

Carbon-14

| 1. Radioactive Material Identification |
|--|
| Common Names: Carbon-14 |
| Atomic Number: 6 |
| Chemical Form: Carbon dioxide, carbon monoxide |
| Chemical Symbol: C-14 or ¹⁴ C |
| Mass Number: 12 (8 neutrons) |
| Physical Form: Organic compounds |

| 2. Radiation Characteristics | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|------------------------|------------------------|-----------------------------|--|--------------------|-----------|--------------|------|---|--|--------------------|---|---|---|---|-----------|---|---|---|---|-------------|---|---|---|---|
| Physical half-life: 5,730 years | | | | | | | | | | | | | | | | | | | | | | | | | |
| Specific Activity (GBq/g): 165 | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th>Principle Emissions</th> <th>E^{Max} (keV)</th> <th>E^{eff} (keV)</th> <th>Dose Rate (μSv/h/GBq at 1m)</th> <th>Shielding Required</th> </tr> </thead> <tbody> <tr> <td>Beta* (β)</td> <td>156.4 (100%)</td> <td>49.5</td> <td>-</td> <td>≤3mm Plexiglas (recommended, not required)</td> </tr> <tr> <td>Gamma (γ) / X-rays</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Alpha (α)</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>Neutron (n)</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table> | Principle Emissions | E ^{Max} (keV) | E ^{eff} (keV) | Dose Rate (μSv/h/GBq at 1m) | Shielding Required | Beta* (β) | 156.4 (100%) | 49.5 | - | ≤3mm Plexiglas (recommended, not required) | Gamma (γ) / X-rays | - | - | - | - | Alpha (α) | - | - | - | - | Neutron (n) | - | - | - | - |
| Principle Emissions | E ^{Max} (keV) | E ^{eff} (keV) | Dose Rate (μSv/h/GBq at 1m) | Shielding Required | | | | | | | | | | | | | | | | | | | | | |
| Beta* (β) | 156.4 (100%) | 49.5 | - | ≤3mm Plexiglas (recommended, not required) | | | | | | | | | | | | | | | | | | | | | |
| Gamma (γ) / X-rays | - | - | - | - | | | | | | | | | | | | | | | | | | | | | |
| Alpha (α) | - | - | - | - | | | | | | | | | | | | | | | | | | | | | |
| Neutron (n) | - | - | - | - | | | | | | | | | | | | | | | | | | | | | |
| Progeny: Nitrogen-14 (N-14) | | | | | | | | | | | | | | | | | | | | | | | | | |

6. Non-radiological Hazards

Prolonged exposure to airborne particles may result in cell damage, with the potential for subsequent cancers.

OSHA Permissible Exposure Limit (PEL):
0.1 mg/m³

7. Emergency Procedures

Personal Decontamination Procedures

- Wash well with soap and water, and monitor skin
- Do not abrade skin, only blot dry
- Decontamination of clothing and surfaces are covered under operating and emergency procedures

Spill and Leak Control

- Alert everyone in the area
- Confine the problem or emergency (includes the use of absorbent material)
- Clear area
- Summon aid

Damage to Sealed Radioactive Source Holder

- Evacuate the immediate vicinity around the source holder
- Place a barrier at a safe distance from the source holder (minimum 5 meters)
- Identify area as a radiation hazard
- Contact emergency number posted on local warning sign

Suggested Emergency Protective Equipment

- Gloves
- Footwear Covers
- Safety Glasses
- Outer layer or easily removed protective clothing (as situation requires)