

Radioactive Material Safety Data Sheet

This data sheet presents information on radioisotopes only. This document is not subject to WHMIS requirements. For information on chemical compounds incorporating this radionuclide, see the relevant Material Safety Data Sheet.

Radium-226

Part 1 – Radioactive Material Identification

Common Names: Radium-226	Chemical Symbol: Ra-226 or ^{226}Ra
Atomic Number: 88	Mass Number: 226 (138 neutrons)
Chemical Form: Radium bromide or radium chloride	Physical Form: A pellet or solution housed within a ceramic outer-housing.

Part 2 – Radiation Characteristics

Physical half-life: 1,603 years **Specific Activity (GBq/g):** 36.6

Principle Emissions	E_{Max} (keV)	E_{eff} (keV)	Dose Rate (mSv/h/GBq at 1m)	Shielding Required
Beta* (β)	-	-	-	-
Gamma (γ) / X-Rays	186 (32.8%)	-	3.3 ^a	HVL Lead: 0.04 cm
Alpha (α)	4,785 (94.6%)	-	-	-
Neutron (n)	-	-	-	-

* Where Beta radiation is present, Bremsstrahlung radiation will be produced. Shielding may be required.

Note: Only emissions with abundance greater than 10% are shown.

^a *The Health Physics and Radiological Health Handbook*, Scintra, Inc., Revised Edition, 1992

Progeny: Radon-222 (Ra-222)

Part 3 – Detection and Measurement

Methods of detection (in order of preference)

1. A radiation survey meter equipped with an energy-compensated Geiger Mueller detector.
2. A radiation contamination monitor equipped with a Geiger-Mueller pancake detector.
3. An ZnS(Ag) alpha scintillation detector – must be calibrated to a radium-226 standard before used for a dose assessment survey.

Dosimetry

Whole Body Skin Extremity Neutron

Internal:	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.
Critical Organ(s):	Bone tissue
Annual dose limits:	<p><i>Non-nuclear energy workers:</i> 1mSv per year</p> <p><i>Nuclear energy workers:</i> a) 50 mSv in one year b) 100 mSv total over five years</p> <p><i>Pregnant nuclear energy workers:</i> 4 mSv over the balance of the pregnancy</p>

Part 4 – Preventive Measures

Always use the principles of time, distance and shielding to minimize dose

Engineering Controls:	Sealed radioactive sources used in industrial applications should always be within a protective source housing to minimize radiation dose and to protect the source capsule from damage.
Personal Protective Equipment	<i>(for normal handling of unsealed sources only. Always wear disposable gloves, safety glasses, personal protective equipment and clothing as appropriate to the material handled).</i> No special PPE required.
Special Storage Requirements:	None

Part 5 – Control Levels

Oral Ingestion	Inhalation	
ALI (kBq)	ALI (kBq)	DAC (Bq/ml)
74	22.2	1.11×10^{-5}
Exemption Quantity (EQ):	10,000 Bq	

Part 6 – Non-Radiological Hazards

None identified at this time.
<u>OSHA Permissible Exposure Limit (PEL)</u> No limit set at this time

Part 7 - Emergency Procedures

*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 and monitor skin
- Do not abrade skin, only blot dry
- Decontamination of clothing and surfaces are covered under operating and emergency procedures

Spill and Leak Control

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

Damage to Sealed Radioactive Source Holder

- Evacuate the immediate vicinity around the source holder
- Place a barrier at a safe distance from the source holder (min. 5 meters)
- Identify area as a radiation hazard
- Contact emergency number posted on local warning sign

Suggested Emergency Protective Equipment

- Gloves
- Footwear Covers
- Safety Glasses
- Outer layer or easily removed protective clothing (as situation requires)

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