

Zirconium (Zr-89)

Half Life: 78.5 hours

Radiation: Beta with gamma decay

Shielding: 3 cm lead for gamma emission, 4.5 mm of plastic will absorb all beta emissions. Bremsstrahlung may be created and require additional shielding.

Dosimetry: Body and ring badges

Detection/Measurement: GM probe (pancake) and wipe tests

General Precautions:

- Maintain your occupational exposure to radiation As Low As Reasonably Achievable [ALARA]
- All persons handling radioactive material must be properly trained by EHS prior to handling and are listed as a rad worker by EHS department
- Plan experiments accordingly to minimize external exposure by reducing exposure time, using shielding and increasing your distance from the radiation source
- Monitor yourself and the work area during and after each use of radioactive material
- Use the smallest amount of radioisotope possible to minimize radiation dose and radioactive waste
- Keep an accurate inventory of all radioactive material including records of all receipts, transfers and disposal – contact EHS for any disposal needs including liquid waste
- Perform and record lab surveys as needed (monthly and post experiment)

- Avoid generating mixed waste (combinations of radioactive, biological and chemical waste)

Special Precautions:

- When working with Zr-89, store behind a minimum of 3 cm lead
- Use tools to indirectly handle unshielded sources and potentially contaminated containers - no direct hand contact
- Ensure that an appropriate, operational survey meter is present in the work area and turned on whenever Zr-89 is handled to immediately detect contamination
- Shield waste containers as needed to maintain accessible dose rate ALARA

Safe Lab Practices:

- Disposable gloves, lab coats, and safety glasses are the minimum PPE required when handling radioactive material
- Remove and discard potentially contaminated PPE prior to leaving the lab area where radioactive material is used
- Cover all lab bench tops where radioactive material is handled with plastic-backed absorbent paper – change as needed
- Handle radioactive solutions in trays large enough to contain the material in the event of a spill
- Never eat, drink, smoke, handle contact lenses, apply cosmetics, or take medicine in the lab - keep food, drinks, and cosmetics out of the lab entirely
- Never pipette by mouth
- Never store food and beverages in refrigerators/freezers used for storing radioisotopes – ensure that isotopes are secured at all times
- Avoid any skin contact with skin-absorbable solvents containing radioactive materials
- Fume hoods and biological safety cabinets for use with non-airborne radioactive material must work properly and be inspected annually by the EHS department
- Do not take any radioactive material off site or use in any ways not approved by the Radiation Safety Officer