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.

Strontium-90

Part 1 – Radioactive Material Identification

Common Names: Strontium-90 **Chemical Symbol:** Sr-90 or ^{90}Sr

Atomic Number: 38 **Mass Number:** 90 (52 neutrons)

Chemical Form: Strontium metal **Physical Form:** A strontium compound incorporated on a ceramic insert or rolled silver foil.

Part 2 – Radiation Characteristics

Physical half-life: 28.6 years **Specific Activity (GBq/g):** 5,050

Principle Emissions	E_{Max} (keV)	E_{eff} (keV)	Dose Rate (mSv/h/GBq at 1 m)	Shielding Required
Beta* (β)	546 (100%) 2,283 (99.9%)[b]	196 935	9.65[a,c]	-
Gamma (γ) / X-Rays	-	-	-	-
Alpha (α)	-	-	-	-
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
[b] This beta is produced by the yttrium-90 progeny, which quickly comes into equilibrium with the strontium parent.
[c] Total dose produced by strontium-90 in equilibrium with the yttrium-90 progeny.

Progeny: Yttrium-90 (Yt-90) {half-life: 64.4 hours; decay progeny: zirconium-90 (Zn-90)}

Part 3 – Detection and Measurement

Methods of detection (in order of preference)

1. A radiation survey meter equipped with a thin-window, energy-compensated Geiger Mueller detector.

2. A radiation contamination monitor equipped with a Geiger Mueller pancake detector.

3. A radiation survey meter equipped with a plastic scintillator detector.

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 tissues	
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

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 (*for normal handling of unsealed sources only. Always wear disposable gloves, safety glasses, personal protective equipment and clothing as appropriate to the material handled).* No special PPE required.	
Special Storage Requirements:	None

Part 5 – Control Levels

Oral Ingestion	Inhalation	
ALI (kBq)	ALI (kBq)	DAC (Bq/ml)
1,110	740	2.96×10^{-7}
Exemption Quantity (EQ):	10,000 Bq	

Part 6 – Non-Radiological Hazards

None identified at this time.

OSHA Permissible Exposure Limit (PEL)
No limits 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)

This information was compiled by:

Stuart Hunt & Associates Ltd.
20 Rayborn Crescent
St. Albert, Alberta
T8N 5C1
Phone: (780) 458-0291 or (800) 661-4591
Fax: (780) 459-0746
Web site: www.stuarthunt.com