

4731.6050 PERFORMANCE CRITERIA; SEALED SOURCES.

Subpart 1. **Applicability.** Sealed sources installed after July 1, 1993, must meet the performance criteria of subparts 2 to 4.

Subp. 2. **General requirements.** Sealed sources must:

- A. have a certificate of registration issued by the NRC under Code of Federal Regulations, title 10, section 32.210, or by an agreement state;
- B. be doubly encapsulated; and
- C. use radioactive material that is as nondispersible as practical and that is as insoluble as practical if the source is used in a wet-source-storage or wet-source-change irradiator.

Subp. 3. **Irradiator pools.** If sealed sources are to be used in irradiator pools, the sealed sources must be encapsulated in a material resistant to general corrosion and to localized corrosion, such as 316L stainless steel or other material with equivalent resistance.

Subp. 4. **Required leak testing.** In prototype testing of a sealed source, the sealed source must have been leak tested and found leak-free after each of the following tests:

- A. temperature test. The test source must be held at -40 degrees Celsius for 20 minutes, 600 degrees Celsius for one hour, and then subjected to a thermal shock test with a temperature drop from 600 degrees Celsius to 20 degrees Celsius within 15 seconds;
- B. pressure test. The test source must be twice subjected for at least five minutes to an external pressure (absolute) of 2,000,000 newtons per square meter;
- C. impact test. A two-kilogram steel weight, 2.5 centimeters in diameter, must be dropped from a height of one meter onto the test source;
- D. vibration test. The test source must be subjected three times for ten minutes each to vibrations sweeping from 25 hertz to 500 hertz with a peak amplitude of five times the acceleration of gravity. The test source must be vibrated for 30 minutes at each resonant frequency found;
- E. puncture test. A 50-gram weight and pin, 0.3-centimeter pin diameter, must be dropped from a height of one meter onto the test source; and
- F. bend test. If the length of the source is more than 15 times larger than the minimum cross-sectional dimension, the test source must be subjected to a force of 2,000 newtons at its center equidistant from two support cylinders, the distance between which is ten times the minimum cross-sectional dimension of the source.

Statutory Authority: *MS s 144.1202; 144.1203*

History: *29 SR 755*

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