

Chapter 9

CLASS 7 — RADIOACTIVE MATERIAL

Parts of this Chapter are affected by State Variations CA 1, CA 2, CA 4, IR 4, JP 2, JP 17; see Table A-1

9.1 GENERAL

9.1.1 Radioactive material, packagings and packages must meet the requirements of 6;7. The quantity of radioactive material in a package must not exceed the limits specified in 2;7.2.4. The types of packages for radioactive materials covered by these Instructions are:

- a) Excepted package (see 1;6.1.5);
- b) Industrial package Type 1 (Type IP-1 package);
- c) Industrial package Type 2 (Type IP-2 package);
- d) Industrial package Type 3 (Type IP-3 package);
- e) Type A package;
- f) Type B(U) package;
- g) Type B(M) package;
- h) Type C package.

Packages containing fissile material or uranium hexafluoride are subject to additional requirements.

9.1.2 The non-fixed contamination on the external surfaces of any package must be kept as low as practicable and, under routine conditions of transport, must not exceed the following limits:

- a) 4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters; and
- b) 0.4 Bq/cm² for all other alpha emitters.

These limits are applicable when averaged over any area of 300 cm² of any part of the surface.

9.1.3 A package, other than an excepted package, must not contain any other items except such articles and documents as are necessary for the use of the radioactive material. This requirement must not preclude the transport of low specific activity material or surface contaminated objects with other items. The transport of such articles and documents in a package, or of low specific activity material or surface contaminated objects with other items may be permitted provided that there is no interaction between them and the packaging or its radioactive contents that would reduce the safety of the package.

9.1.4 Except as provided in 7;3.2.5, the level of non-fixed contamination on the external and internal surfaces of erpacks and freight containers, must not exceed the limits specified in 9.1.2.

9.1.5 Radioactive material meeting the criteria of other Classes or Divisions as defined in Part 2 must be allocated to Packing Group I, II or III, as appropriate, by the application of the grouping criteria provided in Part 2 corresponding to the nature of the predominant subsidiary risk. It must also be capable of meeting the appropriate packaging performance criteria for the subsidiary risk.

9.1.6 Before the first shipment of any package, the following requirements must be fulfilled:

- a) If the design pressure of the containment system exceeds 35 kPa (gauge), it must be ensured that the containment system of each package conforms to the approved design requirements relating to the capability of that system to maintain its integrity under that pressure;
- b) For each Type B(U), Type B(M) and Type C package and for each package containing fissile material, it must be ensured that the effectiveness of its shielding and containment and, where necessary, the heat transfer characteristics and the effectiveness of the confinement system, are within the limits applicable to or specified for the approved design;

- c) For packages containing fissile material, where, in order to comply with the requirements of 6;7.10.1 neutron poisons are specifically included as components of the package, checks must be performed to confirm the presence and distribution of those neutron poisons.

9.1.7 Before each shipment of any package, the following requirements must be fulfilled:

- a) For any package it must be ensured that all the requirements specified in the relevant provisions of these Instructions have been satisfied;
- b) It must be ensured that lifting attachments which do not meet the requirements of 6;7.1.2 have been removed or otherwise rendered incapable of being used for lifting the package, in accordance with 6;7.1.3;
- c) For each package requiring competent authority approval, it must be ensured that all the requirements specified in the approval certificates have been satisfied;
- d) Each Type B(U), Type B(M) and Type C package must be held until equilibrium conditions have been approached closely enough to demonstrate compliance with the requirements for temperature and pressure unless an exemption from these requirements has received unilateral approval;
- e) For each Type B(U), Type B(M) and Type C package, it must be ensured by inspection and/or appropriate tests that all closures, valves, and other openings of the containment system through which the radioactive contents might escape are properly closed and, where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of 6;7.7.7 and 6;7.9.3 were made;
- f) For each special form radioactive material, it must be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Instructions have been satisfied;
- g) For packages containing fissile material, the measurement specified in 6;7.10.4 b) and the tests to demonstrate closure of each package as specified in 6;7.10.7 must be performed where applicable;
- h) For each low dispersible radioactive material, it must be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Instructions have been satisfied.

9.1.8 The shipper must also have a copy of any instructions with regard to the proper closing of the package and any preparation for shipment before making any shipment under the terms of the certificates.

9.1.9 Except for consignments under exclusive use, the transport index of any package or overpack must not exceed 10, nor must the criticality safety index of any package or overpack exceed 50.

9.1.10 Except for packages or overpacks transported under exclusive use and special arrangement under the conditions specified in 7;2.10.5.3, the maximum radiation level at any point on any external surface of a package or overpack must not exceed 2 mSv/h.

9.1.11 The maximum radiation level at any point on any external surface of a package or overpack under exclusive use must not exceed 10 mSv/h.

9.2 REQUIREMENTS AND CONTROLS FOR TRANSPORT OF LSA MATERIAL AND SCO

9.2.1 The quantity of LSA material or SCO in a single Industrial package Type 1 (Type IP-1), Industrial package Type 2 (Type IP-2), or Industrial package Type 3 (Type IP-3), must be so restricted that the external radiation level at 3 m from unshielded material does not exceed 10 mSv/h.

9.2.2 LSA material and SCO which is or contains fissile material must meet the applicable requirements in 7;2.10.4.1, 7;2.10.4.2 and 6;7.10.1.

9.2.3 LSA material and SCO in groups LSA-I and SCO-I must not be transported unpackaged.

9.2.4 LSA material and SCO must be packaged in accordance with Table 4-2.

9.3 PACKAGES CONTAINING FISSILE MATERIAL

Unless not classified as fissile in accordance with 2;7.2.3.5, packages containing fissile material must not contain:

- a) a mass of fissile material (or mass of each fissile nuclide for mixtures when appropriate) different from that authorized for the package design;
- b) any radionuclide or fissile material different from those authorized for the package design; or

- c) contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the package design;

as specified in their certificates of approval, where appropriate.

Table 4-2. Industrial package requirements for LSA material and SCO

<i>Radioactive contents</i>	<i>Industrial package type</i>	
	<i>Exclusive use</i>	<i>Not under exclusive use</i>
LSA-I Solid Liquid	Type IP-1 Type IP-1	Type IP-1 Type IP-2
LSA-II Solid Liquid and gas	Type IP-2 Type IP-2	Type IP-2 Type IP-3
LSA-III	Type IP-2	Type IP-3
SCO-I	Type IP-1	Type IP-1
SCO-II	Type IP-2	Type IP-2

