

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION:

Product Name:	Intrinsically Safe Rechargeable Lithium-Ion Battery Pack	Date Prepared:	Nov 2019
Model:	CNB950EV2 & CNB550EV2		
Manufacturer's Name:	Entel UK Limited		
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Document Number:	QAS-SDS-015		

SECTION 2 – HAZARD IDENTIFICATION:

Classification of Products:

For the battery cell, chemical materials are stored in a hermetically sealed case designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there is no physical danger of ignition or explosion and chemical danger of hazardous materials' leakage. However, if exposed to fire, added mechanical shocks, decomposed, added electric stress by misuse, the gas released vent will be operated. The battery cell case will be breached at the extreme, hazardous materials may be released. Moreover, if heated strongly by a surrounding fire, acrid gas may be emitted.

- **Hazard Symbol(s):** None.
- **Signal Word:** None.
- **Hazard Statement(s):** The product does not meet the criteria for classification.

SECTION 3 – COMPOSITION /INFORMATION OF INGREDIENTS:

Material	Molecular Formula	CAS NO.	EC No.	Quantity (%)
Lithium Cobalt Oxide	LiCoO ₂	12190-79-3	235-362-0	17-25.3
Graphite	C	7782-42-5	231-955-3	15-23
Electrolyte	N/A	n/a	N/A	13-21
Aluminium	Al	7429-90-5	231-072-3	9-13
Copper	Cu	7440-50-8	231-159-6	7-11
PVDF	(CH ₂ -CF ₂) _n	24937-79-9	N/A	0.2-0.8
Carbon Black	C	1333-86-4	215-609-9	0-0.6
Nickel Cobalt Lithium Manganate	LiNi _x CO _y Mn _z O ₂	182442-95-1	N/A	10-18

Abbreviation:

CAS No. is Chemical Abstract Service Registry Number.

EC No. is European Inventory of Existing Commercial Chemical Substance Number.

N/A = Not Applicable.

As manufactured lithium ion cells do not contain lithium metal.

The Watt-hour rating for the Entel lithium ion products specified in this document is **13.32Wh**.

All Entel products should be recycled by the relevant local authorities (recycling information relating to the WEEE Directive may be found on the Entel web site www.entel.co.uk)

SECTION 4 – FIRST AID MEASURES:

The hazardous components in battery pack are in internally sealed cells. **The following measures are only applicable if the battery pack has been abused/damaged causing exposure of hazardous materials noted under section three.**

- **Inhalation:** Make the victim blow his/her nose, gargle and move to fresh air immediately. Seek medical attention if necessary.
- **Skin contact:** Remove contaminated clothes and shoes immediately. Wash the adhered or contact region with soap and plenty of water immediately. Seek Medical attention.
- **Eye contact:** Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention immediately.
- **Ingestion:** Have victim rinse mouth thoroughly with water. Do not induce vomiting. Quickly transport victim to an emergency care facility.
- **Protection for First Aiders:** Do not expose yourself to corrosive vapour-contaminated areas without a respirator.
- **First Aid Facilities:** Eye wash bottle, fountain and safety showers (running water).

Most Important Symptoms & Effects Caused by Exposure:

Inhalation of internal cell contents could cause coughing or difficulty breathing. Skin contact may lead to irritation and possible chemicals burns. Eye contact may cause severe eye irritation, eye burning/pain and even possible irreversible damage. Ingestion may cause gastrointestinal tract irritation or even vomiting. Inhalation of vented cell vapours may lead to severe irritation of the mouth and upper respiratory tract causing a burning/pain sensation or inflammation in the nose and throat.

Indication of any immediate medical attention and special treatment needed:

Advice to Doctor: Treat symptomatically if the person comes into contact with the corrosive electrolyte liquid contents of a damaged battery.

SECTION 5 – FIRE FIGHTING MEASURES:

Extinguishing Media:

- **Suitable extinguishing media:** Water, carbon dioxide gas, nitrogen gas, chemical powder fire extinguishing, and fire foam.
- **Unsuitable extinguishing media:** Oxidizing agents, reducing agents, acids or alkalis.

Explosion Data: Closed container may explode when exposed to temperature above 120°C (248°F).

Hazard decomposition products in case of fire: Battery Pack is not flammable. Combustion products include, but not limited to hydrogen fluoride, carbon monoxide and carbon dioxide.

Sensitivity to Mechanical Impact: Extreme mechanical abuse could cause venting of the cells.

Sensitivity to Static Discharge: Electrolyte if exposed to electrostatic discharge could ignite.

Special Hazards Arising from the Chemical:

Degradation of the batter cell by heat may produce hazardous fumes of lithium, cobalt-manganese, hydrofluoric acid, hydrogen and oxides of carbon, aluminium, lithium, copper and cobalt.

Advise for Fire Fighting:

When battery cells combust, they tend to ignite other cells in the adjacent area. Prevent this by flooding the area with Carbon Dioxide, Foam, Nitrogen Gas or Fire Extinguishing Powder. Although use of water will extinguish flame it may create hydrogen-fluoride gas. Burning component cells or batteries will burn themselves out. Virtually all fires involving Lithium Ion cells and batteries can be controlled with water. When water is used however, hydrogen gas may be evolved which can form an explosive mixture with air. Powdered graphite or copper powder fire extinguisher, sand, dry ground dolomite or soda ash may also be used. These material acts as soothing agent.

Special Protective Equipment for Fire Fighters:

In the case of a fire and release of hydrogen fluoride, it is critical to protect the skin from any contact. Fire fighters should wear a self-contained breathing apparatus. Burning lithium-Ion cells and batteries can produce toxic fumes including hydrogen fluoride, oxides or carbon, aluminium, lithium, copper and cobalt.

Wear adequate personal protective equipment:

Respiratory Protection: Self-contained Breathing Apparatus.

Hand Protection: Protective Gloves.

Eye Protection: Full Face Breathing Apparatus or Goggles.

Body Protection: Protective Uniform.

SECTION 6 – ACCIDENTAL RELEASE MEASURES:

Personal Precautions, Protective Equipment and Emergency Procedures:

If battery packs internal cells become damaged, they could possibly leak minuscule amounts of contaminants. The following procedures list precautions and steps to cleaning these contaminants.

- **Personal precautions:** Leave the area and allow the batteries to cool and vapour to dissipate. Put on protective equipment and clothing listed in Section 8.
- **Emergency procedures:** If battery material is released, remove the personnel from area until fumes dissipate. Provide maximum ventilation to clear out hazardous gases. Avoid skin and eye contact or inhalation of the vapours. Remove the spilled liquid with absorbent and incinerate.
- **Environmental Precautions:** Cover spilled materials with absorbent non-reactive material. Keep contaminated non-reactive material away from soil, sewers or waterways. Inform appropriate authorities if contamination occurs.

Methods and Materials for Containment and Cleaning Up:

Quarantine contaminated area at 25 meters away. Put on protective equipment and clothing listed in Section 8. Do not touch spilled material. Use only non-sparking tools and equipment. Do not expose spilled material to moisture. Seal possible area where contaminants might migrate to environment. Clean up solids and place them into a waste container safe for disposing of contaminated trash. Clean up spilled electrolyte with non-reactive material and place them into same waste container. Dispose as per stated in Section 13.

SECTION 7 - HANDLING AND STORAGE:

Precautions for Safe Handling:

The battery pack and enclosed cells should not be opened. Do not short the battery terminals or dispose of the battery in a fire. Do not disassemble or modify the battery in any way. Do not expose to fire or high temperature. Do not soak cells in water. Do not expose to strong oxidisers. Do not crush. Refer to Quick Start User Guide for safe operating instruction.

Condition for Safe Storage:

Keep battery packs in packaging material to prevent exposure to elements and conductive materials. Do not store battery pack near heat, high humidity, open flame, sunlight, water, sea water, strong acids, strong oxidizers, strong reducing agents, strong alkalis or metal wire. Store in a cool place.

SECTION 8 - EXPOSURE CONTROL / PERSONAL PROTECTION:

Under routine operation none of these safety procedures or equipment is required. Take the following safety measures only if the internal cells are comprised and leak or vent.

Occupational Exposure Limit:

- **Exposure Limit Values:** Airborne exposure to hazardous substances are not expected when battery pack are used for their intended purposes. Exposure standard are not applicable to the sealed articles.
- **Biological Monitoring:** Not applicable.
- **Control Bonding:** Not applicable.
- **Recommended Monitoring Procedures:** Follow standard monitoring procedures.
- **Derived No-Effect (DNEL):** Not Applicable.
- **Derived Minimal Effect Level (DMEL):** Not Applicable.
- **Predicted No-Effect Concentrations (PNECs):** Not Applicable.

Exposure Control Measures:

- **Engineering Control:** Special ventilation is not required when using battery pack in normal use. Ventilation is required if there is leakage from the cell or battery.

Personal Protective Equipment:

- **Eye and Face Protection:** Eye protection is not required when handling batteries during normal use. Wear safety glasses/goggles if handling a leaking or ruptured battery.
- **Hand Protection:** Hand protection is not required when handling battery during normal use. PVC gloves are recommended when dealing with a leaking or ruptured battery.
- **Body Protection:** Not necessary under normal conditions. Wear long sleeved clothing to avoid skin contact if handling a leaking or ruptured battery.
- **Respiratory Protection:** During routine operation, a respiratory is not required. However if dealing with an electrolyte leakage and irritating vapours are generated, an approved half face inorganic vapour and gas/acid/particulate respirator is required.
- **Thermal Protection:** Not Applicable.

Hygiene Measures: Do not eat, drink or smoke in work areas. Avoid storing food and drink near the product. Practice and maintain good housekeeping.

Environmental Exposure Controls: Avoid release to the environment.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES:

Physical State:	Sealed Solid	Vapor Pressure:	Not Applicable
Appearance:	Battery Pack	Vapor Density:	Not Applicable
pH:	Not Applicable	Solubility in Water:	Insoluble
Relative Density:	Not Applicable	Water Distribution Coefficient:	Not Applicable
Boiling Point:	Not Applicable	Odor Type:	Odourless
Melting Point:	Not Applicable	Odor Threshold:	Not Applicable
Viscosity:	Not Applicable	Evaporation Rate:	Not Applicable
Oxidizing Properties	Not Applicable	Auto Ignition Temperature:	Not Applicable
Flash Point:	Not Applicable	Flammability Limits:	Not Applicable
Water Partition:	Not Applicable	Decomposition Temperature:	Not Applicable

SECTION 10 - STABILITY AND REACTIVITY:

Stability: The battery packs manufactured by Entel are completely stable under normal use and in normal storage and condition.

Reactivity: The internal cells within the battery packs may become unstable due to abusive conditions.

Possibility of Hazardous Reactions: Will not occur.

Conditions to Avoid: Do not disassemble, puncture or crush. Avoid exposure to high temperature and do not dispose of battery in fire or incinerate.

Incompatible Materials: Do not immerse in water or any high corrosive conductive liquid.

Hazardous Decomposition Products: This material may release toxic fumes if burned or exposed to fire. In case of open internal cell, there is a possibility of hydrofluoric acid and carbon monoxide release.

SECTION 11 - TOXICOLOGICAL INFORMATION:

The battery packs manufactured by Entel present no toxicology effects under normal use. The hazardous components of the battery are contained in a hermetically sealed case designed to withstand temperatures and pressures encountered during normal use. Exposure to these hazardous components only possible if the internal cell or the battery pack leaks or vents. **The following toxicology data is in respect to if a person comes into contact with electrolyte of the battery cell.**

Acute Toxicity:

- **Inhalation:** Inhalation of vapors from leaking battery is expected to cause severe irritation of the mouth and upper respiratory tract with a burning sensation, pain, burns and inflammation in the nose and throat; there may also be coughing or difficulty breathing.
- **Skin:** The electrolyte contained within the cell of the battery is corrosive liquid. If these corrosive liquids make contact to your skin they could cause skin burn or severe irritation if not washed off immediately. Correct handling procedures should minimize the risk of skin irritation.
- **Eye Contact:** The electrolyte contained within the cell of the battery pack is a corrosive liquid and it is expected that it would cause irreversible damage to the eyes. Contact may cause burns. Effects may be slow to heal after eye contact. Correct handling procedures incorporating appropriate eye protection should minimize the risk of eye irritation.
- **Ingestion:** The electrolyte contained within the cells of the battery pack is corrosive material. Ingestion of this electrolyte would be harmful. Swallowing may result in nausea, vomiting, abdominal pain and chemical burns in the gastrointestinal tract. **During normal usage ingestion of sealed battery pack is physically impossible.**

Skin Corrosion/Irritation: The electrolyte contained within the cell of the battery pack is classified as corrosive liquid and is expected to exhibit dermal irritation. A sealed battery presents no danger to a person's hand or skin.

Serious Eye Damage/Irritation: The electrolyte contained within the cells of the battery pack is a corrosive liquid. If these make contact with the eye it could cause irritation or even irreversible damage to the eye. A sealed battery presents no danger to eyes.

Respiratory or Skin Sensitization: The electrolyte contained within the cell or battery is not expected to be a skin sensitizer based on the available data and known hazards of the components. The electrolyte contained within the

battery is not expected to be a respiratory tract sensitizer, based on the available and the known hazards of the components.

Germ Cell Mutagenicity: The electrolyte contained within the cell of the battery pack is not expected to be mutagenic based on the available data and know hazards of the components.

Carcinogenicity: The electrolyte contained within the cell of the battery pack is not expected to be carcinogen. The cathode contains Cobalt and Nickel components. These components are classified as IARC – 2B possibly carcinogenic to humans, however they do not pose a threat when contained in the cell or battery sealed unit.

Reproductive Toxicity: The electrolyte contained within the battery is not expected to be a reproductive hazard, based on the available data and known hazards of the components.

Specific Target Organ Toxicity (STOT) – Single Exposure: The electrolyte contained within the battery pack is corrosive and is expect to cause respiratory irritation by inhalation. Inhalation of vapors may lead to severe irritation of the mouth and upper respiratory tract with a burning sensation, pain, burns and inflammation in the nose and throat; there may also be coughing or difficulty breathing.

Specific Target Organ Toxicity (STOT) – Repeated Exposure: The cells or battery pack are not expected to cause organ damage from prolonged or repeated exposure according or based on the available data and known hazards of the components.

Aspiration Hazards: The electrolyte contained within the cell of the battery pack presents no aspiration concern. However due to corrosive nature of the product if swallowed, do not induce vomiting. If vomiting has occurred after ingestion the person should be observed to ensure that aspiration into lungs has not occurred and assessed for chemical burns to the gastrointestinal and respiratory tracts.

SECTION 12 - ECOLOGICAL INFORMATION:

Ecotoxicity: A sealed battery pack does not pose any ecotoxicity hazard. The internal cells under normal use and conditions pose no ecotoxicity hazard. In the case the cells are broken or damaged the cell could leak electrolyte. If this electrolyte reacts with water it could potentially cause damage to flora and fauna. Follows the steps under Section 13 to insure battery are disposed of properly.

Persistence and Degradability: No data available.

Bio Accumulative Potential: Not applicable.

Environmental Protection: No data available.

Other adverse Effects: Solid battery cell released into the natural environment will slowly degrade and may release harmful or toxic substances. Battery cells are not intended to be released into water or on land but should be disposed or recycled according to local regulations.

SECTION 13 – DISPOSAL CONSIDERATIONS:

Waste Treatment Methods: Recycling of Entel battery pack is strongly encouraged. The battery packs internal cell's contents should not be released into the environment do not dump into any sewers, on the ground or into any body of water. Do not dispose of battery packs in fire. Used battery packs should be stored in their original packaging. Ensure battery packs stored in a manner to prevent short circuit of the cell. Battery pack should be fully discharged before recycling. Do break battery open before disposal.

Residual Waste: Dispose of in accordance with local regulations.

SECTION 14 – TRANSPORT INFORMATION:

The Watt-hour rating for the Entel lithium Ion products specified in this document is less than 20Wh for cells and 100Wh for batteries. The batteries are packed according to the packaging instruction 965, 966 with the requirement set out in section IB and section II of IATA DGR 61st Edition, or the special provision 188 and 230 of IMDG Code (Amdt. 38-16). The lithium ion batteries comply with the UN Manual of Tests and Criteria Part III Subsection 38.3.

When shipping only 1-2 battery packs (without equipment) description is "UN3480 IATA DGR Section II, PI965" / or IMDG Code Special Provision 188 and 230.

When shipping more than 2 battery packs (without equipment) description is "UN3480 IATA DGR Section IB PI965" / or IMDG Code Special Provision 188 and 230.

When shipping batteries packed with equipment description is "UN3481 IATA DGR Section II, PI966"/ or IMDG Code Special Provision 188 and 230.

Transport Hazard Classes:

- **Class:** 9
- **Subsidiary Risk:** None
- **Labels:** Class 9 Lithium Battery Hazard Label, Lithium Battery Mark and Cargo Aircraft Only Label
- **Hazard No. (ADR):** 9
- **Tunnel Restriction Code:** E
- **Packing Group:** II
- **Environmental Hazards:** None

Transportation in Bulk IBC Code: No Applicable Code.

Modal Information:

Land (ADR):	3480 – 188, 230 (Special Packaging Instruction P903 applies) 3481 – 188, 230 (Special Packaging Instruction P903 applies)
Land (RID):	3480 – 188, 230 (Special Packaging Instruction P903 applies) 3481 – 188, 230 (Special Packaging Instruction P903 applies)
Land (ADN):	3480 – 188, 230 (Special Packaging Instruction P903 applies) 3481 – 188, 230 (Special Packaging Instruction P903 applies)
Sea (IMDG):	188, 230 (Special Packaging Instruction P903 applies)
Air (IATA):	A88, A99, A154, A164, A183, and A206 (Packing Instruction 965, 966) ERG Code: Lithium Ion Batteries – Lithium Ion Batteries in compliance with Packing Instruction 965 Lithium Ion Batteries packed with Equipment - Lithium Ion Batteries in compliance with Packing Instruction 966

When shipping batteries according to the special provision 188 of IMDG (38-16) or the “Recommendations on the Transport of Dangerous Goods-Model Regulation 20th Edition”, the package is subjected to NON-RESTRICTED goods.

IATA Regulations limit weight and quantities as follows:

If shipping Batteries Only on Cargo Aircraft maximum net weight per package is 10Kg.

If shipping Battery Packs packaged together with Radios on Passenger Aircraft maximum net weight per package is 5kg.

SECTION 15 – REGULATORY INFORMATION:

This Material Safety Data Sheet complies with the requirements of Regulation (EC) No. 1907/2006. The following law, regulation and standard of the substance or mixture of management to do the corresponding provisions:

Composition	CAS No.	IECSC	TSCA	DSL/NDL	EINECS/ELINCS/NLP	KECI	NZIoC	AICS	PICCS
Lithium Cobalt Oxide	12190-79-3	Listed	Listed	Listed	Listed	Listed	Listed	Listed	---
Graphite	7782-42-5	Listed	Listed	Listed	Listed	Listed	Listed	Listed	Listed
Aluminum	7429-90-5	Listed	Listed	Listed	Listed	Listed	Listed	Listed	Listed
Copper	7440-50-8	Listed	Listed	Listed	Listed	Listed	Listed	Listed	Listed
PVDF	24937-79-9	Listed	Listed	Listed	Listed	Listed	Listed	Listed	Listed
Carbon Black	1333-86-4	Listed	Listed	Listed	Listed	Listed	Listed	Listed	Listed
Nickel Cobalt Lithium Manganate	182442-95-1	Listed	Listed	Listed	Listed	Listed	Listed	Listed	Listed

Note:

IECSC: Inventory of Existing Chemical Substances Produced or Imported in China

TSCA: Toxic Substances Control Act Inventory of USA

DSL: Canadian Domestic Chemical Substances

NDL: Canadian Non-Domestic Chemical Substances

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

NLP: European No-longer Polymers List

KECI: Korea Existing Chemicals List

NZIoC: New Zealand Inventory of Chemical

AICS: Australian Inventory of Chemical Substances

PICCS: Philippine Inventory of Chemicals and Chemical Substances

SECTION 16 – OTHER INFORMATION:

Preparation Date:	June 24, 2019
Prepared by:	Entel Quality Assurance Department
Revision:	
Rev.0 (Ver. 01/18)	Initial Release
Rev.1 (Ver. 01/19)	Change SDS format as per GHS SDS requirements / Major revision
Rev.2 (Ver. 10/19)	Revised Section 14
Rev.3 (Ver. 11/19)	Revised Section 3: Chemical Composition

Statement of Liability /Disclaimer:

The above information is based on the data of which we are aware and is believed to be correct as of the data hereof. Since this information may be applied under conditions beyond our control and with which may be unfamiliar and since data made available subsequent to the data hereof may suggest modifications of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

The information contained in this Safety data sheet is made in good faith and is based on the present state of knowledge and current legislation. Entel disclaims all liability in respect of the information implied or expressed. Equivalent information is available from the cell manufacturer.