Alpha Industrial Power, Inc.
1075 Satellite Blvd., Suite 400
Suwanee, GA 30024 USA
Phone: 678-475-3995
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MATERIAL SAFETY DATA SHEET
Ni-Cd batteries with pocket plates

EEC Directive 93/112

1. Manufacturer:	
Name	KRUŠIK AKUMULATORI a.d.
Address	14000 Valjevo, Vladike Nikolaja 67, Serbia
Information Issued By:	
Name	Alpha Industrial Power, Inc.
Address	1075 Satellite Blvd., Suite 400 Suwanee, GA, 30024 USA
Telephone/Fax	Ph: 678-475-3995 Toll Free: 800-996-6104 Fax: 678-584-9259
24 Hour Emergency Telephone	Chemtrec: 800-424-9300 Chemtrec Contract No. CCN15107

2. Product information		
Product	Ni-Cd battery (Rechargeable, Alkaline and Vented)	
IEC designation	KL; KM; KH according to IEC 60623	
Electrochemical system	Nickel Cadmium, Alkaline Electrolyte	
Positive Electrode	Nickel Hydroxide and Cobalt Hydroxide Nickel Plated	
Negative Electrode	Cadmium Hydroxide and Iron Oxide Nickel -Steel Plated	
Electrolytes	Cadmium Hydroxide + water	
Nominal voltage	1.2 V	
Composition (weight percentage of basic materials)		
Cell in steel cell container (average values)	**Metals** (%)	**Others** (%)
	Steel Fe : 42 - 52	Potassium Hydroxide : 4.2–5.7
	Nickel Ni : 4 -10	Lithium Hydroxide : < 0.3
	Cadmium Cd : 4 - 10	Carbon : 2 -3.5
	Cobalt Co < 0.2	Water : 15 – 30
		Polypropylene: max. 3
Cell in plastic cell container (average values)	**Metals** (%)	**Others** (%)
	Steel Fe : < 40	Potassium Hydroxide : 4.2 –5.7
	Nickel Ni : 4 - 10	Lithium Hydroxide : < 0.3
	Cadmium Cd : 4 - 10	Carbon : 2 -3.5
	Cobalt Co < 0.2	Water : 15 – 30
		Polypropylene: max. 15

3. Hazards	
Physical	No risk if batteries are used for intended purpose and according to valid directions for use. If the directions for use are not followed in regard to ventilation, oxygen and hydrogen gas may develop and collect in the battery box or room during charging of the batteries. If the gas is ignited by an electric spark or open fire, a violent explosion may occur.
Chemical	In normal use the only chemical risk is the caustic nature of the electrolyte. Precautions must be taken when filling and emptying the battery cells. The properties of the electrode materials are hazardous only if the materials are released by crushing the battery or if it is exposed to fire.

Classification of hazardous substances contained in the product

Substance				Classification			
Name	Formula	EINECS number	CAS number	Mark	Hazard	Warning	Safety advice
Nickel Hydroxide	$Ni(OH)_2$	235- 008-5	12054-48-7	X_n	Harmful to health	R20/22 R40, R43	S2,S22,S26
Cadmium Hydroxide	$Cd(OH)_2$	244-168-5	21041-95-2	X_n	Harmful to health	R20/21/22 R50/53	S2,S60,S61
Potassium Hydroxide	KOH	215-181-3	1310-58-3	C X_i	Corrosive Irritating	R35,R22 R36/37	S1/2,S26, S36/37/39, S45
Lithium hydroxide	Li OH	215-183-4	1310-65-2	C	Corrosive	R35	S2, S26, S37/39
Cobalt Hydroxide	$Co(OH)_2$	244-166-4	21041-93-0	C	Not classified		

(1) Warning marks and labels:

R20/22 Harmful if inhaled or swallowed,
R20/21/22 Harmful if inhaled, in contact with skin and if swallowed,
R22 Harmful if swallowed,
R35 Causes severe burns,
R36/37 Irritating to eyes and respiratory system,
R40 Hazard of permanent harm,
R43 May cause hypersensitivity in contact with skin,
R50/53 Very toxic to aquatic organisms, may cause long-term adverse effects to the aquatic environment.

(2) Safety advice:

S1/2 Keep locked and out of the reach of children,
S2 Keep out of the reach of children,
S22 Do not inhale dust,
S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice,
S36/37/39 Wear suitable protective clothing, gloves and eyes/face protection,
S45 In case of accident or if feeling unwell, seek medical advice immediately (show the label if possible),
S60 The substance and its packaging must be disposed of as hazardous waste,
S61 Avoid release into the environment. Use as indicated by special directives (Safety Data Sheets).

4. First Aid Measures	
General advice	In case of accidental direct contact with electrolyte the contaminated clothing should be removed. The affected skin should be immediately rinsed with plenty of water. Seek medical advice and treatment.
Eye contact	Rinse immediately with plenty of water and seek medical advice and treatment.
Skin contact	Rinse immediately with water and seek medical advice.
Inhalation	Leave the room and inhale fresh air.
Ingestion	Spit out, rinse mouth with water, do not induce vomiting, seek medical advice and treatment.
5.Fire-fighting Measures	
Hazards	With electric-charged batteries short circuit, electric arc or electric spark. Explosive gas is formed during electrical charging ($H_2 + O_2$).
Extinguishers	Foam or sprayed water
Not to be used	Jet of water

6. Accidental Release Measures	
General procedure	In case of accident, provide way out and deny access to untrained personnel
Personal protection procedure	Wear protective clothing and footwear...
Protection of the environment	Prevent electrolyte spillage. If it occurs, collect the spillage and store safely.
Collection of the spilled electrolyte	Contaminated areas should be covered immediately and neutralized.

7. Handling and Storage	
Handling	Follow the Handling and Storing Instructions
Storage	Follow the Handling and Storing Instructions

8. General occupational safety	
General protection procedures	In order to provide fully safe working conditions, clear instructions for each stage of battery usage - charging, electrolyte filling, replacement, transportation- should be provided. Use of open fire should be forbidden during charging and proper ventilation must be provided. All personnel handling batteries should be continually trained and instructed to wear proper protective clothing.
Personal protection equipment	Obligatory
Hands	Alkali-resistant gloves
Eyes	Protective glasses
Body	Full fire resistant suit or alkali-resistant apron
Breathing	Breathing mask

9. Physical and Chemical Properties	
Physical and Chemical properties	Potassium Hydroxide water solution
Color	None
Smell	None
pH	14 (rapid)
Temperature - ignition	Does not burn
Density	1.19 ±0.02 g/cm ^{3}

10.Stability and Reactivity				
Stability	KOH			
Reactivity	Product of decomposition is not hazardous			
Reaction	KOH			
Hazardous reaction	KOH in solid form releases intense heat if resolved abruptly			
11.Toxicological Information				
Toxicity	Nickel Hydroxide	Cadmium Hydroxide	Potassium Hydroxide	Lithium Hydroxide
Oral	LD_{50}:1600mg/kg	No data available	LD_{50}:365mg/kg	No data available
Skin irritation			Causes burns	
Eye irritation			Causes burns	

12.Ecological Information	
General ecological information	Since alkali is a strong poison, alkali release into sewer system and waterways must be avoided. Electrolyte filling technology should reduce electrolyte spillage to the minimum.

13.Waste Treatment	
KOH waste	Waste water treatment -neutralization, hazardous waste collection, recycling.
Used batteries	To be delivered to an authorized dealer for collection, disassembly and recycling.

14.Transport Information	
General information	In public transport, according to ADR, these substances are classified as Category 8. UN codes: Ni-Cd battery: 2795, KOH 1814.

15.Labeling	
Hazards	Toxic T Caustic (Corrosive) C

IF IN DOUBT, CONTACT

ALPHA INDUSTRIAL POWER INC

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