

TABLE 4—ACTIVITY LIMITS FOR LIMITED QUANTITIES, INSTRUMENTS, AND ARTICLES

Nature of contents	Instruments and articles		Limited quantity package limits ¹
	Limits for each instrument or article ¹	Package limits ¹	
Solids:			
Special form	10 ⁻² A ₁	A ₁	10 ⁻³ A ₁
Normal form	10 ⁻² A ₂	A ₂	10 ⁻³ A ₂
Liquids:			
Tritiated water:			
<0.0037 TBq/L (0.1 Ci/L)			37 TBq (1,000 Ci)
0.0037 TBq to 0.037 TBq/L (0.1 Ci to 1.0 Ci/L)			3.7 TBq (100 Ci)
>0.037 TBq/L (1.0 Ci/L)			0.037 TBq (1.0 Ci)
Other Liquids	10 ⁻³ A ₂	10 ⁻¹ A ₂	10 ⁻⁴ A ₂
Gases:			
Tritium ²	2 × 10 ⁻² A ₂	2 × 10 ⁻¹ A ₂	2 × 10 ⁻² A ₂
Special form	10 ⁻³ A ₁	10 ⁻² A ₁	10 ⁻³ A ₁
Normal form	10 ⁻³ A ₂	10 ⁻² A ₂	10 ⁻³ A ₂

¹For mixtures of radionuclides see § 173.433(d).

²These values also apply to tritium in activated luminous paint and tritium adsorbed on solid carriers.

[Amdt. 173-244, 60 FR 50307, Sept. 28, 1995, as amended by Amdt. 173-244, 61 FR 20751, May 8, 1996; 63 FR 52849, Oct. 1, 1998; 65 FR 58630, Sept. 29, 2000; 66 FR 45383, Aug. 28, 2001; 69 FR 3676, Jan. 26, 2004]

§ 173.426 Excepted packages for articles containing natural uranium or thorium.

A manufactured article in which the sole Class 7 (radioactive) material content is natural uranium, unirradiated depleted uranium or natural thorium, and its packaging, are excepted from the requirements in this subchapter for specification packaging, labeling, marking (except for the UN identification number marking requirement described in §173.422(a)), and if not a hazardous substance or hazardous waste, shipping papers and the requirements of this subpart if:

- (a) Each package meets the general design requirements of §173.410;
- (b) The outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or other durable protective material;
- (c) The conditions specified in §173.421(a) (2), (3) and (4) are met; and
- (d) The article is otherwise prepared for shipment as specified in §173.422.

[Amdt. 173-244, 60 FR 50307, Sept. 28, 1995, as amended by Amdt. 173-244, 61 FR 20752, May 8, 1996; 69 FR 3676, Jan. 26, 2004]

§ 173.427 Transport requirements for low specific activity (LSA) Class 7 (radioactive) materials and surface contaminated objects (SCO).

(a) In addition to other applicable requirements specified in this subchapter, LSA materials and SCO, unless excepted by paragraph (c) or (d) of this section, must be packaged in accordance with paragraph (b) of this section and must be transported in accordance with the following conditions:

- (1) The external dose rate may not exceed an external radiation level of 10 mSv/h (1 rem/h) at 3 m from the unshielded material;
- (2) The quantity of LSA and SCO material in any single conveyance may not exceed the limits specified in Table 5;
- (3) LSA material and SCO that are or contain fissile material must conform to the applicable requirements of §173.453;
- (4) Packaged and unpackaged Class 7 (radioactive) materials must conform to the contamination control limits specified in §173.443;
- (5) External radiation levels may not exceed those specified in §173.441; and
- (6) For LSA material and SCO consigned as exclusive use:

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(i) Shipments shall be loaded by the consignor and unloaded by the consignee from the conveyance or freight container in which originally loaded;

(ii) There may be no loose radioactive material in the conveyance; however, when the conveyance is the packaging, there may not be any leakage of radioactive material from the conveyance;

(iii) Packaged and unpackaged Class 7 (radioactive) materials must be braced so as to prevent shifting of lading under conditions normally incident to transportation;

(iv) Specific instructions for maintenance of exclusive use shipment controls shall be provided by the offeror to the carrier. Such instructions must be included with the shipping paper information;

(v) Except for shipments of unconcentrated uranium or thorium ores, the transport vehicle must be placarded in accordance with subpart F of part 172 of this subchapter;

(vi) For domestic transportation only, packaged and unpackaged Class 7 (radioactive) materials containing less than an A₂ quantity are excepted from the marking and labeling requirements of this subchapter. However, the exterior of each package or unpackaged Class 7 (radioactive) materials must be stenciled or otherwise marked "RADIOACTIVE—LSA" or "RADIOACTIVE—SCO", as appropriate, and packages or unpackaged Class 7 (radioactive) materials that contain a hazardous substance must be stenciled or otherwise marked with the letters "RQ" in association with the description in this paragraph (a)(6)(vi); and

(vii) Transportation by aircraft is prohibited except when transported in an industrial package in accordance with Table 6 of this section, or in an authorized Type A or Type B package.

(b) Except as provided in paragraph (c) of this section, LSA material and SCO must be packaged as follows:

(1) In an industrial package (IP-1, IP-2 or IP-3; §173.411), subject to the limitations of Table 6;

(2) In a DOT Specification 7A (§173.350 of this subchapter) Type A package;

(3) In any Type B(U) or B(M) packaging authorized pursuant to §173.416;

(4) In a packaging which meets the requirements of §§173.24, 173.24a, and 173.410, but only for domestic transportation of an exclusive use shipment that is less than an A₂ quantity.

(5) For exclusive use transport of liquid LSA-I only, in either:

(i) Specification 103CW, 111A60W7 (§§173.31, and 179.201–1 to 179.201–11 of this subchapter) tank cars. Bottom openings in tanks are prohibited; or

(ii) Specification MC 310, MC 311, MC 312, MC 331 or DOT 412 (§178.348 or §178.337 of this subchapter) cargo tank motor vehicles. Bottom outlets are not authorized. Trailer-on-flat-car service is not authorized.

(c) LSA material and SCO in groups LSA-I and SCO-I may be transported unpackaged under the following conditions:

(1) All unpackaged material, other than ores containing only naturally occurring radionuclides, shall be transported in such a manner that under normal conditions of transport there will be no escape of the radioactive contents from the conveyance nor will there be any loss of shielding;

(2) Each conveyance must be under exclusive use, except when only transporting SCO-I on which the contamination on the accessible and the inaccessible surfaces is not greater than 4.0 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters and 0.4 Bq/cm² for all other alpha emitters; and

(3) For SCO-I where it is suspected that non-fixed contamination exists on inaccessible surfaces in excess of the values specified in paragraph (c)(2) of this section, measures shall be taken to ensure that the radioactive material is not released into the conveyance or to the environment.

(d) LSA and SCO that exceed the packaging limits in this section must be packaged in accordance with 10 CFR part 71.

(e) Tables 5 and 6 are as follows:

TABLE 5—CONVEYANCE ACTIVITY LIMITS FOR LSA MATERIAL AND SCO

Nature of material	Activity limit for conveyances
1. LSA-I	No limit.
2. LSA-II and LSA-III; Non-combustible solids	No limit.

TABLE 5—CONVEYANCE ACTIVITY LIMITS FOR LSA MATERIAL AND SCO—Continued

Nature of material	Activity limit for conveyances
3. LSA-II and LSA-III; Combustible solids and all liquids and gases.	100 A ₂
4. SCO	100 A ₂

TABLE 6—INDUSTRIAL PACKAGE INTEGRITY REQUIREMENTS FOR LSA MATERIAL AND SCO

Contents	Industrial packaging type	
	Exclusive use shipment	Non exclusive use shipment
1. LSA-I:		
Solid	IP-1 ...	IP-1
Liquid	IP-1 ...	IP-2
2. LSA-II:		
Solid	IP-2 ...	IP-2
Liquid and gas	IP-2 ...	IP-3
3. LSA-III	IP-2 ...	IP-3
4. SCO-I	IP-1 ...	IP-1
5. SCO-II	IP-2 ...	IP-2

[69 FR 3676, Jan. 26, 2004; 69 FR 55118, Sept. 13, 2004; 69 FR 58843, Oct. 1, 2004; 70 FR 56098, Sept. 23, 2005]

§ 173.428 Empty Class 7 (radioactive) materials packaging.

A packaging which previously contained Class 7 (radioactive) materials and has been emptied of contents as far as practical, is excepted from the shipping paper and marking (except for the UN identification number marking requirement described in § 173.422(a)) requirements of this subchapter, provided that—

(a) The packaging meets the requirements of § 173.421(a) (2), (3), and (5) of this subpart;

(b) The packaging is in unimpaired condition and is securely closed so that there will be no leakage of Class 7 (radioactive) material under conditions normally incident to transportation;

(c) The outer surface of any uranium or thorium in its structure is covered with an inactive sheath made of metal or some other substantial material;

(d) Internal contamination does not exceed 100 times the limits in § 173.443(a);

(e) Any labels previously applied in conformance with subpart E of part 172

of this subchapter are removed, obliterated, or covered and the “Empty” label prescribed in § 172.450 of this subchapter is affixed to the packaging; and

(f) The packaging is prepared for shipment as specified in § 173.422.

[Amdt. 173-244, 60 FR 50307, Sept. 28, 1995, as amended by Amdt. 173-244, 61 FR 20752, May 8, 1996; 64 FR 51919, Sept. 27, 1999; 69 FR 3677, Jan. 26, 2004]

§ 173.431 Activity limits for Type A and Type B packages.

(a) Except for LSA material and SCO, a Type A package may not contain a quantity of Class 7 (radioactive) materials greater than A₁ for special form Class 7 (radioactive) material or A₂ for normal form Class 7 (radioactive) material as listed in § 173.435, or, for Class 7 (radioactive) materials not listed in § 173.435, as determined in accordance with § 173.433.

(b) The limits on activity contained in a Type B(U) or Type B(M) package are those prescribed in §§ 173.416 and 173.417, or in the applicable approval certificate under §§ 173.471, 173.472 or 173.473.

[Amdt. 173-244, 60 FR 50307, Sept. 28, 1995, as amended at 69 FR 3677, Jan. 26, 2004]

§ 173.433 Requirements for determining basic radionuclide values, and for the listing of radionuclides on shipping papers and labels.

(a) For individual radionuclides listed in the table in § 173.435 and § 173.436:

(1) A₁ and A₂ values are given in the table in § 173.435; and

(2) Activity concentration exemption values and consignment activity exemption values are given in the table in § 173.436.

(b) For individual radionuclides which are not listed in the tables in § 173.435 or § 173.436:

(1) the radionuclide values in Tables 7 or 8 of this section may be used; or

(2) other basic radionuclide values may be used provided they are first approved by the Associate Administrator or, for international transport, multi-lateral approval is obtained from the pertinent Competent Authorities.

(c) In calculating A₁ or A₂ values for a radionuclide not listed in the table in § 173.435: