

SAFETY DATA SHEET – 14-355

1. IDENTIFICATION

REVISION DATE: 1/3/2017

<p>PRODUCT IDENTITY:</p> <p>Sealed, Lead-Calcium Battery, Nonspillable</p> <p>CDID: Liberty MSE, Liberty DCS and Liberty AES</p>	<p>Product Use: Electric Storage Battery</p> <p>Manufacturer/Supplier: C&D Technologies, Inc.</p> <p>Address: C&D Technologies, Inc. 1400 Union Meeting Road Blue Bell, PA 19422-0858</p> <p>Web Sites: www.cdtechno.com</p> <p>North America 24 Hour Emergency Telephone: (CHEM TEL) 1-800-255-3924 International 24 Hour Emergency Telephone: (CHEM TEL) 1-813-248-0585 C&D Technologies Inc. Telephone: 215-619-2700</p>
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2. GHS HAZARDS IDENTIFICATION

Health	Environmental	Physical
Acute Toxicity (Oral/Dermal/Inhalation) - Category 4 Skin Corrosion/Irritation - Category 1A Eye Damage - Category 1 Reproductive - Category 1A Carcinogenicity (lead) - Category 1B Carcinogenicity (arsenic) - Category 1A Carcinogenicity (acid mist) - Category 1A Specific Target Organ Toxicity (repeated exposure) - Category 2	Aquatic Chronic 1 Aquatic Acute 1	Explosive Chemical, Division 1.3

GHS Label:

Health	Environmental	Physical
<p>Hazard Statements DANGER! Causes severe skin burns and eye damage. Causes serious eye damage.</p>	<p>Precautionary Statements Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Wear protective gloves/protective clothing, eye protection/face</p>	

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<p>May damage fertility or the unborn child if ingested or inhaled.</p> <p>May cause cancer if ingested or inhaled.</p> <p>Causes damage to central nervous system, blood and kidneys through prolonged or repeated exposure.</p> <p>May form explosive air/gas mixture during charging.</p> <p>Extremely flammable gas (hydrogen).</p> <p>Explosive, fire, blast or projection hazard.</p>	<p>protection.</p> <p>Avoid breathing dust/fume/gas/mist/vapors/spray.</p> <p>Use only outdoors or in a well-ventilated area.</p> <p>Causes skin irritation, serious eye damage.</p> <p>Contact with internal components may cause irritation or severe burns. Avoid contact with internal acid.</p> <p>Irritating to eyes, respiratory system, and skin.</p>
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3. *COMPOSITION / INFORMATION ON INGREDIENTS

INGREDIENTS (Chemical/Common Names):	CAS No.:	% by Wt:
*Lead , Lead Compounds	7439-92-1	72 - 73
*Sulfuric Acid/ Battery Electrolyte 1.300 sg 40% wt (H2SO4/H2O)	7664-93-9	7 - 8
Tin	7440-31-5	<0.1
Aluminum	7429-90-5	< 0.01
*Brass	7440-50-8	< 0.01
NON-HAZARDOUS INGREDIENTS		
Water	7732-18-5	15 - 17
Calcium	7440-70-2	0.01
Inert Components	N/A	3 - 6
*Section 313 (40 CFR 372) Listed Toxic Chemical		

4. FIRST AID MEASURES

INHALATION:

Sulfuric Acid: Remove to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Consult a physician.

Lead: Remove from exposure, gargle, wash nose and lips; consult physician.

INGESTION:

Sulfuric Acid: Give large quantities of water; Do NOT induce vomiting or aspiration into the lungs may occur and can cause permanent injury or death; consult physician.

Lead: Consult physician immediately.

SKIN:

Sulfuric Acid: Flush with large amounts of water for at least 15 minutes; remove contaminated clothing completely, including shoes. If symptoms persist, seek medical attention. Wash contaminated clothing before reuse. Discard contaminated shoes.

Lead: Wash immediately with soap and water.

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EYES:

Sulfuric Acid and Lead: Flush immediately with large amounts of water for at least 15 minutes while lifting lids; Seek immediate medical attention if eyes have been exposed directly to acid.

5. FIRE FIGHTING MEASURES

Flash Point: Not Applicable

Oxygen Index = > 28

Flammable Limits: LEL = 4.1% (Hydrogen Gas in air); UEL = 74.2%

Extinguishing media: CO₂; foam; dry chemical. Do not use carbon dioxide directly on cells. Avoid breathing vapors. Use appropriate media for surrounding fire.

Fire Fighting Procedures:

Use positive pressure, self-contained breathing apparatus. Beware of acid splatter during water application and wear acid-resistant clothing, gloves, face and eye protection. If batteries are on charge, shut off power to the charging equipment, but note that strings of series connected batteries may still pose risk of electric shock even when charging equipment is shut down.

Hazardous Combustion Products:

Highly flammable hydrogen gas is generated during charging and operation of batteries. If ignited by burning cigarette, naked flame or spark, may cause battery explosion with dispersion of casing fragments and corrosive liquid electrolyte. Carefully follow manufacturer's instructions for installation and service. Keep away all sources of gas ignition and do not allow metallic articles to simultaneously contact the negative and positive terminals of a battery. Follow manufacturer's instructions for installation and service.

6: ACCIDENTAL RELEASE MEASURES

Stop flow of material, contain/absorb small spills with dry sand, earth or vermiculite. Do not use combustible materials. If possible, carefully neutralize spilled electrolyte with soda ash, sodium bicarbonate, lime, etc. Wear acid-resistant clothing, boots, gloves, and face shield. 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.

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 electrolyte 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

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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.

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.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits (mg/m³) Note: N.E. = Not Established

INGREDIENTS (Chemical/Common Names):	OSHA PEL	ACGIH	US NIOSH	Quebec PEV	Ontario OEL	EU OEL
Lead, Lead Compounds	0.05	0.05	0.05	0.05	0.05	0.15 (b)
Sulfuric Acid/Electrolyte (H ₂ SO ₄ /H ₂ O)	1	0.2	1	1	0.2	0.05 (c)
Tin	2.0	2.0	2.0			
Aluminum	15.0	10.0	10.0			
Brass	1.0	1.0	1.0			

(a)As dusts/mists (b)As inhalable aerosol (c)Thoracic fraction

Engineering Controls (Ventilation):

Store and handle in well-ventilated area. If mechanical ventilation is used, components must be acid-resistant. 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 under normal conditions. When concentrations of sulfuric acid mist are known to exceed PEL, use NIOSH or MSHA-approved respiratory protection.

Skin Protection:

If battery case is damaged, use rubber or plastic acid-resistant gloves with elbow-length gauntlet, acid-resistant apron, clothing and boots.

Eye Protection:

If battery case is damaged, use chemical goggles or face shield.

Other Protection:

In areas where water and sulfuric acid solutions are handled in concentrations greater than 1%, emergency eyewash stations and showers should be provided, with unlimited water supply. Chemically impervious apron and face shield recommended when adding water or electrolyte to batteries. Wash Hands after handling.

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9. PHYSICAL AND CHEMICAL PROPERTIES

Properties Listed Below are for Electrolyte:			
Boiling Point:	235 F	Specific Gravity (H ₂ O = 1):	1.310 +/-0.010
Melting Point:	N/A	Vapor Pressure (mm Hg):	1mm @ 145.8
Solubility in Water:	N/A	Vapor Density (AIR = 1):	Greater than 1
Evaporation Rate: (Butyl Acetate = 1)	Less than 1	% Volatile by Weight:	N/A
pH:	~1 to 2	Flash Point:	Below room temperature (as hydrogen gas)
LEL (Lower Explosive Limit)	4% (Hydrogen)	UEL (Upper Explosive Limit)	74% (Hydrogen)
Appearance and Odor:	Manufactured article; no apparent odor. Gelled electrolyte is a clear to cloudy liquid with a sharp, penetrating, pungent odor. Formed lead dioxide is dark brown in color with a slight acidic odor.		

10. STABILITY AND REACTIVITY

Stability: Stable X Unstable

This product is stable under normal conditions at ambient temperature.

Conditions to Avoid: Prolonged overcharge at high current; sources of ignition.

Incompatibilities: (materials to avoid)

Electrolyte: Contact with combustibles and organic materials may cause fire and explosion. Also reacts violently with strong reducing agents, metals, sulfur trioxide gas, strong oxidizers, and water. Contact with metals may produce toxic sulfur dioxide fumes and may release flammable hydrogen gas.

Lead compounds: Avoid contact with strong acids, bases, halides, halogenates, potassium nitrate, permanganate, peroxides, nascent hydrogen, and reducing agents.

Arsenic compounds: strong oxidizers; bromine azide. NOTE: hydrogen gas can react with inorganic arsenic to form the highly toxic gas – arsine

Hazardous Decomposition Products:

Electrolyte: Sulfur trioxide, carbon monoxide, sulfuric acid mist, sulfur dioxide, hydrogen sulfide.

Lead compounds: Temperatures above the melting point are likely to produce toxic metal fume, vapor, or dust; contact with strong acid or base or presence of nascent hydrogen may generate highly toxic arsine gas.

Hazardous Polymerization:

Will not occur

11. TOXICOLOGICAL INFORMATION

Routes of Entry:

Sulfuric Acid: Harmful by all routes of entry.

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Lead Compounds: Hazardous exposure can occur only when product is heated, oxidized or otherwise processed or damaged to create dust, vapor or fume. The presence of nascent hydrogen may generate highly toxic arsine gas.

Inhalation:

Sulfuric Acid: Breathing of sulfuric acid vapors or mists may cause severe respiratory irritation.

Lead Compounds: Inhalation of lead dust or fumes may cause irritation of upper respiratory tract and lungs.

Ingestion:

Sulfuric Acid: May cause severe irritation of mouth, throat, esophagus and stomach.

Lead Compounds: Acute ingestion may cause abdominal pain, nausea, vomiting, diarrhea and severe cramping. This may lead rapidly to systemic toxicity and must be treated by a physician.

Skin Contact:

Sulfuric Acid: Severe irritation, burns and ulceration.

Lead Compounds: Not absorbed through the skin.

Arsenic compounds: Contact may cause dermatitis and skin hyperpigmentation

Eye Contact:

Sulfuric Acid: Severe irritation, burns, cornea damage, and blindness.

Lead Compounds: May cause eye irritation.

Effects of Overexposure - Acute:

Sulfuric Acid: Severe skin irritation, damage to cornea, upper respiratory irritation.

Lead Compounds: Symptoms of toxicity include headache, fatigue, abdominal pain, loss of appetite, muscular aches and weakness, sleep disturbances and irritability.

Effects of Overexposure - Chronic:

Sulfuric Acid: Possible erosion of tooth enamel, inflammation of nose, throat & bronchial tubes.

Lead Compounds: Anemia; neuropathy, particularly of the motor nerves, with wrist drop; kidney damage; reproductive changes in males and females. Repeated exposure to lead and lead compounds in the workplace may result in nervous system toxicity. Some toxicologists report abnormal conduction velocities in persons with blood lead levels of 50 µg/100 ml or higher. Heavy lead exposure may result in central nervous system damage, encephalopathy and damage to the blood-forming (hematopoietic) tissues.

Carcinogenicity:

Sulfuric Acid: The International Agency for Research on Cancer (IARC) has classified "strong inorganic acid mist containing sulfuric acid" as a Category I carcinogen, a substance that is carcinogenic to humans. This classification does not apply to liquid forms of sulfuric acid or sulfuric acid solutions contained within a battery. Inorganic acid mist (sulfuric acid mist) is not generated under normal use of this product. Misuse of the product, such as overcharging, may result in the generation of sulfuric acid mist.

Lead Compounds: Lead is listed as a 2B carcinogen, likely in animals at extreme doses. Proof of carcinogenicity in humans is lacking at present.

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Arsenic: Listed by National Toxicology Program (NTP), International Agency for Research on Cancer (IARC), OSHA and NIOSH as a carcinogen only after prolonged exposure at high levels.

Medical Conditions Generally Aggravated by Exposure:

Overexposure to sulfuric acid mist may cause lung damage and aggravate pulmonary conditions. Contact of sulfuric acid with skin may aggravate diseases such as eczema and contact dermatitis. Lead and its compounds can aggravate some forms of kidney, liver and neurologic diseases.

Acute Toxicity:

Inhalation LD50:

Electrolyte: LC50 rat: 375 mg/m³; LC50: guinea pig: 510 mg/m³

Elemental Lead: Acute Toxicity Point Estimate = 4500 ppmV (based on lead bullion)

Oral LD50:

Electrolyte: rat: 2140 mg/kg

Elemental lead: Acute Toxicity Estimate (ATE) = 500 mg/kg body weight (based on lead bullion)

Additional Health Data:

All heavy metals, including the hazardous ingredients in this product, are taken into the body primarily by inhalation and ingestion. Most inhalation problems can be avoided by adequate precautions such as ventilation and respiratory protection covered in Section 8. Follow good personal hygiene to avoid inhalation and ingestion: wash hands, face, neck and arms thoroughly before eating, smoking or leaving the work site. Keep contaminated clothing out of non-contaminated areas, or wear cover clothing when in such areas. Restrict the use and presence of food, tobacco and cosmetics to non-contaminated areas. Work clothes and work equipment used in contaminated areas must remain in designated areas and never taken home or laundered with personal non-contaminated clothing. This product is intended for industrial use only and should be isolated from children and their environment.

The 19th Amendment to EC Directive 67/548/EEC classified lead compounds, but not lead in metal form, as possibly toxic to reproduction. Risk phrase 61: May cause harm to the unborn child, applies to lead compounds, especially soluble forms.

12. ECOLOGICAL INFORMATION

Environmental Fate: lead is very persistent in soil and sediments. No data on environmental degradation.

Mobility of metallic lead between ecological compartments is slow. Bioaccumulation of lead occurs in aquatic and terrestrial animals and plants but little bioaccumulation occurs through the food chain. Most studies include lead compounds and not elemental lead.

Environmental Toxicity: Aquatic Toxicity:

Sulfuric acid: 24-hr LC50, freshwater fish (Brachydanio rerio): 82 mg/L

96 hr- LOEC, freshwater fish (Cyprinus carpio): 22 mg/L

Lead: 48 hr LC50 (modeled for aquatic invertebrates): <1 mg/L, based on lead bullion

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Additional Information

- No known effects on stratospheric ozone depletion.
- Volatile organic compounds: 0% (by Volume)
- Water Endangering Class (WGK): NA

13. DISPOSAL CONSIDERATIONS (UNITED STATES)

Spent batteries: Send to secondary lead smelter for recycling. Spent lead-acid batteries are not regulated as hazardous waste when the requirements of 40 CFR Section 266.80 are met. Spilled sulfuric acid is a characteristic hazardous waste; EPA hazardous waste number D002 (corrosivity) and D008 (lead).

Electrolyte: Place neutralized slurry into sealed acid resistant containers and dispose of as hazardous waste, as applicable. Large water diluted spills, after neutralization and testing, should be managed in accordance with approved local, state, and federal requirements. Consult state environmental agency and/or federal EPA.

Following local, State/Provincial, and Federal/National regulations applicable to end-of-life characteristics will be the responsibility of the end-user.

14. TRANSPORT INFORMATION

United States:

Wet, non-spillable batteries do not need to be shipped and transported as fully-regulated Class 8 Corrosive hazardous materials / dangerous goods when tested, packaged and marked in accordance with the following regulations:

U.S. Hazardous Materials Regulations: 49 CFR 173.159(f) and 49 CFR 173.159a

- The batteries are excepted from regulation if they have been tested in accordance with the vibration and pressure differential tests found in 49 CFR 173.159(f) and “rupture test” found at 49 CFR 173.159a;
- When offered for transport, the batteries must be protected against short circuits and securely packaged in accordance with 49 CFR 173.159a; and
- The batteries and outer packaging must be marked NON-SPILLABLE BATTERY or NON-SPILLABLE as required by 49 CFR 173.159a

IATA Dangerous Goods Regulations: Packing Instruction 872 and Special Provision A67

- The batteries are excepted from regulation if they have been tested in accordance with the vibration and pressure differential tests found in Packing Instruction 872 and “rupture test” found in Special Provision A67 of the International Air Transport Association (IATA) Dangerous Goods Regulations
- When offered for transport, the batteries must be protected against short circuits and securely packaged in accordance with Special Provision A67.
- The words “Not Restricted” and “Special Provision A67” must be included in the description of the substance on the Air Waybill when an Air Waybill is issued.

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IMDG Code: Special Provision 238.1 and 238.2

- The batteries are excepted from regulation if they have been tested in accordance with the vibration and pressure differential tests and “rupture test” found in Special Provision 238.1 and 238.2.
- When offered for transport, the batteries must be protected against short circuits and securely packaged in accordance with Special Provision 238.1 and 238.2.

If the regulations listed above are not met, then Batteries, wet, nonspillable (UN2800) are regulated as Class 8 Corrosive hazardous materials / dangerous goods by the U.S. Department of Transportation (DOT) and international dangerous goods regulatory authorities pursuant to the IATA Dangerous Goods Regulations and IMDG Code.

15. REGULATORY INFORMATION

UNITED STATES:

EPCRA Sections 302, 304, 311 & 312

Lead-acid batteries do **NOT** meet the OSHA definition of an "article" (US EPA, Oct. 1998). The lead and acid that compose these batteries must be included when determining the various thresholds for these EPCRA section regulations. The acid in lead-acid batteries is **Sulfuric Acid**, which is an Extremely Hazardous Substance (EHS). The following table outlines the applicable EPCRA Sections and their respective thresholds for **Sulfuric Acid**:

EPCRA Sections – Sulfuric Acid	Thresholds
302 - Emergency Planning Notification	TPQ ≥ 1,000 lbs.
304 - Emergency Release Notification	RQ ≥ 1,000 lbs.
311 - MSDS Reporting	*TPQ ≥ 500 lbs.
312 - Chemical Inventory Reporting (i.e. Tier II)	*TPQ ≥ 500 lbs.

***The reporting threshold for Sulfuric Acid is ≥ the designated TPQ or 500 lbs, whichever is less.**

The lead used in lead-acid batteries does not qualify for any OSHA or EPCRA exemptions. Lead is not an EHS, and the following table outlines the applicable EPCRA Sections and their respective thresholds for **lead**:

EPCRA Sections - Lead	Thresholds
311 - MSDS Reporting	≥ 10,000 lbs.
312 - Chemical Inventory Reporting (i.e. Tier II)	≥ 10,000 lbs.

EPCRA Section 313

The reporting of lead and sulfuric acid (and their releases) in lead-acid batteries used in cars, trucks, most cranes, forklifts, locomotive engines, and aircraft for the purposes of EPCRA Section 313 is not required. Lead-acid batteries used for these purposes are exempt for Section 313 reporting per the "Motor Vehicle Exemption."

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See page B-22 of the U.S. EPA Guidance Document for Lead and Lead Compound Reporting under EPCRA Section 313 for additional information of this exemption.

TSCA:

TSCA Section 8b – Inventory Status: All chemicals comprising this product are either exempt or listed on the TSCA Inventory.

TSCA Section 12b (40 CFR Part 707.60(b)) No notice of export will be required for articles, except PCB articles, unless the Agency so requires in the context of individual section 5, 6, or 7 actions.

TSCA Section 13 (40 CFR Part 707.20): No import certification required (EPA 305-B-99-001, June 1999, Introduction to the Chemical Import Requirements of the Toxic Substances Control Act, Section IV.A)

RCRA: Spent Lead Acid Batteries are subject to streamlined handling requirements when managed in compliance with 40 CFR section 266.80 or 40 CFR part 273. Waste sulfuric acid is a characteristic hazardous waste; EPA hazardous waste number D002 (corrosivity) and D008 (lead).

STATE REGULATIONS (US):

***Proposition 65 Warning**

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and reproductive harm. Wash hands after handling.

*Battery companies not party to the 1999 consent judgment with Mateel Environmental Justice Foundation should include a Proposition 65 Warning that complies with the current version of Proposition 65.

INTERNATIONAL REGULATIONS:

Distribution into Quebec to follow Canadian Controlled Product Regulations (CPR) 24(1) and 24(2).

Distribution into the EU to follow applicable Directives to the Use, Import/Export of the product as-sold.

16. OTHER INFORMATION

NFPA Hazard Rating for sulfuric acid:

Flammability (Red) = 0

Health (Blue) = 3

Reactivity (Yellow) = 2

X = Acid

Sulfuric acid is water-reactive if concentrated.

SDS Preparation/Review Date: 1/3/2017
Prepared by: W.E. Kozlowski – Director EHS

Revision: 3