Last updated: 11th January 2018

# Information for the Safe Handling of Ni-Cd Batteries

Batteries are considered as articles under REACH regulation 1907/2006/EC and, as such, do not require the publication of a safety data sheet. However, there is a requirement to provide safety information on products. This document, which fulfils this requirement, is commonly called an MSDS, but, in Europe, is more correctly referred to as 'Instructions for the Safe Handling of NiCd – batteries (NiCd – accumulators)'.

## 1. Name of material, designation and company

| | |
|---|---|
| **Product specifications:** | NiCd- accumulator (wet, filled with potassium hydroxide solution, closed) |
| **Trade name:** | FP.. XLM, FP.. H1C cells, F20/..H1C, F20/ XLM battery F19 / …H1C |
| **Manufacturer:** | HAWKER GmbH |
| **Address:** | Dieckstr. 42 \| D-58089 \| Hagen<br>GERMANY |
| **Phone:** | +49 (0)23 31 372-0 |
| **24h emergency number CHEMTREC** | +1 703-527-3887 (outside of USA & Canada)<br>(We accept collect calls)<br>Ref.: CCN632660 |

## 2. Potential hazards and unusual risks

No hazards occur during the normal operation of Ni/Cd airborne batteries, provided that they are maintained as prescribed in the component maintenance manual (CMM) or general maintenance manual (GMM), and applied within the Limitation of Use specified in the declaration of design and performance (DDP).

To avoid accidents by "life-threatening" currents & voltages, explosive gases and by human tissue-damaging electrolyte solutions, refer to the standard BS EN 50272-2 Safety requirements for secondary batteries and battery installations - Part 2: Stationary batteries.

Attention:

- Batteries can provide high voltage and currents.
- Potassium hydroxide solution released from cells can cause severe chemical burns of skin tissue and severe eye tissue damage, which may result in blindness.
- Potassium hydroxide solution can damage tissue of throat, respiratory and gastro tract
- Potassium hydroxide solution can be corrosive to certain light alloy and none-precious metals.
- Potassium hydroxide solution reacts violently with strong acids, chlorocarbons, nitrocarbons and many other organic chemicals.
- Potassium hydroxide aerosols released from cells when overcharged can irritate respiratory organs

## 3. Chemical compounds

| CAS no. | Index Numbers | Description | Content [% of weight] | Hazards Category and Statement, GHS pictograms |
|---|---|---|---|---|
| 7440-43-9 | 048-002-00-0 | Cadmium fully charged * | 11% - 16% |  <br>Carc. 1B – H350<br>Repr. 2 – H361fd<br>Muta. 2 – H341<br>STOT RE 1 – H372<br>Acute Tox 2 – H330<br>Aquatic Acute 1 – H400<br>Aquatic Chronic 1 – H410 |
| 21041-95-2 | N/A | Depending on DOD partly converted to Cadmium hydroxide | | |
| 7440-02-0 | 028-002-01-4 | Nickel | 6% - 7 % |  <br>Carc. 2 – H350i<br>STOT RE 1 – H372<br>Skin Sens. 1 – H317<br>Aquatic Chronic 3 – H412 |
| 12054-48-7 | 028-008-00-X | Nickel hydroxide | 9% - 11 % |  <br>Carc. 1 - H350i<br>Repr. 1B – H360D<br>Muta. 2 – H341<br>STOT RE 1 – H372<br>Skin Irrit. 2 – H315<br>Skin Sens. 1 – H317<br>Resp. Sens. 1 – H334<br>Acute Tox. 4 – H302, H332<br>Aquatic Acute 1 – H400<br>Aquatic Chronic 1 – H410 |
| 21041-93-0 | N/A | Cobalt hydroxide | 0,5% - 1% | "According to the majority of notifications provided by companies to ECHA in CLP notifications no hazards have been classified" |
| 7440-50-8 | N/A | Copper | 13% - 15% | Not classified according to most sighnificant joint registration entry for bulk(massive). |
| (7439-89-6) | N/A | Steel (iron) | 22% - 26% | Not classified according to most sighnificant joint registration entry for bulk(massive). |
| | | Plastic Container / Plastic Parts (Polyamide 11) | 7% - 9% | |
| 1310-58-3 | 19-002-00-8 | Electrolyte (potassium hydroxide) | 10 - 15% |  <br>Skin Corr.1A – H314<br>Met. Corr. 1 – H290<br>Acute Tox. 4 – H302 |

*Depending on the state of charge, the batteries may contain cadmium, which was added to the REACH Candidate List in June 2013.

## 4. First Aid Measures

This information is of relevance only if the battery is broken and this results in direct contact with

the battery's contents.

### 4.1 Ni/Cd containing components

| | |
|---|---|
| Skin & Tissue | Wash thoroughly with cold water and soap. |

### 4.2 Electrolyte

| | |
|---|---|
| Eye contact: | Flush eye with plenty of water for 20 minutes and obtain emergency medical aid. |
| Skin contact: | Remove contaminated clothing. As long as skin & tissue is visibly undamaged: Wash contaminated skin areas with plenty of water. Neutralize (immerse) cuticles several times with (in) 5% acetic or citric acid. Get emergency medical aid for the treatment of contaminated wounds. |
| Inhalation: | Move to outdoors. Give oxygen or artificial respiration. Get emergency medical aid. |
| Ingestion: | Do not induce vomiting. Get immediate medical treatment. |

## 5. Fire Fighting Measures

| | |
|---|---|
| **Suitable fire extinguishing agents:** | carbon dioxide |
| **Special hazards:** | Cells being overheated by an external source or an internal short circuit, can release potassium hydroxide vapours and hydrogen gas. In case of fire, cells can release fumes of cadmium oxide and of combustion products from Polyamide. |
| **Special protective equipment:** | Protective suit, self-contained breathing apparatus |

## 6. Accidental release measures (potassium hydroxide solution)

### 6.1 Small spills

Flush spilled electrolyte with large amounts of water or soak with chemical fleeces.

Neutralize with acetic acid or boric acid (5%).

### 6.2 Large spills

Contain large amounts of spilled electrolyte and pump or vacuum-suck them into vessels.

Prevent slip-hazard.

If applicable absorb the remainder with absorbent materials e.g. Chemizorb® OH or Diatomaceous Earth and dispose of this properly in accordance with product or local rules.

Do not allow the spilled electrolyte to enter streams, sewers etc.....

## 7. Handling and Storage

- Keep away from exposed flames, sparks and other ignition sources
- Handle cells with care avoiding shorting or misuse.
- Do not transport cells without vent caps in place
- Always handle and store cells filled with electrolyte in upright position.
- For periods >3months store in deep discharged conditions between 5°C and 35°C in a dry place.

## 8. Exposure controls and personal safety equipment

Wear prescribed PPE safety goggles or face shield, protective gloves of rubber and rubber apron during any disassembly, cleaning, reassembly and data measurement operation on the cells. Any PPE must resist 50% KOH-solution within useful life.

Cells can emit electrolyte aerosols, when topped up with water prior to the end of charge.

| | | |
|---|---|---|
| Hazard statements: | H314 | Causes severe burns and eye damage. |
| | H302 | Harmful if swallowed |
| Precautionary Statements: | P102 | Keep out of reach of children. |
| | P210 | Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking |
| | P305+P351+315 | IF in eyes. Rinse cautiously with water for several minutes. Get immediate medical advice/attention. |
| | P309+315 | IF exposed or if you feel unwell. Get immediate medical advice/attention. |

## 9. Physical and Chemical Properties

### 9.1 Appearance

Physical form and colour as delivered.

### 9.2 Operational Temperature range (environment in °C)

| cell type | permanent | temporary |
|---|---|---|
| FP.. XLM, FP.. H1C cells, F20/..H1C, F20/ XLM | -30 to +55°C | -40 to +72°C |

### 9.3 In-operational maximum storage temperature:

85°C for 6 days.

### 9.4 Energy density:

24 – 35 Wh/kg Cell

Gravimetric Energy Density (Wh/kg) = nominal voltage x nominal capacity in Ah divided by average cell weight in kg (as defined in RTCA DO 293 standard)

### 9.5 Boiling point of electrolyte:

105 - 108°C

### 9.6 Freezing point of electrolyte:

< -40°C

### 9.7 Density of electrolyte:

1.24 kg/l up to 1.30 kg/l

## 10. Stability and Reactivity

### 10.1 Conditions to be avoided

Continuous operational temperatures above 72°C, Freezing electrolyte below -40°C can set the battery or cells out of operation, but does not damage it irreversibly. External short circuits of cells can damage cell cases by melting. Deformation of cell houses by external impact can induce irreversible destruction by internal short circuit. In case of internal short circuit boiling electrolyte might escape through cell vents and any opening in the damaged cell case.

### 10.2 Materials to be avoided

Do not contaminate cells with electrolyte from lead accumulators, and vice versa. Do not use mineral water to top cells electrolyte level up, as irreversible but ongoing decrease of electrochemical performance might result from the increasing content of impurities in the electrolyte.

### 10.3 Toxic and hazardous degrading products

**10.3.1** Nickel compounds, health-harming vapours. When cells are on fire cadmium compounds can sublimate and toxic Cadmium oxide fume can be emitted.

**10.3.2** Vigorous reaction of leaking potassium hydroxide with (strong) mineral acids, carbon dioxide, halogenated hydrocarbons, none-precious metals and light alloys.

**10.3.3** Electrolyte destroys any human tissue and leather. Can destroy cloth of polymers e.g. polyester.

## 11. Toxicological Information

This information does not apply to the finished battery and only applies to its contents in the event of a broken product.

| **Substance** | **$LD_{50}$ (oral, rat)** |
|---|---|
| Nickel hydroxide | 1520 mg/kg |
| Cadmium hydroxide | 72 mg/kg |
| Potassium hydroxide | 273 mg/kg |
| Lithium hydroxide | 210 mg/kg |

## 12. Ecological Information (potassium hydroxide solution)

This information is of relevance if the battery is broken and the ingredients are released to the environment.

**Information on ageing and degradation:**
Potassium hydroxide is converted to potassium carbonate by carbon dioxide from air and combustion (engines). Lithium hydroxide is also converted into Lithium-carbonate by carbon-dioxide

**Reactions in environmental compartments:**
The alkaline Lithium and Potassium hydroxide are water-soluble with a bioaccumulation potential.
Their mobility in soils is high.
The solutions with the mixtures of alkaline hydroxides have low vapour pressure.

**Eco-toxicological effects:**
It can damage vegetation.

**Aquatic toxicity:**
Harmful to fish. pH-Values ≥10.5 may harm or cause death to fish and other aquatic organisms.
Causes severe damages in aquatic plants.
High concentrations can affect greatly the biology or chemistry of sewage treatment plants.

**General Information:**
Do not release it into water, effluent waters or soils.
Water Hazard Classification 1 which is slightly hazardous to water.

## 13. Disposal Considerations

### 13.1 Burning

Never burn NiCd-cells in a furnace.

### 13.2 Disposal

Never throw NiCd-cells in the trash.

Never dispose of them in a landfill.

Only dispose of them in accordance with national rules or via GAZ.

**Cd**

### 13.3 Recycling

NiCd-cells are to be recycled. Please contact the representative of the company Hawker.

Use EWC - 16 06 02* Ni-Cd batteries

## 14. Transport Regulation

**Land transport ADR / RID (trans-border/ inland)**

Classified as Non dangerous goods, if the requirements are met according to Special Provision 598a of ADR.

**Marine transport IMDG/GGVSee**

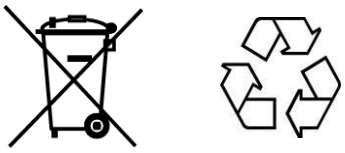
IMO class 8
UN number 2795
Packing group N/A
EmS number F–A, S-B
Proper shipping name: Batteries, wet, filled with alkali

**Air transport ICAO – TI and IATA – DGR:**

ICAO/IATA class 8
UN number 2795
Packing group II
Proper shipping name: Batteries, wet, filled with alkali

## 15. Regulatory Information

In accordance with the EU Battery Directive and German law (published by beuth verlag), Nickel Cadmium batteries have to be marked by a crossed out dust bin with the chemical symbol for cadmium shown below, together with the ISO return/recycling symbol.



Cd

## 16. Other Information

The information given above is provided in good faith based on existing knowledge and does not constitute an assurance of safety under all conditions. It is the user's responsibility to observe all laws and regulations applicable for storage, use, maintenance or disposal of the product. If there are any queries, the supplier should be consulted.

However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.