessive physical shock or vibration. Short-circuiting should be avoided; however, accidental short-circuiting for a few seconds will not seriously affect the battery.
  Prolonged short circuits will cause the battery to rapidly lose energy, could generate enough heat to burn skin. Sources of short circuits include jumbled battery in bulk containers, coins, metal jewelry, metal covered tables, or metal belts used for assembly of battery in devices. To minimize risk of short-circuiting, the protective case supplied with the battery should be used to cover the terminals when transporting or storing the battery. Do not disassemble or deform the battery.

- Storage：

  Store in cool place (temperature: -20 ~ 35 degree C, humidity: 45 ~ 85%).

Exposure controls

- ENGINEERING CONTROLS：-----

Control parameter		
Common chemical name/ General name	TLV-TWA	BEI
Lithium Cobaltic ($LiCoO_2$)	0.02mg/ m^3 (as cobalt)	-----
Aluminum	10mg/ m^3 (metal coarse particulate) 5mg/ m^3 (inflammable powder) 5mg/ m^3 (weld fume)	-----
Carbon (Natural graphite) (Artificial graphite)	2mg/ m^3 (inhalant coarse particulate)	-----
Copper	0.2mg/ m^3 (fume) 1.0mg/ m^3 (a coarse particulate , mist)	-----
Organic electrolyte	-----	-----

Physical and Chemical Properties

Physical state	(Solid)	(Solubility in water)	/
Cell Color	(Metallic color)	(Explosion limit)	/
Odor	(Odorless)	(Auto flammability)	/
Flashpoint	/	(Melting Point)	$LiCoO_2$ about 1130 C
Boiling Point	/	(Freezing Point)	/

Stability and Reactivity

- Stability：
  Stable under normal use
- Reactivity：
  Avoid contact with water and acids.

Toxicological Information

Under normal conditions of use, the battery is toxicological sealed. So void to open and damage battery directly

Ecological Information

If the battery is scrapped, it should be selected and disposed by professional company

Disposal Considerations

Do not dispose of battery into environment or sewerage. It should be recycled and disposed basing on your local legislation and regulations.

Transportation Information

The rechargeable lithium Ion battery pack meet all requirements under UN Manual of Tests and Criteria Part III, subsection 38.3. The lithium battery pack comply with IATA DGR 57th edition lithium ion battery pack UN3480 and comply with Section II of Packing Instruction of 965. Lithium battery label must be placed on the package when the statement is required.

Regulatory Information

(ACGIH)
(OSHA)
European Union (UN)
(ISO)

Other Information

- Reference :SANYO LI-ION CELL BATTERY MSDS
- Made by：Joules Miles Co.， Ltd.
  5F, No. 1-21, Kuo-Chien Rd., Chien-Chen Dist.,Kaohsiung, Taiwan.
  TEL： 886-7-8157868 FAX： 886-7-8154982 www.jms.com.tw

Note: The reference data provide from supplier.

JOULES MILES CO;LTD

佐茂股份有限公司

UN TEST REPORT

Commodity：Rechargeable Lithium-ion Battery pack
Model：G735903002 DS11 BDSB3A
Ambient Environment：23~25℃
Testing item：

1.Altitude simulation test
2.Thermal test
3.Vibration test
4.Shock test
5.External short circuit test
6.Impact
7.Overcharge test
8.Forced discharge
9.1.2m drop test

Approved	Test
陳柏宏 Kerr C.	陳彥齊 Wendell C.

Description:

Name	Rechargeable Lithium-ion Battery pack DS11 11.1V 46.62Wh 4200mAh
Manufacturer	Joules Miles Co., LTD.
Test method	UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS"
Criterion	UNITED NATIONS "Recommendations on the TRANSPORT OF DANGEROUS GOODS"
Remark	

Test Result：

Test item (Refer to UN 38.3)		Test Result	Remark
T1	Altitude simulation test	PASS	The test data is from cell supplier.
T2	Thermal test	PASS	The test data is from cell supplier.
T3	Vibration test	PASS	The test data is from cell supplier.
T4	Shock test	PASS	The test data is from cell supplier.
T5	External short circuit test	PASS	The test data is from cell supplier.
T6	Impact	PASS	The test data is from cell supplier.
T7	Overcharge test	PASS	Only for pack
T8	Forced discharge	PASS	The test data is from cell supplier.
1.2m drop test		PASS	

We declare the above : The test result mentioned above was checked according to UN test. (Manual of Tests and Criteria ST/SG/AC.10/11/Rev.4, PartIII,sub-section 38.3)

Testing Conditions：Refer to UN ST/SG/AC.10/11/Rev.4 Section 38.3

1.Altitude simulation test

Perssure：11.6kPa

Temperature：20℃

Duration：6hrs

Requirement：

A.Mass loss did not exceed 0.1%.

B.No leakage.(By visual inspection)

C.No rupture.(By visual inspection)

D.No fire.(By visual inspection)

E.The voltage of specimen after test is not less than 90% of pre-test value.

2.Thermal test

Procedure：

Step	Temperature	Duration
1	20℃→-40℃	16 mins.
2	-40℃	6 hrs.
3	-40℃→75℃	30 mins.
4	75℃	6 hrs.
5	75℃→20℃	14 mins.
6	Repeat Stept 1 to 5 further 9 times	
7	20℃	24 hrs.

Requirement：

A.Mass loss did not exceed 0.1%.

B.No leakage.(By visual inspection)

C.No rupture.(By visual inspection)

D.No fire.(By visual inspection)

E.The voltage of specimen after test is not less than 90% of pre-test value.

3.Vibration test

Waveform：Sine wave
Frequency：7~200~7 Hz
Sweep time：15 min.
Amplitude：1.6 mm(18~50 Hz)
Acceleration：1g(7~18 Hz)/8g(50~200 Hz)
Direction：X,Y,Z(3 axes)
Duration：3 hrs. / axis
Requirement：

A.Mass loss did not exceed 0.1%.

B.No leakage.(By visual inspection)

C.No rupture.(By visual inspection)

D.No fire.(By visual inspection)

E.The voltage of specimen after test is not less than 90% of pre-test value.

4.Shock test

Pulse shape：Half-sine pulse
Peak acceleration：150 g
Duration of pulse：6 ms
Direction：±X, ±Y, ±Z (6 directions)
Requirement：

A.Mass loss did not exceed 0.1%.

B.No leakage.(By visual inspection)

C.No rupture.(By visual inspection)

D.No fire.(By visual inspection)

E.The voltage of specimen after test is not less than 90% of pre-test value.

5.External short circuit test

Temperature：55℃

External resistance：<0.1Ω

Duration：1 hr after the specimens temperature has returned to 55℃

Requirement：

A.External temperature doesn’t exceed 170℃.

B.No rupture within 6 hours after test.

C.No fire within 6 hours after test.(By visual inspection)

6.Impact

The diameter of bar：15.8mm
Mass：9.1Kg
Height：61±2.5 cm
Requirement：

A.External temperature doesn't exceed 170℃.

B.No rupture within 6 hours after test.

C.No fire within 6 hours after test.(By visual inspection)

7.Overcharge test

Sample condition：
Current：4200mA
Voltage：15V
Duration：24 hrs
Requirement：No fire within 7 days after test.(By visual inspection)

8.Forced discharge

Test procedure：Each cell shall be forced discharge at ambient temperature by connecting it in series with 12 VDC power supply at an initial current equal to the maximum discharge current specified by the manufacturer.

The specified discharge current is to be obtained by connecting resistive load of the appropriate size and rating in series with the test cell .Each cell shall be forced discharge for a time interval (in hour) equal to its rated capacity divided by the initial test current (in Ampere).

Requirement：No fire within 7 days after test.(By visual inspection)

9.1.2m drop test

The package should be dropped from 1.2 meter high onto concrete surface (flat and horizontal) with ten orientations.

(a) 1 corner：(1) 2-3-5

(b) 3 edges ：(1) 2-3 (2)3-5 (3)2-5

(c) 6 faces：(1)5 (2)6 (3)2 (4)4 (5)3 (6)1