



MATERIAL SAFETY DATA SHEET
PRODUCT NAME: NICKEL-CADMIUM AIRCRAFT BATTERY

AERO DESIGN, INC. 385 Industrial Dr. Mt. Juliet, TN 37122 Information: 615-754-7700 (phone) 615-754-8116 (fax)	For Chemical Emergency Spill, Leak, Fire, Exposure or Accident Call CHEMTREC – Day or Night 800-424-9300 or 703-527-3887
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AERO DESIGN, Inc. INDUSTRIAL NICKEL CADMIUM STORAGE BATTERY
HMIS RATINGS: 3 Health 1 Flammability 2 Reactivity

1. HEALTH HAZARD INFORMATION

Effects of Overexposure

Eye Effects: Contact with electrolyte solution inside the battery causes very rapid, severe damage. Extremely corrosive to eye tissues. May result in permanent blindness. Contact with nickel oxide may cause minor irritation.

Skin Effects: Contact with electrolyte solution inside the 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: During activation procedures mist generated 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 oxide may cause dry throat, cough, headache, vomiting, chest pain, chills, excessive overexposure may result in pulmonary edema, breathing difficulty, prostration, and kidney damage.

2. EMERGENCY FIRST AID

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 20 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.

Nickel Oxide

Skin Contact: Wash with cold water and soap.

3. SPECIAL PROTECTION INFORMATION

Perform battery charging procedures in a well ventilated area. Battery operating areas must be well ventilated to remove normal gases generated.

Respiratory Protection: Use NIOSH approved mist respirator during activation and actual usage to maintain exposure levels below the 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 in-soluble, non-permeable glove, i.e., synthetic rubber. DO NOT use leather or wool.

Other Protective Equipment: Rubber boots, rubber apron or rainwear, or equivalent if exposure to electrolyte solution is likely.

4. REACTIVITY DATA

CAUTION: NEVER ACTIVATE OR TOP OFF WITH ACID

Incompatibilities: Aluminum, 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 Products: Nickel oxide, cadmium, cadmium oxide, and potassium hydroxide.

Note that all normal reactions inside the battery liberate flammable hydrogen gas. Do not seal the battery from atmosphere.

Hazardous Polymerization will not occur.

5. FIRE AND EXPLOSION HAZARD DATA

Extinguishing Media: CO₂ Sand

Physical Characteristics:

Metal/Compound	Melting Point	Boiling Point
Cadmium	608°F	1410°F
Cadmium Oxide	N/A	2838°F (sublimes)
Nickel	2645°F	4950°F
Nickel Hydroxide	N/A	445°F (Decomposes to NiO)
Nickel Oxide	3603°F	3990°F (Decomposes to Ni and O ₂)

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 the battery, especially ground connection.

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, aluminum, tin and other active materials releasing flammable hydrogen gas.

Cadmium fumes may be released when batteries are subjected to high temperatures.

In case of fire, do not breath smoke and fumes!

6. INGREDIENTS CAS # EXPOSURE LIMITS QUANTITY

Cadmium (as Cadmium, Cadmium Hydroxide, and Cadmium Oxide)	7440-43-9 21041-95-2 1306-19-0	5.0 mcg/m ³ dust – OSHA 0.05 mg/m ³ ACGIH CEILING-Fume	≈ 8%
Nickel (as Nickel, Nickel Hydroxide, and Nickel Oxide)	7440-02-0 1205-44-87 1313-99-1	1 mg/m ³ – OSHA	≈ 36%
Electrolyte Solution (18-28% potassium hydroxide)	1310-58-3	2 mg/m ³ ACGIH CEILING-Air	≈ 19%
Cobalt Hydroxide (as cobalt metal)	7440-48-4	0.1 mg/ m ³ - OSHA	≈ 1%
Steel		None Established – OSHA	≈ 34%

7. PHYSICAL PROPERTIES

Boiling Point-	Not applicable	Melting Point-	Not applicable
Vapor Pressure-	2 mm Hg at 68°F	Vapor Density-	Not applicable
Specific Gravity-	1,170 – 1.250 (electrolyte)	Evaporation Rate-	Not Determined
Solubility in Water-	Electrolyte solution is completely soluble.	Remainder-	is insoluble

8. SPILL MANAGEMENT PROCEDURES

Electrolyte Solution Spills

Small (up to 5 gallons): 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: 1000 pounds. 40 CFR-117.13.

9. DISPOSAL INFORMATION

The storage battery is a universal waste under RCRA. It may be returned for recycling.

Battery is TCLP Toxic. Battery and electrolyte solution are corrosive. If not recycled, must be disposed of in accordance with all federal, state, and local regulations.

10. PRECAUTIONS AND COMMENTS

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 short circuit – may cause burns or fire. Do not transport activated batteries without vent cap in place. When removing battery from service, visually inspect for leakage prior to handling. If leakage has occurred follow Spill Management Procedures. Do not allow an exposed flame or spark to come near the cells. Do not break cells open.

11. TRANSPORTATION INFORMATION

Batteries being repackaged should be shipped as Hazardous Material using the following description: Batteries, Wet, Filled with Alkali, 8, UN2795, PG III.

Batteries that meet the Aero Design Inc. exceptions and/or DOT special permits may transport and/or forward with undisturbed original packaging. A copy of the required document will be attached to the shipping container(s). All shippers must retain a copy of the document at their location.