

**MATERIAL SAFETY DATA SHEET
(MSDS)**

I. PRODUCT IDENTIFICATION

Chemical Family: Ceramic Materials **Formula:** Proprietary

Manufacturer

Piezo Systems, Inc.
65 Tower Office Park
Woburn, MA 01801

Phone Numbers

(781) 933-4850
Emergency: (Chem-Tel) 800-255-3924

Product Names

PSI-5A4E & PSI-5H4E

II. HAZARDOUS INGREDIENTS

Solid lead zirconate titanate materials are generally non-hazardous but toxic dust may be generated by machining processes.

Hazardous Component	CAS#	%	OSHA PEL (mg/m³)	ACGIH/TLV (mg/m³)
Lead Oxide	1317-36-8	60-72	0.05	0.05
Zirconium Oxide	1314-23-4	5-25	5.0	5.0
Titanium Oxide	13463-67-7	5-15	15.0 (Total Dust)	10.0
Lanthanum Oxide	1312-81-8	0-4	5.0 (Respirable Dust) 15.0 (Total Dust)	10.0
Niobium Oxide	1313-96-8	0-20	None	None
Nickel Oxide	1313-99-1	0-7	1	1.5

HMIS Rating: Health: 2 Flammability: 0 Reactivity: 0 Personal Protection: E (safety glasses, gloves, dust respirator)

III. PHYSICAL DATA

Boiling Point (oC): No Data **Melting Point:** No Data
Specific Gravity: 7.7 to 8.25 g/cc **Vapor Pressure:** N/A
% Volatile by Volume: N/A **Reaction with H₂O:** N/A
Appearance and Odor: Yellow, Tan, White, Brown, or Green Solid or Powder with no odor.
Solubility: Insoluble

IV. FIRE AND EXPLOSION HAZARDS DATA

Flash Point (Method used): N/A **Auto ignition Temp (oC):** N/A
Flammable Limits: Upper: N/A **Lower:** N/A
Extinguishing Media: Nonflammable

V. HEALTH HAZARD INFORMATION

The primary route of entry is either by inhalation or ingestion. This material can be in the form of powder or solid. If inhaled or ingested the toxicology of lead predominates. This includes the potential for damage to the kidneys, blood forming organs as well as the reproductive system and the nervous system. Ingestion can cause vomiting, diarrhea, nausea and abdominal pain. Inhalation may cause irritation of the nose and throat, cough, dyspnea, chest pains, fever and chills. Acute lead poisoning can lead to a condition called acute encephalopathy, which may rapidly develop into seizures, coma and eventually death.

EMERGENCY AND FIRST AID PROCEDURES:

Ingestion: If conscious, induce vomiting

Eye Contact: Flush eyes with plenty of running water for at least 15 minutes. Hold the eyelids apart during the flushing to ensure the rinsing of the entire surface of the eye and lids with water. Seek medical attention if eye irritation occurs.

Inhalation: If ceramic powders inhaled and breathing difficulties experienced, remove to fresh air. Seek medical attention if difficulties persist.

Skin Contact: Wash thoroughly.

VI. REACTIVITY DATA

Stability: Stable

Conditions to Avoid: N/A

Incompatibility (Material of Avoid): N/A

Hazardous Decomposition Products: The materials are normally stable and decompose only in extreme cases such as fire, in which case they will melt and possibly give off gases such as the oxides of lead.

Hazardous Polymerization: Will not occur.

VII. SPILL OR LEAK PROCEDURES

Steps to Be Taken in Case Material is Released or Spilled: Vacuum powder with a HEPA filtered vacuum or wipe up residue with a wet sponge and remove to an approved waste receptacle.

Try to keep material dry and away from acid. Sweep or scoop up spilled material. Handle with adequate ventilation. For nuisance dust, see OSHA 29 CFR 1910.94, Ventilation.

Waste Disposal Method: Dispose of in accordance with Local, State, and Federal regulations.

VIII. SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type): NIOSH approved dust mask should be worn if process causes a dusting. A NIOSH-approved air-purifying respirator is required if TLV and PEL exposure limits are exceeded.

Ventilation: Use local exhaust to maintain concentrations at or below PEL, TLV. General exhaust is recommended.

Protective Gloves: Protective gloves required (latex or nitrile).

Eye Protection: Safety glasses required.

Other Protective Equipment: Local exhaust ventilation is recommended where an airborne dust or powder is generated. Work practices and training may be required depending on the exposure level. Many of these points are discussed in the OSHA Respiratory Protection Standard (29 CFR 1910.134), the OSHA Hazard Communication Standard (29 CFR 1910.1200) and the OSHA Lead Standard (29 CFR 1910.1025)

IX. SPECIAL PRECAUTIONS

Other Handling and Storage Conditions: Keep container closed. Store in a cool, dry place, and away from acids. Wash thoroughly after handling.

Work Practices: Implement engineering and work practice controls to reduce and maintain concentration of exposure at low levels. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating and smoking. Do not blow dust off clothing or skin with compressed air. Maintain eyewash capable of sustained flushing, safety drench shower and facilities for washing.

Transportation Requirements:

DOT Class: N/A

This material is listed on EPA's TSCA Inventory. Lead is regulated under EPA's SARA Regulations.

The above information is believed to be correct, but does not purport to be all-inclusive and shall only be used as a guide.

Piezo Systems shall not be held liable for any damage resulting from handling or from contact with the above product.

Dated: 1/4/2013