Section 15

Sealed Sources

Contents

This section covers sealed radioactive sources. Sealed sources are used for special applications where encapsulated radioactive material is quantified and protected from disbursal. Only radiation capable of penetrating the capsule is of interest, and the emitted radiation has a calibrated intensity. Sealed sources are commonly used to provide precise dose rates for medical treatment, biological experiments, or materials testing. Sometimes, sealed radioactive sources are contained within analytical equipment, like gas chromatographs, and the user must be attentive to the presence of these sources.

A. Security

Sealed sources are typically small in size and can be quite portable. Because of this, extra attention must be given to security. Sealed sources and the instruments or devices that contain them must be secured whenever left unattended.

B. Authorization Requirements

All individuals possessing non-exempt sealed sources must apply for an Authorization for Sealed Source Use from the UW Radiation Safety Office. Non-exempt quantities are activities greater than 10 μCi for sources designed to emit alpha particles and greater than 100 μCi for beta/gamma emitters.

1. Newly Acquired Sealed Sources

The purchase of sealed sources is controlled as described previously in Section 4 – Authorization Process. Newly acquired sealed sources usually have recent leak test certification records included with source calibration and documentation. Copies of these leak test certifications must be forwarded to the Radiation Safety Office, Box 354400, for inclusion in UW records.

2. Portable Gauges

Portable gauges containing sealed sources are authorized for use in specific locations. If the portable gauge is intended for use in multiple locations, the user must comply with transport requirements in Section 12 - Shipment of Radioactive Materials.

3. Relocation of Sealed Sources or Devices Containing Sealed Sources

The location of sealed sources is carefully monitored and recorded by the Radiation Safety staff to facilitate leak testing and inventorying requirements described above. If it becomes necessary to move a source to a new location, either permanently or for an extended period, you must notify the Radiation Safety Office (543-0463) prior to the move.
If the move will result in the source becoming inaccessible for leak testing by the Radiation Safety staff, special arrangements must be made. Special arrangements could include: performing leak tests immediately preceding the move, as in the case of a temporary relocation of the source; performing tests by laboratory personnel *in absentia*; or the transfer of the source from the UW to a new owner, who will then take responsibility for the tests.

4. Transfer of Sealed Sources

Equipment or analytical devices containing sealed sources of radioactive materials are inventoried. If you intend to transfer the equipment to another user or send it to UW Surplus Property, you must notify the Radiation Safety Office (543-0463) prior to that transfer.

a. Another UW Owner

Transfer to another user within the University cannot be done unless the recipient has a UW Sealed Source Authorization.

b. Non-UW User

Transfer to a non-UW user requires verification that the recipient has a valid Radioactive Materials license.

c. UW Surplus Property

Sealed sources are normally removed from equipment being sent to UW Surplus Property, unless it can be verified that the recipient has a valid Radioactive Materials license for the acquisition of the source.

5. Training

Training requirements and Authorization application procedures are described in Section 4 - Authorization Process.

C. Sealed Source Leak Tests

Some sealed sources are of such low activity that they do not require leak testing. However, most sealed sources require semi-annual or quarterly tests to assure integrity of the encapsulation. In addition to these tests, sealed sources must also be inventoried, typically every quarter. Sealed source leak tests and inventories are conducted by the Radiation Safety staff.

1. Sealed Beta/Gamma Emitters

Leak tests of sealed beta/gamma emitters generally consist of wiping the exterior of the source and counting the wipes with appropriate instrumentation. Leak test results are recorded on RSO Form 188 and are kept in the Radiation Safety Office for review by DOH inspectors.

2. Sealed Alpha Sources

Radioactive materials emitting non-penetrating radiation, such as alpha particles, are sometimes plated on the surface of a metal backing and minimally coated with a protective film. These sources are called sealed sources for regulatory purposes, but are not strictly sealed sources since the coating and underlying plating can be easily damaged. Radiation Safety staff takes wipe tests only on adjacent surfaces and does not touch the surface of calibrated alpha particle sources.

3. Suspected Damage of Sealed Sources

If at any time there is reason to suspect that a sealed source might have been damaged, it must be leak tested and not used until the leak test results are quantified and source integrity has been verified.

D. Industrial Radiography

UW departments sponsoring industrial radiography (materials testing or imaging) by contractors or individuals intending to bring radiation sources to campus locations must notify the Radiation Safety Office (543-0463) in advance. This often applies to the UW Facilities Services or the Capital Projects Office. The Radiation Safety staff usually provides additional assistance and monitoring during industrial radiography procedures.