

MATERIAL SAFETY DATA SHEET

SRM Supplier: National Institute of Standards and Technology
Standard Reference Materials Program
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SRM Number: 991
MSDS Number: 991
SRM Name: Lead-206 Assay and Isotopic
Solution

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SECTION I. MATERIAL IDENTIFICATION

Material Name: Lead-206 Assay and Isotopic Standard

Description: The isotopic composition:

²⁰⁴ Pb, Atom Percent	< 0.0003
²⁰⁶ Pb, Atom Percent	99.979
²⁰⁷ Pb, Atom Percent	0.008 ± 0.001
²⁰⁸ Pb, Atom Percent	0.013 ± 0.001

SRM 991 consists of a solution of lead nitrate sealed in quartz ampoules. Each ampoule contains a nominal 15 g of solution, 0.5 N in nitric acid.

Other Designations: Lead Nitrate (lead dinitrate; lead (II) nitrate; lead (II) salt; lead nitrate crystal) in Nitric Acid (aqua fortis; hydrogen nitrate; azotic acid; engraver's acid)

Name	Chemical Formula	CAS Registry Number
Lead Nitrate	Pb(NO ₃) ₂	10099-74-8
Nitric Acid	HNO ₃	7697-37-2

DOT Classification: Corrosive Liquid, Poisonous
N.O.S. (Nitric Acid and Lead Compounds) UN 2922

SECTION II. HAZARDOUS INGREDIENTS

Hazardous Components	Nominal Concentration	Exposure Limits and Toxicity Data
Lead Nitrate (Inorganic fumes as Pb)		ACGIH TLV-TWA: 0.05 mg/m ³
Pb(NO ₃) ₂	106 mg/kg	OSHA TLV-TWA (8 hours): 50 µg/m ³
Pb	66 mg/kg	OSHA Action Level (8 hours): 30 µg/m ³
		Woman, Oral: TD _{LO} : 450 mg/kg/6 yrs
		Rat, Intravenous: LD ₅₀ : 93 mg/kg
		Mouse, Intraperitoneal: LD ₅₀ : 74 mg/kg
Nitric Acid	0.5 N	ACGIH TLV-TWA: 2 mg/kg or 5 mg/m ³
		OSHA TLV-TWA: 2 mg/kg or 5 mg/m ³
		Human, Oral: LD _{LO} : 430 mg/kg

SECTION III. PHYSICAL/CHEMICAL CHARACTERISTICS

Nitric Acid	Lead Nitrate
Appearance and Odor: a white to slightly yellow liquid that darkens to a brownish color upon aging and exposure to light; pungent odor	Appearance and Odor: solid, translucent, colorless to yellow crystals
Relative Molecular Mass: 63.02	Relative Molecular Mass: 331.21
Boiling Point: 83 °C	Boiling Point: not applicable
Freezing Point: -42 °C	Melting Point: not available
Density: 1.05 g/mL (10 % nitric acid)	Density: 4.53 g/mL
Water Solubility: soluble	Water Solubility (@ °C): 38 %
Solvent Solubility: miscible in ether	Solvent Solubility: alcohol, alkali, ammonia; insoluble in concentrated nitric acid

NOTE: The physical and chemical data provided are for the pure components. Physical and chemical data for this lead nitrate/nitric acid solution do not exist. The actual behavior of the solution may differ from the individual components.

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

Flash Point: Not applicable **Method Used:** Not applicable **Autoignition Temperature:** Not applicable

Flammability Limits in Air (Volume %): **UPPER:** Not applicable
LOWER: Not applicable

Unusual Fire and Explosion Hazards: Iron nitrate is a negligible fire hazard; however, it is an oxidizer that may ignite or explode on contact with combustible materials. Although nitric acid does not burn, it is a powerful oxidizing agent that can react with combustible materials to cause fires.

Extinguishing Media: Use extinguishing media that is appropriate to the surrounding fire. Use a water spray to dilute nitric acid and to absorb liberated oxides of nitrogen.

Special Fire Procedures: Fire fighters should wear a self-contained breathing apparatus (SCBA) with a full face piece in the pressure demand or positive mode and other protective clothing.

SECTION V. REACTIVITY DATA

Stability: X Stable _____ Unstable

Stable at normal temperature and pressure.

Conditions to Avoid: Avoid contact with moisture and incompatible materials.

Incompatibility (Materials to Avoid): Lead nitrate is incompatible with combustible materials, metal salts, reducing agents, and acids. Keep nitric acid away from organic materials, plastics, rubber, and some forms of coatings. Nitric acid is incompatible with chlorine and metal ferrocyanide.

See Section IV: "Unusual Fire and Explosion Hazards".

EMERGENCY AND FIRST AID PROCEDURES:

Skin Contact: Remove contaminated shoes and clothing. Rinse affected area with large amounts of water followed by washing the area with soap and water. Watch for chemical irritations and treat them accordingly. Obtain medical assistance if necessary.

Eye Contact: Immediately flush eyes, including under the eyelids, with copious amounts of water for at least 15 minutes. Obtain medical assistance.

Inhalation: If inhaled, move the victim to fresh air. If breathing is difficult, give oxygen; if the victim is not breathing, give artificial respiration by qualified personnel. Obtain medical assistance if necessary.

Ingestion: If ingestion occurs, wash out mouth with water. **DO NOT** induce vomiting. If the exposed person is responsive, give one or two glasses of milk or water to drink. Obtain medical assistance immediately.

NOTE (Nitric Acid): Wash affected skin areas with 5 % solution of sodium bicarbonate (NaHCO_3). If ingested, the risk versus the benefit of the passage of a naso-gastric tube is debatable. Activated charcoal is of no value. **DO NOT** give the exposed person bicarbonate to neutralize the material.

TARGET ORGAN(S) OF ATTACK: **Lead Nitrate:** nervous system, kidneys; teratogen
Nitric Acid: skin, teeth, eyes, and upper respiratory tract

SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken in Case Material is Released or Spilled: Notify safety personnel of spills. Surfaces contaminated with spills should be covered with soda ash or sodium bicarbonate to neutralize the acid. Place the neutralized material into containers suitable for eventual disposal, reclamation, or destruction.

Waste Disposal: Follow all federal, state, and local laws governing disposal.

Handling and Storage: Provide general and local explosion proof ventilation systems to maintain airborne concentrations below the TLV. Provide approved respiratory apparatus for non-routine or emergency use. Use an approved filter and vapor respirator when the vapor or mist concentrations are high. Wear gloves and chemical safety glasses where contact with the liquid or high vapor concentrations may occur. An eye wash station and washing facilities should be readily available near handling and use areas.

NOTE: Contact lenses pose a special problem; soft lenses may absorb irritants and all lenses concentrate them. **DO NOT** wear contact lenses in the laboratory.

Store this material in its original bottle at room temperature.

SECTION VIII. SOURCE DATA/OTHER COMMENTS

Sources: MDL Information Systems, Inc., MSDS *Nitric Acid*, 18 March 2004.
MDL Information Systems, Inc., MSDS *Lead Nitrate*, 18 March 2004.
MDL Information Systems, Inc., MSDS *Lead*, 18 March 2004.
Certificate 991 *Lead-206 Assay and Isotopic Standard*; National Institute of Standards and Technology, U.S. Department of Commerce: Gaithersburg, MD (2004).

Disclaimer: Physical and chemical data contained in this MSDS are provided only for use in assessing the hazardous nature of the material. The MSDS was prepared carefully, using current references; however, NIST does not certify the data on the MSDS. The certified value for this material is given in the NIST Certificate of Analysis.