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## Certificate of Compliance

Company Name	Rose Electronics
Company Address	2030 Ringwood Ave
Company City, State, Country, Postal Code	San Jose, CA 95131
Contact Name	Alex Shimanoff
Contact Email	ashimanoff@rose-elec.com
Contact Phone Number	408-943-0200
Product Name(s)	24-590302-01
Product Part Number(s)	EPG-1289
Nominal Voltage (V)	7.4
Rated Capacity (mAh)	5850
Product Type	Battery Pack, Secondary, Small
Test Standard	UN38.3, UN Manual of Tests and Criteria, 5th Revised Edition, Ammendment 1, Effective January 1, 2013
Overall Test Result	<b>COMPLIANT</b>
<u>Component Test Results</u>	
Altitude (T.1)	Compliant
Thermal (T.2)	Compliant
Vibration (T.3)	Compliant
Shock (T.4)	Compliant
External Short Circuit (T.5)	Compliant
Overcharge (T.7)	Compliant

*\*Note: Tests T.6 (Impact/Crush) and T.8 (Forced Discharge) are applicable to cell-level testing only.*

Release Approved By

Name Cynthia Millsaps  
Date 6/4/2014



Test Standard: UN38.3, UN Manual of Tests and Criteria, 5th Revised Edition, Ammendment 1, Effective January 1, 2013



**UN 38.3 Report - Small, Secondary, Battery Packs**

<b>PROJECT NUMBER</b>	<b>EA0749</b>
<b>DATE OF REPORT</b>	<b>6/4/2014</b>
<b>STATUS</b>	Compliant
<b>DATE SAMPLES RECEIVED</b>	4/28/2014
Contact Name	Alex Shimanoff
Contact Email	<a href="mailto:ashimanoff@rose-elec.com">ashimanoff@rose-elec.com</a>
Contact Phone Number	408-943-0200
Company Name	Rose Electronics
Company Address	2030 Ringwood Ave
Company City, State, Country, Postal Code	San Jose, CA 95131
Product Name(s)	24-590302-01
Product Part Number(s)	EPG-1289
Nominal Voltage (V)	7.4
Rated Capacity (mAh)	5850
Maximum Continuous Charge Current (mA)	3000
Maximum Charge Voltage (V)	8.4
End of Charge Current (mA)	200
Discharge Current for Cycling (mA)	2000
Maximum Discharge Current (mA)	3000
End of Discharge Voltage	6
Nominal Mass of Battery (grams)	248.4
Mass Loss Critical Threshold (Lookup)	0.001
Small or Large Battery (Lookup)	Small
Mass Precision (Calculated Digits)	3
Sample Numbering Legend	F Fresh (cycle 1); fully charged
	C Cycled (cycle 50); fully charged
	S (Spare)

Laboratory Address: Energy Assurance, LLC  
5202 Belle Wood Court, Suite 106  
Buford, GA 30518 USA

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Report Summary Comments

*General notes regarding this report: Test results relate only to the items tested. Energy Assurance reserves the right to use approved partner laboratories in the delivery of services. This is denoted below by a "Y" in the OS field of each test section below. This report shall not be reproduced except in full without the approval of Energy Assurance, LLC.*

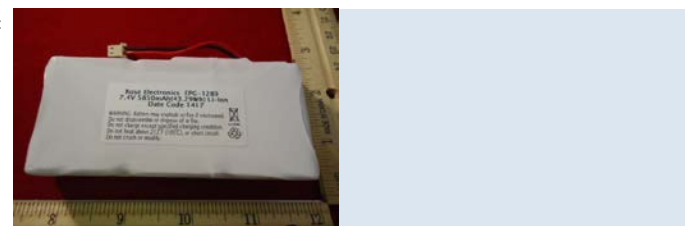
Revision History

Rev	Date	Comments
1	6/4/2014	Initial issue

Reviewed & Released By:

Name Cynthia Millsaps  
Date 6/4/2014

Product Photo:



V-Check Criteria	
Post Test Voltage	≥ 90% Pre-Test Voltage

M-Check Criteria	
Mass (M) of cell or	Mass loss limit
M < 1g	0.5%
1g ≤ M ≤ 75g	0.2%
M > 75g	0.1%

**Altitude Simulation (T.1)**

Test Procedure: Test cells and batteries shall be stored at a pressure of 11.6 kPa or less for at least six hours at ambient temperature (20 ± 5° C).

Date (Test Start)	5/16/2014	OS	N
Date (Test Finish)	5/16/2014	Tech	NM/JC
Test Ambient (°C)	21.5		
Model Tested	EPG-1289	Rated Capacity (mAh)	5850

Test Step Notes (T.1)

	Pre-Test	Pre-Test	Post-Test	Post-Test	V-Ck	M-Ck	Observations (Y/N) - Presence is a failure					Comments
	Voltage (Vdc)	Mass (g)	Voltage (Vdc)	Mass (g)			Leakage	Venting	Dis-Assy	Rupture	Fire	
C1	8.34	248.03	8.33	248.03	Pass	Pass	N	N	N	N	N	None
C2	8.34	248.14	8.34	248.14	Pass	Pass	N	N	N	N	N	None
C3	8.34	247.98	8.33	248.39	Pass	Pass	N	N	N	N	N	None
C4	8.34	248.00	8.34	248.19	Pass	Pass	N	N	N	N	N	None
F1	8.31	247.99	8.31	247.97	Pass	Pass	N	N	N	N	N	None
F2	8.32	248.30	8.31	248.27	Pass	Pass	N	N	N	N	N	None
F3	8.31	247.80	8.31	247.77	Pass	Pass	N	N	N	N	N	None
F4	8.32	248.01	8.31	247.97	Pass	Pass	N	N	N	N	N	None
S1					No Data	No Data						Spare1
S2					No Data	No Data						Spare2

**Measurement Equipment Information (Calibration details available upon request)**

DMM	HP34401A, S/N MY45004881
Scale	Ohaus AV313CU (0-300g), S/N 8031501103
Ambient Temp Gauge	Digital Temperature-Humidity Meter, S/N 2
Timer	Accurite Timer, S/N 2312
Vacuum Gauge	Wika 0-30IN-HG, S/N PG-02

**Thermal Test (T.2) --- Note: Battery size is Small**

Test Procedure: *Test cells and batteries are to be stored for at least six hours at a test temperature equal to 72 ± 2° C, followed by storage for at least six hours at a test temperature equal to - 40 ± 2° C. The maximum time interval between test temperature extremes is 30 minutes. This procedure is to be repeated until 10 total cycles are complete, after which all test cells and batteries are to be stored for 24 hours at ambient temperature (20 ± 5° C). For large cells and batteries, the duration of exposure to the test temperature should be at least 12 hours.*

Date (Test Start)	5/16/2014	OS	N
Date (Test Finish)	5/23/2014	Tech	NM/CT
Model Tested	EPG-1289	Rated Capacity (mAh)	5850

Test Step Notes (T.2)

	Pre-Test	Pre-Test	Post-Test	Post-Test	V-Ck	M-Ck	Observations (Y/N) - Presence is a failure					Comments
	Voltage (Vdc)	Mass (g)	Voltage (Vdc)	Mass (g)			Leakage	Venting	Dis-Assy	Rupture	Fire	
C1	8.33	248.03	8.22	248.01	Pass	Pass	N	N	N	N	N	None
C2	8.34	248.14	8.22	248.12	Pass	Pass	N	N	N	N	N	None
C3	8.33	248.39	8.22	248.37	Pass	Pass	N	N	N	N	N	None
C4	8.34	248.19	8.22	248.17	Pass	Pass	N	N	N	N	N	None
F1	8.31	247.97	8.21	247.94	Pass	Pass	N	N	N	N	N	None
F2	8.31	248.27	8.21	248.24	Pass	Pass	N	N	N	N	N	None
F3	8.31	247.77	8.21	247.73	Pass	Pass	N	N	N	N	N	None
F4	8.31	247.97	8.21	247.94	Pass	Pass	N	N	N	N	N	None
S1					No Data	No Data						Spare1
S2					No Data	No Data						Spare2

**Measurement Equipment Information (Calibration details available upon request)**

DMM	HP34401A, S/N MY45004881
Scale	Ohaus AV313CU (0-300g), S/N 8031501103
Temperature Chamber	Test Equity 1007H, S/N 61593
Timer	ED&D CSW-01 Stopwatch, S/N S02430218

*\*Calibrated stopwatch was used to verify thermal chamber timing accuracy. Study available upon request.*

Vibration (T.3) --- Note: Battery size is Small

Test Procedure:

Cells and batteries are 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 shall be a sinusoidal waveform with a logarithmic sweep between 7 Hz and 200 Hz and back to 7 Hz traversed in 15 minutes. This cycle shall be repeated 12 times for a total of 3 hours for each of three mutually perpendicular mounting positions of the cell. One of the directions of vibration must be perpendicular to the terminal face.

The logarithmic frequency sweep shall differ for cells and batteries with a gross mass of not more than 12 kg (cells and small batteries), and for batteries with a gross mass of more than 12 kg (large batteries).

For cells and small batteries: from 7 Hz a peak acceleration of 1 g<sub>n</sub> is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency is increased until a peak acceleration of 8 g<sub>n</sub> occurs (approximately 50 Hz). A peak acceleration of 8 g<sub>n</sub> is then maintained until the frequency is increased to 200 Hz.

For large batteries: from 7 Hz a peak acceleration of 1 g<sub>n</sub> is maintained until 18 Hz is reached. The amplitude is then maintained at 0.8 mm (1.6 mm total excursion) and the frequency is increased until a peak acceleration of 2 g<sub>n</sub> occurs (approximately 50 Hz). A peak acceleration of 8 g<sub>n</sub> is then maintained until the frequency is increased to 200 Hz.

Date (Test Start)	5/30/2014	OS	N
Date (Test Finish)	6/3/2014	Tech	JC/CSM
Test Ambient(°C)	22.6		
Model Tested	EPG-1289	Rated Capacity (mAh)	5850

Test Step Notes (T.3)

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	Pre-Test Voltage (Vdc)	Pre-Test Mass (g)	Post-Test Voltage (Vdc)	Post-Test Mass (g)	V-Ck	M-Ck	Observations (Y/N) - Presence is a failure					Comments
							Leakage	Venting	Dis-Assy	Rupture	Fire	
C1	8.22	248.03	8.22	248.03	Pass	Pass	N	N	N	N	N	None
C2	8.22	248.14	8.21	248.14	Pass	Pass	N	N	N	N	N	None
C3	8.22	248.39	8.21	248.36	Pass	Pass	N	N	N	N	N	None
C4	8.22	248.19	8.22	248.16	Pass	Pass	N	N	N	N	N	None
F1	8.21	247.88	8.20	247.88	Pass	Pass	N	N	N	N	N	None
F2	8.21	248.22	8.20	248.21	Pass	Pass	N	N	N	N	N	None
F3	8.20	247.67	8.20	247.67	Pass	Pass	N	N	N	N	N	None
F4	8.21	247.95	8.20	247.95	Pass	Pass	N	N	N	N	N	None
S1					No Data	No Data						Spare1
S2					No Data	No Data						Spare2

Measurement Equipment Information (Calibration details available upon request)

DMM	HP34401A, S/N MY45004881
Scale	Ohaus AV313CU (0-300g), S/N 8031501103
Ambient Temp Gauge	Digital Temperature-Humidity Meter, S/N 3
Vibration Controller	Vibration Research VR9500, S/N 950C75B4
ICP Accelerometer	PCB Piezotronics 352C03 (10mV/G), S/N LW136337

**Shock (T.4) --- Note: Battery size is Small**

Test Procedure:

*Cells and batteries are firmly secured to the testing machine by means of a rigid mount which will support all mounting surfaces of each test battery. Each cell or battery shall be subjected to a half-sine shock of peak acceleration of 150 g<sub>n</sub>, and a pulse duration of 6 milliseconds. Each cell or battery shall be subjected to three shocks in the positive direction followed by three shocks in the negative direction of three mutually perpendicular mounting positions of the cell or battery for a total of 18 shocks.*

*However, large cells and large batteries shall be subjected to a half-sine shock of peak acceleration of 50 g<sub>n</sub>, and a pulse duration of 11 milliseconds. Each cell or battery is 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 [or battery] for a total of 18 shocks.*

Date (Test Start)	6/3/2014	OS	N
Date (Test Finish)	6/3/2014	Tech	CSM
Test Ambient (°C)	21.7		
Model Tested	EPG-1289	Rated Capacity (mAh)	5850

Test Step Notes (T.4)

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	Pre-Test	Pre-Test	Post-Test	Post-Test	V-Ck	M-Ck	Observations (Y/N) - Presence is a failure					Comments
	Voltage (Vdc)	Mass (g)	Voltage (Vdc)	Mass (g)			Leakage	Venting	Dis-Assy	Rupture	Fire	
C1	8.22	248.03	8.21	248.03	Pass	Pass	N	N	N	N	N	None
C2	8.21	248.14	8.21	248.14	Pass	Pass	N	N	N	N	N	None
C3	8.21	248.36	8.21	248.39	Pass	Pass	N	N	N	N	N	None
C4	8.22	248.16	8.21	248.19	Pass	Pass	N	N	N	N	N	None
F1	8.20	247.88	8.20	247.88	Pass	Pass	N	N	N	N	N	None
F2	8.20	248.21	8.20	248.21	Pass	Pass	N	N	N	N	N	None
F3	8.20	247.67	8.20	247.67	Pass	Pass	N	N	N	N	N	None
F4	8.20	247.95	8.20	247.95	Pass	Pass	N	N	N	N	N	None
S1					No Data	No Data						Spare1
S2					No Data	No Data						Spare2

**Measurement Equipment Information (Calibration details available upon request)**

DMM	HP34401A, S/N MY45004881
Scale	Ohaus AV313CU (0-300g), S/N 8031501103
Ambient Temp Gauge	Digital Temperature-Humidity Meter, S/N 3
Signal Conditioner	PCB Piezotronics 4-Channel 482A22, S/N 772
ICP Shock Sensor	PCB Piezotronics 350A14, S/N 40088
Oscilloscope	Atten ADS 1102CAL, S/N ADS00003110272

**External Short Circuit (T.5)**

Test Procedure: *The cell or battery to be tested shall be temperature stabilized so that its external case temperature reaches 55 ± 2° C and then the cell or battery shall be subjected to a short circuit condition with a total external resistance of less than 0.1 ohm at 55 ± 2° C. This short circuit condition is continued for at least one hour after the cell or battery external case temperature has returned to 55 ± 2° C. The cell or battery must be observed for a further six hours for the test to be concluded.*

Date (Test Start)	6/4/2014	OS	N
Date (Test Finish)	6/4/2014	Tech	CSM/CT
Chamber Ambient Temp at Start of Test (°C)	54.8		
Model Tested	EPG-1289	Rated Capacity (mAh)	5850

Test Step Notes (T.5)

Observations (Y/N) - Presence is a failure.  
 \*For Dis-Assy, Rupture, & Fire, observation period is test completion + 6 hours.

	MaxTemp °C	T>170°C	Observations (Y/N)			Short-Circuit System		Comments
			Dis-Assy	Rupture	Fire	Ch#	mΩ	
C1	54.8	Pass	N	N	N	BB-1	78	None
C2	55.6	Pass	N	N	N	BB-2	69	None
C3	55.7	Pass	N	N	N	BB-3	76	None
C4	55.0	Pass	N	N	N	BB-4	82	None
F1	54.7	Pass	N	N	N	BB-1	78	None
F2	55.3	Pass	N	N	N	BB-2	69	None
F3	55.5	Pass	N	N	N	BB-3	76	None
F4	54.8	Pass	N	N	N	BB-4	82	None
S1		No Data						Spare1
S2		No Data						Spare2

**Measurement Equipment Information (Calibration details available upon request)**

DMM	HP34401A, S/N MY45004881
Datalogger	HP34970A, S/N MY44028320
Short Circuit System	Short-Circuit Test Apparatus, HOTBOX2-BB

< For short-circuit resistance verification

**Overcharge (T.7)**

Test Procedure:

The charge current shall be twice the manufacturer's recommended maximum continuous charge current. The minimum voltage of the test shall be as follows:

(a) 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.

(b) when the manufacturer's recommended charge voltage is more than 18V, the minimum voltage of the test shall be 1.2 times the maximum charge voltage.

Tests are to be conducted at ambient temperature. The duration of the test shall be 24 hours.

Date (Test Start)	5/20/2014	OS	N
Date (Test Finish)	5/29/2014	Tech	JC
Model Tested	EPG-1289	Rated Capacity (mAh)	5850

Test Step Notes (T.7)

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*\*For Dis-Assy & Fire, observation period is test completion + 7 days.*

Setup Conditions

		Dis-Assy	Fire	Overcharge Channel	Comments
Charge Current <input type="text" value="6000"/> mA	C5	N	N	Box1-1	None
	C6	N	N	Box1-2	None
	C7	N	N	Box1-3	None
	C8	N	N	Box1-4	None
Min Test Voltage <input type="text" value="16.80"/> V	F5	N	N	Box1-1	None
	F6	N	N	Box1-2	None
	F7	N	N	Box1-3	None
	F8	N	N	Box1-4	None
Test Ambient <input type="text" value="23.4"/> °C	S3				Spare3
	S4				Spare4

**Measurement Equipment Information (Calibration details available upon request)**

Ambient Temp Gauge	Digital Temperature-Humidity Meter, S/N 1
Overcharge System1	Overcharge Test Apparatus, 5 Channel, BOX1-20
Overcharge System2	