Rathbone Broadcast Batteries, LLC.
Rathbone Lithium Ion Broadcast Battery

MATERIAL SAFETY DATA SHEET

(form according to EEC Directive 93/112/EC0

NAME: LITHIUM ION RECHARGEABLEBATTERIES
1- IDENTIFICATION (of the product and the supplier)
1.1 Product: Rechargeable battery

Yes	√
No	

Trade name and model: LITHIUM-ION RECHARGEABLE BATTERIES
IEC designation:

_____

Models: RBLI-BP95GM, RBLI-BP95VM, RBLI-BP130GM, RBLI-130VM, RBLI-BP160GM, RBLI-160VM, RBLi-RED160VM, RBLI-BP200GM, RBLI-BP200VM, RBLi-RED200VM, RBLI-30/15-2653AFP

Electrochemical system: Lithium Cobalt Di-Oxide

Electrodes	**Negative Electrode** Carbon/Graphite	**Positive Electrode** **Lithium Cobalt)$LiCoO_2$)***

Electrodes	Solution of Lithium hexafluorophosphate ($LiPF_6$) In a mixture of organic solvents**
Nominal Voltage	3.6 Volts

*Equivalent name: lithiated colbalt oxide
**Ethylene Carbonate (EC) + DiEthyl Carbonate (DMC) + DiEthyl Carbonate (DEC) + Ethyl
Acetate (EA0

COMPOSITION (typical weight percentages of basic material)

Metals	**%**	**Plastics**	**%**	**Others**	**%**
- Steel, Copper, Aluminum	31	_ Polypropylene, Polyethylene	11	- Lithium Cobaltite - Carbon - Organic Solvents - Salts - LiMN2O4	21 17 14 2 4

3—HAZARDS IDENTIFICATION

3.1 Physical:

The Lithium-Ion rechargeable batteries described in this Material Safety Data Sheet are sealed units which are not hazardous when used according to the recommendations of the manufacturer.

Under normal conditions of use, the solid electrode materials and liquid electrolyte they contain are non-reactive provided the battery integrity is maintained and seals remain in tact. There is a Risk of exposure only in case of abuse (mechanical, thermal, electrical), which leads to the activation of the safety valve and / or the rupture of the battery container. Electrolyte

leakage, electrode materials reaction with moisture./water or battery vent/explosion/fire may follow, depending upon the circumstances.

In the case of excessive internal pressure and/or temperature, Rathbone Energy batteries are fitted with a safety vent for protection and/or rupture of the cell case.

3.2 Chemical

Classification of dangerous substances contained into the product as per directive 67/54/EEC

Substances		Melting Point	Boiling Point	Classification			
CAS N0	Chemical Symbol			Exposure Limit	Indication of danger	Special Risk (1)	Safety advices (2)
12190-79-3	LiCoO2	> 1000 0 C	N/A	0.1 mg/m3 OSHA		R 22 R 43	S2 S22 S24 S26 S36 S37 S43 S45
EC: 96-49-1 DMC: 616-38-6 DEC: 105-58-8 EA:141-78-6	Organic Solvents (DC-DMC DEC-EA)	EC: 380C DMC: 40C DEC: -430C EA:-840C	EC:2430C DMC:900C DEC:1270C EA:770C	None established OSHA	Flammable	R21 R22 R41 R42/43	S2 S24 S26 S36 S37 S45
21324-40-3	IIPF6	N/A (decomposes at 1600C)	N/A	None established OSHA	Irritant Corrosive	R41 R21 R22 R41 R43	S2 S8 S22 S24 S26 S36 S37 S45

1—Nature of Special Risks: R14: Reacts with water; **R21**: Harmful in contact with skin; **R22**: Harmful if Swallowed; **R41**: Risk of serious damage to the eye; **R42/43**: May cause sensitization by inhalation and skin contact; **R43**: May cause sensitization by skin contact.

Classification

Safety advices:

S 2 Keep out of reach from children

S 8 Keep away from moisture

S 22 Do not breath dust

S24 Avoid contact with skin

S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical
attention.

S36 Wear suitable gloves

S 45 In case of incident, seek medical attention

4. First Aid Measures
In case of battery rupture or explosion, evacuate personnel from contaminated area and provide maximum ventilation to clean out fumes/gases.

In all cases, seek medical attention.

Eye contact: Flush with plenty of water (eyelids held open) for at least 15 minutes.

Skin Contact: Remove all contaminated clothing and flush affected areas with plenty of water and soap for at least 15 minutes

Do not apply greases or ointments

Ingestion: Dilute by giving plenty of water and get immediate medical attention. Assure that the victim does not aspirate vomited material by use of positional drainage.

Assure that mucus does not obstruct the airway.

Do not give anything by mouth to an unconscious person

Inhalation: Remove to fresh air and ventilate the contaminated area.

Use oxygen or artificial respiration if needed.

5- Fire Fighting Measures

Fire and explosion hazard: The batteries can leak and/or spout vaporized or decomposed and combustible electrolyte fumes in case of exposure above 80^0C resulting from inappropriate use, abuse, or from the environment. Possible information of hydrogen fluoride (HF) and phosphorous oxides during fire, LiPF6 salt contained in the electrolyte releases hydrogen fluoride (HF) in contact with water.

Extinguishing media Suitable….Type D extinguishers, Co2, Dry chemical or Foam extinguishers.

Not to be used:….Spray or immerse in water

Special exposure hazard: Following cell overheating due to external source or due to improper use, electrolyte leakage or battery container rupture may occur and release inner component/material in the environment.

Eye Contact: The electrolyte solution contained in the battery is irritant to ocular tissues.

Skin Contact: The electrolyte solution contained in the battery causes skin irritation.

Ingestion: The ingestion of electrolyte solution causes tissue damage to throat and gastro/respiration tract.

Inhalation: Contents of a leaking or ruptures battery can cause respiratory tract, mucus, membrane irritation and edema.

Special protective equipment: Use self-contained breathing apparatus to avoid breathing irritant fumes.

Wear protective clothing and equipment to prevent body contact with electrolyte solution.

6- ACCIDENTAL RELEASE MEASURES

The material contained within the batteries would only be expelled under abusive conditions. Soak under water or spray copious amounts of water, place in approved container, (after cooling if necessary) and dispose in accordance with local regulations.

7- Handling and Storage

The batteries should not be opened, destroyed, nor incinerate since they may leak or rupture and release in the environment the ingredients they contain.

Handling: Do not crush, pierce, short (+) and (-) terminals with conductive, (i.e. metal) goods. Do not directly heat or solder. Do not throw into fire. Do not mix batteries of different types and brands. Do not mix new and used batteries.

Keep batteries in non-conductive (i.e. plastic) trays.

Storage: Store in cool place (preferably below 30^0C) and ventilated area away from moisture, sources of heat, open flames, food and drink. Keep adequate clearance between walls and batteries. Temperature above 700C may result in battery leakage and rupture. Since short circuit can cause burn, leakage and rupture hazard, keep batteries in original packaging until use and do not jumble them.

Other: Follow manufacturer recommendations regarding maximum recommended currents and operating temperature range.

8- EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory protection: Not necessary under normal use. In case of battery rupture, use self-contained full-face respiratory equipment.

Hand protection: Not necessary under normal use. Use Viton rubber gloves if handling a leaking battery.

Eye protection: Not necessary under normal use. Wear safety goggles or glasses with side shields if handling a leaking or ruptured battery.

Skin Protection: Not necessary under normal use. Use rubber apron and protective work ing in case of handling of a ruptured battery.

9- PHYSICAL AND CHEMICAL PROPERTIES

9.1 Appearance (Physical shape and color as supplied)

9.2 Temperature range

	Continuous	Occasional
In storage during Discharge during During Charge	+ 30^0C max - 30/+70^0C 0/+500C	-40/+ 70^0C -40/+ 70^0C 0/+ 50^0C

9.3 Specific energy: = 120—200whr/kg depending upon size (Note: Wh = Normal voltage x Rated Ah) kg = Average battery weight

9.4 Specific pulse power: 600w-1200w/kg Varies depending upon size

9.5 Mechanical resistance: As defined in relevant IEc standard

9.6 Other:

10. STABILITY AND REACTIVITY

Conditions to avoid: Heat shown 70^0C or incinerate. Deform, mutilate, crush, pierce, disassemble. Short circuit. Prolonged exposure to humid conditions

Materials to avoid: N/A

Hazardous decomposition products: Corrosive/Irritant Hydrogen fluoride (HF0 is produced in case of reaction of lithium hexafluorophosphate ($LiPF_6$) with water. Combustible vapors and formation of Hydrogen fluoride (HF) and phosphorous oxides during fire.

11 - TOXOLOGICAL INFORMATION:
Lithium –Ion rechargeable batteries do not contain toxic materials

12— ECOLOGICAL INFORMATION
When properly used or disposed, Lithium-Ion rechargeable batteries do not present environ mental hazard.

13 - DISPOSAL CONSIDERATIONS
Dispose in accordance with applicable regulations, which vary from country to country. Lithium-Ion batteries should have their terminals insulated and be preferably wrapped in individual plastic bags prior to disposal.

13.1 — Incineration: Incineration should never be performed by battery users but eventually be trained professionals in authorized facilities with proper gas and fumes treatment.

13.2— Recycling: Send to authorized recycling facilities.

14 - TRANSPORT INFORMATION: (SUBJECT TO CHANGE WITHOUT NOTICE)

14.1— United Nations: UN^0 3090
Classification 9
Packaging ICAO 903 for Air Transportation
IMDG 903 for Sea Transport

14.2— International conventions: Air IATA-A45 Yes
Sea IMDG Yes
Land ADR (road) Yes
RID (rail) Yes

14.3 The battery meets the requirements of test in the UN Manual of Tests and Criteria,

Part III, sub-section 38.3

14.4 All the consignment is packed with protection of exposed terminals so as to prevent the potential danger by short-circuiting, according to Special Provision A45 under the current edition of the IATA Dangerous Goods Regulations.

14.5 Other: In the USA: Code of Federal Regulations
(49 CFR Ch. 1 § 173-185)

15 - REGULATION INFORMATION (SUBJECT TO CHANGE WITHOUT NOTICE)
The transport of rechargeable lithium-ion batteries is regulated by various bodies, (IATA, IMO, ADR, US-DOT) that follow the United Nations "Recommendations on the Transport of

Dangerous Goods, Model regulations, 13th Revised edition—2003—Ref. STSG/AC. 10/1 Rev. 13".

Depending on their lithium metal equivalent weight content, design, and ability to pass safety tests defined by the UN in "Recommendations on the Transport of Dangerous Goods—Manual of tests and Criteria—3rd Revised edition—2002—Ref. Ref. STSG/AC. 10/11 Rev. 3 Amendment 1 <Lithium Batteries>>", the lithium-ion cells and the battery packs may or may not be assigned to the UN N0 3090 Class-9, that is restricted for transport.

Individual lithium-ion cells and battery packs with respectively less than 1.5 and 8 grams of equivalent Lithium metal content that pass the UN-defined safety tests, are not restricted for transport (1.0Ah of declared nominal capacity = 0.3 gram of Li equivalent weight content).

16 - OTHER INFORMATION/DISCLAIMER

This information has been compiled from sources considered to be dependable and is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation,

warranty (either expressed or implied) or guarantee is made to the accuracy, reliability or completeness of the information contained herein.

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Additional information is available by calling the telephone number above designated purpose.

NOT RESPONSIBLE:
UNDER NO CIRCUMSTANCES SHALL WE, (RATHBONE BROADCAST BATTERIES, LLC., OUR OFFICERS, OR OUR EMPLOYEES), BE LIABLE FOR ANY INJURY, LOSS, DAMAGE, OR EXPENSE SUFFERED OR INCURRED WITH RESPECT TO ANY DEFECTIVE PRODUCT, NON-DEFECTIVE PRODUCT, OR USE OF THAT PRODUCT WHICH IS ASSEMBLED, BUILT, OR REBUILT BY RATHBONE BROADCAST BATTERIES, LLC., OR FOR PRODUCT OF ANOTHER MANUFACTURER SOLD THROUGH RATHBONE BROADCAST BATTERIES, LLC., INCLUDING LITHIUM ION.

We reserve the right to interpret any and all conditions and situations listed and those not here listed in such a manner as we deem appropriate.

Any dispute will be governed by the Laws of the State of Tennessee. Specifically, any litigation shall be tried in the Cocke County, Tennessee, Sessions and/or Circuit Court depending upon the monetary amount(s) and the varying Legal issues.