# MATERIAL SAFETY DATA SHEET
## Dry Charged Lead Battery

MSDS - Issue No 002
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## 1. PRODUCT IDENTIFICATION

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|---|---|
| **Product Name** | **Dry Charged Battery (No Acid)** |
| **Other Name** | Battery, Dry Charged |
| **Manufacturer's Product Code** | Various |
| **UN Number** | not applicable |
| **Dangerous Goods Class** | not applicable |
| **Packing Group** | not assigned |
| **Hazchem Code** | not applicable |
| **Poisons Schedule Number** | not applicable |

## COMPANY DETAILS

**LINCON BATTERIES LTD**

Faraday Works, 25/26 Faraday Road,Leigh-on-Sea, Essex, SS9 5JU
Tel: +44 1702 525 374
**Emergency Number +44 1702 525 374**

## PHYSICAL DATA

| | | |
|---|---|---|
| **Appearance** | | **A dry charged battery is a manufactured article** |

## 2. HAZARD IDENTIFICATION

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|---|---|---|
| **Battery** | **Mechanical** | Dry Charged batteries can be heavy. Correct manual handling techniques and/or mechanical lifting aids must be used. |
| | **Electrical** | Not hazardous in normal use |
| | **Chemical** | Dry Charged batteries present no chemical hazard during normal operation provided recommendations for handling, storage, transport and use are observed |
| | | If the battery case is broken and the internal components exposed, hazards may exist which require attention |
| **Plate Grid and Active Materials** | | **Metallic Lead, Lead alloys and Lead inorganic compounds**<br>Lead poisoning is usually caused by inhalation of minute particles of Lead fume and dust, which are absorbed by the blood stream from the lungs and deposited in the bone marrow<br>Lead is only slowly released from bone and thus has an accumulative effect causing chronic poisoning<br>TOXIC by ingestion or inhalation of dust, vapour or fumes<br>May cause harm to an unborn child<br>Harmful by inhalation and if swallowed<br>Danger of cumulative effects |
| **Case Material** | | Polypropylene or Hard Rubber: UL94 HB and Flame Retardant (FR) Grade. UL94:V0<br>Not hazardous in normal use<br>Material can burn in a fire emitting toxic smoke and decomposition product |
| **Separator Material** | | PVC , Rubber or Fibre Glass. Fibres may cause IRRITATION to skin or eyes upon exposure and to internal tissues if inhaled or swallowed |

## 3. COMPOSITION / INFORMATION ON INGREDIENTS

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|---|---|---|---|---|---|
| **Battery** | | **A battery is a manufactured article** | | | |
| **Components** | | **Substances** | **Approximate %** | **Chemical Symbol** | **CAS No** |
| | **Plate Grid** | Metallic Lead | approx 40 | Pb | 7439-92-1 |
| | | Calcium | < 0.2 | Ca | 7440-70-2 |
| | | Tin | < 3 | Sn | 7440-31-5 |
| | **Active Materials** | Lead Monoxide | < 0.1 | PbO | 1317-36-8 |
| | | Lead Dioxide (Lead IV Oxide) | 35 to 45 | PbO2 | 1309-60-0 |
| | | Barium Compound | < 1.5 | Ba | 7440-39-3 |
| | **Case Material** | Hard Rubber (Vulcanite / Ebonite) | 5 to 10 | | 9006-04-6 |
| | | Polypropylene copolymer | 5 to 10 | (C3H6)N | 9003-07-0 |
| | **Separator Material** | Polyvinylchloride | 2 to 5 | (C2H3Cl)N | 9002-86-2 |
| | | Rubber | 2 to 5 | | 9006-04-6 |

Note: Inorganic Lead is the main ingredient of a dry charged battery. Other substances may be present but in small amounts dependent on battery type. Contact Shield Batteries Ltd for further information

## 4. FIRST AID MEASURES FOR ACUTE EXPOSURE

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|---|---|
| **NOTE:** | **This information is only of relevance if the battery case has been damaged, the contents exposed and persons have direct contact with the internal components** |

| | **Exposure** | **Action** |
|---|---|---|
| **Components Plate Grids and Active Materials** | Inhalation | Remove the patient from exposure to fresh air<br>Seek advice from medical professional |
| | Ingestion | Wash out mouth with water and give plenty of water to drink. DO NOT INDUCE VOMITING<br>Seek advice from medical professional |
| | Skin Contact | Wash off with plenty of water and soap to prevent accidental ingestion or inhalation<br>Seek advice from medical professional |
| | Eye Contact | Immediately irrigate with eyewash solution or clean water for at least 10 minutes, holding the eyelids apart<br>Then take the person to hospital without delay |
| | Self Protection for the First Aider | Eye Protection (safety glasses or face shield) and protective duty gloves are required<br>In case of inhalation, a face mask or respirator may be required |
| **Case Material** | Inhalation | Material can burn in a fire with toxic smoke and decomposition products<br>Upon inhalation of decomposition products, keep patient calm, remove to fresh air and seek advice from a medical professional. If a large quantity is inhaled, take the patient to hospital |
| | Ingestion | Wash out mouth with water and give plenty of water to drink. DO NOT INDUCE VOMITING.<br>If the patient continues to feel unwell, seek advice from a medical professional |
| | Skin Contact | Areas affected by molten material should quickly be placed under cold running water and a sterile protective dressing applied |
| | Eye Contact | May cause irritation or injury due to mechanical action and traces of battery electrolyte.<br>Immediately irrigate with eyewash solution or clean water for at least 10 minutes, holding the eyelids apart<br>Then take the person to hospital without delay |
| | Self Protection for the First Aider | Eye Protection (safety glasses or face shield) and heavy duty gloves are required<br>In case of inhalation, a face mask or respirator may be required |
| **Separator Material** | Inhalation | Remove patient from exposure to fresh air. If irritation persists, seek advice from a medical professional |
| | Ingestion | Wash out mouth with water and give plenty of water to drink. DO NOT INDUCE VOMITING.<br>If the patient continues to feel unwell, seek advice from a medical professional |
| | Skin Contact | After contact with skin, wash immediately with plenty of soap and water. If irritation persists, seek advice from a medical professional |
| | Eye Contact | May cause irritation or injury due to mechanical action and traces of battery electrolyte.<br>Immediately irrigate with eyewash solution or clean water for at least 10 minutes, holding the eyelids apart<br>Then take the person to hospital without delay |
| | Self Protection for the First Aider | Eye Protection (safety glasses or face shield) and heavy duty gloves are required<br>In case of inhalation, a face mask or respirator may be required |

## 5. FIRE FIGHTING AND EXPLOSION HAZARD MEASURES

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|---|---|---|
| **Battery** | Suitable Extinguisher Types | $CO_2$, Foam, Dry Powder. Use suitable media appropriate for surrounding fire |
| | Unsuitable Extinguisher Types | None known |
| | Hazardous Combustion & Decomposition Products | Lead fume and vapour, toxic fumes from decomposition of battery case materials |
| | Advice for Fire Fighters | Full face visor or safety goggles<br>Respiratory equipment or self contained breathing apparatus (SCBA) |

## 6. ACCIDENTAL RELEASE MEASURES

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| **NOTE:** | **This information is only relevant if the battery has suffered damage and is broken** | |
| **Battery** | | Batteries are designed to be safe to handle. |
| **Plate Grids and Active Materials** | Personal Precautions | Eye Protection (safety glasses or face shield) and protective gloves are required<br>If the material is wet, a face mask or respirator is not required<br>If the material is dry, a face mask or respirator is required |
| | Clean Up Methods | Large solid pieces may be picked up and bagged for recycling<br>Never use a brush to sweep up debris - it may create lead dust in the air<br><br>Wet clean the spill area to remove all trace of debris. Battery debris and cleaning materials must be collected and placed in an inert sealed container (eg self seal plastic bag or bucket) for disposal. See also Section 13 |
| | Environmental Precautions | Do not allow material to enter a watercourse. Exposed Lead materials must be placed in an inert sealed container (eg self sealed plastic bag or bucket) for disposal. See Also Section 13 |
| **Case Material** | Clean Up Methods | Assume battery case material is contaminated and proceed as for Plate Grids and Active Materials above |
| **Separator Material** | Clean Up Methods | Assume separator material is contaminated and proceed as for Plate Grids and Active Materials above |

## 7. HANDLING AND STORAGE

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|---|---|---|
| **Battery** | Precautions for Safe Handling | PPE: No specialist PPE is required except that for handling heavy weights<br>Hygiene: There are no specialist requirements beyond good standard workplace practices<br>Mechanical Lifting Aids: Will be required to move pallets of batteries and large single batteries<br>Mechanical Handling Aids: Will be required to handle individual batteries over 25kg in weight<br><br>General: DO NOT DROP BATTERIES. Dents and deformation of the outer case may be an indication of internal damage to the battery. Cracks will allow introduced electrolyte to escape. DO NOT STORE BATTERIES LID TO LID. |
| | Conditions for Safe Storage | Store batteries in a cool well ventilated area with a solid impervious surface.<br><br>Store under a roof and protect against direct sunlight and adverse weather conditions, including rain, snow and other sources of water<br>Protect against physical damage and exposure to organic solvents and other incompatible materials<br>DO NOT STORE BATTERIES CLOSE TO HEAT SOURCES, NAKED FLAMES AND SPARKS<br><br>Store batteries in their original packaging wherever possible. When batteries are removed from their original packaging, ensure that the new packaging protects the battery/ies from damage and the risk of short circuit from the terminals |
| | End of Life | Ensure batteries are collected for recycling by an approved contractor |

## 8. EXPOSURE CONTROL / PERSONAL PROTECTION

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|---|---|---|
| **Battery** | Control Parameters | There are no special control parameters for the handling or storage of dry charged batteries |
| | Personal Protection | When there is no evidence of damage, dry charged batteries may be handled safely without extra PPE<br>Ensure electrical insulation equipment is used when installing batteries<br>Remove ALL metallic objects from personnel when working with batteries (eg jewellery, pens, torches etc)<br><br>Where there are signs of damage or liquid or solid deposits, rubber gloves and acid resistant clothing must be worn when handling the affected batteries and packaging to protect against the effects of any electrolyte that may be present |
| | Precautionary Statement | WARNING: RISK OF FIRE OR BURNS. DO NOT DISASSEMBLE, HEAT ABOVE 50°C OR INCINERATE |

## 9. PHYSICAL AND CHEMICAL PROPERTIES

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| **Battery** | The main components are listed in Section 2, above.<br>The undamaged product is a manufactured article in an inert Hard Rubber or PP case which will burn if subjected to high temperatures or sources of ignition. Some battery types are made with Flame Retardant compounds |

**The information below refers to the physical and chemical properties of the battery components and substances. This information is for reference only**

| | Appearance | | Safety Related Data | |
|---|---|---|---|---|
| **Plate Grids and Active Materials** | Form<br>Colour<br>Odour | Solid<br>Grey or Brown<br>Odourless | Solidification Point<br>Boiling Point<br>Solubility in Water<br>Solubility in acid or alkiline solutions<br>Density (at 20°C)<br>Vapour Pressure (at 20°C) | 327°C<br>1740°C<br>Very Low (0.15mg/l)<br>Yes, dependent on the strength of solution<br>11.35g/cm3<br>Undetectable |
| **Case Material** | Form<br>Colour<br><br>Odour | Solid<br><br>Various, usually Black<br>Odourless | Softening (Vicat) Point<br>Flash Point<br>Solubility in Water<br>Solubility in acid or alkiline solutions<br><br>Density (at 20°C)<br>Vapour Pressure (at 20°C) | >100°C (DIN 53460)<br>>330°C<br>Insoluble<br>Soluble in polar solvents, aromatic solvents, chlorinated hydrocarbons<br>1.07 - 1.4 g/cm3 (DIN53479)<br>Undetectable |
| **Separator Material** | Form<br>Colour<br><br>Odour | Solid or Fibrous<br>Various, usually White or Grey<br>Odourless | Solidification Point<br>Boiling Point<br>Solubility in Water<br>Density (at 20°C)<br>Vapour Pressure (at 20°C) | 820°C<br>>2500°C<br>Insoluble<br>2.23g/cm3<br>Undetectable |

## 10. STABILITY AND REACTIVITY

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|---|---|---|
| **Battery** | Stability | **Within the operational range of -20°C to +50°C the undamaged product is stable** |
| **Plate Grids and Active Materials** | Materials and Conditions to Avoid | Powdered Lead reacts violently with fused ammonium nitrate and sodium acetylide. Reacts violently when in contact with chlorine trifluoride |
| **Case Material** | Materials and Conditions to Avoid | To avoid thermal decomposition - do not overheat<br>Starts to decompose at temperatures >275°C<br>Powerful Oxidising Agents |
| | Hazardous Decomposition Products | Monomers, other degradation products, traces of hydrogen cyanide |
| **Separator Material** | Stability | Stable Material |
| | Materials and Conditions to Avoid | Incompatible with Hydrofluoric acid and concentrated sodium hydroxide |
| | Hazardous Decomposition Products | No hazardous polymerisation expected |

## 11. TOXICOLOGICAL INFORMATION

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|---|---|---|
| **Battery** | | This information does not apply to the undamaged battery. It is of relevance if the battery is broken and the components released to the environment.<br>Exposure Limits may vary according to National law and regulations |
| **Plate Grids:**<br>**Metallic Lead**<br>**Lead Alloys** | Acute Toxicity<br>  | Toxic by inhalation or ingestion<br>Chronic Poison<br>Lead is a poison that affects virtually every system in the body<br>Symptoms include fatigue, headaches, constipation, aching bones and muscles, gastrointestinal tract disturbances and reduced appetite<br><br>Blood Lead levels of 80µg/dl and above have been associated with both acute and chronic effects of Lead poisoning |
| **Active Materials**<br>**Lead Dioxide** | Acute Toxicity<br>  | Toxic by inhalation or ingestion<br>Chronic Poison<br><br>Chronic exposure to Lead Compounds may lead to a build up of lead in the body, giving rise to a variety of health problems including anaemia, kidney and liver damage, impaired eyesight, memory loss and CNS2 damage |
| **Case Material** | | According to available information, the product is not harmful to health provided it is correctly handled and processed according to given recommendations |
| **Separator Material** | | Based on animal implantation and epidemiologic studies, glass microfibres are thought to have some limited carcinogenic potential and as such are treated as Group 2B materials (IARC, US). The material should be treated as a category 3 carcinogen (Europe).<br>Limited evidence of carcinogenic effect |

## 12. ECOLOGICAL INFORMATION

| | | |
|---|---|---|
| **Battery** | | This information does not apply to the undamaged battery. It is of relevance if the battery is broken and the components released to the environment. |
| **Plate Grids and Active Materials** | Metallic Lead, Lead Alloys and Lead Dioxide<br><br>Ecotoxicity<br>  <br><br>Effect in the Aquatic Environment | Chemical and physical treatment is required for the elimination of Lead from water. Waste water containing Lead must not be disposed of in an untreated condition<br><br>The General Classification for Lead Compounds (R50/53) does not apply to Battery Lead Oxide<br>Tests in 2001 and 2005 concluded that Battery Lead Oxide is not toxic for the environment, neither R50 nor R50/53 nor R51/53 applies to battery Lead Oxide<br>Risk Phrase R52/53 (Harmful to aquatic organisms, may cause long term effects in the aquatic environment) applies to Battery Lead Oxide<br>applies to Battery Lead Oxide<br>Toxicity for Fish: 96 h LC 50 > 100 mg/l<br>Toxicity for Daphnia: 48 h LC 50 > 100 mg/l<br>Toxicity for Algae: 72 h LC 50 > 10 mg/l |
| **Case Material** | Elimination Information Behaviour and Environmental Fate | No data available: Insoluble in water<br><br>Owing to the consistency of the product and its insolubility in water it will apparently not be bio-available |
| **Separator Material** | | No data available: Insoluble in water<br>Not thought to pose any environmental risk |

## 13. DISPOSAL INFORMATION

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|---|---|---|
| **Battery** | Europe | Spent dry charged batteries are subject to the requirements of the Batteries Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators. Spent batteries MUST be sent for recycling through an authorised contractor at end-of-life<br>The WEEE Directive 2002/96/EC (Waste Electrical and Electronic Equipment) applies. Spent batteries MUST be removed from electrical and electronic equipment at end-of-life. |
| | Worldwide | Dry charged batteries contain inorganic Lead compounds which are damaging to the environment<br><br>Spent batteries must be disposed of in an environmentally friendly manner in accordance with local national laws and regulations |
| | | Dry charged batteries must not be dismantled, burnt or incinerated as a means of disposal<br>End of Life batteries may still be electrically "live" and contain electrical energy. The same care and attention to safe handling should be taken as when handling new batteries<br>Particular care must be taken to avoid short circuiting the battery terminals |
| **Plate Grids and Active Materials** | Europe<br>Worldwide | Metallic Lead and active materials (Lead oxides) must be recycled.<br>Disposal must be carried out in accordance with the European Hazardous Waste Directive 2008/98/EC |
| **Case Material** | | Do not dispose of this product into sewers, any ocean or watercourse in order to prevent marine animals and birds from ingesting<br>Recycling is encouraged<br>Disposal by controlled incineration or source landfill in accordance with local national laws and regulations may be acceptable |
| **Separator Material** | | Constitutes a special waste by virtue of hazardous substance content.<br>Dispose of via landfill site<br><br>Disposal by controlled source landfill in accordance with local national laws and regulations may be acceptable |

## 14. TRANSPORT INFORMATION

| | | | |
|---|---|---|---|
| **Battery** | **Land Transport** | **Land Transport: ADR / RID** | |
| | | UN No | **Not Regulated for Transport** |
| | | Classification | **Not Applicable** |
| | | Proper Shipping Name | **Not Applicable** |
| | | Packing Group ADR | **Not Applicable** |
| | | Tunnel Code | **Not Applicable** |
| | **Sea Transport** | **Sea Transport: IMDG Code** | |
| | | UN No | **Not Regulated for Transport** |
| | | Classification | **Not Applicable** |
| | | Proper Shipping Name | **Not Applicable** |
| | | EmS | **Not Applicable** |
| | **Air Transport** | **Air Transport: IATA-DGR** | |
| | | UN No | **Not Regulated for Transport** |
| | | Classification | **Not Applicable** |
| | | Proper Shipping Name | **Not Applicable** |
| | | Cargo Instruction | **Not Applicable** |
| | | Passenger Instruction | **Not Applicable** |
| | | Limited Quantities | **Not Applicable** |
| | **All modes of Transport** | | **Dry Charged Batteries are not hazardous and are not subject to ADR, RID, ADN, IMDG or IATA** |

## 15. REGULATORY INFORMATION

**Batteries supplied by Shield Batteries Ltd are subject to The Batteries and Accumulators (containing Dangerous Substances) Regulations 1994 and are marked in accordance with the requirements of Regulation 4.**

| | | | |
|---|---|---|---|
| **Battery** | Required Marking | | |
| |  | | Crossed out wheely-bin indicating "SEPARATE COLLECTION" FOR ALL BATTERIES AND ACCUMULATORS. Not to be disposed of with general domestic, commercial or industrial waste<br><br>The Pb symbol indicates the heavy metal content of the battery and enables a lead acid battery to be sorted for recycling.<br><br>Ref: The Batteries Directive 2006/66/EC |
| |  | | The International Recycling Symbol, required by law in many countries world-wide to facilitate the identification of secondary batteries and accumulators for recycling<br><br>Ref: IEC 61429:1995, Marking of Secondary Cells and Batteries with the International Recycling Symbol ISO7000-1135 |
| | EC Directives | | Directive 2006/66/EC, on batteries and accumulators, Paragraph (Recital) 29 states: "Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment does not apply to batteries and accumulators used in electrical and electronic equipment |

## 16. OTHER INFORMATION

| | | | |
|---|---|---|---|
| Battery | General Information | | Never install batteries in a gas tight enclosure as gasses may be generated during use<br><br>Never short circuit battery terminals as sparks and arcs can injure personnel and are a fire hazard |
| | Abbreviations | Pb<br>Ba<br>Ca<br>Sn<br>PbO2 | The Chemical Symbol for Lead<br>The Chemical Symbol for Barium<br>The Chemical Symbol for Calcium<br>The Chemical Symbol for Tin<br>The chemical formula for Lead Dioxide |
| | Risk Phases | R21<br>R22<br>R23<br>R24<br>R25<br>R35<br>R36<br>R37<br>R38<br>R49<br>R52<br>R53 | Harmful in contact with skin<br>Harmful if swallowed<br>Toxic by inhalation<br>Toxic in contact with skin<br>Toxic if swallowed<br>Causes severe burns<br>Irritating to eyes<br>Irritating to respiratory system<br>Irritating to skin<br>May cause cancer by inhalation<br>Harmful to aquatic organisms<br>May cause long term adverse effects in the aquatic environment |
| | Training Advice | | See Section 7 for general advice |

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