ALPHA INDUSTRIAL POWER
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MATERIAL SAFETY DATA SHEET

NICKEL CADMIUM BATTERIES

MANUFACTURER:

GAZ UND Akkumulatorenwerk GMBH
Reichenbacher Straab 62-68 Zwickaw, Germany

INFORMATION ISSUED BY:

Alpha Industrial Power Inc
1075 Satellite Blvd Ste 400
Suwanee, Georgia 30024

GENERAL INFORMATION:

NICKEL CADMIUM POCKET PLATE BATTERIES

PERFORMANCE DATA:

Normal Operating Temperature	-40ºC to =45ºC
Normal Voltage per Cell	1.20 - 1.25
Open Circuit Voltage per Cell	1.30 - 1.33
Float Voltage per Cell	1.42 - 1.45
High rate (Equalize) Voltage per Cell	1.52 - 1.65
Gassing Potential (Volts per Cell)	1.47 @ 77ºF

COMPOSITION:

Positive Plate: A thin pocket-construction-electrode or plate made of thin strips, so perforated as to provide a number of fine circular holes, is first filled with the positive material and then inserted into a nickel-plated steel freame. After that, a lug is attached to connect the pocket-type plate to the electrode frame and they are spot-welded for preserving good conductivity. Finally, the whole assembly is pressed to form a positive plate.

Negative Plate: It is the same construction as the positive plate, except for the active material which is a mixture of cadmium and iron.

Separator: It is used to separate the positive plate from the negative plate and keep them properly spaced in order to avoid possible short circuiting, shaped like a rode, it is make of alkali-resistant synthetic resin.

Cell Container: made of translucent polypropylene or nickel-plate steel.

Vent Plug: Provided to let the gases out of the cell container, generated during charging while preventing the electrolyte from spilling out and other foreign matter from getting into the cell.

Electrolyte: High-purity aqueous solution of potassium hydroxide, 20% (caustic potash-KOH) with a small amount of Lithium Hydroxide (LiOH) additive.

HAZARDOUS DECOMPOSITION PRODUCTS:

Electrolyte: Flammable hydrogen gas may be generated during charging. Trichloethlene will react to form dichloractylene, which is spontaneously flammable.

Container: Toxic Cadmium fumes may be released if incinerated.

Toxic Properties: Potassium Hydroxide (solid or solution) is extremely corrosive and causes severe burns to the skin and tissue.

HAZARDOUS DECOMPOSITION PRODUCTS:

- ► Gloves: Rubber, Latex, Plaxtic
- ► Respiratory: None under normal conditions
- ► Eye: goggles, Face Shield
- ► Footwear: Rubber Boots
- ► Clothing: Neoprene/PVC
- ► Ventilation: Adequate ventilation to meet RLV requirements
- ► Leak & Spill Procedure: Contain spilage or leakage in suitable containers or contained in holding area. Do not allow drainage into sewers, streams,storm conduits.

WASTE DISPOSAL: Dispose of spillage water per company contingency plan and in accordance with enviromental regulations.

HANDLING PROCEDURE: Do not permit employees to hadle caustic potash without advance training and proper protective equipment. Keep ample water available.

STORAGE: Holding tanks should be contained in diked area. This area should be free of potential contact with acids, organics or reactive materials.

SPECIAL SHIPPING INFO: Proper shipping name (battery, wet, filled with alkali, dry) P.I.N. UN2795. Label should read "Corrosive": Placard Class 8 Corrosive.

ADDITIONAL: Batteries must be kept in the upright positon.

- ► Active material, Positive Plate — Nickel Hydroxide (HiOOH2)
- ► Active material, Negative Plate — Cadmium Oxide (CdOH2)
- ► Electrolyte Specific Gravity — 1.18 +/- at 20ºC
  1.225 +/- at -40ºC
- ► Plate Grouping — As a general rule, a group of the plates consits of "n" positive and "n-1" negative plates. The positive and negative plates are placed alternately, I.e. a positive plate, a negative plate, again positive plate and so on, and spaced properly apart by nickel plated washers inserted between, and then fastened together by means of nuts. Finally, the whole group of positive and negative plates are assembled as above with a tightly girdled band.

DETAILS OF HAZARDS

►	Product Identification Number	UN1814 (Liquid KOH) UN1813 (Dry KOH Flake) UN2795 (Filled wet cells)
►	Hazardous Ingredients of Materials	Cadmium and Cadmium Hydroxide Nickel and Nickel Hydroxide Lithium Hydroxide
►	Physical Daata for Materials (Electrolyte - Liquid)	Colourless liquid, no odor Vapor pressure 13.8mm at 68ºF Volatile (by volume) 79% pH 13 (approx.) Boiling Point 108ºC freezing Point -22ºC
►	Container	Rectangular plastic or steel container

DETAILS OF HAZARDS

►	Electrolyte Flammability	No
►	Means of Extinction	Suitable for surrounding material

REACTIVITY DATA (Electrolyte)

►	chemical Stability	Yes
►	Incompatibility to other Substances:	Yes. This material is corrosive to all human tissue. It will react violently with organic chemicals, especially Nitrocarbons and Chlorocarbons, Zinc, Aluminum, Tin. Exposure to air can form potassium carbonate.

FIRST AID MEASURES

►	Skin	Remove contaminated clothing and thoroughly flush affected areas with water.
►	Eye	Flush with water for 15 minutes and consult medical help immediately
►	Inhalation	Remove from exposure, get medical help
►	Ingestion	Drink plenty of water or fruit juices. Do not induce vomiting.
►	General Advise	In all cases obtain PROMPT MEDICAL ATTENTION

IF IN DOUBT, CONTACT

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