



Ceramic Magnetics, Inc.

MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

PART I *What is the material and what do I need to know in an emergency?*

1. PRODUCT IDENTIFICATION

<u>TRADE NAME (AS LABELED):</u>	MANGANESE-ZINC FERRITE
<u>CHEMICAL CLASS:</u>	Inert Ceramic Material
<u>MANUFACTURER'S NAME:</u>	CERAMIC MAGNETICS, Inc.
<u>ADDRESS:</u>	16 Law Drive Fairfield, New Jersey 07004
<u>EMERGENCY PHONE:</u>	973-227-4222
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2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	% w/w	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			OTHER
			TLV	STEL	PEL	STEL	IDLH	
Manganese-Zinc Ferrite	12645-49-7	100	For Ceramic Dusts: 10 mg/m ³ Particulates, Not Otherwise Classified	NE	For Ceramic Dusts: 15 mg/m ³ (Total Dust); 5 mg/m ³ (Respirable Fraction) Particulates, Not Otherwise Classified	NE	NE	NE
Note: This ceramic compound is a crystallographically distinct compound comprised of the following elements: Manganese (Mn) = 10-20 %, by weight Zinc (Zn) = 10-15% Iron (Fe) = 45-55 Oxygen: Balance			0.2 mg/m ³ (for Manganese, Inorganic Compounds)	NE	5 C (for Manganese, Inorganic Compounds)	NE	NE	NIOSH REL: 1 mg/m ³ DFG MAK: 5 mg/m ³ (for Manganese, Inorganic Compounds)

NE= Not Established. C = Ceiling Level See Section 16 for Definitions of Terms Used.

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-1993 format.

3. HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is a black, ceramic material which is odorless. The product presents no unusual hazards in typical emergency response situations. Large quantities of dusts of this ceramic can be irritating to the nose and throat. If this material is shattered, sharp edges and shards can pose a serious physical hazard to responders. Exposure to intense heat can cause ceramic to shatter. This product is not reactive.

SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE: No adverse effects are anticipated when employees handle solid ceramic. The main health effect associated with exposure to this product would be irritation of tissue contaminated with dusts, or cuts and abrasions caused by shattered ceramic.

INHALATION: Inhalation of dusts of this ceramic material can be irritating to the nose, throat, and other tissues of the upper respiratory system. The symptoms of such over-exposure may include coughing, sneezing, and a dry nose.

CONTACT WITH SKIN or EYES: Contact with dusts generated from the ceramic can irritate contaminated skin or eyes, and may cause pain and reddening. Shards or sharp edges of this ceramic material can cut or puncture skin or eye tissue, which may result in serious injury.

SKIN ABSORPTION: Skin absorption is not anticipated to be a significant route of exposure for this product.



INGESTION: Ingestion of this product is not anticipated to be a significant route of occupational exposure. If shards of this material are swallowed, the sharp edges may cut the tissues of the mouth, esophagus, and other tissues of the digestive system.

INJECTION: If the skin is punctured by sharp edges of the ceramic material, the surrounding area may become irritated.

HEALTH EFFECTS OR RISKS FROM EXPOSURE: An Explanation in **Lay Terms**.

ACUTE: No adverse effects are anticipated when employees handle the solid ceramic product. The main health effect associated with exposure to this product would be irritation of tissue contaminated with dusts, or cuts and abrasions caused by shattered ceramic.

CHRONIC: Sensitive individuals may develop skin irritation after repeated or prolonged over-exposures to large amounts of the dusts of this product.

HAZARDOUS MATERIAL INFORMATION SYSTEM			
HEALTH		(BLUE)	1
FLAMMABILITY		(RED)	0
REACTIVITY		(YELLOW)	0
PROTECTIVE EQUIPMENT			B
EYES	RESPIRATORY	HANDS	BODY
	See Section 8		See Section 8
For routine industrial applications			

PART II *What should I do if a hazardous situation occurs?*

4. FIRST-AID MEASURES

SKIN EXPOSURE: If dusts of this product irritate the skin, immediately begin decontamination with soap and water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Victim must seek medical attention if irritation persists.

EYE EXPOSURE: If shards of the product enter the eyes, bandage the eye and immediately seek medical attention. If dusts of this product enter the eyes and irritation develops, flush the eyes with water for 15 minutes and immediately seek medical attention.

INHALATION: If chemical is inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers.

4. FIRST-AID MEASURES (Continued)

INGESTION: If chemical is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Victim should drink milk, egg whites, or large quantities of water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow.

5. FIRE-FIGHTING MEASURES

FLASH POINT, °C (method): Not applicable.

AUTOIGNITION TEMPERATURE, °C: Not applicable.

FLAMMABLE LIMITS (in air by volume, %): Lower (LEL): Not applicable.
Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS: This material is not flammable. Use the fire extinguishing agent appropriate for the surrounding fire.

Water Spray: YES

Foam: YES

Carbon Dioxide: YES

Dry Chemical: YES

Halon: YES

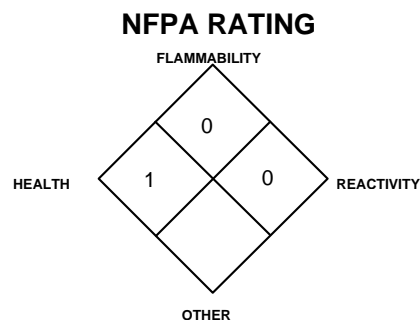
Other: Any "ABC" Class.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This ceramic may shatter if instantly exposed to extremely high temperatures. Sharp edges and shards can pose a physical hazard to fire-fighters.

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural fire fighters must wear Self-Contained Breathing Apparatus and full protective equipment.



6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by trained personnel using pre-planned procedures. Proper protective equipment should be used. In case of a spill, clear the affected area, protect people, and respond with trained personnel.

Minimum Personal Protective Equipment should be **Level D: gloves (leather, ceramic mesh, or steel mesh if cleaning-up broken ceramic; mil nitrile or latex gloves if cleaning-up dusts), safety glasses, and normal work clothing. Level C (which includes an air-purifying respirator with high-efficiency particulate filter) should be worn if excessive amounts of dusts are anticipated during clean-up. Level B (which includes Self-Contained Breathing Apparatus) must be worn in situations where the oxygen level is below 19.5% or is unknown.**

Sweep-up area carefully. Avoid generation of dusts by wetting spilled material with water before-clean-up, as necessary. Decontaminate the area thoroughly. Place all spill residue in an appropriate container and seal. Dispose of in accordance with Federal, State, and local hazardous waste disposal regulations (see Section 13).

PART III *How can I prevent hazardous situations from occurring?*

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Avoid generating dusts. Wash hands after handling this product, especially if dusts were generated during use. Do not eat, drink, or smoke while handling this product. This material must not be machined dry. Machine under water-based, flood coolant to eliminate dust.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Avoid breathing dusts generated from this product. Use a liquid coolant during any machining operations to prevent damage and dust.

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment using soapy water before maintenance begins. Collect all rinsates and dispose of according to applicable Federal, State, or local procedures.

8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation. Use a mechanical fan or vent area to outside, if operations create excessive dust. Ensure that an eye wash station is located near areas in which grinding or other dust-producing operations occur.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed in Section 2. If respiratory protection is needed, use only protection (i.e. a dust mask, an air purifying respirator with a high efficiency particulate filter, or a respirator with a fume filter) authorized in 29 CFR 1910.134, or applicable State regulations. Use supplied air respiration protection during emergency response or if oxygen levels are below 19.5% or if levels are unknown.

EYE PROTECTION: Safety glasses.

HAND PROTECTION: Wear thin mil nitrile gloves or other appropriate gloves for routine industrial use. Use ceramic-mesh, steel-mesh, or leather gloves if handling shards or shattered ceramic.

BODY PROTECTION: Use body protection appropriate for task.

PERSONAL PROTECTIVE EQUIPMENT LEVEL: B.

9. PHYSICAL AND CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): Not applicable

EVAPORATION RATE (n-BuAc = 1): Not applicable.

SPECIFIC GRAVITY (water = 1): 5.1

MELTING POINT or RANGE: Approximately 1500 °C.

SOLUBILITY IN WATER: No.

BOILING POINT: Not applicable.

VAPOR PRESSURE, mm Hg @ 20 °C: Not applicable.

pH: Not applicable.

APPEARANCE AND COLOR: Black, ceramic material with no odor.

HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance of this product is a distinct characteristic of this material. This product can also be attracted by a magnet.

10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: If this product is exposed to extremely high temperature, fumes containing zinc, iron, and manganese compounds can be generated.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product may produce hydrogen gas if exposed to strong acids.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Exposure to strong acids and extreme temperatures.

PART IV *Is there any other useful information about this material?*

11. TOXICOLOGICAL INFORMATION

TOXICITY DATA:

MANGANESE-ZINC FERRITE: There is no specific toxicology information available for this product. Information is available for the main elements comprising this ceramic, as provided below.

IRON:

TDLo (rat) = 450 mg/kg
LD₅₀ (oral-rat) = 30 000 mg/kg
LDLo (intraperitoneal-rabbit) = 20 mg/kg

MANGANESE:

Skin Irritancy (rabbit) 500 mg,24 hr; mild reaction
Eye Irritancy (rabbit) 500 mg 24 hr, mild reaction.
TDLo (intramuscular-rat) = 400 mg/kg
TCLo (inhalation-man) = 2.3 mg/m³;
Brain and Central Nervous System effects

ZINC:

TCLo (inhalation human) = 124 mg/m³/50 min;
PUL, SKN.
Human skin 0.3 mg/3 days intermittent;
mild irritation.

11. TOXICOLOGICAL INFORMATION (Continued)

SUSPECTED CANCER AGENT: This product is not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, CAL/OSHA.

IRRITANCY OF PRODUCT: The dusts of this product can be irritating to the nose, eyes, skin, and other contaminated tissue.

SENSITIZATION TO THE PRODUCT: Sensitive individuals may be prone to skin irritation after prolonged or repeated skin exposure to dusts of this product.

REPRODUCTIVE TOXICITY INFORMATION: Listed below is information concerning the effects of this product and its components on the human reproductive system.

Mutagenicity: This product is not expected to cause mutagenic effects in humans.

Teratogenicity: This product is not expected to cause teratogenic effects in humans.

Reproductive Toxicity: This product is not expected to cause adverse reproductive effects in humans.

A mutagen is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. A teratogen is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A reproductive toxin is any substance which interferes in any way with the reproductive process.

BIOLOGICAL EXPOSURE INDICES: Not applicable.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin conditions and respiratory ailments may be aggravated by over-exposure to the dusts of this ceramic material.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms.

12. ECOLOGICAL INFORMATION

STABILITY: This product will be stable in the environment.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: There is currently no information on this product's impact on plants and animals if this material is released into the environment. However, as with all chemical products, all work practices should be aimed at minimizing environmental contamination.

EFFECT OF CHEMICAL ON AQUATIC LIFE: There is currently no information on this product's impact on aquatic plants and animals if this material is released into the environment. However, as with all chemical products, all work practices should be aimed at minimizing environmental contamination.

13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This chemical, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

EPA WASTE NUMBER: Not applicable to wastes consisting of this product.

14. TRANSPORTATION INFORMATION

THIS MATERIAL IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

<u>PROPER SHIPPING NAME</u> :	Not applicable.
<u>HAZARD CLASS NUMBER and DESCRIPTION</u> :	Not applicable.
<u>UN IDENTIFICATION NUMBER</u> :	Not applicable.
<u>PACKING GROUP</u> :	Not applicable.
<u>DOT LABEL(S) REQUIRED</u> :	Not applicable.

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): Not applicable.

MARINE POLLUTANT: This product is not designated as a Marine Pollutant (as per 49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS NOT CONSIDERED AS DANGEROUS GOODS.

15. REGULATORY INFORMATION

SARA REPORTING REQUIREMENTS: This product is subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act, as follows.

COMPOUND	SECTION 302	SECTION 304	SECTION 313
Manganese	No	No	Yes (Manganese Compound)
Iron	No	No	No
Zinc	No	Yes	Yes (Zinc Compound)
Manganese-Zinc Ferrite	No	No	Yes (as a Zinc Compound and a Manganese Compound)

SARA Threshold Planning Quantity: Not applicable.

TSCA INVENTORY STATUS: This product is listed on the TSCA Inventory.

CERCLA REPORTABLE QUANTITY (RQ): Zinc = 1000 lbs (No reporting is required if the diameter of the solid metal released is equal to or exceeds 100 micrometers).

OTHER FEDERAL REGULATIONS: Not applicable.

STATE REGULATORY INFORMATION: This product is not listed under specific State regulations, as denoted below:

Alaska - Designated Toxic and Hazardous Substances: No .

California - Permissible Exposure Limits for Chemical Contaminants: No .

Florida - Substance List: No.

Illinois - Toxic Substance List: No.

Kansas - Section 302/313 List: No.

Massachusetts - Substance List: No.

Minnesota - List of Hazardous Substances: No.

Missouri - Employer Information/Toxic Substance List: No.

New Jersey - Right to Know Hazardous Substance List: No.

North Dakota - List of Hazardous Chemicals,

Pennsylvania - Hazardous Substance List: No.

Rhode Island - Hazardous Substance List: No.

Texas - Hazardous Substance List: No.

West Virginia - Hazardous Substance List: No.

Wisconsin - Toxic and Hazardous Substances: No.

CALIFORNIA PROPOSITION 65: This product is not on the California Proposition 65 lists.

LABELING (Precautionary Statements): **CAUTION!** Dusts of this product can be irritating to skin, eyes, and other contaminated tissue. Sharp edges or shards can cut skin and eye tissue. Avoid generating dusts of this product. Avoid contact with acids. Consult the Material Safety Data Sheet for further information concerning this product.

TARGET ORGANS (For Dusts): Skin, Eyes.

WHMIS SYMBOLS: Not applicable.

16. OTHER INFORMATION

PREPARED BY:

CHEMICAL SAFETY ASSOCIATES, Inc.
9163 Chesapeake Drive, San Diego, CA 92123-1002
619/565-0302

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. .Ceramic Magnetics, Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, .Ceramic Magnetics, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

CAS #: This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

EXPOSURE LIMITS IN AIR

ACGIH - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

TLV - Threshold Limit Value - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour **Time Weighted Average (TWA)**, the 15-minute **Short Term Exposure Limit**, and the instantaneous **Ceiling Level**. Skin adsorption effects must also be considered.

OSHA - U.S. Occupational Safety and Health Administration.

PEL - Permissible Exposure Limit - this exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The **IDLH - Immediately Dangerous to Life and Health** level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. The **DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called **Recommended Exposure Levels (RELs)**. When no exposure guidelines are established, an entry of **NE** is made for reference.

FLAMMABILITY LIMITS IN AIR

Much of the information related to fire and explosion is derived from the **National Fire Protection Association (NFPA)**. **LEL** - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. **UEL** - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

TOXICOLOGICAL INFORMATION

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD₅₀** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC₅₀** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m³** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause death. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

REGULATORY INFORMATION

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **CTC** are the U.S. Department of Transportation and the Canadian Transportation Commission, respectively. These are: **Superfund Amendments and Reauthorization Act (SARA)**; the **Toxic Substance Control Act (TSCA)**; Marine Pollutant status according to the **DOT**; California's Safe Drinking Water Act (**Proposition 65**); the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund)**; and various state regulations. This section also includes information on the precautionary warnings which appear on the materials package label.