# HBL POWER SYSTEMS LIMITED
# NICKEL CADMIUM AIRCRAFT BATTERY
# SAFETY DATA SHEET

## 1. IDENTIFICATION

| **1.1 Product** |
|---|
| **Product Name**<br>Nickel-Cadmium Aircraft Cells/Batteries<br>**Trade Name**<br>Sintered plate nickel cadmium cells/batteries, (Standard, Low maintenance & Reduced maintenance)<br>**Electrochemical System**: Nickel-Cadmium, alkaline electrolyte |
| **1.2 Supplier** |
| **NAME**: **HBL Power Systems Limited**,<br>**Address**: 8-2-601, Road No10, Banjara Hills, Hyderabad-500 034, Telangana, India.<br>**Phone**: +91 (0) 40 23355575<br>**Fax**: +91 (0) 40 23355048<br><br>**Factory Address**: **HBL Power Systems Limited**, Lalgadi Malakpet,<br>Shameerpet Mandal, Hyderabad-500 078, Telangana,India<br>**Phone**: +91 (0) 8418 301640<br>**Fax**: +91 (0) 8418 301652, +91 (0) 8418 301657 |
| **1.3 Emergency Contact**:www.hbl.in look for <<contact us>> |

## 2. HAZARD IDENTIIFCATION

### 2.1 Ingredients

| **Ingredients** | | | **Classification as per Annex-I of Directive 67/548/EEC** | | |
|---|---|---|---|---|---|
| **Chemical Name** | **Formula** | **CAS No** | **Symbol** | **Risk phrase** | **Safety phrase** |
| Cadmium hydroxide | $Cd(OH)_2$ | 21041-95-2 | Xn<br>N | R20/21/22<br>R50/53 | S2, S60, S61 |
| Nickel hydroxide | $Ni(OH)_2$ | 12054-48-7 | Carc.Cat3<br>Xn<br><br>N | R40<br>R20/22<br>R43<br>R50/53 | S2, S22, S36<br>S60, S61 |
| Potassium Hydroxide | KOH | 1310-58-3 | Xn<br>C | R22<br>R35 | $S^{1/2}$,S26,<br>S36/37/39,S45 |
| Cobalt Hydroxide | $Co(OH)_2$ | 21041-93-0 | Xn<br>Xi | R20/21/22<br>R36/R37/R38<br>R43 | S24, S26<br>S36/37;S39 |
| Lithium Hydroxide | $Li(OH)_2$ | 1310-65-2 | Not Classified | Not Classified | Not Classified |

### 2.2 Effects of Overexposure

| | |
|---|---|
| **Eye Effects** | Contact with electrolyte solution inside battery causes very rapid, severe damage. Extremely corrosive to eye tissues. May result in permanent blindness |
| **Skin Effects** | Contact with electrolyte solution inside battery may cause serious burns to skin tissues. Contact with nickel compounds may cause skin sensitization, resulting in chronic eczema or nickel itch |
| **Ingestion** | Ingestion of electrolyte solution causes tissue damage to throat area and gastro/respiratory tract. Ingestion of cadmium and/or nickel compounds causes nausea and intestinal disorders |
| **Inhalation** | Mists generated during activation procedures may cause varying degrees of irritation to the nasal mucous membranes and respiratory tract tissues varying from mild irritation of nasal mucous membranes to damage of lung tissues proper. Inhalation of cadmium compounds may cause dry throat, cough, headache, vomiting, chest pain and/or chills. Excessive overexposure may result in pulmonary edema, breathing difficulty, and prostration |
| **Carcinogenicity** | NIOSH recommends that nickel and cadmium be treated as occupational carcinogens. |

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Ingredients | CAS No | Quantity |
|---|---|---|
| Cadmium (as Cadmium and Cadmium Hydroxide) | 7440-43-9<br>21041-95-2 | 8%-15% |
| Cobalt (as Cobalt Hydroxide) | 21041-93-0 | ≈ 1% |
| Copper | 7440-50-8 | 9%-11% |
| Electrolyte Solution (20-30% Potassium Hydroxide) | 1310-58-3 | 12-19% |
| Nickel (as Nickel and Nickel Hydroxide) | 7440-02-0<br>12054-48-7 | 20-36% |
| Lithium Hydroxide | 1310-65-2 | <1 |
| Polyamide 11 | - | 11%-15% |
| Steel (Fe) | - | 20% |

## 4. FIRST AID MEASURES

### 4.1 Battery Electrolyte

| | |
|---|---|
| **Eye Contact** | Flush with plenty of water for at least 20 minutes. Get immediate medical attention. |
| **Skin Contact** | Remove contaminated clothing and flush affected areas with plenty of water for at least 30 minutes |
| **Ingestion** | Do not induce vomiting. Dilute by giving large volumes of water or milk. Get immediate medical attention. Do not give anything by mouth to an unconscious person. |
| **Inhalation** | Remove to fresh air. Give oxygen or artificial respiration if needed. Get immediate medical attention. |

### 4.2 Nickel and Cadmium Compounds

| | |
|---|---|
| **Skin contact** | Wash with cold water and soap for 15 minutes |

## 5. FIRE-FIGHTING MEASURES

### 5.1 Extinguishing Media

Carbon dioxide ($CO_2$) and Sand

### 5.2 Melting and Boiling Point

| Element/Compound | Melting Point | Boiling Point |
|---|---|---|
| Cadmium | 608ºF/320ºC | 1410ºF/766ºC |
| Cadmium hydroxide | N/A | 2838ºF/1559ºC (sublimes) |
| Copper | 19891ºF/1083ºC | 4653ºF/2567ºC |
| Nickel | 2645ºF/1452ºC | 4950ºF/2732ºC |
| Nickel Hydroxide | N/A | 445ºF/229ºC (Decomposes to NiO) |
| Cell case material: Polyamide 11 | 370-374ºF/188-190ºC | N/A |

### 5.3 Special Fire Fighting Procedures

Use self-contained breathing apparatus to avoid breathing toxic fumes. Wear protective clothing and equipment to prevent potential body contact with electrolyte solution or mixture of water and electrolyte solution. Disconnect or cut all cables to and from battery-especially ground connection.

### Unusual Fire and Explosion Hazards

Electrolyte solution is corrosive to all human tissues. It will react violently with many organic chemicals, especially nitrocarbons and chlorocarbons. Electrolyte solution reacts with zinc, aluminium, tin and other active materials releasing flammable hydrogen gas.

## 6. ACCIDENTAL RELEASE MEASURES

### 6.1 Electrolyte Solution Spills

| | |
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| Small (up to 20 liters) | Flush with water and neutralize with dilute citric acid. |
| Large | Contain material in suitable containers or holding area. DO NOT allow material to enter sewers, streams, or storm conduits. Recover material with vacuum truck and dispose of properly. Reportable Quantity: 450 Kgs. 40 CFR-117.13 |

## 7. HANDLING AND STORAGE

These cells and the batteries constructed from them may be highly charged and are capable of high-energy discharge. Care should be taken to handle cells properly to avoid shorting or misuse that will result in a rapid, uncontrolled electrical, chemical, or heat energy release.

Do not transport activated batteries without vent caps in place.

When removing battery from service, visually inspect for leakage prior to handling. If leakage has occurred follow spill management procedures.

Store in sealed packaging and in normal vertical position at temperature +20ºC ± 15ºC and humidity inferior at 70%

Keep away from exposed flames, sparks, and other ignition sources.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Exposure Control**

| Ingredients | CAS No | Exposure Limits |
|---|---|---|
| Cadmium (as Cadmium and Cadmium Hydroxide) | 7440-43-9<br>21041-95-2 | 5.0 mcg/$m^3$ dust-OSHA<br>0.05 mg/$m^3$ ACGIH CEILING-Fume |
| Cobalt (as Cobalt Hydroxide) | 21041-93-0 | 0.1 mg/ $m^3$ OSHA |
| Copper | 7440-50-8 | 1 mg/ $m^3$ dust- OSHA |
| Electrolyte Solution (20-30% Potassium Hydroxide) | 1310-58-3 | 2mg/ $m^3$ ACGIH CEILING-Air |
| Nickel (as Nickel and Nickel Hydroxide) | 7440-02-0<br>12054-48-7 | 1 mg/ $m^3$ - OSHA |

**Personal Protection**

Perform activation procedures in a well-ventilated area. Battery operating areas must be well ventilated for removal of potentially dangerous and harmful gases generated. Normal reactions inside the battery liberate explosive and flammable hydrogen gas.

| | | |
|---|---|---|
|  | **Respiratory Protection** | Use NIOSH approved mist respirator during activation and actual usage to maintain exposure levels below TWA. |
|  | **Eye Protection** | Use splash goggles or face shield whenever handling a battery |
|  | **Hand Protection** | If exposure to electrolyte solution or dried salts is likely, use any water insoluble, non-permeable glove, i.e., synthetic rubber. DO NOT use leather or fabric gloves. |
|  | **Other Protective Equipment** | Rubber apron or rainwear, or equivalent if exposure to electrolyte solution is likely. |

## 9. PHYSICAL AND CHEMICAL PROPERTIES

| | | | |
|---|---|---|---|
| Boiling Point: Not Applicable | | Melting Point: | Not Applicable |
| Vapor pressure: 2mm Hg at 20ºC | | Vapor density: | Not Applicable |
| Specific Gravity: 1.17-1.30 (electrolyte) | | Evaporation Rate: | Not Determined |
| Solubility in water: Electrolyte solution is completely soluble | | Remainder: | is insoluble |

## 10. STABILITY AND REACTIVITY

**CAUTION: NEVER ACTIVATE OR TOP UP WITH ACID**

| | |
|---|---|
| **Incompatibilities** | Aluminium, zinc, tin and other active metals, acid, chlorinated and aromatic hydrocarbons, nitrocarbons, halocarbons. Trichloroethylene will react with electrolyte solution to form dichloroacetylene, which is spontaneously combustible |
| **Hazardous Decomposition** | Nickel compounds, cadmium compounds, and potassium hydroxide |
| | Note that normal reactions inside battery liberate explosive and flammable hydrogen gas. Do not seal battery from atmosphere. Hazardous Polymerization will not occur. |

## 11. TOXICOLOGICAL INFORMATION

| Ingredients | CAS No | $LD_{50}$ (Oral, Rat) |
|---|---|---|
| Cadmium Hydroxide | 21041-95-2 | Not Available |
| Nickel Hydroxide | 12054-48-7 | 1600 mg/Kg |
| Potassium Hydroxide | 1310-58-3 | 365 mg/Kg |
| Cobalt hydroxide | 21041-93-0 | Not Available |

## 12. ECOLOGICAL INFORMATION

The electrolyte solution (20-30% Potassium Hydroxide) is very toxic to aquatic organisms. It may cause long-term adverse effects in the aquatic environment.

## 13. DISPOSAL CONSIDERATIONS

Nickel Cadmium aircraft batteries are universal wastes under RCRA. They may be returned to HBL Power Systems, Hyderabad or routed to the distributor/seller for recycling.

These batteries are TCLP Toxic. These batteries and the electrolyte solution they contain are considered to be corrosives. If not recycled, they must be disposed of in accordance with state and local hazardous waste regulations.

## 14. TRANSPORT INFORMATION

### 14.1 United Nations

UN No.: 2795

### 14.2 International Conventions

Air : IATA
Sea : IMDG
Land : ADR (road) or RID (rail) Batteries exempt according to special Paragraph No. 598.

| UN No. | | RAIL & ROAD (ADR) | | | | SEA (IMDG) | | | | | AIR (IATA) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Proper shipping name | CL | Code | Packing group | Labeling | CL | Risk | EmS | Packing group | Labelling | CL | Risk | Packing group | Labeling |
| 2795 | Batteries, Wet, Filled with Alkali | 8 | C 11 | *** | None | 8 | *** | F-A, S-B | II | 8 | 8 | *** | II | 8 |

## 15. REGULATORY INFORMATION

### 15.1 Product Marking

### 15.2 EPCRA Reporting Requirements

**EPCRA reporting requirements**

Section 313 Supplier – Notification – This product contains the following EPCRA section 313 chemicals subject to the reporting requirements of section 313 if the emergency planning and community right to know act of 1986 (40 CFR 372)

| CAS No | Chemical Name | Percent by weight |
|---|---|---|
| 7440-43-9 | Cadmium | 8%-16% |
| 7440-48-4 | Cobalt | 1% |
| 7440-50-8 | Copper | 9%-11% |
| 7440-02-0 | Nickel | 19-36% |

## 15.3 EC Classification

### 15.3.1 Symbols

| | |
|---|---|
| C | Corrosive |
| N | Dangerous for the environment |
| $X_n$ | Harmful |
| $X_i$ | Irritant |

### 15.3.2 Risk Phrases

| | |
|---|---|
| R20 | Harmful by inhalation |
| R21 | Harmful in contact with skin |
| R22 | Harmful if swallowed |
| R36 | Irritating to eyes |
| R37 | Irritating to respiratory system |
| R38 | Irritating to skin |
| R40 | Limited evidence of a carcinogenic effect |
| R41 | Risk of serious damage to the eyes |
| R43 | May cause sensitization by skin contact |
| R50/53 | Very Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment |

### 15.3.3 Safety Phrases

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|---|---|
| S 1/2 | Keep locked up and out of the reach of children |
| S2 | Keep out of the reach of children |
| S20 | When, using, do not eat or drink |
| S22 | Do not breath dust |
| S26 | In case of contact with eyes, rinse immediately with plenty of water and seek medical advice |
| S36 | Wear suitable protective clothing |
| S37 | Wear suitable gloves |
| S39 | Wear eyes/face protection |
| S45 | In case of accident or if you feel unwell, seek medical advice |
| S60 | Must be disposed of as hazardous waste |
| S61 | Avoid release to environment |

## 16 OTHER INFORMATION

| **Healthcare Information and Management Systems (HIMS) Society Ratings** | |
|---|---|
| Health | 3 |
| Flammability | 1 |
| Reactivity | 2 |