

HDI INSTRUMENTS LLC

HDIBATT-E608-DOT-AA (Rev-February 24th, 2020) DGD-USA.COM

Lithium Metal Battery Safety Data Sheet

1. Section 1. Identification

SECTION 1 IDENTIFICATION

Product Name: Primary (non-rechargeable) Lithium metal Thionyl Chloride (Li/SOCl₂) cells and batteries. Models of HDIBATT-E608-DOT-AA - 3.6V series. This Safety Data Sheet covers the above Model with the finished versions and batteries assembled from them, denoted by "/" followed by letters or digits. **HDI PART NUMBER HDIBATT-E608-DOT-AA**

Manufacturer Name: HDI INSTRUMENTS LLC

Local address: 7240 BRITTMOORE RD. SUITE #119 HOUSTON TEXAS 77041 USA

Tel. for EMERGENCY ASSISTANCE 1 800 242 9300

CHEMTREC CONTRACT NUMBER 817438

Tel. for EMERGENCY INFORMATION 1-703-741-5970

Tel. for TECHNICAL INFORMATION 1-713-688-8555

The Lithium Thionyl chloride batteries described in this Safety Data Sheet are hermetically sealed units, which are not considered hazardous when used according to the recommendations of the manufacturer.

Under normal conditions of use of the batteries, the electrode materials and the liquid electrolyte they contained are non-reactive provided the battery integrity is maintained. Risk of exposure exists only in case of mechanical, electrical or thermal abuse. Thus, the batteries should not short circuit, recharge, puncture, incinerate, crush, immerse in water, force discharge, or expose to temperatures above the temperature range of the cell or battery. In these cases, there is risk of fire or explosion.

SECTION 2 HAZARDOUS INFORMATION

Protection from charging:

Whenever lithium batteries are not the single power source in a circuit, whenever lithium batteries are not the single power source in a circuit, the measures recommended by Underwriters Laboratories are relevant. The relevant protection means should be recommended/approved by HDI INSTRUMENTS LLC in HOUSTON TEXAS USA

GHS LABEL ELEMENTS: INCLUDING PRECAUTIONARY STATEMENTS



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GHS CLASSIFICATION:

SKIN IRRITATION – CATEGORY 2

SKIN SENSATION – CATEGORY 1

EYE IRRITATION – CATEGORY 2

SINGLE TARGET ORGAN TOXICITY EXPOSURE – CATEGORY 3

CARCINOGEN – CATEGORY 1B

SIGNAL WORD – DANGER

HAZARD STATEMENTS

H 315 MAY CAUSE SKIN IRRITATION

H 317 MAY CAUSE AN ALLERGIC REACTION

H 319 MAY CAUSE SERIOUS EYE IRRITATION

H 335 MAY CAUSE RESPIRATORY IRRITATION

PRECAUTIONARY STATEMENTS

P 280 WEAR PROTECTIVE GLOVES AND CLOTHING

P 302 + P 350 IF ON SKIN GENTLY WASH - SOAP AND WATER

P 305 + P 351 IF IN EYES GENTLY RINSE WITH WATER ONLY

WHMIS CLASSIFICATION

D2A MAY BE TOXIC – MAY BE A CARCINOGEN

D2B TOXIC MATERIAL MAY CAUSE OTHER EFFECTS

MODERATE SKIN IRRITATION

SKIN SENSITIZATION

MODERATE RESPIRATORY IRRITANT

MODERATE EYE IRRITATION

OSHA CLASSIFICATION

HAZARDOUS

HMIS CLASSIFICATION

HEALTH – 2

CHRONIC – 0

FLAMMABILITY – 2

PHYSICAL HAZARD - 0

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SECTION 3 – COMPOSITION - INGREDIENTS

Component	HS Number	%	ACGIH (TLV)*
Lithium Metal (Li)	7439-93-2	<5%	Not Established
Thionyl Chloride (SOCl ₂)	7719-09-7	<47%	0.2 ppm
Carbon (C)	7440-44-0	<6%	3.5 mg/m ³
Aluminum Chloride (AlCl ₃)	7446-70-0	<5%	2 mg/m ³ (Al salt, soluble)
Lithium Chloride (LiCl)	7447-41-8	<2%	Not Established
Glass	-	<1%	Not Established
PVC	9002-86-2	<1%	Not Established
PTFE	9002-84-0	<1%	Not Established
Steel, nickel, and inert components		balance	

* TLV- Threshold Limit Value is personal exposure limits determined by ACGIH (American Council of Governmental Industrial Hygienists).

IMPORTANT NOTE: The above levels are not anticipated under normal use conditions.

SECTION 4 FIRST AID First aid measures

In case of battery rupture, explosion, or major leakage, evacuate personnel from the area and provide adequate ventilation to clear out fumes, gases or the pungent odor. Seek immediate medical attention if any signs of exposure are evident.

Eyes - Immediately rinse with copious amounts of water for 15-20 minutes (remove contact lenses if easily possible), and then seek immediate medical attention.

Skin - Remove contaminated clothes if safe to do so and thoroughly rinse skin with plenty of water or shower for 15-20 min. Seek help from emergency medical personnel.

Inhalation - Remove to well ventilated area for fresh air, rest exposed persons in a half-upright position, use SCBA or Mouth to Mouth for artificial respiration if needed for assistance.

Ingestion - DO NOT induce vomiting, give plenty of water to rinse out the mouth

SECTION 5 FIRE FIGHTING MEASURES

1. Lith- X (Class D extinguishing media) is the only effective on fires involving a few lithium

batteries. If the cells are directly involved in a fire DO NOT USE: WATER, SAND, CO₂, HALON, and DRY POWDER OR SODA ASH EXTINGUISHERS.

2. If the fire is in adjacent area and the cells that are either packed in their original containers or unpacked, the fire can be fought based on fueling material, e.g., paper and plastic products. In these cases, the use of copious amounts of cold water is effective extinguishing media. Storage area may also employ sprinkler system with cold water.

AUTO-IGNITION: Not Determined

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SPECIAL FIRE FIGHTING PROCEDURES: Wear SCBA self-contained breathing apparatus to avoid breathing of irritant fumes (NIOSH approved SCBA & full protective equipment). Wear protective clothing and equipment to prevent bodily contact with contaminated solution. Fire may be fought, but only by trained fire-fighting responders from a safe distance. Evacuate all nonessential persons from immediate area of fire or contaminated area.

UNUSUAL EXPLOSION AND FIRE EXPLOSION: Batteries may explode when subject to excessive heat, when recharging, over charged, punctured and crushed. During thermal decomposition generation of chlorine (Cl_2), hydrogen chloride (HCl), and sulfur dioxide (SO_2) may be formed.

Section 6: Accidental release measures

PROCEDURES TO CONTAIN AND CLEAN UP LEAKS OR SPILLS SHOULD ONLY BE PERFORMED BY TRAINED CERTIFIED EMERGENCY RESPONDERS:

The material contained within the battery would only be released under abusive conditions as it is sealed in epoxy.

In the event of battery rupture and leakage: contain the spill while wearing proper protective clothing and ventilate the area. Then, cover with sodium carbonate (Na_2CO_3) or 1:1 mixture of soda ash and slaked lime. Keep away from water, rain, and snow. Placed in approved container (after cooling if necessary) and disposed according to the Local, State and Federal regulations.

NEUTRALIZING AGENTS: Sodium carbonate (Na_2CO_3) or 1:1 mixture of soda ash and slaked lime.

WASTE DISPOSAL METHOD: Product decomposed by water must be neutralized. if sufficiently diluted, it may be added to wastewater if it is sufficiently diluted.

PRECAUTIONS IN HANDLING AND STORAGE: avoid short-circuiting, over-charging and heating to high temperatures. Store the batteries in dry and cool area and keep container dry and tightly closed in well-ventilated area. Store cells away from food and drink.

OTHER PRECAUTIONS: Never attempt to disassemble, machine, or otherwise modify batteries or injury may result. The batteries should not be opened, destroyed or incinerate, since they may leak or rupture and release to the environment the ingredients that they normally contained in the hermetically sealed container.

SECTION 7: HANDLING AND STORAGE

HANDLING- Do not short circuit terminals or expose to temperatures above the temperature rating of the battery, over charge the battery, forced over-discharge (voltage below 0.0V), throw to fire.

Do not crush or puncture the battery or immerse in liquids.

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STORAGE- is preferably done in cool (below 30° C), dry and ventilated area, which is subject to little temperature change.

Do not place the battery near heating equipment, nor expose to direct sunlight for long periods. Elevated temperatures can result in shortened battery life and degrade performance.

Keep batteries in original packaging until use and do not jumble them.

Do not store batteries in high humidity environment for long periods.

OTHER- cells and batteries are not rechargeable batteries and should not be charged. Applying pressure and deforming the battery may lead to disassembly followed by eye skin and throat irritation.

Follow manufacturer recommendations regarding maximum recommended current and operating temperature range.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

GENERAL: The following safety measures are not necessary in normal use. They need only be applied if there is a risk that, in use or handling, the recommendations, as outlined in Section 3, have not been followed.

RESPIRATORY PROTECTION: In case of abuse or leak of liquid or fumes, use NIOSH approved Acid Gas Filter Mask or Self-Contained Breathing Apparatus.

VENTILATION: In case of abuse, use adequate mechanical ventilation (local exhaust) for battery that vents gas or fumes.

PROTECTIVE GLOVES: In case of spill use PVC or Nitrile gloves of 15 mils (0.015 inch) or thicker.

EYE PROTECTION: Use ANSI approved chemical worker safety goggles or face shield.

OTHER PROTECTIVE EQUIPMENT: In case needed, chemical resistance clothing is recommended along with eye wash station and safety shower should be available meeting ANSI design criteria.

WORK HYGIENIC PRACTICES: Use good hygiene practice. Wash hands after use and before drinking, eating or smoking. Launder contaminated cloth before reuse.

SUPPLEMENTARY SAFETY AND HEALTH DATA: If the battery is broken or leaked the main hazard is the electrolyte. The electrolyte is mainly solution of Lithium chloride (LiCl), and aluminum chloride (AlCl₃) in Thionyl chloride (SOCl₂).

Fires may be fought but only from safe firefighting distance, evacuate all persons from immediate area of fire. Prevent heating of the battery, charging the battery, discharge to predetermined limit, do not crush, disassemble, incinerate or short circuit.

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SECTION 9: CHEMICAL AND PHYSICAL PROPERTIES

Boiling point (760 mm Hg)	NA, unless individual components exposed
Vapor Pressure (mm Hg, 25°C)	NA, unless individual components exposed
Vapor Density (air=1)	NA, unless individual components exposed
Density (gr/cc)	> 1 GRAM/CC
Volatile by Volume (%)	NA, unless individual components exposed
Evaporation Rate (butyl acetate=1)	NA, unless individual components exposed
Physical State	GEOMETRIC SOLID EPOXY COATED OBJECT
Solubility in Water (% by weight)	NA, unless individual components exposed
PH LEVEL	NA, unless individual components exposed
Appearance	SOLID GEOMETRIC SHAPE
Odor	IF LEAKING, GIVES OFF STRONG CORROSIVE ODOR

SECTION 10: STABILITY & REACTIVITY

STABLE OR NOT STABLE

Stable

INCOMPATIBILITY (MATERIAL TO AVOID)

Strong mineral acids, water and alkali solutions.

HAZARDOUS

1. Reaction of lithium with water: Hydrogen (H₂), Lithium hydroxide (LiOH).

DECOMPOSITION

2. Thermal decomposition over 150°C: Sulfur oxides, (SO₂, SO₃), Sulfur

PRODUCTS

chlorides (S₂Cl₂), Chlorine (Cl₂), Lithium oxide, Li₂O

3. Electrolyte with water: Hydrogen Chloride (HCl) and SO₂

DECOMPOSITION TEMPERATURE (° F)

NOT APPLICABLE

HAZARDOUS POLYMERIZATION:

May Occur__

Will Not OCCUR_X_

CONDITIONS TO AVOID

Avoid mechanical abuse and electrical abuse such as short-circuiting, overcharge, over-discharge, (voltage reversal) and heating.

SECTION 11 - TOCICOLOGICAL DATA_____

THRESHOLD LIMIT VALUE (TLV) AND SOURCE: NA

HEALTH HAZARD ACUTE AND CHRONIC: Inhalation, skin contact, eye contact and ingestion are not likely by exposure to sealed battery.

Inhalation, skin contact and eye contact are possible when the battery is opened. Exposure to internal contents, the corrosive fumes will be very irritating to skin, eyes and mucous membranes. Overexposure can cause symptoms of non-fibrotic lung injury and membrane irritation.

Carcinogenicity- NTP: No

Carcinogenicity- IARC: No

Carcinogenicity- OSHA: No

Explanation of Carcinogenicity- No ingredient of a concentration of 0.1% or greater is listed as a carcinogen or suspected carcinogen.

SIGNS AND SYMPTOMS OF OVEREXPOSURE: Exposure to leaking electrolyte from ruptured or leaking battery can cause:

For further information refer to section 4.

SECTION 12: ECOLOGICAL INFORMATION

1. When properly handled used and or disposed of the battery does not present environmental hazards.
2. Cells do not contain mercury, cadmium, lead or other heavy metals.
3. Do not let internal components enter marine environment. Avoid release to waterways, wastewater or ground water.

SECTION 13: DISPOSAL CONSIDERATIONS

1. Dispose in accordance with the applicable local, state and federal regulations.
2. Disposal should be performed by permitted, professional disposal firms knowledgeable in Federal, State or Local requirements of hazardous waste treatment and hazardous waste transportation.
3. Incineration should never be performed by battery users – do not throw in trash or fire
4. Battery recycling should be done in authorized facility.

14. Section 14: Transport information

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SECTION 14 TRANSPORTATION PROVISIONS

UN OR ID NUMBER: 3090 & 3091

PROPER SHIPPING NAMES:

UN 3090 – LITHIUM METAL BATTERIES

UN 3091 – LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT

HAZARD CLASSIFICATION: CLASS 9

PACKING GROUP: NOT APPLICABLE

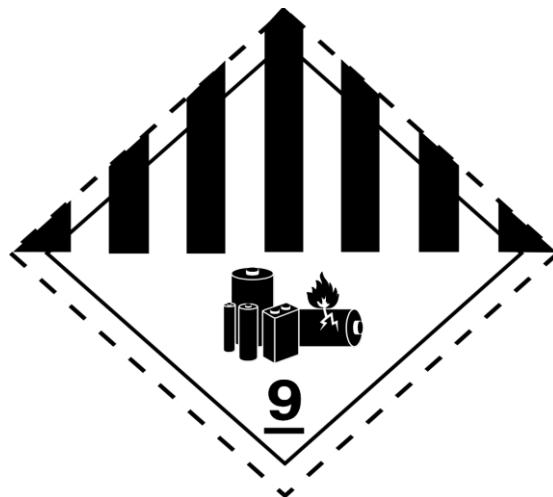
Special provisions and packing instructions:

The cells and batteries are manufactured under a quality management program in an ISO9001 certified factory and meet all the requirements of a UN manual of tests and criteria, Part III, sub-section 38.3. A copy of the UN 38.3 test is available upon request to HDI Instruments LLC at their Houston office listed in Section 1.

All cells and batteries must be packed in accordance with Packing Instructions/ Special Provisions (SP) of the applicable code:

IATA (61ST revised edition)/ICAO (Packing Instructions: PI968, PI969 and PI970)

IMDG CODE - (SP188) ADR (SP188).



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Transportation within, to and from the US: are governed by the US DOT CFR 49, Parts 171, 172, 173 and 175. They detail the required packaging and labels and transportation mode of cells transported separately or in equipment. The battery cannot be shipped, within, to, and from the US by passenger aircraft. Air shipments of cells can be done only by cargo aircraft.

Air transport: Lithium Metal cells and Batteries are forbidden for transport on passenger aircraft worldwide. However, batteries in equipment or packed with equipment can be tendered for Cargo Only Aircraft provided the Air Carrier accepts Lithium Batteries.

ALL WAYS CHECK CURRENT REGULATIONS BEFORE OFFERING BATTERIES FOR TRANSPORT. PACKAGING AND PAPERWORK CAN ONLY BE PERFORMED BY A TRAINED TESTED CERTIFIED EMPLOYEE WHO HAS COMPLETED THE REQUIRED TRAINING FOR LITHIUM BATTERIES.

SECTION 15 REGULATORY INFORMATION

1. All the cells and batteries are defined as "articles" and thus are exempt from the requirements of the Hazard Communication Standard".
2. The internal component (Thionyl chloride) is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1920.1200.
3. NFPA rating- Lithium batteries are not included in the NFPA material list. Below is the NFPA rating for lithium metal. Lithium metal is an internal component, enclosed by hermetically sealed metallic can. Under normal application is not exposed.

16. Section 16: Other Information

SECTION 16: OTHER INFORMATION – CONTACT REFERENCES

The information and the recommendations set forth are made in good faith and believed to be accurate at the date of preparation. The present file refers to normal use of the product in question. HDI INSTRUMENTS LLC nor any of its agents makes no warranty expressed or implied. It is the end user's responsibility to determine the applicability of this or any other product or chemical before its use. Always consult with your HSE Officer prior to the use of this or any other chemical or product. Follow all established Safety Protocols including use of proper PPE.

Assembly of battery packs:

The design and assembly of battery packs require special skills, expertise and experience. Therefore, it is not recommended that the end user will attempt to self-assemble battery packs. It is preferable that any battery using lithium cells will be assembled by HDI INSTRUMENTS LLC to ensure proper battery design and construction. A full assembly service is available from HDI INSTRUMENTS LLC who can be contact for further information. If for any reason, this is not possible, **HDI INSTRUMENTS LLC** can assist to review the pack design in confidence to ensure that the design is safe and capable of meeting the stated performance requirements. This Safety Data Sheet has been reviewed and revised by Dangerousgoods.com Inc. of Houston Texas USA on February 24th, 2020.