

# MATERIAL SAFETY DATA SHEET

**SRM Supplier:** National Institute of Standards and Technology  
Standard Reference Materials Program  
Bldg. 202 Rm. 211  
Gaithersburg, MD 20899

**SRM Number:** 3115a  
**MSDS Number:** 3115a  
**SRM Name:** Dysprosium Standard Solution  
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## SECTION I. MATERIAL IDENTIFICATION

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**Material Name:** Dysprosium Standard Solution

**Description:** SRM 3115a is a single element solution prepared gravimetrically to contain a nominal 10 mg/g of dysprosium with a nitric acid volume fraction of 10 %.

**Other Designations:** **Dysprosium** in **Nitric Acid** (aqua fortis; hydrogen nitrate; azotic acid; engraver's acid); **Dysprosium Nitrate\*** (dysprosium trinitrate pentahydrate; dysprosium (III) nitrate pentahydrate; nitric acid dysprosium (III) salt pentahydrate) in **Standard Solution**

Name	Chemical Formula	CAS Registry Number
Nitric Acid	HNO <sub>3</sub>	7697-37-2
Dysprosium Nitrate Pentahydrate	Dy(NO <sub>3</sub> ) <sub>3</sub> •5H <sub>2</sub> O	10031-49-9
Dysprosium	Dy	7429-91-6

**DOT Classification:** Nitric Acid Solution, UN2031

**Manufacturer/Supplier:** Available from a number of suppliers

\* The addition of dysprosium to nitric acid, along with other intermediate chemical reactions, forms dysprosium nitrate pentahydrate which will precipitate upon evaporation or drying of the solution.

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## SECTION II. HAZARDOUS INGREDIENTS

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Hazardous Components	Nominal Concentration (%)	Exposure Limits and Toxicity Data
Nitric Acid	10	ACGIH TLV-TWA: 2 mg/kg or 5 mg/m <sup>3</sup> OSHA TLV-TWA: 2 mg/kg or 5 mg/m <sup>3</sup> Human, Oral: LD <sub>50</sub> : 430 mg/kg
Dysprosium Nitrate	2.7	No occupational exposure limits established Rat, Oral: LD <sub>50</sub> : 2386 mg/kg
Dysprosium	1	No occupational exposure limits established



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**SECTION VI. HEALTH HAZARD DATA**

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Route of Entry:       X   Inhalation                     X   Skin                     X   Ingestion

**Health Hazards (Acute and Chronic): Nitric Acid:** Nitric acid may be fatal if inhaled, swallowed, or absorbed through the skin. This material causes burns and is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin. Inhalation may be fatal as a result of spasm, inflammation, and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

**Dysprosium and Dysprosium Nitrate:** Dysprosium and dysprosium nitrate may be harmful by inhalation, ingestion, or skin absorption. Exposure may cause irritation to skin, eyes, mucous membranes, and upper respiratory tract. Some rare earth elements may cause lung granulomas. Inhalation may cause itching, sensitivity to heat, and an increased awareness of odor and taste. Application to abraded skin may cause extensive injury resulting in epilation and scar formation. The oral toxicity of the rare earth metals and salts is low due to poor gastrointestinal absorption. Rare earth compounds may effect the blood's ability to clot.

**Medical Conditions Generally Aggravated by Exposure:** eye disorders, skin disorders, respiratory disorders, and allergies

**Listed as a Carcinogen/Potential Carcinogen:**

	Yes	No
In the National Toxicology Program (NTP) Report on Carcinogens	_____	<u>  X  </u>
In the International Agency for Research on Cancer (IARC) Monographs	_____	<u>  X  </u>
By the Occupational Safety and Health Administration (OSHA)	_____	<u>  X  </u>

**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. Obtain medical assistance if necessary.

**Ingestion:** If ingestion occurs, wash out mouth with water. **DO NOT** induce vomiting. Obtain medical assistance immediately.

**NOTE (Nitric Acid):** Wash affected skin areas with 5 % solution of sodium bicarbonate (NaHCO<sub>3</sub>). 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:**     **Nitric Acid:** skin, teeth, eyes, and upper respiratory tract

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**SECTION VII. PRECAUTIONS FOR SAFE HANDLING AND USE**

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**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 nonroutine 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 at room temperature.

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#### SECTION VIII. SOURCE DATA/OTHER COMMENTS

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**Sources:** MDL Information Systems, Inc., MSDS *Dysprosium*, 06 September 1999.  
MDL Information Systems, Inc., MSDS *Nitric Acid*, 01 June 2000.  
Sigma Aldrich Co., MSDS *Dysprosium Nitrate*, August 2000.  
The Merck Index, 11th Ed., 1989.  
The Sigma Aldrich Library of Chemical Safety Data, Ed. II, 1988.

**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.