Safety Data Sheet

1. IDENTIFICATION

Product Name: Nickel – Metal Hydride Battery **Synonyms:** Sealed nickel-metal hydride battery	**Product Use**: Vehicle Electrical System **Manufacturer/Supplier:** Johnson Controls Battery Group **Address:** P.O. Box 590 Milwaukee, WI 53201 US
General Information Number: (800)-333-2222 ext. 3138 **Contact Person:** Industrial Hygiene & Safety Department	**Emergency number:** CHEMTREC: 800-424-9300

NOTE: The Johnson Controls battery is considered an article as defined by 29 CFR 1910.1200 (OSHA Hazard Communication Standard). The information contained in this SDS is supplied at the customer's request for information only.

2. HAZARD(S) IDENTIFICATION

Label Elements:

Health	Environmental	Physical
		

Danger!
Flammable solid.
Catches fire spontaneously if exposed to air
Harmful if swallowed
Causes severe skin burns and eye damage
Causes skin irritation
May cause an allergic skin reaction
Harmful if inhaled
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Suspected of causing genetic defects
Suspected of causing cancer
May damage the unborn child
Causes damage to organs through prolonged or repeated exposure
Very toxic to aquatic life with long lasting effects

3. COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENTS (Chemical/Common Names):	CAS No.:	% by Wt:
Nickel	7440-02-0	24 – 34
Nickel Hydroxide	12054-48-7	12 – 20
Potassium Hydroxide	1310-58-3	10 – 15
Cobalt Hydroxide	21041-93-0	1 – 3

Composition Comments All concentrations are in percent by weight.

4. FIRST AID MEASURES

Note: Under normal conditions of battery use, internal components will not present a health hazard.

Inhalation	If contents of an opened battery are inhaled, remove source of contamination or move victim to fresh air. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve
Skin contact	If skin contact with contents of an open battery occurs, immediately flush with lukewarm water for at least 30 minutes. Thoroughly wash (or discard) clothing and shoes before reuse. If irritation persists get medical attention.
Eye contact	If eye comes in contact with contents of an open or damaged cell or battery, immediately flush the contaminated eye(s) with lukewarm water for at least 30 minutes. Get medical attention immediately. Continue to rinse. Permanent eye damage including blindness could result. Burning pain and severe corrosive skin damage.
Ingestion	If ingestion of contents of an open battery occurs, rinse mouth thoroughly with water. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Call a physician or poison control center immediately.

5. FIRE FIGHTING MEASURES

Flash Point	None determined.
Auto ignition Temperature	None determined.
Flammable Limits	None determined.
Extinguishing Media	CO2; foam; dry chemical.
Unsuitable Extinguishing Media	Water.
Special Fire Fighting Procedures	Use positive pressure, self-contained breathing apparatus. Full protective clothing must be worn in case of fire.
Unusual Fire and Explosion Hazard	The sealed battery is not considered flammable, but it will burn if involved in a fire. Nickel hydroxide and cobalt hydroxide: reacts with acids Mischmetal: Pyrophoric released as fine powder Electrolyte: Consists of potassium hydroxide dissolved in water

6: ACCIDENTAL RELEASE MEASURES

Personal precautions	Avoid skin contact and inhalation of vapors during disposal of spills. Wear protective clothing as described in Section 8 of this safety data sheet. Provide adequate ventilation.
Protective Measures to be Taken if Material is Released or Spilled	Stop flow of material, contain/absorb small spills with dry sand, earth, and vermiculite. Do not use combustible materials. If possible, carefully neutralize spilled acid with soda ash, sodium bicarbonate, lime, etc. Do not allow discharge of un-neutralized acid to sewer. Acid must be managed in accordance with approved local, state, and federal requirements. Consult state environmental agency and/or federal EPA.
Waste Disposal Method	Dispose of as a hazardous waste. Dispose of in accordance with applicable local, state and federal regulations.

7. HANDLING AND STORAGE

Handling	Unless involved in recycling operations, do not breach the casing or empty the contents of the battery. Handle carefully and avoid tipping, which may allow acid leakage. There may be increasing risk of electric

shock from strings of connected batteries. Keep containers tightly closed when not in use. If battery case is broken, avoid contact with internal components. Keep vent caps on and cover terminals to prevent short circuits. Place cardboard between layers of stacked automotive batteries to avoid damage and short circuits. Keep away from combustible materials, organic chemicals, reducing substances, metals, strong oxidizers and water. Use banding or stretch wrap to secure items for shipping.

Storage Store batteries under roof in cool, dry, well-ventilated areas separated from incompatible materials and from activities that may create flames, spark, or heat. Store on smooth, impervious surfaces provided with measures for liquid containment in the event of electrolyte spills. Keep away from metallic objects that could bridge the terminals on a battery and create a dangerous short-circuit. Room ventilation is required for batteries utilized for standby power generation. Never recharge batteries in an unventilated, enclosed space.

Charging: There is a possible risk of electric shock from charging equipment and from strings of series connected batteries, whether or not being charged. Shut-off power to chargers whenever not in use and before detachment of any circuit connections. Batteries being charged will generate and release flammable hydrogen gas. Charging space should be ventilated. Keep battery vent caps in position. Prohibit smoking and avoid creation of flames and sparks nearby. Wear face and eye protection when near batteries being charged.

Other Follow Manufacturers Recommendations regarding maximum recommended currents and operating temperature range. Do not overcharge beyond the recommended upper charging voltage limit. Applying pressure or deforming the battery may lead to disassembly followed by eye, skin and throat irritation.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure limits

US OSHA Table Z-1 Limits for Air Contaminants (29CFR 1910.1000)

Ingredient	CAS Number	Type	Value
Nickel	7440-02-0	PEL	1 mg/m³

US ACGIH Threshold Limit Values

Ingredient	CAS Number	Type	Value	Form
Potassium hydroxide	1310-58-3	Ceiling	2 mg/m³	
Nickel hydroxide	12054-48-7	TWA	0.2 mg/m³	Inhalable fraction
Cobalt hydroxide	21041-93-0	TWA	0.2 mg/m³	
Nickel	7440-02-0	TWA	1.5 mg/m³	Inhalable fraction

US NIOSH: Pocket Guide to Chemical Hazards

Ingredient	CAS Number	Type	Value
Potassium hydroxide	1310-58-3	TWA	2 mg/m³
Nickel hydroxide	12054-48-7	TWA	0.015 mg/m³
Nickel	7440-02-0	TWA	0.015 mg/m³

Biological limit values

ACGIH Biological Exposure Indices

Ingredient	Value	Determinant	Specimen	Sampling Time
Cobalt hydroxide (CAS 21041-93-0)	15 µg/l	Cobalt	Urine	*
	1 µg/l	Cobalt	Blood	

* - For Sampling details please see the source document.

Exposure Guidelines:

The OELs listed above are only applicable if the internal components of the battery cell are released. Follow standard monitoring procedures.

Engineering Controls (Ventilation):
Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant. Ventilation rates should be matched to conditions. Handle batteries cautiously, do not tip to avoid spills. Make certain vent caps are on securely. If battery case is damaged, avoid bodily contact with internal components. Wear protective clothing, eye and face protection, when filling, charging, or handling batteries. Do not allow metallic materials to simultaneously contact both the positive and negative terminals of the batteries. Charge batteries in areas with adequate ventilation. General dilution ventilation is acceptable.

Respiratory Protection (NIOSH/MSHA approved):
NONE REQUIRED FOR NORMAL HANDLING OF THE FINISHED PRODUCT.
In case of risk of inhalation of mist or vapor: Use NIOSH approved respirator with organic vapor/acid gas protection.

Skin Protection:
NONE REQUIRED FOR NORMAL HANDLING OF THE FINISHED PRODUCT.
If battery case is damaged, use rubber or plastic acid-resistant gloves with elbow-length gauntlet, acid-resistant apron, clothing and boots.

Eye Protection:
NONE REQUIRED FOR NORMAL HANDLING OF THE FINISHED PRODUCT.
If necessary to handle damage product where exposure to the organic electrolyte is a possibility, chemical splash goggles and a face shield are recommended.

Other Protection:
Where splashing is possible, full chemically resistant protective clothing (e.g. acid suit) and boots are required. Wash hands after handling.

General Hygiene Considerations:
When using, do not eat, drink, or smoke. Wash hands after handling. Contaminated work clothing should not be allowed out of the workplace. Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance and Odor	Electrolyte is a clear, odorless liquid. Nickel-hydroxide is a green, odorless solid. Cobalt hydroxide is a dark-brown solid. Mischmetal is a dark, gray odorless solid.
Odor Threshold	Not determined.
pH	Not determined.
Melting Point	Nickel-hydroxide: 2,370 °F Mischmetal: 6,330 °F
Boiling Point	Not applicable unless individual components exposed. > 212 °F (>100 °C) Electrolyte
Flash Point	Not determined.
Evaporation Rate (Butyl Acetate = 1)	Not determined.
Upper/lower flammability or explosive limits	Not determined.
Vapor Pressure	0 mm Hg Electrolyte
Vapor Density	Not determined.
Relative Density	2 Electrolyte
Solubility	Nickel Hydroxide: Low Cobalt hydroxide and Mischmetal: insoluble Electrolyte: 100% soluble in water
% Volatile by Weight	Not determined.
Partition coefficient (n-octanol/water)	Not determined.
Auto-ignition temperature	Not determined.
Decomposition temperature	Not determined.

Viscosity	Not determined.
Density	Not determined.

10. STABILITY AND REACTIVITY

Reactivity	This product is non-reactive under normal conditions or use, storage, and transport.
Stability	Material is stable under normal conditions.
Conditions to Avoid	Sparks and other sources of ignition; high temperature; over charging.
Incompatibility (materials to avoid)	Nickel hydroxide and cobalt hydroxide: reacts with acids Mischmetal: Pyrophoric released as fine powder Electrolyte: Reacts with acids and flammable liquids.
Hazardous Decomposition Products	Nickel Oxides and Metal Oxides
Hazardous Polymerization	Will not occur.

11. TOXICOLOGICAL INFORMATION

NOTE: Under normal conditions of use, this product does not present a health hazard. The following information is provided for organic electrolyte and lead exposure that may occur due to container breakage or under extreme conditions such as fire. Organic electrolyte – reacts with moisture/water to produce hydrofluoric acid in trace quantities. Hydrofluoric acid is extremely corrosive and toxic. In severe exposures it acts as a systemic poison and causes severe burns. The reaction may be delayed. Any contact with this material, even minor, requires immediate medical attention.

ROUTES AND METHODS OF ENTRY

Inhalation	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE.** Exposure to contents of an open or damaged battery: May cause irritation to the respiratory system.
Skin Contact	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE.** In the event that cell or battery is damaged, open or leaking – brief contact may cause skin burns with possible symptoms including pain, local redness, and tissue damage.
Eye Contact	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE.** In the event that cell or battery is damaged, open or leaking – irritation with injury resulting in permanent impairment of vision or chemical burn may occur.
Ingestion	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE.** Exposure to contents of an open or damaged battery: Causes digestive tract burns.

SIGNS AND SYMPTONS OF OVEREXPOSURE

Acute Effects	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE**. Acute exposures to metals may cause respiratory tract irritation, skin irritation, and eye irritation. Exposure and/or contact with battery electrolyte may lead to acute irritation of the skin, corneal damage of the eyes, and irritation of the mucous membranes of the eyes and upper respiratory system, including lungs.
Chronic Effects	**EXPOSURE IS NOT EXPECTED FOR PRODUCT UNDER NORMAL CONDITIONS OF USE.** Metals may cause respiratory disease, allergic sensitization and dermatitis. Battery electrolyte may lead to scarring of the cornea, skin burns/ulceration and chronic respiratory conditions.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Contact of electrolyte with the skin may aggravate sin diseases such as eczema and contact dermatitis.

Toxicological Data

Constituents	**Species**	**Test Results**
Nickel hydroxide (CAS 12054-48-7)		
Acute		
Inhalation		
LC50	Rat	> 5.08 mg/l, 4 hours
Oral		
LD50	Rat	200 mg/kg

Cobalt hydroxide (CAS 21041-93-0)

Acute

Inhalation

LD50	Rat	1060 mg/kg

Skin corrosion/irritation	Electrolyte: Causes severe skin burns
Serious eye damage/eye irritation	Electrolyte: Causes severe skin burns
Respiratory Sensitization	Nickel hydroxide – May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Skin Sensitization	Not a skin sensitizer
Germ Cell Mutagenicity	Nickel hydroxide – Suspected of causing genetic defects.

CARCINOGENICITY

Under normal handling and storage conditions, the exposure to carcinogenic components is not expected. Risk of adverse effects occurs only if the cell is mechanically, thermally, or electrically abused to the point of compromising the enclosure.
Contains nickel, which can cause lung or nasal cancer. Long-term breathing of this material may cause chronic lung cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Cobalt hydroxide (CAS 21041-93-0)	2B Possibly carcinogenic to humans.
Nickel (CAS 7440-02-0)	2B Possibly carcinogenic to humans.
Nickel hydroxide (CAS 12054-48-7)	1 carcinogenic to humans.

NTP Report on Carcinogens

Nickel (CAS 7440-02-0)	Known to be human carcinogen Reasonably anticipated to be human carcinogen
Nickel hydroxide (CAS 12054-48-7)	Known to be human carcinogen

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity	May damage fertility or the unborn child.
Specific target organ toxicity - single exposure	No data available.
Specific target organ toxicity - repeated exposure	Mischmetal: Respiratory tract Nickel hydroxide: Causes damage to organs: Lung (inhalation)
Aspiration hazard	Not classified.

12. ECOLOGICAL INFORMATION

Ecotoxicity Very toxic to aquatic life with long lasting effects. However, no ecological impacts expected under normal use conditions.

Constituents		Species	Test Results
Cobalt hydroxide (CAS 21041-93-0)			
Aquatic			
Algae	EC50	Psuedokirchneriella subcapitata	144 µg/l, 72 hours (cobalt chloride, hexahydrate)
Crustacea	EC50	Water Flea (Ceriodaphnia)	0.605 mg/l, 48 hours (cobalt chloride, hexahydrate)

Persistence and Degradability	No data available
Bioaccumulative potential	No data available
Mobility in Soil	The product is not mobile in soil.

13. DISPOSAL CONSIDERATIONS

Waste disposal method	Material should be recycled if possible. Batteries are completely recyclable. Dispose waste and residues in accordance with applicable federal, state, and local regulations.
Hazardous waste code	D006: Waste Cadmium
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or packaging may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. TRANSPORT INFORMATION

Note: Transportation requirements do not apply once the battery pack has been installed in a vehicle as part of the vehicle's functional components.

United States DOT:	
UN number	UN3496
UN proper shipping name	Batteries, nickel-metal hydride see Batteries, dry, sealed, n.o.s for nickel-metal hydride batteries transported by modes other than vessel.
Transport hazard classes:	
Class	9
Subsidiary risk	-
Label(s)	9
Packaging Group	Not applicable
Special precautions for use	Read Safety instructions, SDS and emergency procedures before handling.
Special Provisions	340
IATA	
UN number	UN3496
UN proper shipping name	Batteries, nickel-metal hydride
Transport hazard classes:	
Class	9
Subsidiary risk	-
Packaging Group	Not applicable
Environmental Hazards	No.
ERG Code	9L
Special precautions for use	Read Safety instructions, SDS and emergency procedures before handling.
IMDG	
UN number	UN3496
UN proper shipping name	Batteries, nickel-metal hydride
Transport hazard classes:	
Class	9
Subsidiary risk	-
Packaging Group	Not applicable
Environmental Hazards	No.
EmS	F-A, S-I
Special precautions for use	Read Safety instructions, SDS and emergency procedures before handling.

15. REGULATORY INFORMATION

This product is an article pursuant to 29 CFR 1910.1200 and as such is not subjected to the OSHA Hazard Communication Standard.

All components are on the U.S. EPA TSCA Inventory List

TSCA

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated

CERCLA Hazardous Substance List (40 CFR 302.4)

Cobalt hydroxide (CAS 21041-93-0)	LISTED
Nickel (CAS 7440-02-0)	LISTED
Nickel hydroxide (CAS 12054-48-7)	LISTED
Potassium hydroxide (CAS 1310-58-3)	LISTED

Superfund Amendment and Reauthorization Act of 1986 (SARA)

Hazard Categories	Immediate Hazard – Yes Fire Hazard – Yes Delayed Hazard – Yes Reactivity Hazard – Yes Pressure Hazard – Yes
SARA 302 Extremely hazardous substance	Not Listed
SARA 311/312 Hazardous Chemical	Yes

SARA 313 (TRI Reporting)

Chemical Name	**CAS Number**	**% by Weight**
Nickel	7440-02-0	24-34
Nickel Hydroxide	12054-48-7	12-20

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Cobalt Hydroxide (CAS 21041-93-0)
Nickel (CAS 7440-02-0)
Nickel Hydroxide (CAS 12054-48-7)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not Regulated

Safe Drinking Water Act (SDWA)

Not regulated

US State Regulations

US. Massachusetts RTK – Substance List

Nickel (CAS 7440-02-0)
Nickel Hydroxide (CAS 12054-48-7)
Potassium Hydroxide (CAS 1310-58-3)

US New Jersey Worker and Community Right-to-know Act

Cobalt Hydroxide (CAS 21041-93-0)
Nickel (CAS 7440-02-0)
Nickel Hydroxide (CAS 12054-48-7)
Potassium Hydroxide (CAS 1310-58-3)

US Pennsylvania Worker and Community Right-to-know Law

Nickel (CAS 7440-02-0)
Nickel Hydroxide (CAS 12054-48-7)
Potassium Hydroxide (CAS 1310-58-3)

US Rhode Island RTK

Cobalt Hydroxide (CAS 21041-93-0)
Nickel (CAS 7440-02-0)
Nickel Hydroxide (CAS 12054-48-7)
Potassium Hydroxide (CAS 1310-58-3)

US. California Proposition 65

WARNING: This product contains chemicals known to the State of California to cause cancer.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Nickel (CAS 7440-02-0)
Nickel Hydroxide (CAS 12054-48-7)

International Inventories

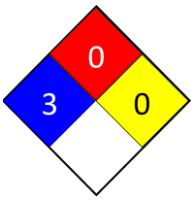
Country(s) or Region	**Inventory Name**	**On inventory (yes/no)***

United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes	

* A “Yes” indicates this product complies with the inventory requirements administered by the governing country(s).
A “No” indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. OTHER INFORMATION

Issue Date: 04/01/2015
Revision Date: 12/07/2015
Version #: 02
Further information: NFPA Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3=Serious 4 = Severe
NFPA ratings



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