



Material Safety Data Sheet
Product name: Nickel–Cadmium aircraft battery / cell

1. IDENTIFICATION

Product	
Product name This document is applicable for all Saft Nickel-Cadmium (Ni-Cd) batteries and cells	
Trade name VO, VP, VHP, VXP, Delta Plus, ULM®, AMFB	
Supplier	
Saft America Inc. 711 Gil Harbin Industrial Blvd. Valdosta, GA 31601- USA Phone: +1 (229)-247-2331 Fax: +1 (229)-245-2890 For Chemical Emergency Spill, Leak, Fire, Exposure or Accident Call CHEMTREC - Day or night Tel: +1 (800) 424 93000	Saft Bordeaux 111/113 boulevard Alfred Daney 33074 BORDEAUX – France Phone: +33 (0)5 57 10 64 00 Fax: +33 (0)5 57 10 65 70

2. CHEMICAL COMPOSITION

Ingredients	CASH #	EINECS#	Quantity
Cadmium (as Cadmium and Cadmium hydroxide)	7440-43-9 21041-95-2	231-152-8 244-168-5	8% - 16%
Nickel (as Nickel and Nickel dihydroxide)	7440-02-0 12054-48-7	231-111-4 235-008-5	19% - 36%
Electrolyte solution (18-30% Potassium hydroxide)	1310-58-3	215-181-3	13% - 19%
Cobalt (as Cobalt hydroxide)	21041-93-0	244-166-4	~ 1%
Copper	7440-50-8	231-159-6	9% - 11%
Polyamide 11			11% - 13%
Steel			22% - 34%

3. HEALTH HAZARD IDENTIFICATION

Ingredients				Classification*		
Name	Chemical	CASH #	EINECS#	Symbol	Risk phrase	Safety phrase
Cadmium hydroxide	Cd(OH) ₂	21041-95-2	244-168-5	Xn N	R20/21/22 R50/53	S2, S60, S61
Nickel dihydroxide	Ni(OH) ₂	12054-48-7	235-008-5	Carc. Cat3 Xn	R40 R20/22 R43	S2, S22, S36, S60; S61
Potassium hydroxide	K(OH)	1310-58-3	215-181-3	N Xn C	R50/53 R22 R35	S ^{1/2} , S26, S36/37/39, S45
Cobalt hydroxide	Co(OH) ₂	21041-93-0	244-166-4	Xn Xi	R20/21/22 R36/R37/R38 R43	S24, S26 S36/37; S39

*Classification according to the Annex I of Directive 67/548/EEC

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	Dust 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 oedema, breathing difficulty, and prostration.
Carcinogenicity	NIOSH recommends that nickel and cadmium be treated as occupational carcinogens.



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4. FIRST AID MEASURES

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	Move to an outdoor location. Give oxygen or artificial respiration if needed. Get immediate medical attention.
Nickel and Cadmium Compounds	
Skin contact	Wash with cold water and soap for 15 minutes.

5. FIRE AND EXPLOSION HAZARDS

Extinguishing Media:	CO ₂ sand	
	Melting Point	Boiling Point
Cadmium	608°F / 320°C	1410°F / 766°C
Cadmium hydroxide	N/A	2838°F / 1559°C (sublimes) 4653°F / 2567°C
Copper	19891°F / 1083°C	
Nickel	2645°F / 1452°C	4950°F / 2732°C
Nickel dihydroxide	N/A	445°F / 229°C (Decomposes to NiO)
Case material : Polamyde 11	370-374°F / 188-190°C	N/A (burns may release toxic NO ₂ fumes)
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

Electrolyte Solution Spills	
Small (up to 19 liters / 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: 453.6 kg / 1000 pounds. 40 CFR-117.13.

7. HANDLING AND STORAGE

The cells and the batteries may be highly charged and are capable of high energy discharge. Handle cells with care 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 +20°C (68°F) ± 15°C (± 27°C) and humidity inferior at 70%.

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

8. EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure control			
Ingredients	CAS #	EINECS#	Exposures Limits
Cadmium (as Cadmium and Cadmium hydroxide)	7440-43-9	231-152-8	5.0 mcg/m ³ dust – OSHA 0.05 mg/m ³ ACGIH CEILING-Fume
	21041-95-2	244-168-5	
Nickel (as Nickel and Nickel dihydroxide)	7440-02-0	231-111-4	1 mg/m ³ – OSHA
	12054-48-7	235-008-5	
Electrolyte solution (18-30% Potassium hydroxide)	1310-58-3	215-181-3	2 mg/m ³ ACGIH CEILING-Air
Cobalt (as Cobalt hydroxide)	21041-93-0	244-166-4	0.1 mg/m ³ OSHA
Copper	7440-50-8	231-159-6	1 mg/ m ³ dust - OSHA



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8. EXPOSURE CONTROLS AND PERSONAL PROTECTION (continued)

Personal protection

Perform battery 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 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-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 PROPERTIES

Boiling Point:	Not Applicable	Melting Point:	Not applicable
Vapor Pressure:	2 mm Hg at 68°F / 20°C	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 OFF WITH ACID

Incompatibilities

Aluminium, zinc, tin and other active metals, acid, chlorinated and aromatic hydrocarbons, nitrocarbons, halocarbons. Trichlorethylene will react with electrolyte solution to form dichloroacetylene which is spontaneously combustible.

Hazardous Decomposition Products

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 #	EINECS#	LD ₅₀ (Oral, Rat)
Cadmium hydroxide	21041-95-2	244-168-5	Not available
Nickel dihydroxide	12054-48-7	235-008-5	1600 mg/kg
Potassium hydroxide	1310-58-3	215-181-3	365 mg/kg
Cobalt hydroxide	21041-93-0	244-166-4	Not available

12. ECOLOGICAL INFORMATION

The electrolyte solution (18-30% 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 Saft Valdosta or local collecting points mentioned in Saft website (www.saftbatteries.com) 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 all federal, state, and local hazardous waste regulations.

14. TRANSPORTATION INFORMATION

Batteries, wet, filled with alkali, Class 8, UN2795

Rail & Road (RID/ADR) : Code C11, PG N/A

Sea (IMDG) : Labelling 8, PG N/A

Air (IATA) : Labelling 8, PG N/A

15. REGULATIONS

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 #	EINECS#	Chemical Name	Percent by Weight
7440-43-9	231-152-8	Cadmium	8%-16%
7440-48-4	231-158-0	Cobalt	1%
7440-50-8	231-159-6	Copper	9%-11%
7440-02-0	231-111-4	Nickel	19%-36%

A copy of this MSDS may be required to be filled with your local emergency planning commission, state emergency response



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EPCRA reporting requirements (continued)

Commission, and local fire department in accordance with sections of the Emergency Planning and Community right-To-Know Act.

EC classification

Symbols

C	Corrosive
N	Dangerous for the environment
Xn	Harmful
Xi	Irritant

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.

Safety phrases

S1/2	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 breathe 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 immediately (show the label whenever possible.)
S60	Must be disposed of as hazardous waste.
S61	Avoid release to the environment

16. OTHER INFORMATION

HIMS Ratings

Health	3
Flammability	1
Reactivity	2

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