

Shipping Guidelines for Specific Lithium Batteries Used in Sea-Bird Products

DISCLAIMER

Sea-Bird Electronics, Inc offers the following interpretations of law and shipping requirements, only to customers needing to re-ship lithium batteries received from Sea-Bird, as assistance in becoming acquainted with the laws and regulations regarding shipment of lithium batteries. No other use is intended. This document does not constitute legal advice and every shipper is cautioned that we cannot guarantee the interpretations or shipping guidelines are correct or up-to-date with the most current regulations. Every shipper is responsible for compliance with the laws and regulations in his own jurisdiction.

Sea-Bird Electronics, Inc. has made a careful study of the batteries we use and of the laws and regulations pertaining to the legal shipment of them, in order to understand and comply with the laws and regulations in effect as of the date of this document. The shipping guidelines herein are those followed by Sea-Bird Electronics, Inc. in shipping only the lithium batteries identified in this document.

Sea-Bird Electronics, Inc.
1808 136th Place NE
Bellevue, Washington 98005 USA
Telephone: 425-643-9866
Fax: 425-643-9954
E-mail: seabird@seabird.com
Website: www.seabird.com

Version #003, 01/11/06

Table of Contents

Summary of Key Points.....	3
SBE 37-SM, 37-SMP, 37-IM, 37-IMP, and 44 Batteries	3
SBE 39 and 39-IM (V1) Batteries	4
SBE 39-IM (V2) Batteries	4
SBE 51 Batteries.....	5
Spare Batteries used as On-Board Memory Backup.....	5
Printed Circuit Board Assemblies with Lithium Cells Installed	5
Lithium Battery Shipping Interpretations	6
Appendix A: Lithium Battery Shipping Guidelines	11
Lithium Batteries Shipped With (along side) Equipment.....	11
Lithium Batteries Shipped Inside (installed in) Equipment	11
Lithium Batteries Shipped as Spares	12
Appendix B: Certificate of Compliance (SBE PN 80981.1)	14
Appendix C: Ultralife U9 VL-FP Material Safety Data Sheet (SBE PN 22074).....	16
Appendix D: Panasonic BR2/3A-T2SP UN Certification (SBE PN 22009)	21
Appendix E: Panasonic BR2032 UN Certification (SBE PN 22076).....	22
Appendix F: Sanyo CR14250SE Material Safety Data Sheet (SBE PN 22085)	23
Appendix G: Saft LS14500 Transportation Certificate (SBE PN 22095).....	28

SUMMARY of KEY POINTS

1. The **SBE 37-SM, 37-SMP, 37-IM, 37-IMP, and 44** use a set of 6 lithium batteries (SBE PN 80981.1). Each battery contains three 3-Volt Panasonic BR2/3A cells in series (9 V nominal).



BR 2/3A Cell



SBE PN 80981.1 Battery

- One battery set PN 50243.1 (6 each of PN 80981.1) will be separately packaged and shipped in the box with, but not installed in, each instrument. Installing batteries in the battery holder forms a larger series/parallel battery pack having a total lithium content that is subject to dangerous goods shipping restrictions. Therefore, **batteries must be removed from the instrument, disassembled from the holder, and prevented from making electrical contact during shipping.**
- Spare 80981.1 batteries (more than the six intended to operate the instrument) may not be packed with the instrument. They must be shipped separately in a qualifying carton (they may be re-shipped in the carton that Sea-Bird shipped them in). Shipments of spare batteries must be labeled appropriately (see Appendix A, Section 3) and may not be shipped commercially on passenger aircraft, but are otherwise not classified as dangerous goods.
- Gross shipping weight (carton, packing material, and batteries) of spare batteries may not be more than 30 kilograms (gross). A set of 6 batteries weighs 0.3 kilograms. The 30 kilogram limit would permit a shipment of approximately 80 sets of 6 batteries (PN 50243.1), assuming a tare weight of 6 kilograms.

2. The **SBE 39 and 39-IM (V1)** use a 9-Volt lithium battery (SBE PN **22074**, Ultralife U9VL-FP) distributed widely in the consumer home security and smoke alarm market.



- **The SBE 39 or 39-IM (V1) may be shipped with one battery, installed in the instrument, or uninstalled but packed with the instrument, without restriction.**
- Spare batteries may not be packed with the instrument. They must be shipped separately in a qualifying carton (they may be re-shipped in the carton that Sea-Bird shipped them in). Shipments of spare batteries must be labeled appropriately (see Appendix A, Section 3) and may not be shipped commercially on passenger aircraft, but are otherwise not restricted or classified as dangerous goods.
- Gross shipping weight (carton, packing material, and batteries) of spare batteries may not weigh more than 30 kilograms (gross). One 9-Volt battery weighs 34 grams (0.034 kilograms). The 30 kilogram limit would permit a shipment of approximately 700 batteries, assuming a tare weight of 6 kilograms.

3. The **SBE 39-IM (V2)** uses two 3.6-Volt AA lithium batteries (SBE PN **22095**, Saft LS14500).



- The SBE 39-IM (V2) may be shipped with one battery set PN 50404 (2 each of PN 22095), installed in the instrument, or separately packaged in a qualifying carton and shipped in the box with each instrument.
- Spare batteries may not be packed with the instrument. They must be shipped separately in a qualifying carton (they may be re-shipped in the carton that Sea-Bird shipped them in). Shipments of spare batteries must be labeled appropriately (see Appendix A, Section 3) and may not be shipped commercially on passenger aircraft, but are otherwise not restricted or classified as dangerous goods.
- Gross shipping weight (carton, packing material, and batteries) of spare batteries may not be more than 30 kilograms (gross). A set of 2 batteries weighs 33 grams (0.033 kilograms). The 30 kilogram limit would permit a shipment of approximately 725 set of 2 batteries (PN 50404), assuming a tare weight of 6 kilograms.

4. The **SBE 51** uses sixteen 3.6-Volt AA lithium batteries (SBE PN 22095, Saft LS14500).



- Two battery sets PN 50409 (8 each of PN 22095) will be separately packaged and shipped in the box with, but not installed in, each instrument. Installing batteries in the battery holder forms a larger series/parallel battery pack having a total lithium content that is subject to dangerous goods shipping restrictions. Therefore, **batteries must be removed from the instrument, disassembled from the holder, and prevented from making electrical contact during shipping.**
- Spare 22095 batteries (more than the 16 intended to operate the instrument) may not be packed with the instrument. They must be shipped separately in a qualifying carton (they may be re-shipped in the carton that Sea-Bird shipped them in). Shipments of spare batteries must be labeled appropriately (see Appendix A, Section 3) and may not be shipped commercially on passenger aircraft, but are otherwise not classified as dangerous goods.
- Gross shipping weight (carton, packing material, and batteries) of spare batteries may not be more than 30 kilograms (gross). A set of 8 batteries weighs 0.13 kilograms. The 30 kilogram limit would permit a shipment of approximately 180 sets of 8 batteries (PN 50409), assuming a tare weight of 6 kilograms.

5. Spare lithium cells, Panasonic BR-2/3A (PN 22009) used as **on-board memory backup** in some instruments should be shipped per Appendix A, Section 3. Appendix A, Section 2 applies to these cells when shipped installed in equipment.



6. Spare lithium coin-type cells (PN 22076 Panasonic BR2032 or PN 22085 Sanyo CR14250-SE-SP1-1) used as **on-board memory backup** in some instruments should be shipped per Appendix A, Section 3. Appendix A, Section 2 applies to these cells when shipped installed in equipment.



Various BR & CR Coin-Type Cells

7. **Printed circuit board assemblies with lithium cells installed** should be packaged to prevent the cell(s) from shorting. Appendix A, Section 2 applies to these cells when shipped installed in equipment.

LITHIUM BATTERY SHIPPING INTERPRETATIONS

The transportation of lithium batteries aboard aircraft is regulated by the United States Department of Transportation (U.S. DOT), the International Civilian Aviation Organization (ICAO), and the International Air Transport Association (IATA). The governing regulation for the U.S. DOT is the Code of Federal Regulations, Title 49: Transportation, Section 100-185. Section 173.185 provides specifications on exceptions and packaging for shipping based on details of weights, tests and classifications. International shipping regulations are incorporated into the ICAO Technical Instructions and IATA Dangerous Goods Regulations manuals with exceptions under Special Provision A45.

173.185 Lithium Batteries and Cells

- (a) “Except as otherwise provided in this subpart, a lithium cell or battery is authorized for transportation only if it conforms to the provisions of this section...”
- (b) “...cells and batteries are not subject to any other requirements of this subchapter if they meet the following:”
 - (1) “Each cell with a solid cathode may contain not more than 1.0 g of lithium content;”
 - (2) “Each battery with a solid cathode may contain an aggregate quantity of not more than 2.0 g of lithium content”.
- (c) “...cells and batteries are not subject to any other requirements of this subchapter if they meet the following:”
 - (1) “The lithium content of the anode of each cell, when fully charged, is not more than 5 g”.
 - (2) “The aggregate lithium content of the anodes of each battery, when fully charged, is not more than 25 g.”

Special Provision A45

- (1) “Lithium cells and batteries offered for transport are not subject to other provisions of these Regulations if they meet the following:”
 - (a) “For lithium metal or lithium alloy cell, the lithium content is not more than 1 g, and for lithium ion cell, the lithium-equivalent content is not more than 1.5g;”
 - (b) “For a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2 g, and for a lithium ion battery, the aggregate lithium-equivalent content is not more than 8 g;”

These imposed limitations are greater than the lithium content of the cells and batteries used in our equipment. See Table 1: Lithium Battery Weight and Lithium Content.

SBE P/N	MANUFACTURER	MANUFACTURER P/N	WEIGHT	LITHIUM CONTENT
22009	Panasonic	BR2/3A-T2SP	13.5 g	0.4 g
22074	Ultralife Batteries	U9VL-FP	33.8 g	1.35 g
22076	Panasonic	BR2032	2.5 g	0.05 g
22085	Sanyo	CR14250SE-SP1-1	9 g	0.26 g
22095	Saft	LS14500	16.2g	0.6g
80981.1	Nexergy	BR2/3A-L3P	46 g	1.2 g

Table 1: Lithium Battery Weight and Lithium Content

In addition to the limitation of lithium content, each cell or battery must be proven to be non-dangerous by testing in accordance to the UN Manual of Tests and Criteria, Part III, sub-section 38.3 (T1-T8) for the safe transport of lithium batteries.

173.185 Lithium Batteries and Cells

- (c) "...cells and batteries are not subject to any other requirements of this subchapter if they meet the following:"
 - (3) "Each cell or battery is of the type proven to be non-dangerous by testing in accordance with tests in the UN Manual of Tests and Criteria (IBR; see 171.7 of this subchapter). Such testing must be carried out on each type of cell or battery prior to the initial transport of that type..."

Special Provision A45

- (c) "Each cell or battery is of a type proved to meet the requirements of each test in the UN Manual of Tests and Criteria, Part III, sub-section 38.3;"

Cells and batteries in Table 1 as supplied from Panasonic, Saft, Sanyo, and Ultralife have been tested by their respective manufacturers and do not require additional testing (see Appendix C, D, E, F, G). The battery supplied by Nexergy, used in the SBE 37-SM, SBE 37-SMP, SBE37-IM, SBE 37-IMP, and SBE 44 (PN 80981.1), has been tested and certified by an independent laboratory of Motorola as an acceptable battery for shipment (MPTS#644, 10/29/04, Appendix B: Certificate of Compliance). Any modification or alteration to our existing battery pack would require it to be tested again

Lithium cells and batteries must be packaged to effectively prevent short circuits and to prevent movement which could lead to short circuits.

173.185 Lithium Batteries and Cells

- (b) "...cells and batteries are not subject to any other requirements of this subchapter if they meet the following:"
 - (4) "Cells and batteries must be packed in such a way so as to prevent short circuits and must be packed in strong packagings..."
- (c) "...cells and batteries are not subject to any other requirements of this subchapter if they meet the following:"
 - (5) "Cells and batteries are designed or packed in such a way as to prevent short circuits under conditions normally encountered in transportation."

Special Provision A45

- (d) "Cells and batteries are separated so as to prevent short circuits and are packed in strong packagings..."

Current packaging techniques used for PN 50243.1 (6 each PN 80981.1) include inner heat sealed bag, and outer bubble wrap that is placed in a fiberboard box (PN 31372). Current packaging techniques used for PN 50404 (2 each PN 22095) include inner heat sealed bag, and outer bubble wrap that is placed in a fiberboard box (PN 31435). Current packaging techniques used for PN 50409 (8 each PN 22095) include inner heat sealed bag, and outer bubble wrap per four batteries that are placed in a fiberboard box (PN 31473). The Ultralife 9V lithium battery PN 22074, as delivered from the manufacturer, is placed in a Foil Pack with non-conductive inner liner. Additional packaging will be required when sending 22009, 22076, and 22085 to prevent short circuiting potentials.

Shipments of accepted lithium cells and batteries can be classified as:

1. shipping cells and/or batteries with (along side) equipment,
 2. shipping cells and/or batteries inside (installed in) equipment,
 3. or shipping only cells and/or batteries.
- (See Appendix A)

When shipping cells and/or batteries, with (1) or installed in (2) equipment, that meet the requirements as stated above, they are not subject to the prohibition imposed to disallow their transport aboard passenger-carrying aircraft.

173.185 Lithium Batteries and Cells

- (f) “Equipment containing or packed with cells and batteries meeting the requirements of paragraph (b) or (c) of this section is excepted from all other requirements of this subchapter.”

172.102 Special provisions.

- A101 “A primary (non-rechargeable) lithium battery or cell packed with equipment is forbidden for transport aboard a passenger carrying aircraft unless:”
- a. “The battery or cell complies with the requirements and limitations of 173.185 (b)(1), (b)(2), (b)(3), (b)(4) and (b)(6) or 173.185 (c)(1), (c)(2), (c)(3) and (c)(4) of this subchapter;”
 - b. “The package contains no more than the number of lithium batteries or cells necessary to power the intended piece of equipment;”
 - c. “The equipment and the battery or cell are packed in strong packagings;”
 - d. “The gross weight of the package does not exceed 5 kg. Packages complying with the requirements of this special provision are excepted from all other requirements of this subchapter.”
- A102 “A primary (non-rechargeable) lithium battery or cell contained in equipment is forbidden for transport aboard a passenger carrying aircraft unless:”
- a. “The battery or cell complies with the requirements and limitations of 173.185 (b)(1), (b)(2), (b)(3), (b)(4) and (b)(6) or 173.185 (c)(1), (c)(2), (c)(3) and (c)(4) of this subchapter;”
 - b. “The package contains no more than the number of lithium batteries or cells necessary to power the intended piece of equipment;”
 - c. “The equipment and the battery or cell are packed in strong packagings;”
 - d. “The net weight of the package does not exceed 5 kg. Packages complying with the requirements of this special provision are excepted from all other requirements of this subchapter.”

It is our interpretation that the package specified by the 5 kg gross limit imposed by A101 for batteries or cells packed with equipment is that of the batteries and not the gross weight of the package and equipment contained within. Supporting evidence to corroborate these findings can be found in the Federal Register, Volume 69, Number 240, December 15, 2004, page 75211.

IV. Interim Final Rule

C. Batteries Shipped in or with Equipment

“The prohibition in this interim final rule does not apply to the transportation as cargo on passenger aircraft of small primary lithium batteries that are shipped with or installed in equipment for which they are intended to provide power.”

“Those primary lithium batteries or cells we are continuing to allow to be transported as cargo aboard passenger-carrying aircraft when packed with or in equipment must:”

- (1) “comply with the requirements and limitations of 173.185...”
- (2) “the battery or cell or equipment containing the battery or cell,..., must be packed in strong packagings.
- (3) “the package contains no more than the number of primary lithium batteries or cells necessary to power the intended piece of equipment; and”
- (4) “the total net weight of the primary lithium batteries in the package does not exceed 5 kg.”

Although no special labeling or documentation is required, Sea-Bird will continue to supply, inside the shipping box, our generic document that indicates the package contains lithium batteries and a copy of our Certificate of Compliance or associated manufacturer's documentation (see Appendix B, C, D, E, F, G). *As of January 1, 2006, in the IATA Dangerous Goods Regulations, 47th Edition, the note regarding special provision A45 that requires the special provision must be referenced on the Air Waybill no longer applies to Lithium batteries contained in, or packed with equipment. For international shipments, shipments classified as shipping batteries must still adhere to the requirement, with the phrase "Non Restricted Per Special Provision A45" on the Air Waybill.*

If a package contains more batteries than are intended to power the equipment it is classified as shipping batteries (only) and not shipping batteries with equipment and is limited to 30 kg in gross weight. Packages containing batteries only, batteries and spare parts or more batteries than are intended to power the equipment must follow packaging, labeling and documentation set forth in the guidelines as described below.

173.185 Lithium Batteries and Cells

- (b) "...cells and batteries are not subject to any other requirements of this subchapter if they meet the following:"
 - (5) "The outside of each package that contains a primary (non-rechargeable) lithium battery or cell must be marked "PRIMARY LITHIUM BATTERIES – FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT" on a background of contrasting color, in letters:"
 - (i) "At least 12 mm (0.5 inch) in height on packages having a gross mass of more than 30 kg (66 pounds); or"
 - (ii) "At least 6mm (0.25 inch) on packages having a gross mass of 30 kg (66 pounds) or less;"

Special Provision A45

- (e) "...each package containing more than 24 lithium cells or 12 batteries must in addition meet the following requirements:"
 - (i) "Each package must be marked indicating that it contains lithium batteries and that special procedures should be followed in the event that the package is damaged;"
 - (ii) "Each shipment must be accompanied with a document indicating that the package contains lithium batteries and that special procedures should be followed in the event a package is damaged;"
 - (iii) "Each package is capable of withstanding a 1.2 meter drop test in any orientation without damage to cells or batteries contained therein, without shifting of the contents so as to allow battery to battery (or cell to cell) contact and without release of contents; and"
 - (iv) "...packages may not exceed 30 kg gross mass."

Figure 1 shows an example of the label required by the U.S. DOT for packages that are classified as shipping lithium batteries. Figure 2 shows an example of the international label requirements addressed in Special Provision A45 (PN 31269).

<p>PRIMARY LITHIUM BATTERIES – FORBIDDEN FOR TRANSPORT ABOARD PASSENGER AIRCRAFT</p>

Figure 1: U.S. Department of Transportation Battery Shipping Label

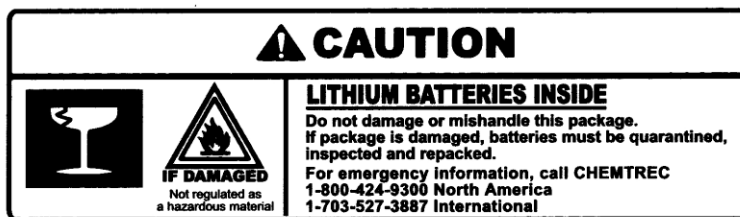


Figure 2: International Lithium Battery Shipping Label

Although the label in Figure 2 is only required for international shipments, Sea-Bird uses both labels for all shipments of packages classified as shipping lithium batteries. A document that indicates the package contains lithium batteries and a copy of Sea-Bird's Certificate of Compliance for UN testing of the PN80981.1 battery sticks, MPTS#644, 10/29/04, or associated manufacturer's documentation should accompany the packing slip. *As of January 1, 2006, in the IATA Dangerous Good Regulations, 47th Edition, the note regarding special provision A45 that requires the special provision must be referenced on the Air Waybill no longer applies to Lithium batteries contained in, or packed with equipment. Shipments classified as shipping batteries must still adhere to the following requirement: For international shipments the phrase "Non Restricted Per Special Provision A45" must appear on the airway bill.*

APPENDIX A: Lithium Battery Shipping Guidelines

1. LITHIUM BATTERIES SHIPPED WITH (along side) EQUIPMENT

Packaging of Batteries:

A) PN 80981.1 SBE 37/44 BATTERY ASSEMBLY /BR2/3A-L3P, FUSED

- 1) Battery sticks must be heat sealed in non-conductive plastic and placed in bubble-wrap outer sleeve.
- 2) A maximum of twelve battery sticks can be installed per heat sealed bag.
- 3) The sealed bag must be packed in strong packaging.

B) PN 22095 SBE 51 LS14500 AA LITHIUM BATTERY

- 4) Batteries must be heat sealed in non-conductive plastic and placed in bubble-wrap outer sleeve.
- 5) A maximum of twelve batteries can be installed per heat sealed bag.
- 6) The sealed bag must be packed in strong packaging.

Shipping Weight per Box:

- 7) When shipping “small” primary lithium batteries *with equipment* the net weight of all batteries in the shipping box must not exceed 5kg (11 lbs). The weight of six 80981.1 batteries is approximately 0.65 lbs. The weight of sixteen 22095 batteries is approximately 0.58 lbs.

Shipping Box Label:

- 8) When shipping “small” primary lithium batteries *with equipment* there are no special labeling requirements.

Included Documents:

- 9) Include inside the shipping box, document stating, “*This package contains small lithium cells and/or batteries that are exempt as a hazardous material for transportation purposes. Packaging, labeling and documentation for this package are in accordance with shipping regulations for lithium cells containing 1.0 g or less of lithium metal and/or batteries containing 2.0 g or less of lithium metal.*”
- 10) Include inside the shipping box, Sea-Bird certificate of compliance document, “Certificate of Compliance for UN testing of the PN80981.1 battery sticks, MPTS#644, 10/29/04” or “Transportation Certificate, Ref. TC-LS 14500 06/03-2”, where applicable.
- 11) *As of January 1, 2006, in the IATA Dangerous Good Regulations, 47th Edition, the note regarding special provision A45 that requires the special provision must be referenced on the Air Waybill no longer applies to Lithium batteries contained in, or packed with equipment.*

2. LITHIUM BATTERIES SHIPPED INSIDE (installed in) EQUIPMENT

Packaging of Batteries:

A) PN 22074 BATTERY, 9V LITHIUM PRISMATIC U9VL-FP

- 12) Battery is installed in the SBE 39, SBE 39-IM (V1), or other piece of equipment it is intended to power, and there are no battery packing requirements.

B) PN 22095 BATTERY, SAFT AA LITHIUM, LS14500

- 13) Batteries (two) are installed in the SBE 39-IM (V2) or other piece of equipment it is intended to power, and there are no battery packing requirements.

Note: Batteries cannot be installed in the SBE 51 for shipment.

C) PN 22009 BR2/3A-T2SP, PN 22076 BR2032 and PN 22085 CR14250SE-SP1-1

- 14) On board memory or clock backup inside various SBE products. There are no battery packing requirements.
- 15) Printed circuit board assemblies with lithium cells installed should be packaged to prevent the cell(s) from shorting (i.e. insulate exposed traces and connectors).

Shipping Weight per Box:

- 16) When shipping “small” primary lithium batteries in equipment the net weight of all batteries in the shipping box must not exceed 5kg (11 lbs). The weight of one Ultralife 9 volt lithium U9VL battery is 9 g (0.02 lbs). The weight of two Saft LS14500 lithium battery is 32.4g (0.07 lbs).

Shipping Box Label:

- 17) When shipping “small” primary lithium batteries *in equipment* there are no special labeling requirements.

3. LITHIUM BATTERIES SHIPPED AS SPARES

(includes packages containing equipment with more batteries than needed to power equipment)

Packaging of Batteries:

A) PN 80981.1 SBE 37/44/ BATTERY ASSEMBLY /BR2/3A-L3P, FUSED

- 18) Battery sticks must be heat sealed in non-conductive plastic and placed in bubble-wrap outer sleeve.
19) A maximum of twelve battery sticks can be installed per heat sealed bag.
20) The sealed bag must be packed in strong packaging. When placed in shipping box it must be packed to effectively prevent movement.

B) PN 22074 BATTERY, 9V LITHIUM PRISMATIC U9VL-FP

- 21) The Ultralife 9V lithium battery as delivered from the manufacturer is placed in a Foil Pack with non-conductive inner liner. When placed in shipping box it must be packed to effectively prevent movement.

C) PN 22095 BATTERY, SAFT AA LITHIUM, LS14500

- 22) Batteries must be heat sealed in non-conductive plastic and placed in bubble-wrap outer sleeve.
23) A maximum of twelve batteries can be installed per heat sealed bag.
24) The sealed bag must be packed in strong packaging. When placed in shipping box it must be packed to effectively prevent movement.

D) PN 22009 BR2/3A-T2SP, PN 22076 BR2032, and PN 22085 CR14250SE-SP1-1

- 25) Batteries must be packaged to prevent short circuiting. When placed in shipping box it must be packed to effectively prevent movement.

Shipping Weight per Box:

- 26) The gross weight of the shipping box and batteries may not exceed 30kg (66 lbs).

Shipping Box Labels:

- 27) The U.S. DOT requires that all shipments containing only primary lithium batteries must contain the following label:

**PRIMARY LITHIUM BATTERIES—
FORBIDDEN FOR TRANSPORT
ABOARD PASSENGER AIRCRAFT**

- 28) IATA and ICAO, in addition to the aforementioned label, require the yellow/black/white caution label that contains emergency contact information. This label must be affixed for international shipments and is optional for domestic shipments, but advised.



Included Documents:

- 29) Include inside the shipping box, document stating, *“This package contains small lithium cells and/or batteries that are exempt as a hazardous material for transportation purposes. Packaging, labeling and documentation for this package are in accordance with shipping regulations for lithium cells containing 1.0 g or less of lithium metal and/or batteries containing 2.0 g or less of lithium metal.”*
- 30) Include inside the shipping box, the associated manufacturer’s MSDS or UN certification documentation.
- 31) For international shipments, the airway bill must include the phrase, “Non Restricted Per Special Provision A45”. *As of January 1, 2006, in the IATA Dangerous Good Regulations, 47th Edition, the note regarding special provision A45 that requires the special provision must be referenced on the Air Waybill no longer applies to Lithium batteries contained in, or packed with equipment. Shipments classified as shipping batteries must still adhere to the requirement as previously outlined.*

APPENDIX B: Certificate of Compliance (SBE PN 80981.1)



1700 Belle Meade Court
Lawrenceville, Georgia USA 30043

Motorola Technology SND.BHD. Plot 2
Bayan Lepas, Malaysia, 11900

Motorola Electronics China, Ltd.
No. 53, Muning Rd, TEDA, Tanggu, Tianjin, PRC

Certificate of Compliance

Certificate/Test Data Report Number: Issue Date:

The following product(s) have been evaluated and tested to ensure compliance with the Third Revised Edition of the UN Manual of Tests and Criteria, Section 38.3, Lithium Batteries. Specific test methods are given in the reference. Additional method implementation details are available in local test instructions available upon request. Test data is provided in the associated test data report filed under the same reference number as this certificate. The results obtained from this testing only relate to the actual products tested as described below.

Product Name:
 Product Description:
 Part Numbers:
 Sampling Plan/Proc:

Client Name:
 Client Address:
 Client City, State, Zip:

Characterization of Product per the Referenced Standard.

Cell Primary Large Prismatic (applies to cells only)
 Battery Secondary Small Non-Prismatic (applies to cells only)

Tests Conducted

T- 1 Altitude Simulation (All) T- 5 Short Circuit (All)
 T- 2 Temperature Cycling (All) T- 6 Impact (Cells Only)
 T- 3 Vibration (All) T- 7 Overcharge (Packs Only)
 T- 4 Shock (All) T- 8 Forced Discharge (Cells Only)

Approvals

Signature:
 Date:
 Typed Name:
 Title:

Signature:
 Date:
 Typed Name:
 Title:



This is to Certify that

Battery Model:

Sea-Bird Electronics, Inc., Model BR2/3A-L3P

Manufactured by:

Nexergy

*Has successfully passed the following tests as described in the
UN Manual of tests and criteria, Part III, sub-section 38.3:*

- Test 1: Altitude Simulation
- Test 2: Thermal Test
- Test 3: Vibration

- Test 4: Shock
- Test 5: External Short Circuit

Cynthia Millsaps
Laboratory Manager

Jane C. Gyll
Program/Business Manager

APPENDIX C: Ultralife U9VL-FP Material Safety Data Sheet (SBE PN 22074)

MATERIAL SAFETY DATA SHEET

MSDS001

Ultralife Batteries, Inc.
2000 Technology Parkway
Newark, NY 14513-2175
CAGE Code: 0UU59

Emergency Telephone Number:
Chemtrec for Spills, Leaks, Fires
USA 1-800-424-9300
International 703-527-3887

SECTION I PRODUCT IDENTIFICATION

Product Name: Ultralife Lithium Power Cell
Size: U9VL/U9VL-FP (Lectro)
National Stock Number: U9VL: 6135-01-369-9792
U3VL: Not issued
Chemistry System: Manganese Dioxide/Lithium Metal

SECTION II PRECAUTIONARY LABELING

Caution: May leak and/or flame if opened, recharged, connected improperly, or disposed of in fire.

SECTION III HAZARDOUS COMPONENTS

Chemical Name	CAS #	Exposure Limits	Percent of Content
Manganese Dioxide, MnO ₂	1313-13-9	None Listed	35.3 – 38.5
Lithium Metal, Li	7439-93-2	None Listed	2.7 – 3.7
Propylene Carbonate, C ₄ H ₆ O ₃	108-32-7	None Listed	8.6 – 10.7
1,3-Dioxolane, C ₃ H ₆ O ₂	646-06-0	None Listed	5.4 – 7.5
Lithium Hexafluoroarsenate, LiAsF ₆	29935-35-1	As: .01 mg/m ³	2.1 – 3.2

Important Note: The materials in this section may only represent a hazard if the integrity of the battery is compromised or if the battery is physically or electrically abused.

SECTION IV PHYSICAL AND CHEMICAL PROPERTIES

N/A

ULTRALIFE BATTERIES, INC.

MSDS001
Rev.: H
Date: 10/25/04

SECTION V**FIRE AND EXPLOSION DATA**

A. Extinguishing Media

- Copious amounts of cold water is an effective extinguishing medium for lithium batteries. Do not use warm or hot water.
- Do not use CO₂ or Halon type extinguishing material.

B. Fire Fighting Procedures

- Use a positive pressure self-contained breathing apparatus if batteries are involved in a fire.
- Full protective clothing is necessary.
- During water application, caution is advised as burning pieces of lithium may be ejected from the fire.

C. Unusual Fire and Explosion Hazards

- Batteries may flame or leak potentially hazardous organic vapors if exposed to excessive heat or fire.
- Fire or excessive heat may produce hazardous decomposition products.
- Damaged or opened batteries can result in rapid heating and the release of flammable vapors. Vapors are heavier than air and may travel along the ground or be moved by ventilation to an ignition source and flash back.

SECTION VI**STORAGE PRECAUTIONS**

- Do not store batteries in a manner that allows terminals to short circuit.
- Store batteries in a cool (below 70°F), dry area that is subject to little temperature change.
- Do not place near heating equipment, nor expose to direct sunlight for long periods. Elevated temperatures can result in reduced battery service life.

ULTRALIFE BATTERIES, INC.

MSDS001
Rev.: H
Date: 10/25/04

SECTION VII**HANDLING/USE PRECAUTIONS**

A. Battery Charging

- Batteries are not designed to be recharged. Charging a battery may result in electrolyte leakage and/ or cause the battery to flame.

B. Battery Disassembly

- Never disassemble a battery.
- Should a battery unintentionally be crushed, thus releasing its contents, rubber gloves must be used to handle all battery components. Avoid inhalation of any vapors that may be emitted.
- In the event of skin or eye exposure to the electrolyte, refer to Section VII, First Aid Information.

C. Battery Short Circuit

- More than a momentary short circuit will generally reduce the battery service life.
- Extended short circuiting creates high temperatures in the cell. High temperatures can cause burns in skin or cause the cell to flame.
- Avoid reversing battery polarity within the battery assembly. To do so may cause cell to flame or to leak.

D. Exposure Limits

Component	Value	Unit	Type	Authority
Manganese Dioxide (powder)	0.2	mg/m ³	TLV	ACGIH
Lithium metal	No	Data	Available	
Electrolyte	No	Data	Available	

ULTRALIFE BATTERIES, INC.

MSDS001
Rev.: H
Date: 10/25/04

SECTION VIII**FIRST AID INFORMATION**

A. Electrolyte Contact

- Skin- Immediately flush with plenty of water for at least 15 minutes. If symptoms are present after flushing, get medical attention.
- Eyes- Immediately flush with plenty of water for at least 15 minutes and get medical attention.

B. Lithium Metal Contact

- Skin- Remove particles of lithium from skin as rapidly as possible. Immediately flush with plenty of water for at least 15 minutes and get medical attention.
 - Eyes- Immediately flush with plenty of water for at least 15 minutes and get immediate medical attention.
-

SECTION IX**DISPOSAL PROCEDURES**

- Batteries must be completely discharged prior to disposal and/ or the terminals must be taped or capped to prevent short circuit.
 - Disposal of large quantities of lithium power cells may be subject to Federal, State, or Local regulations.
-

SECTION X**TRANSPORTATION**

- This battery has been tested to Section 38.3 of 'UN Manual of Tests and Criteria'. And has passed T1-T8. The amount of Lithium contained in these batteries is below the limits set by the DOT in Section 49CFR173.185 and IATA A45. This product can be shipped with the following shipping label:

<p style="text-align: center;">LITHIUM BATTERIES Do not damage or mishandle this package If package is damaged, batteries must be quarantined, inspected and repacked. For emergency information, call CHEMTREC 1-800-424-9300 North America 1-703-527-3887 International</p>
--

ULTRALIFE BATTERIES, INC.

MSDS001
Rev.: H
Date: 10/25/04

SECTION XI**OTHER INFORMATION**

The information contained herein is furnished without warranty of any kind. Users should consider this data only as a supplement to other information gathered by them and must make independent determinations of the suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers.

ULTRALIFE BATTERIES, INC.

MSDS001
Rev.: H
Date: 10/25/04

APPENDIX D: Panasonic BR2/3A-T2SP UN Certification (SBE PN 22009)

Matsushita Battery Industrial Co., Ltd.

No. BR-2/3A 001

Independent Certification of Lithium battery (UN Model Regulation) / 国連勧告テスト証明

Nominal specification / 規格

Items / 項目	Specification Value / 規格値	Remarks / 備考
Model Number / 品番	BR-2/3A	
Nominal Voltage / 公称電圧	3.0V	
Nominal Capacity / 公称容量	1200 mAh	
Lithium Content / 鋳鉛含有量	0.4 g	Category / 分類 : Cell / 単電池

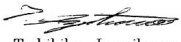
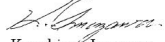
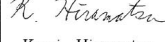
Test Results / 結果

UN Manual of Tests and Criteria 国連勧告テストと判定基準	Results 結果	Remarks 備考
T1 : Altitude simulation / 高度シミュレーション	Pass / 合格	
T2 : Thermal Test / 温度試験	Pass / 合格	
T3 : Vibration / 振動	Pass / 合格	
T4 : Shock / 衝撃	Pass / 合格	
T5 : External short circuit / 外部短絡	Pass / 合格	
T6 : Impact / 内部短絡	Pass / 合格	
T7 : Overcharge / 過充電	for rechargeable batteries only / 充電式電池のみ
T8 : Forced discharge / 強制放電	Pass / 合格	

Hereby we certify that this model of Lithium battery meets the requirements of each test in the UN Manual of Tests and Criteria, Part III, sub-section 38.3.

上記テストは国連勧告テスト(Manual of Tests and Criteria, Part III, sub-section 38.3.)に従い確認された結果であることを証明致します。

Issued on : Jan. 7, 2003

Approved / 承認	Checked / 確認	Prepared / 作成
 Toshihiko Izumikawa	 Kazuhiro Imazawa	 Kosei Hiramatsu

Lithium and Micro Battery Business Unit / 野村一電池ビジネスユニット
Matsushita Battery Industrial Co., Ltd. / 松下電池工業株式会社

APPENDIX E: Panasonic BR2032 UN Certification (SBE PN 22076)

Matsushita Battery Industrial Co., Ltd.

No. BR2032 001

Independent Certification of Lithium battery (UN Model Regulation) / 国連勧告テスト証明

Nominal specification / 規格

Items / 項目	Specification Value / 規格値	Remarks / 備考
Model Number / 品番	BR2032	
Nominal Voltage / 公称電圧	3.0 V	
Nominal Capacity / 公称容量	190 mAh	
Lithium Content / リチウム含有量	0.05 g	Category / 分類 : Cell / 単電池

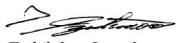
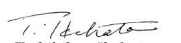

Test Results / 結果

UN Manual of Tests and Criteria 国連勧告テストと判定基準	Results 結果	Remarks 備考
T1 : Altitude simulation / 高度シミュレーション	Pass / 合格	
T2 : Thermal Test / 温度試験	Pass / 合格	
T3 : Vibration / 振動	Pass / 合格	
T4 : Shock / 衝撃	Pass / 合格	
T5 : External short circuit / 外部短絡	Pass / 合格	
T6 : Impact / 内部短絡	Pass / 合格	
T7 : Overcharge / 過充電	-----	for rechargeable batteries only / 充電式電池のみ
T8 : Forced discharge / 強制放電	Pass / 合格	

Hereby we certify that this model of Lithium battery meets the requirements of each test in the UN Manual of Tests and Criteria, Part III, sub-section 38.3.

上記テストは国連勧告テスト(Manual of Tests and Criteria, Part III, sub-section 38.3.)に従い確認された結果であることを証明致します。

Issued on : Jan. 7, 2003

Approved / 承認	Checked / 確認	Prepared / 作成
 Toshihiko Izumikawa	 Toshihiko Ikehata	 Kosei Hiramatsu

Lithium and Micro Battery Business Unit / リチウム一次電池ビジネスユニット
Matsushita Battery Industrial Co., Ltd. / 松下電池工業株式会社

APPENDIX F: Sanyo CR14250SE Material Safety Data Sheet (SBE PN 22085)

Page 1 of 5

MATERIAL SAFETY DATA SHEET

SANYO Batteries

SANYO Energy (USA) Corp.
2055 Sanyo Ave.
San Diego, CA 92154

Telephone No.: (619) 661-4888
www.sanyobatteries.com
In case of emergency contact:
CHEMTREC at (800) 424-9300

Date of Preparation: 6/23/03

Section I – Product Identification

Product Name: Lithium Battery

Model: Coin and Cylindrical (SE) Type Batteries

Chemical System: Manganese Dioxide Lithium Primary Designated for Recharge: Yes No

Section II –Composition / Information on Ingredients

IMPORTANT NOTE: The battery cell should not be opened or exposed to heat because exposure to the following ingredients contained within could be harmful under some circumstances.

Chemical Name	CAS No.	PEL	TLV
Manganese Dioxide (MnO ₂)	1313-13-9	5 mg/m ³	5 mg/m ³
Lithium*	7439-93-2	None Established	None Established
Propylene Carbonate (PC)	108-32-7	None Established	None Established
Dimethoxyethane (DME)	110-71-4	None Established	None Established
Lithium Perchlorate		None Established	None Established

*Weight of lithium per cell: See chart Page 5

Section III – Physical Data

Boiling point (°C):	PC-242, DME-85
Vapor pressure (mmHg):	PC-0.03, DME-61
Vapor Density (Air=1):	DME-3.1
Solubility in Water:	DME-complete, PC-moderate
Specific Gravity (H ₂ O=1):	MnO ₂ -5.03, PC-1.20, DME-0.87
Melting Point (°C):	Li-0.54, LiClO ₄ -2.43
Evaporation Rate: (Butyl Acetate=1)	Li-179, MnO ₂ -decomposes at 535, LiCl ₂ -236
Appearance and Odor:	DME-4.99
	Lithium is a soft, silvery metal.
	MnO ₂ is a black powder.
	PC is a colorless, odorless liquid.
	DME is a colorless liquid with a sweet odor.

The information and recommendations set forth are made in good faith and believed to be accurate as of the date of preparation. SANYO ENERGY CORP. makes no warranty, expressed or implied, with respect to this information and disclaims all liabilities from reliance on it.

Section IV – Fire and Explosion Hazard Data

Flash Point (°C):	DME: -1
Extinguishing Media:	Water
Flammable Limits:	Not available
Special Fire Fighting Procedure:	In case of fire in an adjacent area, use water, CO ₂ or dry chemical extinguishers if cells are packed in their original containers since the fuel of the fire is basically paper products. For bulk quantities of unpackaged cells use LITH-X (Graphite Base). In this case, do not use water.

Section V - Reactivity Data

Stability:	Stable
Conditions to Avoid:	Do not heat, disassemble or charge.
Hazardous Decomposition or By-products:	N/A
Hazardous polymerization will not occur.	

Section VI - Health Hazard Data

Routes of Entry:	Inhalation	Yes
	Skin	Yes
	Ingestion	Yes

Health Hazards (Acute and Chronic):

These chemicals are contained in a sealed can. Risk of exposure occurs only if the battery is mechanically or electrically abused. The most likely risk is acute exposure when a cell vents.

DME is believed to be slightly to moderately toxic, and propylene carbonate is considered to be non-toxic but moderately irritating to the eyes. LiClO₄ is irritating to skin, eyes and mucous membranes. Contact of electrolyte and extruded lithium with skin and eyes should be avoided.

Carcinogenicity:

NTP: None

IARC Monograph: None

OSHA Regulated: None

Signs / Symptoms of Exposure:

DME may be a reproductive hazard. Lithium can cause thermal and chemical burns upon contact with the skin.

Medical Conditions Generally Aggravated by Exposure:

An acute exposure will not generally aggravate any medical condition.

Emergency and First Aid Procedures:

In case of skin contact with contents of battery, flush immediately with water. For eye contact, flush with copious amounts of water for 15 minutes. Do not inhale leaked material. If irritation persists, get medical help.

The information and recommendations set forth are made in good faith and believed to be accurate as of the date of preparation. SANYO ENERGY CORP. makes no warranty, expressed or implied, with respect to this information and disclaims all liabilities from reliance on it.

Section VII - Precautions for Safe Handling and Use

Steps to be Taken in Case Material is Released or Spilled:

The preferred response is to leave the area and allow the batteries to cool and the vapors to dissipate.
Avoid skin and eye contact or inhalation of vapors. Remove spilled liquid with absorbent and incinerate.

Waste Disposal Method:

Dispose in accordance with appropriate regulations. Open cells should be treated as hazardous waste.

Precautions to be Taken in Handling and Storing:

Avoid mechanical or electrical abuse.

Other Precautions:

Batteries may explode or cause burns, if disassembled, crushed or exposed to fire or high temperatures. Do not short or install with incorrect polarity.

Section VIII - Control Measure

Respiratory Protection (Specify Type):	Not necessary under conditions of normal use.
Ventilation:	Not necessary under conditions of normal use.
Protective Gloves:	Not necessary under conditions of normal use.
Eye Protection:	Not necessary under conditions of normal use.
Other Protective Clothing or Equipment:	Not necessary under conditions of normal use.

Section IX - Disposal

Lithium batteries are best disposed of as a non-hazardous waste when fully or mostly discharged. The Federal Environmental Protection Agency (EPA) (governed by the Resource Conservation and Recovery Act (RCRA)) do not list or exempt Lithium as a hazardous waste. However, if waste lithium batteries are still fully charged or only partially discharged, they can be considered a reactive hazardous waste because of significant amounts of unreacted, or unconsumed lithium remaining in the spent battery. The batteries must be neutralized through an approved secondary treatment facility prior to disposal as a hazardous waste (as required by the U.S. Land Ban Restrictions for the hazardous and Solid Waste Amendments of 1984.) Secondary treatment centers receive these batteries as manifested hazardous waste under code "D003 - reactive." Button cells are exempt because they contain so little lithium and therefore can be disposed of in the normal municipal waste stream. Use a professional disposal firm for disposal of mass quantities of undischarged lithium batteries.

DO NOT INCINERATE or subject battery cells to temperatures in excess of 212°F. Such treatment can cause cell rupture.

The information and recommendations set forth are made in good faith and believed to be accurate as of the date of preparation. SANYO ENERGY CORP. makes no warranty, expressed or implied, with respect to this information and disclaims all liabilities from reliance on it.

Section X - Transportation

SANYO Lithium batteries are exempt from dangerous goods regulations and meet the exceptions of 49CFR Part 173.185(b). They are considered non-dangerous goods by the International Civil Aviation Organization (ICAO) and the International Air Transport Association (IATA) because they meet all requirements of Special Provision A45. More information concerning shipping, testing, marking and packaging can be obtained from Labelmaster at <http://www.labelmaster.com>.

Separate Lithium batteries when shipping to prevent short-circuiting. They should be packed in strong packaging for support during transport.

Each SANYO cell or battery has been tested under provisions of the UN Manual of Tests and Criteria, Part III, Sub-section 38.3.

The information and recommendations set forth are made in good faith and believed to be accurate as of the date of preparation. SANYO ENERGY CORP. makes no warranty, expressed or implied, with respect to this information and disclaims all liabilities from reliance on it.

WEIGHT OF LITHIUM FOR LITHIUM BATTERY

(Figure: Max. amount)

Battery Type		Model	Weight of Battery(g) /cell or Battery	Weight of Lithium(g) /cell or Battery
Primary Batteries	Coin-type	CR1220	0.8	0.01
		CR2016	1.7	0.03
		CR2025	2.5	0.05
		CR2032	3.0	0.06
		CR2430	4.0	0.08
		CR2450	6.9	0.16
	Cylindrical- type	CR-1/3N	3.3	0.06
		2CR-1/3N	9.1	0.12
		CR15270	11.0	0.33
		CR14500	17.4	0.62
		CR15400	17.0	0.54
		CR17335	16.0	0.57
		CR2	11.0	0.33
		CR123A	17.0	0.57
		CR-V3	38.0	1.24
		CR-P2	37.0	1.14
		2CR5 (CR15400x2)	40.0	1.08
		2CR5 (CR17335x2)	38.0	1.14
		CR17335E-R	16.0	0.55
		CR17450E-R	22.0	0.82
		CR17335HE-R	16.0	0.47
CR17450HE-R	22.0	0.71		
Cylindrical- type (SE series)	CR14250SE (SE-R)	9.0	0.26	
	CR12600SE	15.0	0.48	
	CR17335SE (SE-R)	17.0	0.49	
	CR17450SE (SE-R)	22.0	0.72	
	CR23500SE (SE-R)	42.0	1.52	
Secondary Batteries	ML series	ML414	0.07	0.0004
		ML414R	0.07	0.0007
		ML414RU	0.08	0.0007
		ML414RU2	0.08	0.0008
		ML421	0.10	0.0009
		ML614	0.16	0.0012
		ML614R	0.19	0.0012
		ML621	0.22	0.0038
		ML1220	0.80	0.009
		ML2016	1.80	0.016
		ML2020	2.20	0.024
		ML2430	4.10	0.048
	NBL series	NBL414	0.07	0.0004
		NBL414R	0.08	0.0007
		NBL621	0.23	0.0038

The information and recommendations set forth are made in good faith and believed to be accurate as of the date of preparation. SANYO ENERGY CORP. makes no warranty, expressed or implied, with respect to this information and disclaims all liabilities from reliance on it.

APPENDIX G: Saft LS14500 Transportation Certificate (SBE PN 22095)



TRANSPORTATION CERTIFICATE

Ref. TC-LS 14500 06/03-2

This is to certify that the Saft cell type, **LS 14500**, has been subject and has met the requirements of:

- UN Recommendations on the transport of dangerous goods, Model Regulations 12th Revised edition - 2001 - Ref. ST/SG/AC.10/1/Rev. 12
- UN Recommendations on the transport of dangerous goods, Manual of Tests and Criteria 3rd Revised edition - 1999 - Ref. ST/SG/AC.10/1/Rev. 3, amended per Addendum 2, Annex 4 - Ref. ST/SG/AC.10/27/Add.2

as detailed in Saft-Poitiers internal reports P 0107/01, dated 02/2001, relative to the ability of the LS 14500 cell to pass the T6 Impact test, and P 0134/02, dated 06/2002, relative to the other tests.

Concerned Part Numbers

All the following LS 14500 cell versions that just vary by their termination mode and labeling:

04224X - 04229C - 04230D - 04231E - 04286L - 04268S - 04287M - 04490Q - 04492S - 04679M - 04722D - 04746C - 04750G - 04766Y - 04768A - 04825K - 04859U - 04861W - 04927Q - 04928R - 04931U - 04933W - 05160S.

Product Description

Primary (non-rechargeable), Lithium-Thionyl Chloride (Li-SOCl₂) single cell

Nominal Voltage	3.6 Volts
Nominal Capacity	2.25 Ah
Lithium metal content	0.60 gram
Maximum recommended continuous discharge current	120 mA

Product Classification

Since it passes the UN-defined transport tests and thanks to its lithium content below the 1 gram limit, **the LS 14500 cell in all its finish versions, is declared exempt from the Dangerous Goods regulations**, that is **non-restricted to transport/non-assigned to Class 9**, providing packed in accordance with Clause 188 of UN Recommendations on the transport of dangerous goods, Model Regulations 12th Revised edition - 2001 - Ref. ST/SG/AC.10/1/Rev. 12.

Signed on Behalf of Saft, Specialty Battery Group

Pascal Hans SBG Product Test Engineer

Gilles Tardivo SBG Quality Manager

Alain Kerouanton SBG Lithium Product Manager

dated 10/11/2004

dated 10/11/2004

dated 05/11/2004

Specialty Battery Group – Rue Georges Leclanché BP 1039 – 86060 Poitiers Cedex 09 – France