



M E R T T Radioactive Material Shipping Packages

notes

TRANSPORTING RADIOACTIVE MATERIAL

Radioactive materials are a vital part of our modern society. They are used in our hospitals, factories, laboratories and homes. Life would be more difficult if we had to stop using radioactive material. Many of the benefits we get from radioactive material cannot be obtained by any other means.

Doctors use them to diagnose and treat many diseases. Smoke detectors use a small amount of radioactive material to provide early warning of fires in our homes. Products like plastic wrap, radial tires, and coffee filters are manufactured in factories that use radioactive material. There are many more uses of radioactive materials in our modern society that provide enormous benefits.

Radioactive material is transported every day by highway, rail, air, and water. Radioactive material must be shipped from where it is produced to where it is used. The use of radioactive material sometimes produces radioactive waste that must then be shipped to a disposal site. Radioactive materials are transported according to very strict federal regulations. The regulations are designed to protect the public and the environment from risks associated with radioactive material during normal and accident conditions. The DOE complies with all applicable regulations pertaining to the transport of radioactive material.

Radioactive material is generally shipped in its most stable form. Typically, that means they are shipped as solids. When radioactive liquids or gases are transported, federal regulations require additional precautions. Careful research and design goes into packaging radioactive materials. Emergency planning, driver training, and strict government inspections are a part of a program that has **never** resulted in a radiologically related death or injury from a transportation incident.



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Excepted Packaging is used to transport material with extremely low levels of radioactivity. Excepted packagings are authorized for limited quantities of radioactive material that would pose a very low hazard if released in an accident. Examples of material typically shipped in excepted packaging include consumer goods such as smoke detectors. Excepted packagings are excepted (excluded) from specific packaging, labeling, and shipping paper requirements; they are however, required to have the letters “UN” and the appropriate four-digit UN identification number marked on the outside of the package. Requirements for excepted packaging are addressed in 49 CFR 173.421.





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To demonstrate that Type B Packages can withstand a severe accident, a tractor-trailer (below) carrying a Type B Package prototype was crashed into a massive concrete wall at 84 miles per hour. The package was slightly dented, but it did not release its simulated radioactive material.





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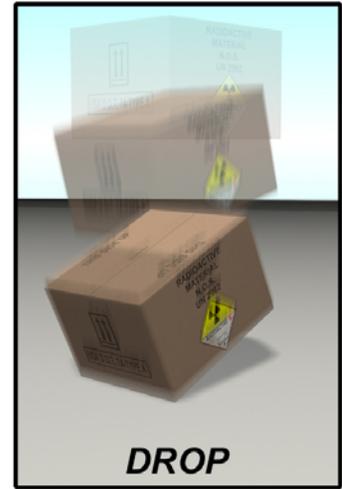
PACKAGE TESTING REQUIREMENTS

Type A Tests

Type A Packages must be able to withstand a series of tests that simulate normal transport conditions. These tests include:



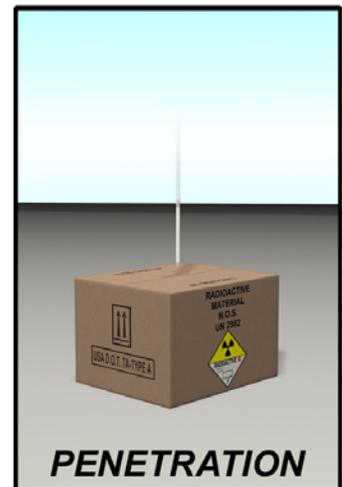
Water spray for 1 hour to simulate rainfall of 2 inches per hour.



Free drop test onto a flat, hard surface.



Stacking test of at least 5 times the weight of the package. This test is conducted for at least 24 hours.



Penetration test by dropping a 13-pound, 1.25-inch diameter bar vertically onto the package from a height of 3.3 feet.



Check Your Understanding

1. This type of packaging, along with its radioactive contents, must meet standard testing requirements designed to ensure that the package retains its containment integrity and shielding under normal transport conditions.
 - a) Type A packaging
 - b) Type B packaging
 - c) Industrial packaging
 - d) Excepted packaging
2. _____ packaging must be able to withstand a series of tests that simulate severe or “worst case” accident conditions.
3. Radiopharmaceuticals are typically shipped in _____ packagings and spent nuclear fuel is typically shipped in _____ packagings.
4. Which of the following statements best applies to the risks associated with material shipped in Type A Packages?
 - a) Type A Packages are used to transport very high levels of radioactive material.
 - b) Type A Packages are used to transport exempt quantities of radioactive material.
 - c) Type A Packages are built to withstand the most severe accident conditions.
 - d) Type A Packages contain non life-endangering amounts of radioactive material.

ANSWERS

1. a
2. Type B
3. Type A
4. d

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