

SPI Supplies Division**Structure Probe, Inc.**

P.O. Box 656 West Chester, PA 19381-0656 USA

Phone: 1-(610)-436-5400 Fax: 1-(610)-436-5755

E-mail: spi3spi@2spi.comWWW: <http://www.2spi.com>

Manufacturer's CAGE: 1P573



Material Safety Data Sheet

SPI #02546-AB SPI-Chem™ Uranyl Nitrate Hexahydrate
Section 01 Identification

 Date Effective..... March 3, 2010
 (most recent revision)

Chemical Name/Synonyms... Uranyl Nitrate Hexahydrate

Emergencies

Contacting CHEMTREC:

24 Hour Emergency Use Only #'s...

Worldwide phone: 1-(703)-527-3887

Worldwide FAX: 1-(703)-741-6090

Toll-free phone: 1-(800)-424-9300 USA only



Product or Trade Name.... SPI #02546-AB Uranyl nitrate hexahydrate

Synonyms: Uranyl(VI)nitrate hexahydrate; Dinitratodioxouranium hexahydrate;

Uranyl dinitrate hexahydrate; Uranium, bis(nitrato-O)dioxo-,hexahydrate(T-4)-(9CI)

Chemical Family: Radioactive material

Chemical Formula: $N_2O_8U \cdot 6H_2O$

RTECS #: YR3850000

Hazardous Material Information System USA	Health	3	National Fire Protection Association USA	
	Fire Hazard	0		
	Reactivity	0		
	Personal Protection	3		

NFPA Rating:

(estimated) Health: 3; Flammability: 0 ; Reactivity: 3

Section 2 Composition

Component Name	CAS #	%	EINECS/ELINCS
Uranyl Nitrate Hexahydrate	13520-83-7	99.9	n/a

Section 3: Hazard Identification

Emergency overview: Oxidizing. Highly Toxic (USA); Very Toxic (EU):

Appearance: Pale yellow crystalline solid

Flash Point: n/a

Warning! Fire hazard in contact with combustible materials.

Target Organs: Kidneys, Liver

Potential Health Effects

Eye: Risk of serious damage to eyes.

Skin: Irritating to the skin.

Ingestion: Very toxic if swallowed.

Inhalation: Irritating to the respiratory system. Toxic by inhalation.

Chronic: Danger of cumulative effects.

Additional toxicological information is available in Section 11.

Section 4: First Aid Measures

Eyes: In case of eye contact, immediately flush with copious amounts of water for at least 15 minutes, holding the eyelids open. Seek immediate medical attention.

Skin: In case of skin contact, wash with soap and flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. If irritation develops or persists, seek medical attention.

Ingestion: If swallowed, and the victim is conscious, wash out mouth with water. Seek immediate medical attention.

Inhalation: If inhaled, remove to fresh air. If breathing is difficult, seek immediate medical attention.

Section 5: Fire Fighting Measures

General Information:

Wear self-contained breathing apparatus and protective clothing to prevent skin and eye contact. Emits toxic fumes under fire conditions. Contact with combustible material may cause fire. May react explosively with cellulose and certain organic solvents.

Extinguishing Media:

Water spray, carbon dioxide, dry chemical powder or appropriate foam.

Section 6: Accidental Release Measures

General Information:

Evacuate area. Handle as a radioactive spill.

Spills/Leaks:

Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves. Sweep up, place in a bag, and hold for waste disposal. Avoid raising dust. After material pickup is completed, ventilate area and wash the spill site.

Section 7: Handling and Storage

Handling:

Do not breathe dust. Avoid all contact with eyes, skin or clothing. Avoid repeated or prolonged exposure.

Storage:

Store in cool, dry area in tightly closed containers. Store away from combustible materials, reducing agents, cellulose, or organic solvents.

Section 8: Exposure Controls and Personal Protection

Engineering Controls: Safety shower and eye wash station must be available to the work area. Use only in a chemical fume hood.

Exposure Limits:

USA MSHA	Standard-air	TWA = 0.2 mg (U) /m ³
USA OSHA	PEL 8hr	TWA = 0.05 mg (U) /m ³

Personal Protective Equipment

Eyes: Chemical splash goggles

Skin: Chemical-resistant gloves, other protective clothing such as long sleeves or a lab coat should be worn to prevent skin contact.

Respirators: Use a NIOSH/MSHA or European Standard EN 149 approved respirator. If risk assessment indicates use of air-purifying respirators are needed, use a full-face respirator with type N100 (US) or type P3 (EN143) respirator cartridges as backup to engineering controls.

General Hygiene Measures: Wash thoroughly after handling.

Section 9: Physical and Chemical Properties

Physical State: Solid

Appearance: pale yellow crystalline
Odor: odorless
pH: N/A
Vapor Pressure: N/A
Vapor Density: N/A
Evaporation Rate: N/A
Viscosity: N/A
Boiling Point: N/A
Freezing/Melting Point: N/A
Autoignition Temperature: N/A
Flash Point: N/A
Decomposition Temperature: N/A
Explosion Limits
 Lower: N/A
 Upper: N/A
Solubility in water: Insoluble
Specific Gravity/Density: N/A
Molecular Formula: $N_2O_8U \cdot 6H_2O$
Molecular Weight: 502.1

N/A = Not available

Section 10: Stability and Reactivity

Chemical Stability: Stable

Conditions to Avoid: Moisture

Incompatibility with Other Materials: Avoid contact with combustible materials, cellulose, reducing agents, organic solvents

Hazardous Decomposition of Products: Oxides of uranium, Nitrogen oxides

Hazardous Polymerization: Will not occur.

Section 11: Toxicological Information

RTECS#: SD4431500

LD₅₀/LC₅₀ Information:

LD509 Mouse, intravenous 63 mg/kg

Carcinogenicity:

CAS# 4197-25-5 is not listed by ACGIH, IARC, NTP, OR California Proposition 65.

Teratogenicity: Not known

Reproductive Effects: Not known

Neurotoxicity: Not known

Mutagenicity: Not known

Other Studies: Not known

Section 12: Ecological Information

Substance is toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment. No further data is available

Section 13: Disposal Considerations

Dispose of spilled material as a radioactive waste. Dispose of in accordance with all local, state and federal regulations on the disposal of radioactive waste.

Section 14: Transport Information**US DOT Hazard Classes:**

Shipping Name: Radioactive material, excepted package - limited quantity of material
UN#: 2910
Hazard Class: 7
Packing Group: None

Shipping Name: Nitrates, inorganic, n.o.s.
UN#: 1477
Class: 5.1
Packing Group: II
Hazard Label: Oxidizer
PIH: Not PIH

IATA (for international shipments):

Shipping Name: Radioactive material, excepted package - limited quantity of material
IATA UN#: 2910
Hazard Class: 7

Shipping Name: Nitrates, inorganic, n.o.s.
IATA UN#: 1477
Hazard Class 5.1
Packing Group: II

Section 15: Regulatory Information**United States:**

Indication of danger: Oxidizing; Highly Toxic;

Risk Statements: Contact with combustible material may cause fire.

Very toxic if swallowed.

Irritating to respiratory system and skin.

Risk of serious damage to eyes.

There is limited evidence of a carcinogenic effect.

SARA Listed: NO

Note that anhydrous uranyl nitrate, CAS# 10102-06-4, has an RQ of 100 under CERCLA.

California No Significant Risk Level:

California Prop. 65: This product is known to the state of California to cause cancer.

European/International Regulations:

European Labeling in Accordance with EC Directives

Hazard Symbols: T + R N

Very toxic. Radioactive. Dangerous for the environment.

Risk Phrases:

R26/28 Very toxic by inhalation and if swallowed.

R33 Danger of cumulative effects.

R51/53 Toxic to aquatic organisms; May cause long-term adverse effects in the aquatic environment.

Safety Phrases:

S20/21 When using, do not eat, drink, or smoke.

S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S61 Avoid release to the environment. Refer to special instructions/safety data sheets.

Canada

This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL/NDSL: CAS# 13520-83-7 is not on the DSL List or the NDSL List.

Section 16: Other Information**Disclaimer of Liability:**

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URANYL NITRATE, HEXAHYDRATE, SOLUTION

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Chemical Identifiers

[What is this information?](#) ▶

UN/NA Number	CAS Number	CHRIS Code	DOT Hazard Label
2980	13520-83-7	none	RADIOACTIVE CORROSIVE

NFPA 704: data unavailable

General Description

Acidic solution in water of uranyl nitrate, a radioactive yellow crystalline solid. Mildly chemically toxic. Contains nitric acid. Noncombustible, but will accelerate the burning of other combustible materials if concentrated or if the water evaporates. Large quantities may explode if exposed to fire. Produces toxic oxides of nitrogen if involved in fire. Radioactive materials emit certain rays which can be detected only by instruments. Unirradiated uranium is only mildly radioactive. Minimal radiation hazard during transportation. No protective shielding is required. Non-fissile (natural or depleted) uranium; containing not more than 1.0% u-235, cannot sustain a nuclear chain reaction.

Hazards

[What is this information?](#) ▶

Reactivity Alerts

- ⚠ Strong Oxidizing Agent
- ⚠ Radioactive Material

Air & Water Reactions

Dissolves in water forming a weak solution of nitric acid, the reaction is not hazardous.

Fire Hazard

Some of these materials may burn, but most do not ignite readily. Uranium and Thorium metal cuttings may ignite spontaneously if exposed to air, refer to GUIDE 136 below. Nitrates are oxidizers and may ignite other combustibles, refer to GUIDE 141 below.

GUIDE 136: Extremely flammable; will ignite itself if exposed to air. Burns rapidly, releasing dense, white, irritating fumes. Substance may be transported in a molten form. May re-ignite after fire is extinguished. Corrosive substances in contact with metals may produce flammable hydrogen gas. Containers may explode when heated.

GUIDE 141: These substances will accelerate burning when involved in a fire. May explode from heat or contamination. Some may burn rapidly. Some will react explosively with hydrocarbons (fuels). May ignite combustibles (wood, paper, oil, clothing, etc.). Containers may explode when heated. Runoff may create fire or explosion hazard. (ERG, 2008)

Health Hazard

Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential hazard of

radioactive content increases. Undamaged packages are safe. Contents of damaged packages may cause higher external radiation exposure, or both external and internal radiation exposure if contents are released. Low radiation hazard when material is inside container. If material is released from package or bulk container, hazard will vary from low to moderate. Level of hazard will depend on the type and amount of radioactivity, the kind of material it is in, and/or the surfaces it is on. Some material may be released from packages during accidents of moderate severity but risks to people are not great. Released radioactive materials or contaminated objects usually will be visible if packaging fails. Some exclusive use shipments of bulk and packaged materials will not have "RADIOACTIVE" labels. Placards, markings and shipping papers provide identification. Some packages may have a "RADIOACTIVE" label and a second hazard label. The second hazard is usually greater than the radiation hazard; so follow this GUIDE as well as the response GUIDE for the second hazard class label. Some radioactive materials cannot be detected by commonly available instruments. Runoff from control of cargo fire may cause low-level pollution. (ERG, 2008)

Reactivity Profile

Mixtures of metal/nonmetal nitrates with alkyl esters may explode, owing to the formation of alkyl nitrates; mixtures a nitrate with phosphorus, tin (II) chloride, or other reducing agents may react explosively [Bretherick 1979. p. 108-109]. Dissolves in water forming a weak solution of nitric acid, the reaction is not hazardous.

Belongs to the Following Reactive Group(s)

- Inorganic Oxidizing Agents
- Water

Response Recommendations

What is this information? ►

Firefighting

Contact the local, state, or Department Of Energy Radiological Response Team. Flood with water. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible. (AAR, 2003)

Non-Fire Response

Contact the local, state, or Department Of Energy Radiological Response Team. Keep sparks, flames, and other sources of ignition away. Keep material out of water sources and sewers. Build dikes to contain flow as necessary. Land spill: Dig a pit, pond, lagoon, holding area to contain liquid or solid material. Dike surface flow using soil, sand bags, foamed polyurethane, or foamed concrete. Absorb bulk liquid with fly ash, cement powder, or commercial sorbents. Neutralize with agricultural lime (CaO), crushed limestone (CaCO₃) or sodium bicarbonate (NaHCO₃). Water spill: Neutralize with agricultural lime (CaO), crushed limestone (CaCO₃), or sodium bicarbonate (NaHCO₃). Adjust pH to neutral (pH=7). Use mechanical dredges or lifts to remove immobilized masses of pollutants and precipitates. (AAR, 2003)

Protective Clothing

Keep upwind. Avoid breathing dusts, and fumes from burning material. Wear appropriate chemical protective clothing. Wear positive pressure self-contained breathing apparatus. Do not handle broken packages unless wearing appropriate personal protective equipment. Wash away any material which may have contacted the body with copious amounts of water or soap and water. (AAR, 2003)

First Aid

Call 911 or emergency medical service. Medical problems take priority over radiological concerns. Use first aid treatment according to the nature of the injury. Do not delay care and transport of a seriously injured person. Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult. In case of contact with substance, wipe from skin immediately; flush skin or eyes with running water for at least 20 minutes. Injured persons contaminated by contact with released material are not a serious hazard to health care personnel, equipment or facilities. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. (ERG, 2008)

Physical Properties

[What is this information?](#) ▶

Molecular Formula: H2O.1
6N2O8U

Flash Point: data unavailable
Lower Explosive Limit: data unavailable
Upper Explosive Limit: data unavailable
Autoignition Temperature: data unavailable
Melting Point: data unavailable
Vapor Pressure: data unavailable
Vapor Density: data unavailable
Specific Gravity: data unavailable
Boiling Point: data unavailable
Molecular Weight: data unavailable
Water Solubility: data unavailable
AEGL: data unavailable
ERPG: data unavailable

TEEL-1
1.27 mg/m3
(SCAPA, 2008)

TEEL-2
1.27 mg/m3

TEEL-3
21.1 mg/m3

IDLH: 10.0 mg/m3 As U (soluble compounds, as U); A potential human carcinogen. (NIOSH, 2003)

Regulatory Information

[What is this information?](#) ▶

Regulatory Names: none
CAA RMP: Not a regulated chemical.
CERCLA: Not a regulated chemical.
EHS (EPCRA 302): Not a regulated chemical.
TRI (EPCRA 313): Not a regulated chemical.
RCRA Chemical Code: none

Alternate Chemical Names

[What is this information?](#) ▶

- DINITRATODIOXOURANIUM HEXAHYDRATE
- NITRATE D'URANYLE, HEXAHYDRATÉ, EN SOLUTION (DOT FRENCH)
- NITRATO DE URANILO, HEXAHIDRATADO, EN SOLUCIÓN (DOT SPANISH)
- URANIUM (SOLUBLE COMPOUNDS, AS U)
- URANIUM DIOXIDE DINITRATE, HEXAHYDRATE
- URANIUM, BIS(NITRATO-O)DIOXO-, HEXAHYDRATE, (T-4)-
- URANIUM, DINITRATODIOXO-, HEXAHYDRATE
- URANYL DINITRATE HEXAHYDRATE
- URANYL NITRATE HEXAHYDRATE

- URANYL NITRATE HEXAHYDRATE SOLUTION

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Description/Abstract	Specific weight, viscosity, electroconductivity, and refractive index of uranyl nitrate--nitric acid--water systems in the concentration ranges 0 to 2 M uranyl nitrate were investigated. The specific weight was calculated by the formula $d = d_{\text{sub } 0} + 0.17c_{\text{sub } U} + 0.029c_{\text{sub } H}$ with an order of accuracy of 0.5%; the index of refraction was calculated by $n = n_{\text{sub } 0} + 0.339c_{\text{sub } U} + 0.0067c_{\text{sub } H}$ with an order of accuracy of 0.2%. A method is suggested for determining the composition of the system, and a diagram is plotted of specific weight electroconductivity, and refractive index. (R. V.J.)
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