



Material Safety Data Sheet

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SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: MTI Battery Cathode EQ-Lib-LNCM
MANUFACTURER: MTI
DIVISION: Electronics Markets Materials Division

ADDRESS: MTI Corporation
860 South 19th Street, Richmond, CA 94804, USA

EMERGENCY PHONE: 1-888-525-3070 or (510) 525-3070

Issue Date: 01/28/13

Product Use:

Intended Use: Battery Cathode

SECTION 2: INGREDIENTS

CHEMICAL NAME: LITHIUM COBALT MANGANESE NICKEL OXIDE
CHEMICAL FORULA: $\text{Li}_x\text{Co}_y\text{Mn}_z\text{Ni}_w\text{O}_2$ (x is between 1 and 1.20, y is between 0.05 and 0.30, z is between 0.30 and 0.60, w is between 0.30 and 0.60)
GAS REGISTRY NO: This substance is a proprietary formulation of Lithium Cobalt Manganese Nickel Oxide, and does not have a CAS number.

SECTION 3: HAZARDS IDENTIFICATION

3.1 EMERGENCY OVERVIEW

Specific Physical Form: Powder

Odor, Color, Grade: Black powder

General Physical Form: Solid

Immediate health, physical, and environmental hazards: May cause allergic skin reaction. May cause allergic respiratory reaction. Contains a chemical or chemicals which can cause cancer. May cause target organ effects.

3.2 POTENTIAL HEALTH EFFECTS

Eye Contact:

Moderate Eye Irritation: Signs/symptoms may include redness, swelling, pain, tearing, and blurred or hazy vision.

Skin Contact:

Allergic Skin Reaction (non-photo induced): Signs/symptoms may include redness, swelling, blistering, and itching.

Moderate Skin Irritation: Signs/symptoms may include localized redness, swelling, itching, and dryness.

Inhalation:

Respiratory Tract Irritation: Signs/symptoms may include cough, sneezing, nasal discharge, headache, hoarseness, and nose and throat pain.

Allergic Respiratory Reaction: Signs/symptoms may include difficulty breathing, wheezing, cough, and tightness of chest.

Prolonged or repeated exposure may cause:

Respiratory Effects: Signs/symptoms may include cough, shortness of breath, chest tightness, wheezing, increased heart rate, bluish colored skin (cyanosis), sputum production, changes in lung function tests, and/or respiratory failure.

May be absorbed following inhalation and cause target organ effects.

Ingestion:

Gastrointestinal Irritation: Signs/symptoms may include abdominal pain, stomach upset, nausea, vomiting and diarrhea.

May be absorbed following ingestion and cause target organ effects.

Target Organ Effects:

Central Nervous System (CNS) Depression: Signs/symptoms may include headache, dizziness, drowsiness, incoordination, nausea, slowed reaction time, slurred speech, giddiness, and unconsciousness.

May cause blindness.

Prolonged or repeated exposure may cause:

Cardiac Effects: Signs/symptoms may include irregular heartbeat (arrhythmia), changes in heart rate, damage to heart muscle, heart attack, and may be fatal.

Neurological Effects: Signs/symptoms may include personality changes, lack of coordination, sensory loss, tingling or numbness of the extremities, weakness, tremors, and/or changes in blood pressure and heart rate.

Kidney/Bladder Effects: Signs/symptoms may include changes in urine production, abdominal or lower back pain, increased protein in urine, increased blood urea nitrogen (BUN), blood in urine, and painful urination.

Liver Effects: Signs/symptoms may include loss of appetite, weight loss, fatigue, weakness, abdominal tenderness and jaundice.

Ocular Effects: Signs/symptoms may include blurred or significantly impaired vision.

Blood Effects: Signs/symptoms may include generalized weakness and fatigue, skin pallor, changes in blood clotting time,

internal bleeding, and/or hemoglobinemia.

Auditory Effects: Signs/symptoms may include hearing impairment, balance dysfunction and ringing in the ears.

Carcinogenicity:

Contains a chemical or chemicals which can cause cancer.

<u>Ingredient</u>	<u>C.A.S. No.</u>	<u>Class Description</u>	<u>Regulation</u>
CAS NO S~CO~CE2	NONE	Grp. 2B: Possible human carc.	International Agency for Research on Cancer
NICKEL COMPOUNDS	NONE	Grp. 1: Carcinogenic to humans	International Agency for Research on Cancer
NICKEL COMPOUNDS (EXCEPT ALLOYS)	NONE	Known human carcinogen	National Toxicology Program Carcinogens

SECTION 4: FIRST AID MEASURES

4.1 FIRST AID PROCEDURES

The following first aid recommendations are based on an assumption that appropriate personal and industrial hygiene practices are followed.

Eye Contact: Flush eyes with large amounts of water. If signs/symptoms persist, get medical attention.

Skin Contact: Remove contaminated clothing and shoes. Immediately flush skin with large amounts of water. Get medical attention. Wash contaminated clothing and clean shoes before reuse.

Inhalation: Remove person to fresh air. If signs/symptoms develop, get medical attention.

If Swallowed: Do not induce vomiting unless instructed to do so by medical personnel. Give victim two glasses of water. Never give anything by mouth to an unconscious person. Get medical attention.

SECTION 5: FIRE FIGHTING MEASURES

5.1 FLAMMABLE PROPERTIES

Autoignition temperature	<i>Not Applicable</i>
Flash Point	No flash point
Flammable Limits (LEL)	<i>Not Applicable</i>
Flammable Limits (UEL)	<i>Not Applicable</i>

5.2 EXTINGUISHING MEDIA

Non-combustible. Choose material suitable for surrounding fire.

5.3 PROTECTION OF FIRE FIGHTER

Special Fire Fighting Procedures: Wear full protective equipment (Bunker Gear) and a self-contained breathing apparatus (SCBA).

Unusual Fire and Explosion Hazards: No unusual fire or explosion hazards are anticipated.

Note: See STABILITY AND REACTIVITY (SECTION 10) for hazardous combustion and thermal decomposition information.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Ventilate the area with fresh air.

6.2. Environmental precautions

Place in a closed container approved for transportation by appropriate authorities. Dispose of collected material as soon as possible.

Clean-up methods

Observe precautions from other sections. Call MTI- HELPS line (1-888-525-3070) for more information on handling and managing the spill. Collect as much of the spilled material as possible. Use wet sweeping compound or water to avoid dusting. Sweep up.

In the event of a release of this material, the user should determine if the release qualifies as reportable according to local, state, and federal regulations.

SECTION 7: HANDLING AND STORAGE

7.1 HANDLING

For industrial or professional use only. Avoid breathing of dust. Avoid skin contact. Avoid eye contact with dust or airborne particles. Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water. Use general dilution ventilation and/or local exhaust ventilation to control airborne exposures to below Occupational Exposure Limits. If ventilation is not adequate, use respiratory protection equipment.

7.2 STORAGE

Keep container tightly closed.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 ENGINEERING CONTROLS

Use with appropriate local exhaust ventilation. Provide local exhaust ventilation at transfer points. Provide appropriate local exhaust when product is heated. Do not use in a confined area or areas with little or no air movement.

8.2 PERSONAL PROTECTIVE EQUIPMENT (PPE)

8.2.1 Eye/Face Protection

Avoid eye contact.

The following eye protection(s) are recommended: Indirect Vented Goggles

8.2.2 Skin Protection

Avoid skin contact.

Select and use gloves and/or protective clothing to prevent skin contact based on the results of an exposure assessment. Consult with your glove and/or protective clothing manufacturer for selection of appropriate compatible materials.

Gloves made from the following material(s) are recommended: Neoprene
Nitrile Rubber

. The following protective clothing material(s) are recommended: Apron - Neoprene

8.2.3 Respiratory Protection

Avoid breathing of dust.

Select one of the following NIOSH approved respirators based on airborne concentration of contaminants and in accordance with OSHA regulations: Fullface supplied-air respirator

. Consult the current MTI Respiratory Selection Guide for additional information or call 1-888-525-3070 for MTI technical assistance.

8.2.4 Prevention of Swallowing

Do not eat, drink or smoke when using this product. Wash exposed areas thoroughly with soap and water.

8.3 EXPOSURE GUIDELINES

Ingredient	Authority	Type	Limit	Additional Information
Cobalt, inorganic compounds	ACGIH	TWA, as Co	0.02 mg/m ³	
MANGANESE COMPOUNDS	OSHA	CEIL, as Mn	5 mg/m ³	
MANGANESE, INORGANIC COMPOUNDS	ACGIH	TWA, as Mn	0.2 mg/m ³	
Nickel, insoluble inorganic compounds	ACGIH	TWA, as Ni, inhalable fraction	0.2 mg/m ³	

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Specific Physical Form:	Powder
Odor, Color, Grade:	Black powder
General Physical Form:	Solid
Autoignition temperature	<i>Not Applicable</i>
Flash Point	No flash point
Flammable Limits(LEL)	<i>Not Applicable</i>
Flammable Limits(UEL)	<i>Not Applicable</i>
Boiling Point	<i>Not Applicable</i>
Density	<i>No Data Available</i>
Vapor Density	<i>Not Applicable</i>
Vapor Pressure	<i>Not Applicable</i>
Specific Gravity	<i>No Data Available</i>
pH	<i>No Data Available</i>
Melting point	>=1,100 °C
Solubility In Water	<=20 mg/l [<i>Details: At pH = 7</i>]
Evaporation rate	<i>No Data Available</i>
Kow - Oct/Water partition coef	0.03
Viscosity	<i>No Data Available</i>

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.

Materials and Conditions to Avoid:

10.1 Conditions to avoid

None known

10.2 Materials to avoid

None known

Hazardous Polymerization: Hazardous polymerization will not occur.

Hazardous Decomposition or By-Products

Substance

Oxides of Cobalt
Toxic Vapor, Gas, Particulate

Condition

During Combustion
During Combustion

SECTION 11: TOXICOLOGICAL INFORMATION

Please contact the address listed on the first page of the MSDS for Toxicological Information on this material and/or its components.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

Test Organism

Water flea, Daphnia magna

Test Type

48 hours Effect Concentration 50%

Result

> 0.33 mg/l

CHEMICAL FATE INFORMATION

Not determined.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Method: Reclaim if feasible. Incinerate in an industrial or commercial facility in the presence of a combustible material. As a disposal alternative, dispose of waste product in a facility permitted to accept chemical waste.

EPA Hazardous Waste Number (RCRA): Not regulated

Since regulations vary, consult applicable regulations or authorities before disposal.

SECTION 14: TRANSPORT INFORMATION

ID Number(s):

WE-3005-2068-4, WE-3009-4617-8, WE-3009-4689-7

Not regulated per U.S. DOT, IATA or IMO.

*These transportation classifications are provided as a customer service. As the shipper YOU remain responsible for complying with all applicable laws and regulations, including proper transportation classification and packaging. MTI's transportation classifications are based on product formulation, packaging, MTI policies and MTI's understanding of applicable current regulations. MTI does not guarantee the accuracy of this classification information. This information applies only to transportation classification and **not the packaging, labeling, or marking requirements**. The original MTI package is certified for U.S. ground shipment only. If you are shipping by air or ocean, the package may not meet applicable regulatory requirements.*

SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS

Contact MTI for more information.

This material contains a chemical which requires export notification under TSCA Section 12[b]:

<u>Ingredient (Category if applicable)</u>	<u>C.A.S. No.</u>	<u>Regulation</u>	<u>Status</u>
Lithium Cobalt Manganese Nickel Oxide	NONE	Toxic Substances Control Act (TSCA) 5 SNUR or Consent Order Chemicals	Applicable

This material contains a chemical regulated by an EPA Significant New Use Rule (TSCA Section 5)

<u>Ingredient (Category if applicable)</u>	<u>C.A.S. No.</u>	<u>Reference</u>
Lithium Cobalt Manganese Nickel Oxide	NONE	40 CFR 721.10201

STATE REGULATIONS

Contact MTI for more information.

CALIFORNIA PROPOSITION 65

<u>Ingredient</u>	<u>C.A.S. No.</u>	<u>Classification</u>
NICKEL COMPOUNDS	NONE	**Carcinogen

** WARNING: contains a chemical which can cause cancer.

CHEMICAL INVENTORIES

The components of this product are in compliance with the chemical notification requirements of TSCA.

This material is subject to specific TSCA regulations limiting its use. Please contact the SMMG EHSR Group prior to any TSCA-regulated use of this material.

Contact MTI for more information.

INTERNATIONAL REGULATIONS

Contact MTI for more information.

This MSDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: OTHER INFORMATION

Revision Changes:

Copyright was modified.

Section 5: Flash point information was modified.

Section 9: Flash point information was modified.

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