# RADIONUCLIDE SAFETY DATA SHEET

## RADIONUCLIDE: In-111

### FORMS: Soluble

## PHYSICAL CHARACTERISTICS

**HALF-LIFE:** 2.8 days

### DECAY EMISSIONS

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Gammas / X-rays</td>
<td>Betas / Positrons (+) / Electrons*</td>
<td>Alphas</td>
</tr>
<tr>
<td>E (keV)</td>
<td>%</td>
<td>E (keV, Ave)</td>
<td>%</td>
</tr>
<tr>
<td>245</td>
<td>94</td>
<td>19*</td>
<td>11</td>
</tr>
<tr>
<td>171</td>
<td>91</td>
<td>145*</td>
<td>9</td>
</tr>
<tr>
<td>23</td>
<td>69</td>
<td>219*</td>
<td>5</td>
</tr>
<tr>
<td>26</td>
<td>8</td>
<td>22</td>
<td>4</td>
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</tbody>
</table>

- Only 4 most probable emissions per decay type included. Emissions below 10 keV or 1% excluded.

## STANFORD HAZARD CATEGORY

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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<tbody>
<tr>
<td>C</td>
<td>≤ 20 mCi (low hazard)</td>
</tr>
<tr>
<td>B</td>
<td>&gt; 20 mCi, ≤ 1 Ci (moderate hazard)</td>
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<tr>
<td>A</td>
<td>&gt; 1 Ci (high hazard)</td>
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## EXTERNAL RADIATION HAZARDS

- **Gamma dose rate, point source at 1 ft, 1 mCi:** 2.45 mrem/h
- **Beta dose rate to skin, point source at 1 ft, 1 mCi:** 0.33 mrem/h
- **Contamination skin dose, uniform deposit of 1 µCi per cm²:** 1400 mrem/h

## SHIELDING

- **Gammas/X-rays:** 2 mm of lead will reduce the gamma dose rate by 90%.
- **Betas/electrons:** 0.5 mm of plastic will absorb all emissions.

## INTERNAL RADIATION HAZARDS

- **Annual Limit on Intake:**
  - Ingestion: 4000 µCi
  - Inhalation: 6000 µCi

The values 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).

## DOSIMETRY AND BIOASSAY REQS

- Whole-body and finger-ring dosimeters are required for handling 5 mCi or more, or 1 mCi amounts weekly. Urine assays may be required after large spills or contaminations.

## SPECIAL PROBLEMS AND PRECAUTIONS:

1. Recommended survey probe: NaI
2. Always wear protective gloves, a lab coat, and safety eyewear to protect the skin and eyes from contamination. Change gloves often.
3. Survey work areas before, during, and after work. Work areas may require shielding to keep dose ALARA. Instrument and smear surveys are required.
4. Segment waste to those with half-lives of between 1 and 8 days. Survey the waste disposal area to ensure exposure rates are less than 2 mR/hr at 1 foot.
5. Limit soluble waste to the sewer to less than 100 µCi/day per lab.

## References: