MATERIAL SAFETY DATA SHEET

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UN Manual of Tests and Criteria, Part III, Subsection 38.3 (Test T1-T8) Independent Certificate

Model(s):
DR202UL

Version 1.2
JAN. 3th, 2017

Revision History

Version #	***Date of Issued***	***Remarks***	***Issued by***
1.2	***2017.01.03***	***IATA updated to comply with the standards requested in the 57th Edition of the IATA Dangerous Goods Regulations***	***Anny Lin***

Document Review Team

	Names	***Titles***	***Date***
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1. MANUFACTURER

Name of Company	*1.1.1.1 J.S POWER CO., LTD.*
Address	***No. 2, Ln. 87, Baoxing Rd. , Xindan Dist, New Taipei City 23145 , Taiwan R.O.C***
Telephone number	***+886-2-8911-1919***
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Emergency number	***+886-921-278-271***
Contact Person	***Carson Jang***

2. PRODUCT

Product Category	*2.1.1.1 Lithium ion rechargeable battery pack*
Model(s)	***DR202UL***
Capacity	***7800mAh***
Voltage	***11.1V***
Chemical System	***Lithium ion***

3. DANGEROUS GOODS CLASSIFICATION STATUS

The 58th edition of the IATA Dangerous Goods Regulations incorporates all amendments made by the ICAO Dangerous Goods Panel in developing the content of the 2017-2018 edition of the ICAO Technical Instructions as well as changes adopted by the IATA Dangerous Goods Board. The following list is intended to assist the user to identify the main changes introduced in this edition and must not be considered an exhaustive listing. The changes have been prefaced by the section or subsection in which the change occurs.

A simple rule of thumb is that "Total Watt-Hour rating = Number of voltage x aggregate capacity in Ah"

For examples:

Models	***Total Watt-Hour rating***	***Remarks***
DR202UL	***(3*3.7)*7.8= 86.58 Wh***	***NOT DANGEROUS GOODS***

4. HAZARDOUS AND TOXICITY CLASS

Class Name	*4.1.1.1 Not applicable for regulated class*
Hazard	***It may cause heat generation or electrolyte leakage if battery terminals contact with other metal. 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.***

5. FIRST AID MEASURES

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

Eye Contact	*5.1.1.1 Flush the eyes with plenty of clean water for at least 15 minutes immediately, without rubbing. Take a medical treatment. 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	***Content of an opened battery can cause respiratory irritation. Provide fresh air and get a medical treatment immediately.***

6. FIRE FIGHTING MEASURES

Extinguishing Method	***Since vapor, generated from burning batteries may make eyes, nose and throat irritate, be sure to extinguish the fire on the windward side. Wear the respiratory protection equipment in some cases.***
Fire Extinguishing Agent	***Dry chemical, alcohol-resistant foam, carbon dioxide and plenty of water are effective.***

7. MEASURES FOR ELECTROLYTE LEAKAGE FROM THE BATTERY PACK

Take up with absorbent cloth.
Move the battery away from the fire

8. HANDLING AND STORAGE

When packing the batteries, do not allow battery terminals to contact each other, or contact with other

metals. Be sure to pack batteries by providing partitions in the packaging box, or in a separate plastic bag so that the single batteries are not mixed together.
Do not let water penetrate into packaging boxes during their storage and transportation.
The batteries will be stored at room temperature, charged to about 30~50% of capacity.
Do not store the batteries in places of the high temperature exceeding 35 degree C or under direct sunlight or in front of a stove. Please also avoid the places of high humidity. Be sure not to expose the battery to condensation, water drop or not to store it under frozen condition.
Please avoid storing the battery in the places where it is exposed to the static electricity. It may cause the protection circuit to be damaged.

9. EXPOSURE CONTROL

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

10. STABILITY AND REACTIVITY

Since batteries utilize a chemical reaction they are actually considered a chemical product. As such, battery performance will deteriorate over time even if stored for a long period of time without being used. In addition, the various usage conditions such as charge, discharge, ambient temperature, etc. are not maintained within the specified ranges the life expectancy of the battery may be shortened or the device in which the battery is used may be damaged by electrolyte leakage.

11. TOXICOLOGICAL INFORMATION

Acute toxicity	*11.1.1.1 Oral (rat) LD50>2g/kg (estimated)*
Irritation	***Irritating to eyes and skin.***
Chronic Toxicity	***Not specified***

12. ECOLOGICAL INFORMATION

When properly used or disposed, this product do not present environmental hazard.

13. DISPOSAL CONSIDERATIONS (PRECAUTION FOR RECYCLING)

When the battery is worn out, dispose of it under the ordinance of each local government or the low issued by relating government. Disposal of the worn-out battery may be subjected to Collection and Recycling Regulation.

14. TRANSPORT INFORMATION

The following are transportation requirements:

All lithium, lithium ion and lithium polymer cells and batteries must be tested in accordance with the "UN Manual of Tests and Criteria, Part III, Subsection 38.3 (Test T1-T8) 2017
The 58th edition of the IATA Dangerous Goods Regulations incorporates all amendments made by the ICAO Dangerous Goods Panel in developing the content of the 2017-2018 edition of the ICAO Technical Instructions as well as changes adopted by the IATA Dangerous Goods Board. The following list is intended to assist the user to identify the main changes introduced in this edition and must not be considered an exhaustive listing. The changes have been prefaced by the section or subsection in which the change occurs.
☑ UN3480, PACKING INSTRUCTION 965, Lithium Ion Batteries ***☐ UN3481, PACKING INSTRUCTION 966, Lithium Ion Batteries packed with equipment*** ***☐ UN3480, PACKING INSTRUCTION 967 Lithium Ion Batteries contained in equipment*** **Cells and batteries must be packed in inner packaging that completely encloses the cell or battery.** **Cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with conductive materials within the same packaging that could lead to a short circuit.** **Each consignment must be accompanied with a document such as an air waybill with an indication that:** **• the package contains lithium ion cells or batteries;** **• the package must be handled with care, and that a flammability hazard exists if the package is damaged;** **• special procedures should be followed in the event the package is damaged, to include inspection and repacking if necessary; and** **• a telephone number for additional information.** **Each package must be labelled with a lithium battery handling label;** ***Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities.***

15. REGULATORY INFORMATION

The international regulations on air transportation of rechargeable Lithium Ion batteries (commercial and cargo) are governed mainly by the following regulations

International Conventions	**** Air - IATA (International Air Transport Association) Dangerous Goods Regulations(DGR) 58th Edition Effective January 2017.*** **** Air - ICAO (International Civil Aviation Organization) Technical Instructions for the safe transport of dangerous goods by air.*** **** Sea – IMDG (International Maritime Dangerous Goods) regulations*** **** Land – ADR (road), RID (rail)*** ***United Nations "Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria, Part III, Subsection 38.3, (Tests T1-T8), November 1, 2006.*** ***United Nations "Recommendations on the Transport of Dangerous Goods, Model Regulations –Dec. 2006, Ref. ST/SG/AC.10/34/Add.1"*** ***United Nations "Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria Dec. 2006 – Ref. ST/SG/AC.10/34/Add.2"***
USA	**** Code of Federal Regulations (49CFR Ch. 1 & 173 -185)*** ***Both IATA and ICAO Special Provision A88 and IMO Special Provision 188, are identical to the requirements of***

16. DISCLAIMER

The application of the regulations can vary according to the aviation company, therefore, highly recommends that you consult with the aviation company prior to transporting battery or cell. This information has been compiled from sources considered to be reliable and to the best of our knowledge, accurate and reliable. However, does not accept liability for any loss or damage that may occur, direct or indirect, from using this information.

17. IATA T1–T8 CERTIFICATE

According to the 58th Edition of the IATA Dangerous Goods Regulations effective January 2017, all lithium ion and/or lithium polymer cells and batteries must be tested in accordance with the "UN Manual of Tests and Criteria, Part III, Subsection 38.3 (Test T1-T8 2017).

We, certified that the model(s) listed in this document comply with T1 to T8 test as required by the IATA.

Lithium Ion Polymer Rechargeable Cell/Battery Manufacturer:	***J.S POWER CO.,LTD***
Lithium Ion Polymer Rechargeable Cell/Battery Model(s):	***DR202UL***

No.	***Test Items***	***Results***
T1	***Altitude Simulation – Stored batteries at a pressure of 11.6kPa or less for at least six hours at ambient temperature (20±5℃)***	***☑Pass – no mass loss, no leakage, no venting, no disassembly, no rupture and no fire..***
T2	***Thermal Test – Stored batteries for at least six hours at a test temperature equal to 75±2℃, followed by storage for at least six hours at a test temperature equal to -40±2℃. The maximum time interval between test temperature extremes was 30 minutes. The procedure was repeated 10 times, after which all test batteries were stored for 24 hours at ambient temperature (20±5℃).***	***☑Pass - no mass loss, no leakage, no venting, no disassembly, no rupture and no fire.***
T3	***Vibration – Batteries were firmly secured to the platform of the vibration machine without distorting the cells in such a manner as to faithfully transmit the vibration. The vibration was a sinusoidal waveform with a logarithmic sweep between 7Hz and 200Hz and back to 7Hz traversed in 15 minutes. This cycle was repeated 12 times for a total of 3 hours for each three mutually perpendicular mounting positions of cell. One of the directions of vibration was perpendicular to the terminal face.***	***☑Pass - no mass loss, no leakage, no venting, no disassembly, no rupture and no fire.***

	The logarithmic frequency sweep is as follows: from 7Hz a peak acceleration of 1gη is maintained until 18Hz is reached. The amplitude is then maintained at 0.8mm (1.6mm total excursion) and the frequency increased until a peak acceleration of 8gη occurs (approximately 50Hz). A peak acceleration of 8gη is then maintained until the frequency is increased to 200Hz.	
T4	***Shock – Batteries were secure to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery. Each battery was subjected to a half-sine shock of peak acceleration of 150gη and pulse duration of 6 milliseconds. Each battery were subjected to three shocks in the positive direction followed by three shocks in the negative direction of each of three mutually perpendicular mounting positions of the cell for a total of 18 shocks.***	***☑Pass - no mass loss, no leakage, no venting, no disassembly, no rupture and no fire.***
T5	***External Short Circuit – Batteries tested were temperature stabilized so that its external case temperature reaches 55±2℃ and then the battery was subjected to a short circuit condition with a total external resistance of less than 0.1ohm at 55±2℃. this short circuit condition is continued for at least one hour after the battery external case temperature has returned to 55±2℃. The battery must be observed for a further six hours for the test to be concluded.***	***☑Pass - no mass loss, no leakage, no venting, no disassembly, no rupture and no fire.***
T6	***Impact (For cell only) – The test sample cell or component cell was placed on a flat surface. A 15.8mm diameter bar was placed across the centre of the sample. A 9.1kg mass was dropped from a height of 61±2.5cm onto the sample.***	***☑Pass – external temperature does not exceed 170℃ and there is no disassembly and no fire within six hours of the test***
T7	***Overcharge – the charge current was set at twice***	***☑Pass – no disassembly and no***

	the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test was as follows: - ***when the manufacturer's recommended charge voltage is not more than 18V, the minimum voltage of the test shall; be the lesser of two times the maximum charge voltage of the battery or 22V.*** - ***when the manufacturer's recommended charge voltage is more then 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage.***	***fire within seven days of the test.***
T8	***Forced Discharge (For cell only) – Each cell was forced discharged at ambient temperature by connecting it in series with a 12V D.C. power supply at an initial current equal to the maximum discharge current specified by the manufacturer.***	***☑Pass - no disassembly and no fire within seven days of the test.***

18. 18. UN TRANSPORTATION MODEL REGULATION <PACKING>

No.	***Test Item***	***Criteria***	***Result***	***Remark***
P1	***Drop Test***	***No damage which threatens safety during the transport in the layer outside the exterior container most.***	***Passed***	***Requirement of SP188*** ***Height=1.2m***
P2	***Packing Weight***	***Packing must not exceed 10kg (gross weight)***	***Passed***	***Less than 10kg***