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must be capable of being rendered inoperable for lifting the package during transport or must be designed with strength equivalent to that required for lifting attachments.

(c) The external surface, as far as practicable, will be free from protruding features and will be easily decontaminated.

(d) The outer layer of packaging will avoid, as far as practicable, pockets or crevices where water might collect.

(e) Each feature that is added to the package will not reduce the safety of the package.

(f) The package will be capable of withstanding the effects of any acceleration, vibration or vibration resonance that may arise under normal conditions of transport without any deterioration in the effectiveness of the closing devices on the various receptacles or in the integrity of the package as a whole and without loosening or unintentionally releasing the nuts, bolts, or other securing devices even after repeated use (see §§173.24, 173.24a, and 173.24b).

(g) The materials of construction of the packaging and any components or structure will be physically and chemically compatible with each other and with the package contents. The behavior of the packaging and the package contents under irradiation will be taken into account.

(h) All valves through which the package contents could escape will be protected against unauthorized operation.

(i) For transport by air—

(1) The temperature of the accessible surfaces of the package will not exceed 50 °C (122 °F) at an ambient temperature of 38 °C (100 °F) with no account taken for insulation;

(2) The integrity of containment will not be impaired if the package is exposed to ambient temperatures ranging from −40 °C (−40 °F) to +55 °C (131 °F); and

(3) A package containing liquid contents must be capable of withstanding, without leakage, an internal pressure that produces a pressure differential of not less than the maximum normal operating pressure plus 95 kPa (13.8 psi).


§ 173.411 Industrial packages.

(a) General. Each industrial package must comply with the requirements of this section which specifies package tests, and record retention applicable to Industrial Package Type 1 (Type IP–1), Industrial Package Type 2 (Type IP–2), and Industrial Package Type 3 (Type IP–3).

(b) Industrial package certification and tests. (1) Each Type IP–1 package must meet the general design requirements prescribed in §173.410.

(2) Each Type IP–2 package must meet the general design requirements prescribed in §173.410 and when subjected to the tests specified in §173.465(c) and (d) or evaluated against these tests by any of the methods authorized by §173.461(a), must prevent:

(i) Loss or dispersal of the radioactive contents; and

(ii) A significant increase in the radiation levels recorded or calculated at the external surfaces for the condition before the test.

(3) Each Type IP–3 package must meet the requirements for Type IP–1 and Type IP–2 packages, and must meet the requirements specified in §173.412(a) through (j).

(4) A portable tank may be used as a Type IP–2 or Type IP–3 package provided that:

(i) It meets the requirements for Type IP–1 packages specified in paragraph (b)(1);

(ii) It meets the requirements prescribed in Chapter 6.7 of the United Nations Recommendations on the Transport of Dangerous Goods, (IBR, see §171.7 of this subchapter), “Requirements for the Design, Construction, Inspection and Testing of Portable Tanks and Multiple-Element Gas Containers (MEGCs),” or other requirements at least equivalent to those standards;

(iii) It is capable of withstanding a test pressure of 265 kPa (38.4 psia); and

(iv) It is designed so that any additional shielding which is provided must be capable of withstanding the static...
and dynamic stresses resulting from handling and routine conditions of transport and of preventing more than a 20% increase in the maximum radiation level at any external surface of the portable tanks.

5. A cargo tank or a tank car may be used as Type IP–2 or Type IP–3 package for transporting LSA–I and LSA–II liquids and gases as prescribed in Table 6 of §173.427, provided that:

(i) It meets the requirements for a Type IP–1 package specified in paragraph (b)(1);

(ii) It is capable of withstanding a test pressure of 265 kPa (38.4 psia); and

(iii) It is designed so that any additional shielding which is provided must be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of transport and of preventing more than a 20% increase in the maximum radiation level at any external surface of the tanks.

6. A freight container may be used as Type IP–2 or Type IP–3 packages provided:

(i) The radioactive contents are restricted to solid materials;

(ii) It meets the requirements for a Type IP–1 packages specified in paragraph (b)(1); and

(iii) It meets the standards prescribed in the International Organization for Standardization document ISO 1496–1: “Series 1 Freight Containers—Specifications and Testing—Part 1: General Cargo Containers; excluding dimensions and ratings (IBR, see §171.7 of this subchapter). It must be designed such that if subjected to the tests prescribed in that document, and the accelerations occurring during routine conditions of transport it would prevent:

(A) Loss or dispersal of the radioactive contents; and

(B) More than a 20% increase in the maximum radiation level at any external surface of the intermediate bulk container.

(c) Except for Type IP–1 packages, each offeror of an industrial package must maintain on file for at least two years after the offeror’s latest shipment, and must provide to the Associate Administrator on request, complete documentation of tests and an engineering evaluation or comparative data showing that the construction methods, package design, and materials of construction comply with that specification.

[79 FR 40611, July 11, 2014]

§173.412 Additional design requirements for Type A packages.

In addition to meeting the general design requirements prescribed in §173.410, each Type A packaging must be designed so that—

(a) The outside of the packaging incorporates a feature, such as a seal, that is not readily breakable, and that, while intact, is evidence that the package has not been opened. In the case of packages shipped in closed transport vehicles in exclusive use, the cargo compartment, instead of the individual packages, may be sealed.

(b) The smallest external dimension of the package is not less than 10 cm (4 inches).

(c) Containment and shielding is maintained during transportation and storage in a temperature range of −40 °C (−40 °F) to 70 °C (158 °F). Special attention shall be given to liquid contents and to the potential degradation of the packaging materials within the temperature range.

(d) The packaging must include a containment system securely closed by a positive fastening device that cannot