

# RADIONUCLIDE SAFETY DATA SHEET

**RADIONUCLIDE:** **Ni-63**

**FORMS:** Soluble

## PHYSICAL CHARACTERISTICS

**Half-life:** 101.2 years

### DECAY EMISSIONS

| Gammas / X-rays |   | Betas / Positrons (+) / Electrons |     | Alphas  |   |
|-----------------|---|-----------------------------------|-----|---------|---|
| E (keV)         | % | E (keV, max)                      | %   | E (keV) | % |
|                 |   | 66.9                              | 100 |         |   |

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): ≤ 15 mCi - No DRS protocol required

B – level (moderate hazard): > 15 mCi and ≤ 30 mCi - DRS approval required for ceiling increase

A – level (high hazard): > 30 mCi - DRS protocol required

## EXTERNAL RADIATION HAZARDS

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

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

Contamination skin dose, uniform deposit of 1  $\mu\text{Ci}/\text{cm}^2$

## INTERNAL RADIATION HAZARDS

Annual Limit on Intake:

Ingestion: 9 mCi

Inhalation: 800  $\mu\text{Ci}$

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:**

0.1 mm Lucite will stop all betas.

## DOSIMETRY AND BIOASSAY REQS

No dosimetry required.

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

## SPECIAL PRECAUTIONS:

1. Detection efficiency of Ni-63 with a pancake GM probe is very low (< 1%). Contamination monitoring should be done with smears counted in a liquid scintillation counter.
2. Always wear lab coat, gloves, and protective eyewear when handling Ni-63
3. Source vials must be secured in a locked container when not in use.
4. Ni-63 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).
5. Sealed sources containing > 100  $\mu\text{Ci}$  of Ni-63 must be inventoried and leak tested semi-annually.

### 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.
- 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
- Delacroix, D., Guerre, J. P., Leblanc, P., Hickman, C., Radionuclide and Radiation Protection Data Handbook 2002.
- Stanford Environmental Health and Safety. Safety Fact Sheets. <https://ehs.stanford.edu/safety-fact-sheets>
- [ehs.stanford.edu/reference](https://ehs.stanford.edu/reference) Radionuclide Fact Sheets