

Radioactive Materials Hazard Operations

	Low Toxicity Isotopes	Medium Toxicity Isotopes	High Toxicity Isotopes
Examples	<ul style="list-style-type: none"> ➤ H-3 ➤ C-14 	<ul style="list-style-type: none"> ➤ Na-24 ➤ K-42 ➤ Hg-197 ➤ P-32 ➤ S-35 ➤ Cl-36 ➤ Fe-59 ➤ Rb-86 ➤ Sr-89 ➤ Au-198 ➤ Hg-203 ➤ Cr-51 ➤ P-33 	<ul style="list-style-type: none"> ➤ Na-22 ➤ Ca-45 ➤ Co-60 ➤ Sr-90 ➤ I-131 ➤ I-125 ➤ Cs-137 ➤ Am241 ➤ Ra226
Hazard Class	Low energy beta emitters with no associated external radiation hazards.	Medium to high energy beta and/or low energy gamma emitting isotopes. An external radiation hazard.	High energy beta, gamma emitting isotopes. Alpha particles (internal dose only) May constitute both an internal and external radiation hazard.
Review	University Radiation Protection Committee (URPC) Review and Approval		
Work Practices	<p>Only URPC approved research protocols.</p> <p>Only properly trained and authorized radiation workers.</p> <p>Practice your experiment with inert materials before beginning work with isotope.</p> <p>Survey hands, feet, work area with appropriate radiation detection equipment before, during and after use of isotope.</p> <p>Time, Distance, Shielding</p> <p>Higher quantities may require additional controls.</p>	Same as for Low Toxicity Isotopes.	Same as for Medium Toxicity Hazards.

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Engineering Controls	<p>Use a fume hood if material is volatile or the process may produce aerosols.</p> <p>Use appropriate storage containers for raw materials and waste materials.</p>	<p>Same as for Low Toxicity Isotopes, <i>plus</i>:</p> <p>Lead or Lucite shielding</p>	<p>Same as for Medium Toxicity Isotopes, <i>plus</i>:</p> <p>Thicker shielding</p> <p>Glove box may be required.</p>
PPE	Nitrile gloves, safety goggles, lab coat.	Same as for Low Toxicity Isotopes.	Same as for Medium Toxicity Isotopes.
Designated Area	<p>All isotope used areas must be clearly delineated and labeled.</p> <p>Isotope can only be used in URPC approved authorized space.</p>	Same as for Low Toxicity Isotopes.	Same as for Medium Toxicity Isotopes.
Monitoring	<p>External radiation monitoring badges not required.</p> <p>Wipe surveys are the most appropriate contamination monitoring method for these isotopes.</p> <p>If using H-3 in quantities >50 mCi, bioassay may be required.</p> <p>RPS will perform regular monitoring of work areas.</p>	<p>Same as for Low Toxicity Isotopes, <i>plus</i>:</p> <p>External radiation monitoring badges may be required for certain quantities. (Isotope specific)</p> <p>GM meter or NaI must be utilized when performing research.</p>	<p>Same as for Medium Toxicity Isotopes, <i>plus</i>:</p> <p>External radiation monitoring badges are required.</p> <p>In-vivo/in-vitro bioassays may be required. (Isotope specific)</p> <p>GM, NaI or ZnS monitoring devices must be utilized when performing research.</p>

Addendum:

Because each specific isotope has unique associated hazards, contact Radiation Protection Services for specific use and handling precautions.