integrity of the packaging, or of the packaging and its shielding, whichever is applicable, must be retained to the extent required by § 173.412(j) for the packaging being tested.

§ 173.465 Type A packaging tests.

(a) The packaging, with contents, must be capable of withstanding the water spray, free drop, compression and penetration tests prescribed in this section. One prototype may be used for all tests if the requirements of paragraph (b) of this section are met.

(b) Water spray test. The water spray test must precede each test or test sequence prescribed in this section. The water spray test must simulate exposure to rainfall of approximately 5 centimeters (2 inches) per hour for at least one hour. The time interval between the end of the water spray test and the beginning of the next test must be such that the water has soaked in to the maximum extent without appreciable drying of the exterior of the specimen. In the absence of evidence to the contrary, this interval may be assumed to be two hours if the water spray is applied from four different directions simultaneously. However, no time interval may elapse if the water spray is applied from each of the four directions consecutively.

(c) Free drop test. The specimen must drop onto the target so as to suffer maximum damage to the safety features

being tested, and:

(1) The height of the drop measured from the lowest point of the specimen to the upper surface of the target may not be less than the distance specified in Table 12, for the applicable package mass. The target must be as specified in § 173.465(c)(5). Table 12 is as follows:

TABLE 12.—FREE DROP DISTANCE FOR TESTING PACKAGES TO NOR-MAL CONDITIONS OF TRANSPORT

Packaging mass	Free drop dis- tance	
Kilograms (pounds)		
	Meters	(Feet)
< Mass 5000 (11,000)	1.2	(4)
5,000 (11,000) Mass to 10,000 (22,000) 10,000 (22,000) Mass to	0.9	(3)
15,000 (33,000) > 15,000 (33,000) Mass	0.6 0.3	(2) (1)

(2) For packages containing fissile material, the free drop test specified in paragraph (c)(1) of this section must be preceded by a free drop from a height of 0.3 meter (1 foot) on each corner, or in the case of cylindrical packages, onto each of the quarters of each rim.

(3) For fiberboard or wood rectangular packages with a mass of 50 kilograms

(110 pounds) or less, a separate specimen must be subjected to a free drop onto each corner from a height of

0.3 meter (1 foot).

(4) For cylindrical fiberboard packages with a mass of 100 kilograms (220 pounds) or less, a separate specimen must be subjected to a free drop onto each of the quarters of each rim from a height of 0.3 meter (1 foot).

(5) The target for the free drop test must be a flat, horizontal surface of such mass and rigidity that any increase in its resistance to displacement or deformation upon impact by the specimen would not significantly increase the damage to the specimen.

(d) Stacking test. (1) The specimen must be subjected for a period of at least 24 hours to a compressive load equivalent to the greater of the

following:

(i) Five times the mass of the actual

package; or

(ii) The equivalent of 13 kilopascals (1.9 pounds per square inch) multiplied by the vertically projected area of the

package.
(2) The compressive load must be applied uniformly to two opposite sides of the specimen, one of which must be the base on which the package would

normally rest.

(e) Penetration test. For the penetration test, the specimen must be placed on a rigid, flat, horizontal surface that will not move significantly while

the test is being performed.
(1) A bar of 3.2 centimeters (1.3 inches) in diameter with a hemispherical end and a mass of 6 kilograms (13.2 pounds) must be dropped and directed to fall with its longitudinal axis vertical, onto the center of the weakest part of the specimen, so that, if it penetrates far enough, it will hit the containment system. The bar may not be significantly deformed by the test: and

(2) The height of the drop of the bar measured from its lower end to the intended point of impact on the upper surface of the specimen must be 1 meter

(3.3 feet) or greater.

§ 173.466 Additional tests for Type A packagings designed for liquids and gases.

(a) In addition to the tests prescribed in § 173.465, Type A packagings designed for liquids and gases must be capable of withstanding the following

(1) Free drop test. The packaging specimen must drop onto the target so as to suffer the maximum damage to its containment. The height of the drop measured from the lowest part of the packaging specimen to the upper surface of the target must be 9 meters (30 feet) or greater. The target must be as specified in § 173.465(c)(5).

(2) Penetration test. The specimen must be subjected to the test specified in § 173.465(e) except that the height of the drop must be 1.7 meters (5.5 feet).

§ 173.467 Tests for demonstrating the ability of Type B and fissile materials packagings to withstand accident conditions in transportation.

Each Type B packaging or packaging for fissile material must meet the test requirements prescribed in 10 CFR Part 71 for ability to withstand accident conditions in transportation.

§173.468 Test for LSA-III material.

- (a) LSA-III Class 7 (radioactive) material must meet the test requirement of paragraph (b) of this section. Any differences between the material to be transported and the test material must be taken into account in determining whether the test requirements have been
- (b) *Test method.* (1) The specimen representing no less than the entire contents of the package must be immersed for 7 days in water at ambient temperature.
- (2) The volume of water to be used in the test must be sufficient to ensure that at the end of the test period the free volume of the unabsorbed and unreacted water remaining will be at least 10% of the volume of the specimen
- (3) The water must have an initial pH of 6-8 and a maximum conductivity of 10 micromho/cm at 20°C (68°F).
- (4) The total activity of the free volume of water must be measured following the 7 day immersion test and must not exceed $0.1 A_2$.

§ 173.469 Tests for special form Class 7 (radioactive) materials.

- (a) Special form Class 7 (radioactive) materials must meet the test requirements of paragraph (b) of this section. Each solid Class 7 (radioactive) material or capsule specimen to be tested must be manufactured or fabricated so that it is representative of the actual solid material or capsule that will be transported with the proposed radioactive content duplicated as closely as practicable. Any differences between the material to be transported and the test material, such as the use of non-radioactive contents, must be taken into account in determining whether the test requirements have been met. The following additional conditions apply:
- (1) A different specimen may be used for each of the tests;
- (2) The specimen may not break or shatter when subjected to the impact, percussion, or bending tests;