

RADIONUCLIDE SAFETY DATA SHEET

RADIONUCLIDE: **Sr-90**

FORMS: Soluble

PHYSICAL CHARACTERISTICS

Half-life: 28.91 years

DECAY EMISSIONS

Gammas / X-rays		Betas / Positrons (+) / Electrons		Alphas	
E (keV)	%	E (keV, max)	%	E (keV)	%
		545.9 2278.5	100 99.9		

Only the four most likely emissions of each type are included. Emission must be > 10 keV and > 1% frequency.

NIH HAZARD CATEGORY

C – level (low hazard): ≤ 3 mCi - No DRS protocol required

B – level (moderate hazard): > 3 mCi and ≤ 6 mCi - DRS approval required for ceiling increase

A – level (high hazard): > 6 mCi - DRS protocol required

EXTERNAL RADIATION HAZARDS

Gamma dose rate, point source @ 1 foot, 1 mCi:

n/a

Beta dose rate to skin, point source @ 1 foot, 1 mCi:

755 mrem/hr

Contamination skin dose, uniform deposit of 1 µCi/cm²

13000 mrem/hr

INTERNAL RADIATION HAZARDS

Annual Limit on Intake:

Ingestion: 30 µCi

Inhalation: 4 µCi

The value(s) above indicate the activity taken into the body that would result in either 5 rem to the whole body (CEDE) or 50 rem to an organ or tissue (CDE).

SHIELDING

Gammas/X-rays:

n/a

Betas/electrons:

9.9 mm Lucite will stop all betas. Lead may be needed if Bremsstrahlung is detectable through plastic shielding.

DOSIMETRY AND BIOASSAY REQS

Dosimetry may be required when working with Sr-90. Fill out Dosimetry Evaluation Form, and DRS will determine if it is required.

Urine bioassay may be required after spills, contamination, or other abnormal occurrences.

SPECIAL PRECAUTIONS:

1. Contamination monitoring for Sr-90 should be performed with a pancake GM probe. Typical probe efficiency is 29%.
2. Sr-90 should be handled with remote tools when possible.
3. Ensure Sr-90 is properly shielded when in storage and use. Shield waste containers containing Sr-90 waste.
4. Always wear lab coat, gloves, and protective eyewear when handling Sr-90
5. Source vials must be secured in a locked container when not in use.
6. Sr-90 waste must be segregated from short half-life radionuclides (≤ 120 days). Multi-hazard waste must be segregated from short and medium half-life radionuclides (≤ 30 days and > 30 days but ≤ 120 days respectively).
7. Sr-90 is likely in secular equilibrium with Y-90. Decay emissions, dose rates, meter efficiencies, and shielding thicknesses given use this assumption.

References:

- Brookhaven National Laboratory, National Nuclear Data Center, Decay Radiation Search, Version 3/25/2022.
- National Institutes of Health Division of Radiation Safety, DRS-214 Form - Activity Control System - Cumulative Inventory Ceilings, Revised 10/4/2021.
- Delacroix, D., Guerre, J. P., Leblanc, P., Hickman, C., Radionuclide and Radiation Protection Data Handbook 2002.
- Nuclear Regulatory Commission, 10 Code of Federal Regulation Part 20 Appendix B.
- National Institute of Standards and Technology, ESTAR: Stopping Power and Range Tables for Electrons, July 2017
- Ehs.stanford.edu/reference Radionuclide Fact Sheets