STORAGE BATTERY SYSTEMS, LLC.

SAFETY DATA SHEET
Nickel Cadmium Batteries

1. IDENTIFICATION

1.1 Product

NICKEL CADMIUM BATTERY (Rechargeable Alkaline Batteries)

Trade name: DN-300C-HT

IEC Designation: DN-300C-HT

Relevant identified uses: Re-chargeable Nickel Cadmium batteries for pack builds

1.2 Supplier

STORAGE BATTERY SYSTEMS, LLC
N56 W16665 Ridgewood Drive
Menomonee Falls, WI 53051
Phone: 262-708-5800 / 800-554-2243
Person responsible for preparation: John Bondy, President
Revision date: June 22, 2015

1.3 Emergency contact :

INFOTRAC 800-535-5053 / 1-352-323-3500

2. HAZARDS

No risk if batteries are used for its intended purpose and according to valid directions for use.

Under normal circumstances, positive, negative electrodes and alkaline electrolyte are inside the cell. Precautions required to be taken while handling cells, electrolyte during leakages/ filling/ emptying. See also safety data sheet for electrolyte. Electrolyte is harmful if swallowed and causes severe burns.

Eye effects: Contact with electrolyte 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.

Ingestion: Ingestion of electrolyte solution causes tissue damage to throat area. Ingestion of cadmium and nickel compounds is carcinogenic.

Inhalation: Mists generated during activation procedures may cause varying degrees of irritation to the nasal mucous membranes and respiratory tract issues

STORAGE BATTERY SYSTEMS, LLC.

3. COMPOSITION

Positive Electrode	Nickel hydroxide and Cobalt hydroxide on Nickel Plated substrate
Negative Electrode	Cadmium hydroxide and iron oxide on Nickel plated substrate
Electrolyte	Potassium Hydroxide + water
Nominal voltage	1.2 V

3.1 (Weight as % of basic materials for a typical medium sized cell)

Metals %		Plastic %	Other %	
Steel (Fe)	10-25	Polypropylene 8-11	Potassium hydroxide	5.5-6.2
Nickel (Ni)	3-25		Lithium Hydroxide	0.5-1.0
Cadmium (Cd)	3-17		Carbon	0.1-4.0
			Water	28-35

3.2 Chemical

CLASSIFICATION OF DANGEROUS SUBSTANCES CONTAINED INTO THE PRODUCT (In charged condition).

SUBSTANCES				CLASSIFICATION			
Name	**Chemical**	**EINECS Number**	**CAS Number**	**Letter**	**Identification of danger**	**Special risk (1)**	**Safety advise-2**
Nickel Oxy Hydroxide	Ni OOH		86676-91-7	C	Not classified		
Cadmium	Cd	231-152-8	7440-43-9	Xn	Harmful	R45/26 R48/23/25 R50/53 R62/63/68	S2, S60, S61
Potassium Hydroxide	KOH	215-181-3	1310-58-3	C Xi	Corrosive Irritant	R35, R22 R36/37	$S^{1/2}$,S26, S36/37/39, S45
Lithium Hydroxide	LiOH	215-183-4	1310-65-2	C	Not classified	R35	Not classified

For the wording of the listed risk phrases, please refer to section 16.

4. FIRST AID MEASURES

When handling electrolyte, precautions must be taken to avoid personal to get in direct contact with it. If this accidentally happens the following must be exercised:

Inhalation:
Supply fresh air OR Oxygen.
Rinse mouth and nose with water.
Call for doctor for medical treatment.

4.1 Skin contact:
Instantly wash with plenty of running water thoroughly.
If skin irritation persists call for physician.

4.2 Eyes contact :
Important: Rinse immediately with plenty of water during at least 15-30 minutes and consult a physician.

4.3 Ingestion:
Rinse out mouth and then drink plenty of water (preferably milk).
Do not induce vomiting. Immediately call for medical help.

5. FIRE-FIGHTING MEASURES

5.1 Extinguishing media
Suitable: Class D-Dry chemical, Carbon dioxide (CO2), Carbon dioxide blanket, Sand, foam.
Not to be used: Water *

*Water sprinklers can be used for fire safety for the cells stored without connecting the inter cell connectors (As individual cells) in plywood boxes.

5.2 Special exposure hazards
Cells can be overheated by an external source or by internal shorting and develop potassium hydroxide mist and/or hydrogen gas. In fire situations fumes containing Cadmium, Nickel and Iron may be evolved.

5.3 Special protective equipment
Use self-contained breathing apparatus and full fire-fighting protective clothing. Use personal protective equipment. Ensure adequate ventilation. Remove all sources of ignition.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment & Emergency procedures:
- Wear protective equipment.
- Keep un-protected persons away.
- Keep away from ignition sources.
- Flush electrolyte spillage with plenty of water. Beware risk of slipping.

6.2 Environmental precautions:
- Do not allow electrolyte to enter the ground/ soil.

6.3 Methods and materials for containment and cleaning:
- Collect mechanically
- Dilute with much water and neutralize.

7. HANDLING AND STORAGE
- Handle and store/ transport cells filled with electrolyte always with vents upwards.
- Avoid direct sunlight, high temperature and high humidity.
- Store in a cool and dry place. (Between 10 to 30 degree C & humidity of 45 to 85 %)
- Do not connect positive terminal to negative terminal with electrically conductive material.
- Do not store/operate the Nickel Cadmium batteries in the same room where the lead acid batteries are stored / operated.
- Keep away from water.
- Do not use the tools used for lead acid batteries for use in Nickel Cadmium batteries (Ex: hydrometer and thermometer etc.)
- Do not store any other material on top of the batteries.
- Batteries shall be stored in adequately ventilated areas.

STORAGE BATTERY SYSTEMS, LLC.

8. EXPOSURE CONTROLS/ PERSONAL PROTECTION

- Under normal condition of use no special personnel protection is required
- When emptying or filling cells with electrolyte, eye protection goggles and protection gloves, aprons must be used. (Alkali resistant material)
- While carrying out preventive and routine maintenance, use only insulated tools.
- Use self-contained breathing apparatus and full fire-fighting protective clothing.
- Ensure adequate ventilation.
- Ensure availability of emergency eye wash facility in the battery room.

9. PHYSICAL & CHEMICAL PROPERTIES

9.1 Appearance

Batteries supplied in prismatic polypropylene plastic containers.

9.2 Temperature range (ambient °C)

Cell Type	Continuous	Occasional
Plastic container	-40 +50	-50 +70

9.3 Specific energy : 13-22 Wh/Kg

Note: Wh: Normal voltage x Rated Ah
Kg: Average battery weight in kg.

9.4 Specific instant power : 53-106 W/Kg

Note: W= 0.5 x Nominal voltage x Ip / weight
Ip = current in Amperes delivered by a fully charged battery for half the nominal voltage at one second
Kg = Average battery weight in kg.

9.5 Melting point : Not applicable
Boiling point : Not applicable
Flash point : Not applicable

10. STABILITY AND REACTIVITY

10.1 Chemical Stability

Thermal decomposition / conditions to be avoided:

No decomposition if used according to specifications.

Temperatures over 85°C. Short-circuit of electrode connections. Deformation of cells.

Do not connect the positive terminal to the negative terminal with electrically conductive material.

Protect from heat and direct sunlight. Protect from humidity and keep away from water. Incompatible materials: Conductive materials, water, seawater, strong oxidizers and strong acids.

10.2 Material to avoid

Do not fill cells with lead-acid battery electrolyte.

10.3 Possibility of Hazardous decomposition products

In the event of misuse of a battery gases like, oxygen or hydrogen accumulates in the cell and these gases may be emitted through the gas release vent. These gases may ignite if in the proximity of a naked flame or source of ignition.

Hazardous decomposition products: Acrid or harmful gas is emitted during fire.

STORAGE BATTERY SYSTEMS, LLC.

11. TOXICOLOGICAL INFORMATION

Nickel Hydroxide	LD_{50} / oral / rat : 1600 mg / kg*
Cadmium Hydroxide	No data available
Potassium Hydroxide	LD_{50} / oral / rat : 365 mg / kg*
Lithium Hydroxide	No data available
Cadmium oxide	LD_{50} / oral / rat : 1.3 mg / m3 (30 minutes)
Cadmium oxide	LD_{50} / oral / mouse : 0.7 mg / m3 (30 minutes)

*(INRS data)

12. ECOLOGICAL INFORMATION

There is no ecological harm when batteries are used correctly and recycled after use has ended.

Spilled/released electrolyte : The sharp pH rise may cause harmful impact on fish, plankton and stationary organisms.

13. DISPOSAL CONSIDERATIONS

As with all battery systems, Ni-Cd cells must be collected separately from other waste and recycled.

13.1 Incineration

Never incinerate Nickel Cadmium batteries.

13.2 Landfill

Never dispose Ni-Cd cells as landfill.

13.3 Recycling

Nickel Cadmium batteries must be recycled. Contact Storage Battery Systems LLC for information.

14. TRANSPORT INFORMATION

14.1 United Nations

UN No.: 2795

14.2 International conventions

Air : IATA
Sea : IMDG
Land : ADR (road) or RID (rail) Batteries exempt according to special Paragraph No. 598.

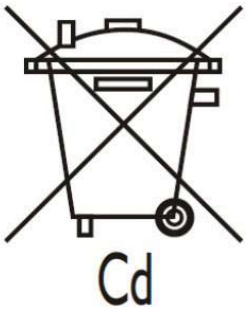
UN No.	PROPER SHIPPING NAME	RAIL & ROAD (ADR)				SEA (IMDG)					AIR (IATA)			
		CL	Code	Packing group	Labeling	CL	Risk	EmS	Packing group	Labeling	CL	Risk	Packing group	Labeling
2795	BATTERIES, WET, FILLED WITH ALKALI Electric Storage	8	C 11	***	None	8	***	F-A, S-B	II	8	8	***	***	8

STORAGE BATTERY SYSTEMS, LLC.

15. REGULATORY INFORMATION

According to item 14.2.

15.1 Product marking



16. OTHER INFORMATION

Issue date : 22nd June 2015

Marine pollutant : none

Risk Phrases

(1) Nature of special risk

R22	Harmful if swallowed
R26	Very toxic by inhalation
R35	Causes severe burns.
R36/37	Irritating to eyes and respiratory system.
R48/23/25	May cause sensitization by skin contact
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R62	Possible risk of impaired fertility
R63	Possible risk to the unborn child
R68	Possible risk of irreversible effects

(2) Safety advice

$S^{1/2}$	Keep locked up and out of the reach of children.
S2	Keep out of the reach of children
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 you feel unwell, seek medical advice immediately.
S60	Must be disposed of as hazardous waste.
S61	Avoid release to the environment.