
1. PRODUCT AND COMPANY IDENTIFICATION

Product Name	Americium-243, Am-243
Physical Form	Black powder
CAS No.	7440-35-9
Chemical Formula	Americium oxide: AmO ₂
Mass Number	243.06138 g/mol (148 neutrons)
Supplier Address*	ISOFLEX USA P.O. Box 472615 San Francisco, CA 94147 United States
Telephone	+1 415-440-4433
Fax	+1 415-563-4433
Emergency Phone Number (both supplier and manufacturer)	Infotrac/ +1 800-535-5053 *May include subsidiaries or affiliate companies/divisions
Email	iusa@isoflex.com
Website	www.isoflex.com
Preparation Information	ISOFLEX USA Product Safety +1 415-440-4433

2. HAZARDS IDENTIFICATION

Emergency Overview Sealed sources pose no internal radiation hazard. However, in the event of loss of containment by the sealed source, all precautions should be taken to prevent inhalation or ingestion of the material.

Radiological Hazard. Warning: THIS MATERIAL SHOULD ONLY BE USED BY PERSONS QUALIFIED TO HANDLE RADIOACTIVE MATERIAL!

Americium-243 is a radioactive material. It decays by alpha-particle emission to Neptunium-239, which decays by beta-particle emission. During the decay process X-rays and gamma rays with energies from 14 keV to 700 keV are emitted.

Label Elements

Symbol



Signal Word

DANGER

Hazard Statement(s)
Precautionary Statement(s)

H314 Causes severe skin burns and eye damage
P260 Do not breathe fumes, mists, vapors, or spray.
P264 Wash hands thoroughly after handling.
P280 Wear protective gloves, protective clothing and eye protection.
P301/330/331 If swallowed: Rinse mouth. Do NOT induce vomiting.
P303/361/353 If on skin (or hair): Remove immediately all contaminated clothing. Rinse skin with water.
P304/340 If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305/351/338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 Immediately call a doctor.
P363 Wash contaminated clothing before reuse.
P405 Store locked up.
P501 Dispose of contents and container according to local regulations.

Potential Health Effects

Principle Routes of Exposure: Inhalation
Skin Contact
Ingestion

Dosimetry: Whole Body

Critical Organ(s): Bone surface

Annual Dose Limits: Non-nuclear energy workers: 1mSv per year

Nuclear Energy Workers: a) 50 mSv in one year
b) 100 mSv total over five years

Pregnant Nuclear Energy Workers: 4 mSv over the balance of the pregnancy

Non-Radiological Hazards Currently no information available
Control Levels No data available

NFPA Ratings (0 = Minimal; 1 = Slight; 2 = Moderate; 3 = Serious; 4 = Severe)
Health Hazard: 3 Flammability: 0 Reactivity Hazard: 0

HEALTH HAZARD	3
FLAMMABILITY	0
PHYSICAL HAZARD	0
PERSONAL PROTECTION	

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name: Americium-243
CAS No.: 7440-35-9
Physical Half-Life: 7370 years
Specific Activity (Ci/g): 0.2
Decay Mode: a

Radiation Energy (MeV):

Alpha (α): 5.3
Beta (β): 0.022
Gamma (γ): 0.055

4. FIRST AID MEASURES

Methods of detection (in order of preference):

1. A radiation survey meter equipped with an energy-compensated Geiger Mueller detector.
2. Ion chamber survey meter – tends to be less sensitive than a Geiger Mueller survey meter but is able to respond more precisely in higher radiation fields.
3. Gamma scintillation detector – very sensitive but is also energy-dependent. Must be calibrated for Am-243 before it can be used for dose assessment surveys.

The following is a guide for first-responders. The following actions, including remediation, should be carried out by qualified individuals. In cases where life-threatening injury has resulted, first treat the injury, second deal with personal decontamination.

Personal Decontamination Techniques

Wash well with soap and water; monitor skin
Do not abrade skin, only blot dry
Decontamination of clothing and surfaces are covered under operating and emergency procedures

5. FIREFIGHTING MEASURES

<i>Flammable Properties</i>	Negligible fire hazard
<i>Suitable Extinguishing Media</i>	Suitable: Use extinguishing media appropriate to the surrounding fire. Unsuitable: None listed.
<i>Specific Hazards Arising from the Chemical</i>	Oxides of nitrogen
<i>Protective Equipment and Precautions for Firefighters</i>	Gloves, footwear covers, safety glasses, and outer layer or easily removed protective clothing (as situation requires). NIOSH-approved self-contained breathing apparatus. Avoid inhalation of material or combustion byproducts.

6. ACCIDENTAL RELEASE MEASURES

This material is radioactive. DO NOT TOUCH spilled material. Immediately notify safety personnel of a spill.

<i>Personal Precautions</i>	Use personal protective equipment: gloves, footwear covers, outer layer or easily-removed full protective clothing (as situation requires).
<i>Damage to Sealed Radioactive Source Holder</i>	Evacuate the immediate vicinity around the source holder Place a barrier at a safe distance from the source holder (minimum 5 meters). Identify area as a radiation hazard. Contact emergency number posted on local warning sign.

Spill and Leak Control

Alert everyone in the area
Confine the problem or emergency (includes the use of absorbent material)
Clear area
Summon aid

7. HANDLING AND STORAGE

Safe Handling Precautions/Storage:

This material is radioactive. Store and handle in accordance with all current regulations and standards. See NRC 10 CFR 20 or state regulations. See Section 8, below.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits:

Americium-243:

AL_{inh}: 0.006 μ Ci (bone surface) See NRC 10 CFR 20 Appendix B.

AL_{ing}: 0.8 μ Ci (bone surface)

OSHA: See OSHA 29 CFR and NRC 10 CFR 20.

ACGIH: See International Commission on Radiological Protection guidelines.

Nitric Acid:

NIOSH (REL): 5 mg/m³ (2 ppm; TWA)
10 mg/m³ (4 ppm; STEL)
65 mg/m³ (25 ppm; IDLH)

ACGIH (TLV): 5 mg/m³ (2 ppm; TWA)
10 mg/m³ (4 ppm; STEL)

OSHA (PEL): 5 mg/m³ (2 ppm; TWA)

Engineering Controls: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Personal Protection: In accordance with OSHA 29 CFR 1910.132, subpart I, wear appropriate Personal Protective Equipment (PPE) to minimize exposure to this material.

Respiratory Protection: If workplace conditions warrant a respirator, a respiratory protection program that meets OSHA 29CFR 1910.134 must be followed. Refer to NIOSH 42 CFR 84 for applicable certified respirators.

Eye/Face Protection: Wear splash-resistant safety goggles with a face shield. An eye wash station should be readily available near areas of use.

Skin/Body Protection: Wear protective clothing to prevent contact with skin. Wear appropriate gloves.

9. PHYSICAL AND CHEMICAL PROPERTIES (Americium-243)

Appearance

Form	Powder
Color	Black

Safety Data

Physical Half-Life:	7370 years
Specific Activity (Ci/g):	0.2
Decay Mode:	α

Radiation Energy (MeV):

Alpha (α):	5.3
Beta (β):	0.022
Gamma (γ):	0.055

10. STABILITY AND REACTIVITY

<i>Stability</i>	Stable at normal temperatures and pressure
<i>Incompatible Materials</i>	Acids, combustible materials, halo carbons, amines, bases, oxidizing materials, metals, halogens, metal salts, metal oxides, reducing agents, peroxides, metal carbide, cyanides
<i>Conditions to Avoid</i>	Avoid contact with combustible materials and incompatible materials.
<i>Hazardous Polymerization</i>	Will not occur

11. TOXICOLOGICAL INFORMATION

<i>Routes of Exposure:</i>	Inhalation, Skin, Ingestion
<i>Symptoms Related to the Physical, Chemical and Toxicological Characteristics:</i>	Burning pain and severe corrosive skin damage. Permanent eye damage, including blindness, could result.
<i>Potential Health Effects (Acute, Chronic and Delayed):</i>	Inhalation: Nitric acid, if inhaled, can damage the mucous membranes and respiratory tract. Short-term exposure may cause irritation and inflammation of the upper respiratory tract, coughing, choking, sore throat, shortness of breath, headache, dizziness and nausea. Long-term exposure to acid fumes may cause damage to teeth, bronchial irritation, chronic cough, bronchial pneumonia, and gastrointestinal disturbances. Skin Contact: Nitric acid can cause severe skin burns. Severity of the damage depends on the concentration and duration of exposure. Effects of acid burns may be delayed. Eye Contact: Nitric acid can cause severe eye irritation, corneal burns, permanent eye damage, or blindness. Severity of the damage depends on the concentration and duration of exposure. Ingestion: Ingestion of this material is unlikely under normal conditions of use. If ingested, nitric acid can cause severe burns and damage to the gastrointestinal tract.

Numerical Measures of Toxicity:

<i>Acute Toxicity:</i>	Nitric acid – Rat - Inhalation LC50: 130 mg/m ³ (4 hours)
<i>Skin Corrosion/Irritation:</i>	If material contains 6% nitric acid, it is classified as Category 1B.
<i>Serious Eye Damage/Irritation:</i>	If material contains 6% nitric acid, it is classified as Category 1.
<i>Respiratory Sensitization:</i>	No data available
<i>Skin Sensitization:</i>	No data available
<i>Germ Cell Mutagenicity:</i>	No data available
<i>Carcinogenicity:</i>	<i>Listed as a Carcinogen/Potential Carcinogen - No</i> Nitric acid is not listed by NTP, IARC or OSHA as a carcinogen. <i>Radiological Hazard:</i> Americium-243 - Ionizing radiation is a known carcinogen.
<i>Reproductive Toxicity:</i>	No data available
<i>Specific Target Organ</i>	
<i>Toxicity / Single Exposure:</i>	No data available
<i>Specific Target Organ</i>	
<i>Toxicity / Repeated Exposure:</i>	No data available
<i>Aspiration Hazard:</i>	No data available

12. ECOLOGICAL INFORMATION

Ecotoxicity Data

Component: Nitric Acid

Fish: Starfish (*Asterias rubens*), LC50: 100-300 mg/L (48 hrs / renewal / aerated water)

Component: Americium-243

No ecotoxicity data listed

Persistence and Degradability No data available

Bioaccumulative Potential No data available

Mobility in Soil No data available

Other Adverse Effects No data available

13. DISPOSAL CONSIDERATIONS

Waste Disposal:

This material is radioactive. Dispose in accordance with all applicable federal, state, and local regulations for RADIOACTIVE materials. See NRC 10 CFR 20 subpart K.

14. TRANSPORT INFORMATION

DOT/IATA

Primary Risk:

UN2031, Nitric acid 6%, Hazard Class 8, Packing Group II

Subsidiary Risk:

Non-radioactive per transportation regulations.

Note: Not radioactive for shipping purposes unless more than 5 units ordered.

15. REGULATORY INFORMATION

US Regulations

CERCLA Sections 102a/103 (40 CFR 302.4): Nitric Acid, 1000 lbs; 454 kg RQ

SARA Title III Section 302 (40 CFR 355.30): Nitric Acid, 1000 lbs TPQ.

SARA Title III Section 304 (40 CFR 355.40): Nitric Acid, 1000 lbs EPCRA RQ

SARA Title III Section 313 (40 CFR 372.65): Nitric Acid, 1.0 % de minimis concentrations

OSHA Process Safety (29 CFR 1910.119): Nitric Acid at higher concentrations (>94.5 %) is regulated.

SARA Title III Sections 311/312 Hazardous Categories (40 CFR 370.21):

ACUTE HEALTH: Yes

CHRONIC HEALTH: Yes

FIRE: No

REACTIVE: No

PRESSURE: No

TSCA Inventory: Nitric acid listed

TSCA 12(b), Export Notification: No components are listed

State Regulations

California Proposition 65: No components are regulated

Canadian Regulations

WHMIS Information: Not provided for this material

16. OTHER INFORMATION

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P.O. Box 472615
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Revision Number 4

Revision Note Update supplier address

Sources ChemAdvisor Inc., SDS *Nitric Acid*, 19 June 2014.

CDC; NIOSH; *NIOSH Pocket Guide to Chemical Hazards*; Department of Health and Human Services (DHHS), Centers for Disease Control and Prevention (CDC), National Institute for Safety and Health; *Nitric Acid*, 18 November 2010; available at <http://www.cdc.gov/niosh/npg/npgd0447.html> (accessed Jan 2015).

United States National Library of Medicine, Hazardous Substance Database (HSDB), *Nitric Acid*; available at <http://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm> (accessed Jan 2015).

United States National Library of Medicine, Hazardous Substance Database (HSDB), *Americium Radioactive*; available at <http://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm> (accessed Jan 2015).

OSHA 29 CFR, Subpart Z, Ionizing radiation, 1910.1096.

NRC 10 CFR 20, Standards for Protection Against Radiation.

DOT 49 CFR 173, Shippers General Requirements for Shipments and Packages.

ISOFLEX USA's Commonly Used Abbreviations and Acronyms*

ACGIH	American Conference of Governmental Industrial Hygienists
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road
AICS	Australian Inventory of Chemical Substances
ALARA	As Low As Is Reasonably Achievable
AMU	Atomic Mass Unit
ANSI	American National Standards Institute
BLS	Basic Life Support
BOD5	Biochemical Oxygen Demand
CAM	Continuous Air Monitor
CAS	Chemical Abstracts Service (division of the American Chemical Society)
CEN	European Committee for Standardization
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CLP	Classification, Labelling and Packaging (European Union)
COD	Chemical Oxygen Demand
CPR	Controlled Products Regulations (Canada)
CWA	Clean Water Act (USA)
DAC	Derived Air Concentration (USA)
DOE	United States Department of Energy (USA)
DOT	United States Department of Transportation (USA)
DSL	Domestic Substances List (Canada)
EC50	Half Maximal Effective Concentration
ECL	Korean Existing Chemicals List
EINECS	European Inventory of Existing Commercial Chemical Substances

EHS	Environmentally Hazardous Substance
ELINCS	European List of Notified Chemical Substances
EMS	Emergency Response Procedures for Ships Carrying Dangerous Goods
EPA	Environmental Protection Agency (USA)
EPCRA	Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986
GHS	Globally Harmonized System
HMIS	Hazardous Materials Identification System (USA)
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IBC	Intermediate Bulk Containers
ICAO	International Civil Aviation Organization
IDLH	Immediately Dangerous to Life or Health
IECSC	Inventory of Existing Chemical Substances Produced or Imported in China
IMDG	International Maritime Code for Dangerous Goods
IMO	International Maritime Organization
LC50	Lethal concentration, 50 percent
LD50	Lethal dose, 50 percent
LDLO	Lethal Dose Low
LOEC	Lowest-Observed-Effective Concentration
MARPOL	International Convention for the Prevention of Pollution from Ships
MSHA	Mine Safety and Health Administration (USA)
NCRP	National Council on Radiation Protection & Measurements (USA)
NDSL	Non-Domestic Substances List (Canada)
NFPA	National Fire Protection Association (USA)
NIOSH	National Institute for Occupational Safety and Health (USA)
NOEC	No Observed Effect Concentration
N.O.S.	Not Otherwise Specified
NRC	Nuclear Regulatory Commission (USA)
NTP	National Toxicology Program (USA)
OSHA	Occupational Safety and Health Administration (USA)
PBT	Persistent Bioaccumulative and Toxic Chemical
PEL	Permissible Exposure Limit
PICCS	Philippines Inventory of Chemicals and Chemical Substances
PIH	Poisonous by Inhalation Hazard
RCRA	Resource Conservation and Recovery Act (USA)
RCT	Radiation Control Technician
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (Europe)
RID	Regulations Concerning the International Transport of Dangerous Goods by Rail
RQ	Reportable Quantity
RTECS	Registry of Toxic Effects of Chemical Substances
RTK	Right to Know
SARA	Superfund Amendments and Reauthorization Act (USA)
SNUR	Significant New Use Rule (TSCA)
TDG	Transportation of Dangerous Goods (Canada)
TIH	Toxic by Inhalation Hazard
TLV	Threshold Limit Value
TPQ	Threshold Planning Quantity
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average
UN	United Nations (Number)
VOC	Volatile Organic Compound
vPvB	Very Persistent Very Bioaccumulative Chemical
WGK	Wassergefährdungsklassen (Germany: Water Hazard Classes)
WHMIS	Workplace Hazardous Materials Information System

*One or more of the above-listed items may not appear in this document.

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