

DECREE

No. 379

of 7th November 2016

concerning the approval of some products in the field of peaceful use of nuclear energy and ionising radiation and the carriage of radioactive or fissile material

The State Office for Nuclear Safety stipulates, pursuant to § 236 of Act No 263/2016 Coll., the Atomic Act towards the implementation of § 9(4)(a) and (b), § 24(7), § 137(6), § 138(6)(a) to (c), § 141(3) and § 143(4):

§ 1

Subject matter

This decree incorporates relevant Euratom regulations¹⁾ and regulates the type approval of certain products in the field of the peaceful use of nuclear energy and ionising radiation and the carriage of radioactive or fissile material.

§ 2

Definitions

For the purposes of this implementing decree, the following definitions apply:

- a) the value A_1 is the value of activity of special form radioactive material listed in Table 2 of Annex 3 to this decree, or stipulated pursuant to Points 3 to 7 of Annex 3 to this decree, and used to stipulate activity limits for purposes of carriage;
- b) the value A_2 is the value of activity of an other than special form radioactive material listed in Table 2 of Annex 3 to this decree, or stipulated pursuant to Points 3 to 7 of Annex 3 to this decree, and used to stipulate activity limits for purposes of carriage;
- c) a package is packaging with its radioactive content;
- d) a confinement system is the organisation of fissile material in packaging or the organisation of part of packaging in a manner necessary to control criticality;
- e) a containment system is the organisation of part of packaging in a manner necessary to prevent the escape of the radioactive or fissile material during transport;
- f) a freight container is a device for the carriage of packaged or unpackaged products via one or more modes of transport without the handling of individual items of its contents that has a permanent closure, is sufficiently durable for repeated use and has equipment that permits its handling, especially its transfer among means of transport from one mode of transport to another; freight containers are broken down into
 1. small container with all external dimensions of less than 1.5 m or with an internal volume of less than 3 m³;
 2. intermediate bulk container for unpackaged substances or items, which is mechanical portable container whose resistance to stress during handling and transport is verified by testing, and with an internal volume of no greater than 3 m³;

¹⁾ Council Directive 2006/117/Euratom of 20 November 2006 on the supervision and control of shipments of radioactive waste and spent fuel.

Commission Decision 2008/312/Euratom of 5 March 2008, establishing the standard document for the supervision and control of shipments of radioactive waste and spent fuel referred to in Council Directive 2006/117/Euratom.

3. large container, which is any container not meeting the definitions in Points 1 and 2;
- g) an overpack is a protective case used by one carrier as one handling unit to facilitate the transport of one or more packages;
 - h) a consignment is all packages or packagings or a load of radioactive or fissile substances handed over by the carrier for transport;
 - i) exclusive use is the use of a conveyance or large container by one carrier, whose instructions govern all loading and unloading activity during the entire course of carriage;
 - j) a low specific activity material is a radioactive material whose own specific activity is naturally limited, or a radioactive material whose mean specific activity has been intentionally limited;
 - k) a low toxicity radionuclide source emitting alpha radiation (hereinafter a “low toxicity alpha emitter”) is natural uranium, depleted uranium, natural thorium, ^{235}U , ^{238}U , ^{232}Th , ^{228}Th , and ^{230}Th contained in ores or in physical or chemical concentrates, or other radionuclide sources emitting alpha radiation (hereinafter “alpha emitter”) with transformation half-lives of less than 10 days;
 - l) maximum normal operating pressure is the maximum overpressure that can occur in a retention system over the course of one year at a temperature and sunlight corresponding to ambient conditions during transport, assuming no ventilation, external cooling via an auxiliary system, or operating check during transport occur;
 - m) a surface contaminated object is a solid object that is not itself radioactive but which has radioactive or fissile material distributed on its surface;
 - n) unirradiated thorium is thorium containing not more than 10^{-7} g ^{233}U per gram of ^{232}Th ;
 - o) unirradiated uranium is uranium containing not more than 2.10^3 Bq of plutonium per gram of ^{235}U , at most 9.10^6 Bq of fission products per gram of ^{235}U , and at most 5.10^{-3} g ^{236}U per gram of ^{235}U ;
 - p) uranium
 - 1. natural uranium, including chemically separated uranium, containing uranium isotopes in the following distribution: approximately 99.28 % by mass of ^{238}U , approximately 0.72 % by mass of ^{235}U , and an insignificant mass percentage of ^{234}U ;
 - 2. depleted uranium with a smaller mass percentage of ^{235}U than natural uranium; depleted uranium also contains an insignificant mass percentage of ^{234}U ;
 - 3. enriched uranium with a higher mass percentage of ^{235}U than 0.72 %; enriched uranium also contains an insignificant mass percentage of ^{234}U ;
 - q) routine conditions of carriage are conditions during which no radiation emergency occurs;
 - r) normal conditions of carriage are conditions during which a radiation emergency simulated by tests pursuant to Points 19 to 25 of Part II of Annex 1 to this decree occurs;
 - s) accident conditions of carriage are conditions during which a radiation emergency simulated by tests pursuant to Points 26 to 37 of Part II of Annex 1 to this decree occurs.

§ 3

Carriage of a radioactive or fissile material requiring authorisation, classification of radioactive or fissile material and requirements imposed on radioactive or fissile material

(Re § 9(4)(a) and (b) of the Atomic Act)

(1) Carriage requiring authorisation pursuant to § 9(4)(a) or (b) of the Atomic Act is carriage of

- a) fissile material if the sum of the criticality safety indices of packages in one conveyance or shipping container is greater than 50;
- b) nuclear fuel;
- c) a package containing special form radioactive material with activity greater than $3.10^3 A_1$, radioactive material other than special form with activity greater than $3.10^3 A_2$ or radioactive material with activity greater than 1 000 TBq, depending on which of these values is lower;
- d) radioactive or fissile material in packaging of Type B(M) that is not designed for a temperature range of minus 40 °C to plus 70 °C or that is designed to permit occasional controlled ventilation; and
- e) radioactive or fissile material via a vessel intended for this purpose with a specified radiation protection programme.

(2) Carriage requiring authorisation pursuant to § 9(4)(a) or (b) of the Atomic Act, and in the case of international carriage also authorisation of the relevant authority of the state that the carriage concerns, is carriage of

- a) radioactive or fissile material containing radionuclides whose values of A_1 and A_2 not listed in Table 2 of Annex 3 to this decree were stipulated by calculation pursuant to Points 3 to 7 of Annex 3 to this decree;
- b) radioactive or fissile material contained in an instrument or product and containing radionuclides whose values for a package exception listed in column 5 of Table 2 of Annex 3 to this decree were replaced by values calculated according to principles and methods stipulated in Annex 6 to this decree; and
- c) fissile substances pursuant to Point 17(f) of Annex 3 to this decree.

(3) Classification of radioactive or fissile substances and packages and requirements imposed on them are provided in Points 1 and 8 to 34 of Annex 3 to this decree, and in Part I of Annex 1 to this decree.

§ 4

Packaging for the carriage, storage or deposit of radioactive or fissile material

(Re § 9(4)(a) and (b) of the Atomic Act)

(1) Requirements for specification of the type of packaging for the transport of radioactive or fissile material, depending on the radioactive content of the package, are stipulated in Annex 3 to this decree.

(2) Types of packaging for the carriage of a radioactive or fissile material and corresponding packages are as follows:

- a) packaging for a package exception and a package exception;
- b) Type IP-1 packaging and a Type IP-1 industrial package;
- c) Type IP-2 packaging and a Type IP-2 industrial package;
- d) Type IP-3 packaging and a Type IP-3 industrial package;
- e) Type A packaging and a Type A package;
- f) Type B(U) packaging and a Type B(U) industrial package;
- g) Type B(M) packaging and a Type B(M) industrial package;
- h) Type C packaging and a Type C industrial package.

(3) Packaging for the transport of radioactive material that is not fissile material must, depending on its type, meet the requirements of Part I of Annex 1 to this decree, as follows:

- a) every packaging must meet the requirements of Points 7 to 18 and of Points 19 to 21, if it is intended for air carriage;
- b) packaging for package exceptions must meet the requirements of Point 22;
- c) Type IP-1, IP-2, and IP-3 packaging must meet the requirements of Points 23 to 30;
- d) packaging for the transport of 0.1 kg or more of uranium hexafluoride must meet the requirements of Points 31 to 33, or of Point 34;
- e) Type A packaging must meet the requirements of Points 35 to 51;
- f) Type B(U) packaging must meet the requirements of Points 52 to 66;
- g) Type B(M) packaging must meet the requirements of Points 67 and 68; and
- h) Type C packaging must meet the requirements of Points 69 to 72.

(4) Packaging for the transport of fissile material must, depending on its type, meet the requirements of (3)(a) to (h) and the requirements of Points 73 to 86 of Part I of Annex 1 to this decree. The requirements of Points 73 to 86 of Part I of Annex 1 to this decree do not apply to packages in a consignment containing only fissile material that meets the requirements of one of (a) through (f) of Point 17 of Annex 3 to this decree (hereinafter “exceptions of fissile material”).

(5) Type S packaging for the storage of radioactive or fissile material and type D packaging for the deposit of radioactive or fissile material must, depending on its type, meet the requirements of Annex 2 to this decree.

§ 5

Requirements regarding the content of documentation for authorisation of carriage of radioactive or fissile material

(Re § 24(7) of the Atomic Act)

Documentation for authorisation of carriage of radioactive or fissile material contained in an instrument or product, and containing radionuclides for which values for exempting a package have been replaced by values calculated according to the principles and methods stipulated in Annex 6 to this decree, must for the purpose of the calculation of individual dosages for a transport worker and a representative individual, and collective dosages under routine conditions of carriage, normal conditions of carriage and under accident conditions of carriage, contain data on

- a) the expected use of the device or product and the radionuclides it contains;
- b) the maximum activity of the radionuclides contained in the device or product;
- c) the maximum radiation level on the surface and at a distance of 1 m from the device or product;
- d) the chemical and physical form of the radionuclides contained in the device or product;
- e) the design of the device or product, especially the containment system and radiation shielding for the radionuclides contained in the device or product;
- f) the management system used, including quality control, and that the device or product is manufactured according to the design type specifications;
- g) verification procedures to ensure that radionuclide activity and absorbed dose equivalent limits declared for the device or product are not exceeded, and
- h) the maximum number of devices or products that are to be shipped in one consignment, annually.

§ 6

The method of stipulating and maximum permissible values of the transport index (TI), the criticality safety index, unfixed contamination and absorbed equivalent dose, and the manner in which the package category is specified

(Re § 141(3)(a) of the Atomic Act)

- (1) The method for determining
 - a) the transport index for a package, an overpack, a freight container, unpackaged material with low mass activity in group LSA-I, or an unpackaged surface contaminated item in group SCO-I is stipulated in Points 23 and 24 of Annex 4 to this decree;
 - b) the criticality safety index for
 1. a consignment, a freight container and an overpack are stipulated in Point 25 of Annex 4 to this decree; and
 2. a package is stipulated in Points 84 to 86 of Part I of Annex 1 to this decree; and
 - c) a package category is stipulated in Points 29 of Annex 4 to this decree.

(2) The maximum permissible values for the transport index, criticality safety index, and radiation level on the surface and at a given distance from it for a package, an overpack, and a conveyance are stipulated in Points 26 to 28, 66 to 69, and 73 of Annex 4 to this decree.

(3) The maximum permissible non-fixed contamination values for a package, an overpack, and a conveyance are stipulated in Points 8, 9, 13, and 14 of Annex 4 to this decree.

§ 7

Technical and organisational conditions of carriage and transport of radioactive or fissile material

(Re § 141(3)(b) of the Atomic Act)

- (1) Technical and organisational conditions that must be fulfilled
 - a) prior to the initial and prior to every further carriage of radioactive or fissile material are stipulated in Points 1 to 3 of Annex 4 to this decree;
 - b) to secure the carriage of individual package types are stipulated in Points 4 to 22 of Annex 4 to this decree;
 - c) for the safe separation of packages, overpacks or containers containing radioactive or fissile material and some radioactive material from transport workers, the population, unexposed photographic film, and other dangerous items during carriage and stowage are stipulated in Points 62 and 63 of Annex 4 to this decree;
 - d) for the safe placement of a consignment of packages on or in the means of transport and during stowage are listed in Points 64 to 67 of Annex 4 to this decree; and
 - e) for the safe mutual separation of groups of packages containing fissile material during carriage and during stowage are listed in Points 68 to 70 of Annex 4 to this decree.

(2) Further requirements to ensure safe carriage are stipulated in Annex 4 to this decree, and if they apply to

- a) carriage documents and marking in general, in Points 45 to 61;
- b) carriage via rail and road, in Points 71 to 74;
- c) carriage via vessels, in Points 75 and 76;
- d) carriage via air, in Points 77 to 79;
- e) carriage via post, in Point 80;

- f) other essentials of carriage, in Points 81 to 88.

§ 8

Requirements regarding the content, language and availability of documentation required for the carriage and transport of radioactive or fissile material

(Re § 141(3)(c) of the Atomic Act)

(1) Requirements for

- a) the essentials of a description of a consignment in a carriage document are stipulated in Point 46 of Annex 4 to this decree;
- b) carriage documentation are stipulated in Points 47 to 53 of Annex 4 to this decree; and
- c) documentation and operating rules that the carrier must ensure are available to the consignor are stipulated in Points 54 to 56 of Annex 4 to this decree.

(2) During the cross-border carriage pursuant to § 9(4)(d) of the Atomic Act, documentation accompanying carriage must include also completed relevant standard documents provided in Annex 5 to this decree, specifically during carriage of

- a) radioactive waste standard documents A-1 and A-4a and also standard document A-5 in case of carriage based on common authorisation for multiple cross-border carriages, and
- b) spent nuclear fuel standard documents B-1 and B-4a and also standard document B-5 in case of carriage based on common authorisation for multiple cross-border carriages.

§ 9

The manner, scope and deadlines for notifying the administrative authorities for carriage

(Re § 141(3)(d) of the Atomic Act)

The manner, scope, and deadlines for notifying

- a) the Office and the relevant authority of the state that international transport concerns are stipulated in Points 57 to 60 of Annex 4 to this decree; and
- b) the consignor by the carrier regarding necessary measures for carriage are stipulated in Points 54 to 56 of Annex 4 to this decree.

§ 10

The marking, appearance and method of use of labelling to mark a package, freight container and conveyance for carriage

(Re § 141(3)(e) of the Atomic Act)

(1) The marking of a package and overpack with UN numbers and naming pursuant to Table 1 of Annex 3 to this decree is stipulated in Points 30 to 37 of Annex 4 to this decree.

(2) The use of labelling to mark a package, overpack, and freight container is stipulated in Points 38 and 39 of Annex 4 to this decree. The completion of these labels is stipulated in Points 40 to 42 of Annex 4 to this decree.

(3) The use of placards and tables to mark a freight container and conveyance is stipulated in Points 43 and 44 of Annex 4 to this decree.

(4) The appearance and dimensions of the trefoil radioactivity symbol, labels, placards, and tables are stipulated in Figures 1 to 7 of Annex 4 to this decree.

§ 11

Products subject to Product Type Approval

(Re § 137(6) of the Atomic Act)

(1) Type approval applies to the following packaging intended for carriage, storage or deposit of radioactive or fissile material, including radioactive waste:

- a) Type IP-1, IP-2, IP-3 and A for the carriage of fissile material, aside from excepted fissile material;
- b) for the carriage of 0.1 kg or more of uranium hexafluoride; in the event of international carriage of radioactive shipments pursuant to Point 34 of Part I of Annex 1 to this decree, type approval by the relevant authority of the state that the carriage concerns is also necessary;
- c) Type B(U), B(M) and C packaging for the carriage of radioactive or fissile material; in the event of international carriage of Type B(M) radioactive shipments pursuant to Point 67 of Part I of Annex 1 to this decree, type approval by the relevant authority of the state that the carriage concerns is also necessary;
- d) for the carriage of a radioactive or fissile material requiring multilateral approval pursuant to international treaties by which the Czech Republic is bound;
- e) Type D intended for the deposit of spent or irradiated nuclear fuel or radioactive waste produced by its reprocessing; and
- f) Type S intended for the storage of radioactive or fissile material, including radioactive waste, specifically for special form radioactive material whose activity exceeds A_1 , or for radioactive material other than special form whose activity exceeds A_2 .

(2) Special form radioactive material with properties stipulated in Points 2 to 4 of Part I of Annex 1 to the draft decree and low dispersible radioactive material with properties stipulated in Point 5 of Part I of Annex 1 to the draft decree are subject to type approval.

§ 12

Documentation for a type approval application, tests or calculations and analyses and the contents of their documentation

(Re § 138(6)(a) and (b) of the Atomic Act)

(1) The scope, contents and performance method of tests or calculations and analyses for a type approval application for special form radioactive material, low dispersible radioactive material or packaging for the carriage, storage or deposit of radioactive or fissile material are stipulated in Part II of Annex 1 to this decree.

(2) Documentation for an application for type approval of special form radioactive material, low dispersible radioactive material or packaging for the carriage, storage or deposit of radioactive or fissile material is product test documentation or documentation of calculations, safety assays and analyses, and their independent verification (hereinafter "test documentation"). Documentation for a product type approval application comprises,

- a) for packaging, test documentation pursuant to Points 13 to 37 of Part II of Annex 1 to this decree applicable to the given type of packaging with an evaluation of results in accordance with Points 1 and 2 of Part II of Annex 1 to this decree; evaluation of results

- proves compliance with requirements stipulated for the given type of packaging in § 4(3) to (5);
- b) for special form radioactive material, test documentation pursuant to Points 4 to 11 of Part II of Annex 1 to this decree with an evaluation of results in accordance with Points 1 and 2 of Part II of Annex 1 to this decree; evaluation of results proves compliance with requirements in Points 2 to 4 of Part I of Annex 1 to this decree; and
 - c) for low dispersible radioactive material, test documentation pursuant to Points 3 and 12 of Part II of Annex 1 to this decree with an evaluation of results in accordance with Points 1 and 2 of Part II of Annex 1 to this decree; evaluation of results proves compliance with the requirements of Point 5 of Part I of Annex 1 to this decree.

§ 13

Requirements for an authorised corporate subject performing tests and independent verification of tests or calculations and analyses for a product type approval application;

(Re § 138(6)(c) of the Atomic Act)

(1) A corporate entity that performs tests for type approval of a special form radioactive material, a low dispersible radioactive material or packaging for the transport, storage or deposit of radioactive or fissile material must

- a) have a facility equipped for the performance of tests pursuant to Part II of Annex 1 to this decree appropriate for the given product type;
- b) have drawn up procedures for the performance of tests pursuant to Part II of Annex 1 to this decree appropriate for the given product type;
- c) have workers trained for the performance of tests pursuant to Part II of Annex 1 to this decree appropriate for the given product type;
- d) have a quality management system in place; and
- e) be independent of the applicant.

(2) A corporate entity performing calculations and analyses or independent verification of these calculations and analyses instead of tests applicable to a given type of special form radioactive material, low dispersible radioactive material and packaging for the carriage, storage or deposit of radioactive or fissile material must, in accordance with Points 1 and 2 of Part II of Annex 1 to this decree:

- a) use a calculation program for such calculations and analyses or independent verification of these calculations and analyses that ensures sufficient precision and accuracy of results;
- b) must have workers trained to perform the appropriate calculations and analyses or independent verification of these calculations and analyses;
- c) have a quality management system in place; and
- d) not be in a dependent relationship with the applicant when performing independent verification of calculations and analyses.

§ 14

Samples of standard documents used in the area of cross-border carriage of radioactive waste or spent nuclear fuel

(Re § 143(4) of the Atomic Act)

Samples of standard documents used in the area of cross-border carriage of radioactive waste or spent nuclear fuel are provided in Annex 5 to this decree.

§ 15

Notification

This decree was notified in accordance with Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services.

§ 16

Entry into force

This implementing decree shall enter into force on 1st January 2017.

Chairperson:
Ing. Dana Drábová Ph.D., v. r.

REQUIREMENTS AND TEST PROCEDURES FOR TYPE APPROVAL

PART I

I. REQUIREMENTS FOR RADIOACTIVE OR FISSILE MATERIALS, PACKAGINGS, AND PACKAGES

I.1. REQUIREMENTS FOR RADIOACTIVE OR FISSILE MATERIALS

I.1.1 Requirements for a radioactive material with low specific activity material in group LSA-III

1. A radioactive material with low specific activity in group LSA-III must be a solid material of such a nature that after the entire contents of the package are subjected to the test specified in Point 3 of Part II, the activity of water does not exceed $0.1 A_2$.

I.1.2 Requirements for special form radioactive material

2. Special form radioactive material must have at least one dimension greater than 5 mm.
3. Special form radioactive material shall be of such a nature or shall be so designed that
 - a) it does not break or shatter under impact or pressure tests pursuant to Points 5 and 6 or pursuant to Point 9(a), and during bending tests pursuant to Point 7 of Part II;
 - b) it does not melt or disperse during heat tests pursuant to Point 8 or 9(b) of Part II;
 - c) the activity of water during the leaching test pursuant to Points 10 and 11 of Part II does not exceed 2 kBq, or for sealed sources, the leakage rate during volumetric leakage assessment test does not exceed the permitted limit pursuant to ISO 9978:1992 (E).
4. When a sealed capsule constitutes part of the special form radioactive material, the capsule shall be so manufactured that it can be opened only by destroying it.

I.1.3 Requirements for low dispersible radioactive material

5. Low dispersible radioactive material shall be such that the total amount of this radioactive material in a package shall meet the following requirements:
 - a) the radiation level at 3 m from unshielded radioactive material does not exceed 10 mSv/h;
 - b) if subjected to tests specified in Points 36 and 37 of Part II, the airborne release in gaseous and particulate forms of up to 100 μm aerodynamic equivalent diameter would not exceed $100 A_2$; a separate specimen may be used for each test; and
 - c) if subjected to the test specified in Point 3 of Part II, the activity of water would not exceed $100 A_2$; in the application of this test, the damaging effects of the tests specified in (b) shall be taken into account.

I.1.4 Requirements for exception of fissile material

6. An exceptions of fissile material pursuant to Point 17(f) of Annex 3 to this decree shall be subcritical without the need for accumulation control under conditions
 - a) of Point 73(a);
 - b) consistent with requirements for assessing a set of packages under normal conditions of carriage pursuant to Point 84(b) and under accident conditions of carriage pursuant to Point 85(b); and
 - c) of Point 83(a) for packages transported by air.

I.2. GENERAL REQUIREMENTS FOR PACKAGINGS AND PACKAGES

7. A package shall be designed so that
 - a) it can be easily and safely transported with regard to its mass, volume, and shape, and
 - b) it can be secured in or on the conveyance during transport.
8. A package shall be designed so that
 - a) any lifting attachments on the package are functional, and if they fail, the fulfilment of other requirements of this decree is not threatened, and
 - b) safety factors for snatch lifting of the package are met.
9. Attachments and any other features on the outer surface of a package that could be used to lift it shall be designed either to support its mass in accordance with the requirements of Point 8. If the requirement in the first sentence is not met, they shall be removable or otherwise rendered incapable of being used during transport.
10. As far as practicable, packaging shall be so designed that the external surfaces are free from protruding features and can be easily decontaminated.
11. As far as practicable, the outer layer of a package shall be so designed as to prevent the collection and retention of water.
12. Equipment carried together with a package shall not reduce its safety.
13. A package shall be capable of withstanding the effects of any acceleration, vibration or vibration resonance that may arise under routine conditions of transport and repeated use so that
 - a) there is no deterioration in the effectiveness of the closing devices on the various receptacles of the package;
 - b) its integrity is not compromised; and
 - c) nuts, bolts and other securing devices do not become loose or fall off.
14. The material of the packaging and any components or structures shall be physically and chemically compatible with each other and with the radioactive contents; changes in their characteristics due to irradiation must also be taken into account.

15. All valves through which the radioactive contents could escape shall be protected against unauthorised operation.
16. The design of the package shall take into account ambient temperatures and pressures that are likely to be encountered in routine conditions of transport.
17. A package shall be so designed that it provides sufficient shielding to ensure that, under routine conditions of transport and with the maximum design activity of its radioactive contents, the radiation level at any point on the external surface of the package does not exceed the values specified in Points 16, 27, and 28 of Annex 4 to this decree, taking into account Points 66(b) and 73 of Annex 4 to this decree.
18. The design of a package must also take into account other properties of radioactive or fissile material pursuant to Point 7 of Annex 4 to this decree.

I.3. ADDITIONAL REQUIREMENTS FOR PACKAGES TRANSPORTED BY AIR

19. For a package to be transported by air, the temperature of the accessible surfaces shall not exceed 50 °C at an ambient temperature of 38 °C with no account taken for insolation.
20. A package to be transported by air shall be so designed that if it is exposed to ambient temperatures ranging from minus 40 °C to plus 55 °C, the integrity of the containment system would not be breached.
21. A package to be transported by air shall be capable of withstanding an internal pressure that produces a pressure differential of not less than maximum normal operating pressure plus 95 kPa, without loss or dispersal of radioactive contents.

I.4. REQUIREMENTS FOR PACKAGE EXCEPTIONS

22. A package exception shall be designed to meet the requirements of Points 7 to 18 and of Points 19 to 21, if carried by air.

I.5. REQUIREMENTS FOR INDUSTRIAL PACKAGES

I.5.1. Requirements for Type IP-1

23. A package exception shall be designed to meet the requirements of Points 7 to 18 and 36, and of Points 19 to 21, if carried by air.

I.5.2. Requirements for Type IP-2

24. A Type IP-2 package shall be designed to meet the requirements for Type IP-1 as specified in Point 23, and so that performance of tests in Points 22 and 23 of Part II does not cause:
 - a) loss or dispersal of the radioactive contents; and
 - b) more than a 20 % increase in the maximum radiation level on an arbitrary location on the external surface of the package.

I.5.3. Requirements for Type IP-3

25. A Type IP-3 package shall be designed to meet the requirements for Type IP-1 as specified in Point 23, and requirements in Points 37 to 49.

I.5.4. Alternative requirements for Type IP-2 and Type IP-3

26. A package may be used as Type IP-2 if:
- a) it meets requirements for Type IP-2 specified in Point 23;
 - b) it is designed to meet requirements for UN Packing Group I or II according to the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations; and
 - c) performance of tests stipulated for UN Packing Group I or II does not result in
 1. loss or dispersal of the radioactive contents; and
 2. more than a 20 % increase in the maximum radiation level on an arbitrary location on the external surface of the package.
27. A portable tanks may be used as Type IP-2 or Type IP-3, provided that:
- a) it meets requirements for Type IP-1 specified in Point 23;
 - b) it is designed so that
 1. it meets the requirements of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations, or other requirements guaranteeing the same or higher level of protection; and
 2. is capable of withstanding a test pressure of 265 kPa; and
 - c) is designed so that any additional shielding that is provided
 1. withstands the static and dynamic stresses resulting from handling and routine conditions of transport; and
 2. prevents more than a 20 % increase in the maximum radiation level on an arbitrary location on the external surface of the package.
28. Tanks, other than portable tanks, may be used as Type IP-2 or Type IP-3 for transporting LSA-I and LSA-II liquids and gases as prescribed in Table 1 of Annex 4 to this decree, provided that:
- a) it meets requirements for Type IP-1 specified in Point 23;
 - b) it is designed so that
 1. it complies with relevant requirements of the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)²⁾ or other requirements guaranteeing the same or greater level of protection; and
 2. is capable of withstanding a test pressure of 265 kPa; and
 - c) is designed so that any additional shielding that is provided
 1. withstands the static and dynamic stresses resulting from handling under routine conditions of transport; and
 2. prevents more than a 20 % increase in the maximum radiation level on an arbitrary location on the external surface of the package.
29. A freight container with the characteristics of a permanent enclosure may be used as Type IP-2 or Type IP-3, provided that:
- a) its radioactive contents are restricted to solid material;

²⁾ The European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), decreed under No 64/1987, as amended.

- b) it meets requirements for Type IP-1 specified in Point 23; and
- c) it is designed to meet requirements pursuant to ISO 1496:1990(E), except for dimensions and ratings. If subjected to the tests prescribed in the first sentence and to acceleration occurring during routine conditions of transport it would prevent:
 - 1. loss or dispersal of the radioactive contents; and
 - 2. more than a 20 % increase in the maximum radiation level on an arbitrary location on the external surface of the package.

30. A metal intermediate bulk container may also be used as Type IP-2 or Type IP-3, provided that:
- a) it meets requirements for Type IP-1 specified in Point 23; and
 - b) it is designed to meet requirements for UN Packing Group I or II pursuant to the United Nations Recommendations on the Transport of Dangerous Goods - Model Regulations. If subjected to the tests prescribed in the first sentence, but with the drop test performed with the most damaging orientation of the test container, it would prevent:
 - 1. loss or dispersal of the radioactive contents; and
 - 2. more than a 20 % increase in the maximum radiation level on an arbitrary location on the external surface of the package.

I.6. REQUIREMENTS FOR PACKAGES CONTAINING URANIUM HEXAFLUORIDE

31. A package intended for the transport of uranium hexafluoride shall meet the requirements that pertain to the radioactive and fissile properties of the transported material. Except as allowed in Point 34, uranium hexafluoride in quantities of 0.1 kg or more shall be packaged and transported in accordance with ISO 7195:2005(E) and the requirements of Points 32 and 33.
32. A package intended for contents of 0.1 kg or more of uranium hexafluoride shall be designed so that it shall:
- a) withstand a pressure test specified in Point 18 of Part II without leakage and without unacceptable stress, as specified in ISO 7195:2005(E), except for cases specified in Point 34;
 - b) withstand the free drop test specified in Point 22 of Part II without loss or dispersal of the uranium hexafluoride; and
 - c) withstand the thermal test specified in Point 28 of Part II without rupture of the containment system, except as allowed in Point 34.
33. A package intended for contents of 0.1 kg or more of uranium hexafluoride shall not be equipped with pressure relief devices.
34. A package intended for contents of 0.1 kg or more of uranium hexafluoride that
- a) is designed to standards other than ISO 7195:2005(E) guaranteeing the same or higher degree of nuclear safety and radiation protection;
 - b) withstands, without leakage and without unacceptable stress, a pressure test specified in point 18 of Part II only at a test pressure less than 2.76 MPa; or
 - c) is designed to contain 9 000 kg or more of uranium hexafluoride and does not meet the requirements of Point 32(c);

may be used for carriage only if its type has been approved by the Office, and in the case of international carriage, also by the relevant authority of the state that the carriage concerns; other requirements in Points 31 to 33 must be fulfilled.

I.7. REQUIREMENTS FOR TYPE A PACKAGES

35. A Type A package shall be designed to meet the requirements of Points 7 to 18, 36 to 51, and requirements of Points 19 to 21, if carried by air.
36. The smallest overall external dimension of the package shall not be less than 10 cm.
37. The outside of the package shall incorporate a feature such as a seal that is breakable with difficulties and which, while intact, will be evidence that the package has not been opened in an unauthorised manner.
38. Any tie-down attachments on the package shall be so designed that, under normal and accident conditions of transport, the forces in those attachments shall not impair the ability of the package to meet the requirements of this decree.
39. The design of the package shall take into account temperatures ranging from $-40\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$ for the components of the packaging. Special attention shall be given to freezing temperatures for liquids and to the potential degradation of packaging material within the temperature range from $-40\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$.
40. The design and manufacturing techniques shall be in accordance with national, foreign or international standards or legislation if, during the use of the packaging for transport, they ensure the same or greater degree of nuclear safety, radiation protection, physical protection and handling of a radiation emergency as stipulated by the Atomic Act and its implementing legislation.
41. The design of the package shall include a containment system securely closed by a positive fastening device that cannot be opened unintentionally or due to pressure that may arise within the package.
42. Special form radioactive material may be considered part of the containment system.
43. If the containment system forms a separate unit of the package, it shall be capable of being securely closed by a positive fastening device that is independent of any other part of the package.
44. Any component of the containment system must be designed to withstand any radiolytic decomposition of liquids and other volatile materials and the generation of gas by chemical reaction and radiolysis.
45. The containment system shall retain its radioactive contents during reduction of ambient pressure to 60 kPa.

46. All valves, other than pressure relief valves, shall be provided with an enclosure to retain any leakage.
47. A radiation shield that encloses a component of the package that is part of the containment system shall be so designed as to prevent the unintentional release of that component from the shielded area. Where the radiation shield pursuant to the first sentence forms a separate unit, it must be capable of being securely closed by a positive fastening device that is independent of any other part of the packaging.
48. A package shall be so designed that if it were subjected to the tests specified in Points 19 to 24 of Part II, it would prevent:
 - a) loss or dispersal of the radioactive contents; and
 - b) more than a 20 % increase in the maximum radiation level on an arbitrary location on the external surface of the package.
49. The design of a package intended for liquid radioactive or fissile material shall expand with space to accommodate thermal changes in the volume of the liquid radioactive contents, dynamic effects and filling dynamics.
50. A Type A package designed to contain liquid radioactive or fissile material shall meet the conditions specified in Point 48(a) if subjected to tests specified in Point 25 of Part II and
 - a) contain sufficient absorbent material that
 1. will absorb at least twice its volume of liquid contents; and
 2. is suitably positioned so as to contact the liquid in the event of leakage;or
 - b) be provided with a containment system composed of primary inner and secondary outer containment components designed to enclose the liquid contents completely and to ensure their retention within the secondary outer containment components, even if the primary inner components leak.
51. A package designed for gases shall prevent loss or dispersal of the radioactive contents during tests specified in Point 25 of Part II, except for a Type A package designed for tritium gas or for noble gases.

I.8. REQUIREMENTS FOR TYPE B(U) PACKAGES

52. A Type B(U) package shall be designed to meet the requirements of Points 7 to 18, 36 to 47, 48(b), 49, 53 to 66 and of Points 19 to 21 if carried by air.
53.
 1. A package shall be so designed that heat generated within the package by its contents shall not negatively affect compliance with containment system and shielding requirements, as follows:
 - a) under ambient conditions specified in Points 56 and 57;
 - b) under normal conditions of transport specified in Points 19 to 24 of Part II; and
 - c) if left unattended for seven days.
 2. Particular attention shall be paid to the effects of heat that may

- a) alter the arrangement, the geometrical form, or the physical state of the radioactive contents;
 - b) cause deformation or melting of the radioactive content, receptacle, or packaging enclosing the radioactive content;
 - c) reduce the efficiency of the packaging through differential thermal expansion, cracking or melting of the shielding material; and
 - d) accelerate corrosion when combined with moisture.
54. Except for a package transported under exclusive use, a package shall be so designed that the temperature of an arbitrary part of an easily accessible surface shall not exceed 50 °C
- a) under ambient conditions specified in Point 56; and
 - b) if it is not exposed to sunlight.
55. 1. Except for a package transported by air pursuant to Point 19, the maximum temperature of an arbitrary part of an easily accessible surface of a package shall not exceed 85 °C
- a) under conditions of exclusive use under ambient conditions pursuant to Point 56;
 - b) if it is not exposed to sunlight; and
 - c) if left unattended for seven days.
2. Barriers or screens intended for protection of transport workers may be taken into account without the need for these to be tested as packages.
56. Ambient temperature is defined as 38 °C.
57. Sunlight exposure conditions and their values are specified in Table 1.
58. A package that includes thermal protection for the purpose of satisfying the requirements of the thermal test specified in Point 28 of Part II shall be so designed that such protection will remain effective if the package is subjected to the tests specified in Points 19 to 24, and further if subjected, depending on the mass, average specific mass and activity of the package according to rules specified in Point 59(b), to tests specified in Points 27(a) and 27(b), or in Points 27(b) and 27(c) of Part II. Thermal protection on the exterior of the package shall be designed so not to be rendered ineffective by ripping, cutting, skidding, abrading or rough handling.

Table 1 Insolation values

Case	Form and location of surface	Insolation for 12 h per day (W/m ²)
1	Flat surfaces transported horizontally — downward facing	0
2	Flat surfaces transported horizontally — upward facing	800
3	Surfaces transported vertically	200 ^{a)}
4	Other downward facing (not horizontal) surfaces	200 ^{a)}
5	All other surfaces	400 ^{a)}

Legend:

^{a)} Alternatively, a sine function may be used, with an absorption coefficient adopted and the effects of possible reflection from neighbouring objects neglected.

59. 1. A package shall be designed so that
- a) it restricts the loss of radioactive contents to not more than $10^{-6} A_2$ per hour after performance of tests specified in Part 19 to 24 of Part II;
 - b) it retains sufficient shielding to ensure that the radiation level 1 m from the surface of the package does not exceed 10 mSv/h with the maximum radioactive contents that the package is designed to contain, according to
 1. Point 27(c) of Part II, if the package has a mass not greater than 500 kg, a mean density not greater than $1\,000\text{ kg/m}^3$ based on its external dimensions, and radioactive contents greater than $1\,000 A_2$ not as special form radioactive material; or
 2. Point 27(a) of Part II for other packages; and
 - c) the accumulated loss of radioactive contents in a period of seven days does not exceed $10 A_2$ for ^{85}Kr and A_2 for all other radionuclides after the performance of tests specified in (a) or (b).
2. Where mixtures of different radionuclides are present, the provisions of Points 5 to 7 of Annex 3 to this decree shall apply to the calculation of A_2 , except that for ^{85}Kr an effective $A_2(i)$ value equal to $10 A_2$ may be used. When determining loss of radioactive contents pursuant to (1)(a), the assessment shall take into account the external contamination limits specified in Point 8 of Annex 4 to this decree.
60. A package for the transport of radioactive contents with activity greater than $10^5 A_2$ shall be so designed that if it were subjected to the enhanced water immersion test specified in Point 30 of Part II, there would be no rupture of the containment system.
61. Compliance with the permitted activity release limits shall depend neither upon filters nor upon a mechanical cooling system.
62. A package shall not include a pressure relief system from the containment system that would allow the release of radioactive material to the environment under the conditions of the tests specified in Points 19 to 24 and 26 to 29 of Part II.
63. A package shall be so designed that if it were at the maximum normal operating pressure and it were subjected to the tests specified in 19 to 24 and 26 to 29 of Part II, the levels of strains in the containment system would not attain values that would adversely affect the fulfilment of other requirements of this decree.
64. A package shall not have a maximum normal operating pressure in excess of 700 kPa.
65. A package containing low dispersible radioactive material shall be so designed that any features added to the low dispersible radioactive material that are not part of it, or any internal components of the packaging, shall not adversely affect the characteristics of the low dispersible radioactive material.
66. A package shall be designed for an ambient temperature range of $-40\text{ }^\circ\text{C}$ to $+38\text{ }^\circ\text{C}$.

I.9. REQUIREMENTS FOR TYPE B(M) PACKAGES

67. 1. Type B(M) packages shall meet the requirements for Type B(U) packages specified in Point 52.
2. The requirements of (1) need not be met during carriage within the Czech Republic or during carriage solely between the Czech Republic and certain states if the Office or the Office and a relevant authority of those states approve the packaging type pursuant to requirements other than those specified in Points 37, 55 to 57 and 60 to 66. Notwithstanding, the requirements for Type B(U) packages specified in Points 55 and 60 to 66 shall be met as far as practicable.
68. Intermittent venting of Type B(M) packages is possible provided the the Office stipulates this in a type approval decision or if, in the case of international carriage, the Office and the relevant authority of the state that the carriage concerns stipulate this.

I.10. REQUIREMENTS FOR TYPE C PACKAGES

69. A Type C package shall be designed to meet the requirements of Points 7 to 21, 36 to 47, 48(b), 49, 53 to 57, 61 to 66 and 70 to 72.
70. A package shall be capable of meeting the assessment criteria prescribed for tests in Points 59(b) and 63 after being placed in an environment defined by a thermal conductivity of 0.33 W/(m·K) and a temperature of 38 °C in the steady state. Initial conditions for assessment of the package are that any thermal insulation of the package remains intact, the package is at the maximum normal operating pressure, and the ambient temperature is 38 °C.
71. 1. A package shall be designed so that
- a) at maximum normal operating pressure and after the performance of tests specified in Points 19 to 24, it would restrict the loss of radioactive contents to not more than $10^{-6} A_2$ per hour; and
 - b) after performance of the series of tests specified in Point 34 of Part II
 1. it retains sufficient shielding to ensure that the radiation level 1 m from the surface of the package does not exceed 10 mSv/h with the maximum radioactive contents that the package is designed to contain; and
 2. the accumulated loss of radioactive contents in a period of seven days does not exceed 10 A_2 for ^{85}Kr and A_2 for other radionuclides.
2. Where mixtures of different radionuclides are present, the provisions of Points 5 to 7 of Annex 3 to this decree shall apply to the calculation of A_2 , except that for ^{85}Kr an effective $A_2(i)$ value equal to 10 A_2 may be used. When determining loss of radioactive contents pursuant to (1), external non-fixed contamination limits specified in Point 8 of Annex 4 to this decree shall be taken into account.

72. A package shall be so designed that if it were subjected to the enhanced water immersion test specified in Point 30 of Part II, there would be no rupture of the containment system.

I.11. REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL

73. Fissile material shall be transported so as to:
- a) Maintain subcriticality during routine, normal and accident conditions of transport; in particular, the following contingencies shall be considered:
 1. leakage of water into or out of the package;
 2. loss of efficiency of built-in neutron absorbers or moderators;
 3. rearrangement of the contents either within the package or as a result of loss from the package;
 4. reduction of spaces within or between packages;
 5. packages becoming immersed in water or buried in snow; and
 6. temperature changes; and
 - b) meet the requirements:
 1. of Point 36 except for unpackaged material when specifically allowed by Point 17(e) of Annex 3 to this decree;
 2. of radioactive properties of fissile material stipulated by this decree;
 3. of Point 37 unless the material is excepted by Point 17 of Annex 3 to this decree; and
 4. of Points 76 to 86 unless the material is excepted by Point 17 of Annex 3 to this decree, and Point 74 or 75.
74. A package containing fissile material that meets the requirements of (d) and one of the provisions of (a) to (c) is excepted from the requirements of Points 76 to 86 of Part I.
- a) A package containing fissile material in any form provided that:
 1. the smallest external dimension of the package is not less than 10 cm; and
 2. the criticality safety index of the package does not exceed 10, where it is calculated using the following formula:

$$CSI = 50 \times 5 \times \left(\frac{m_{235U}}{Z} + \frac{m_{ost}}{280} \right)$$

where m_{235U} is the mass of ^{235}U in the package in grams,
 m_{ost} is the mass of other fissile radionuclides in the package in grams,
Z are the values taken from Table 2.

- b) A package containing fissile material in any form provided that:
 1. the smallest external dimension of the package is not less than 30 cm;
 2. the package, after being subjected to the tests specified in Points 19 to 24 of Part II, retains its fissile material contents, preserves the minimum overall outside dimensions of at least 30 cm, and prevents the entry of a 10 cm cube; and
 3. the criticality safety index of the package does not exceed 10, where it is calculated using the following formula:

$$CSI = 50 \times 2 \times \left(\frac{m_{235U}}{Z} + \frac{m_{ost}}{280} \right)$$

where m_{235U} is the mass of ^{235}U in the package in grams,

m_{ost} is the mass of other fissile radionuclides in the package in grams,

Z are the values are taken from Table 2.

- c) A package containing fissile material in any form provided that:
1. the smallest external dimension of the package is not less than 10 cm;
 2. the package, after being subjected to the tests specified in Points 19 to 24 of Part II, retains its fissile material contents, preserves the minimum overall outside dimensions of at least 10 cm, and prevents the entry of a 10 cm cube;
 3. the criticality safety index is calculated using the following formula:

$$CSI = 50 \times 2 \times \left(\frac{m_{235U}}{450} + \frac{m_{ost}}{280} \right)$$

where m_{235U} is the mass of ^{235}U in the package in grams,

m_{ost} is the mass of other fissile radionuclides in the package in grams and

4. the maximum mass of fissile radionuclides in any package does not exceed 15 g.
- d) The total mass of beryllium, hydrogenous material enriched in deuterium, graphite and other allotropic forms of carbon in an individual package shall not be greater than the mass of fissile radionuclides in the package except where their total concentration does not exceed 1 g in any 1 000 g of material. Beryllium incorporated in copper alloys up to 4 % by weight of the alloy does not need to be considered.

Table 2 Values of Z for calculation of the criticality safety index pursuant to Point 74

Enrichment ^{a)}	Z
Uranium enriched up to 1.5 %	2200
Uranium enriched up to 5%	850
Uranium enriched up to 10%	660
Uranium enriched up to 20%	580
Uranium enriched up to 100%	450

Legend:

^{a)} If a package contains uranium with varying enrichments of ^{235}U , then the value corresponding to the highest enrichment shall be used for Z.

75. A package containing not more than 1 000 g of plutonium are excepted from the

requirements of Points 76 to 86 provided that:

- a) not more than 20 % of the plutonium by mass is fissile radionuclides;
- b) the criticality safety index is calculated using the following formula:

$$CSI = 50 \times 2 \times \frac{m_{Pu}}{1000}$$

where m_{Pu} is the mass of plutonium in the package in grams and

- c) the amount of uranium contained along with plutonium in the package does not exceed 1 % of the mass of the plutonium.

I.11.1. Contents specification for assessments of package designs containing fissile material

76. Where the chemical or physical form, isotopic composition, mass or concentration, moderation ratio or density, or geometric configuration is not known, the assessments of Points 80 to 85 shall be performed assuming that each unknown parameter has a value that gives the maximum neutron multiplication consistent with known conditions and parameters in these assessments.

77. The assessment of irradiated nuclear fuel according to Points 80 to 85 shall be based on:

- a) an isotopic composition demonstrated to provide maximum neutron multiplication during irradiation history;
- b) or a conservative estimate of the neutron multiplication for assessment of the package. After irradiation but prior to shipment, a measurement shall be performed to confirm the conservatism of the isotopic composition.

I.11.2. Geometry and temperature requirements

78. A package, after being subjected to the tests specified in Points 19 to 24:

- a) shall preserve minimum overall outside dimensions of at least 10 cm; and
- b) shall prevent the entry of a 10 cm cube.

79. A package shall be designed for an ambient temperature range of $-40\text{ }^{\circ}\text{C}$ to $+38\text{ }^{\circ}\text{C}$ unless the Office specifies otherwise in a type approval decision.

I.11.3. Assessment of an individual package in isolation

80. For a package in isolation, it shall be assumed that water can leak into void spaces or out of all void spaces of the package, including those within the containment system. If the design incorporates special features to prevent leakage of water into void spaces or out of void spaces, even as a result of operator error, it may be assumed that water leaks neither into or out of these spaces. Special features are

- a) multiple high standard water barriers, not less than two of which would remain watertight if the package were subject to the tests prescribed in Point 85(b), and a high degree of quality control in the manufacture, maintenance and repair of packaging, and tests to demonstrate the closure of each package before each shipment; or
- b) for packages containing uranium hexafluoride with a maximum uranium enrichment of 5 % by mass ^{235}U :
 1. no physical contact between the valve and any other component of the packaging other than at its original point of attachment for the test

- specified in Point 85(b), and perfectly leak-proof valves after the performance of tests specified in Point 28 of Part II; and
2. a high degree of quality control in the manufacture, maintenance and repair of packaging, and tests to demonstrate closure of each package before each shipment.

81. When assessing an isolated package, it shall be assumed that the confinement system causes reflection of neutrons as would be caused by a layer of water at least 20 cm thick or bigger reflection of neutrons as may be caused by the surrounding material of the packaging. When it can be demonstrated that the confinement system remains within the packaging following the tests prescribed in Point 85(b), the reflection of neutrons by a layer of water at least 20 cm thick may be assumed in Point 82(c).
82. A package shall remain subcritical under the assumptions of Points 80 and 81 and under conditions that result in the maximum neutron multiplication consistent with:
 - a) routine conditions of transport;
 - b) the tests specified in Point 84(b); and
 - c) the tests specified in Point 85(b).
83. For a package transported by air:
 - a) the package shall be subcritical under conditions consistent with the Type C package tests specified in Point 34 of Part II, assuming reflection by at least 20 cm of water but no leakage of water into the package; and
 - b) in the assessment pursuant to Point 82, special features pursuant to Point 80 are not allowed, unless following Type C package tests specified in Point 34 of Part II and water ingress tests for a package pursuant to Point 33 of Part II, leakage of water into void spaces and out of void spaces is prevented.

I.11.4. Assessment of package arrays under normal transport conditions

84. A number N shall be derived, such that a set of five times N packages shall be subcritical for the arrangement and package conditions that provide the maximum neutron multiplication, where:
 - a) there shall not be any substance between the packages, and the package arrangement is exposed on all sides to neutron reflection as would be caused by a layer of water at least 20 cm thick; and
 - b) the state of each package corresponds to a condition after the performance of tests specified in Points 19 to 24 of Part II.

I.11.5. Assessment of package arrays under accident conditions of transport

85. A number N shall be derived, such that a set of two times N packages shall be subcritical for the arrangement and package conditions that provide the maximum neutron multiplication, where:
 - a) there is a hydrogen moderator between the packages, and the package arrangement is exposed on all sides to neutron reflection as would be caused by a layer of water at least 20 cm thick;
 - b) the state of each package corresponds to a condition after the performance of tests specified in Points 19 to 24 of Part II and after the performance of the more limiting of the following tests:

1. for packages having a mass not greater than 500 kg and an overall density not greater than 1 000 kg/m³ based on external dimensions, according to Point 27(b), Point 27(c), Point 28, and either according to Point 29 or according to Points 31 to 33 of Part II; or
 2. for other packages according to Point 27(a), Point 27(b), Point 28, and either according to Point 29 or according to Points 31 to 33 of Part II; and
- c) when part of the fissile material escapes from the containment system following the tests specified in Point 85(b), it shall be assumed that fissile material escaped from each package in the array. All of the fissile material shall be arranged and moderated to achieve maximum neutron multiplication and neutron reflection as would be caused by a layer of water at least 20 cm thick.

I.11.6. Stipulation of the criticality safety index

86. The criticality safety index for packages containing fissile material is calculated according to the formula:

$$CSI = \frac{50}{N}$$

where N is the smaller of two values of N according to Points 84 and 85. The value of the critical safety index may be zero, provided that an unlimited number of packages are subcritical (i.e. N is effectively equal to infinity in both cases).

PART II

II. TEST PROCEDURES

II.1. DEMONSTRATION OF COMPLIANCE

1. Demonstration of compliance with the performance standards required in Part I shall be accomplished by one or more of the methods listed in (a) to (d). The methods are as follows:
 - a) a test with specimens representing LSA-III material, special form radioactive material, or low dispersible radioactive material, or with prototypes or samples of the packaging. The contents of the specimen or the packaging for the tests shall simulate as closely as practicable the expected range of radioactive contents. The specimens or packaging to be tested shall be prepared as presented for transport;
 - b) presentation of documentation from a prior successful demonstration of conformance pursuant to (a), (c) and (d) of a sufficiently similar nature;
 - c) tests with models of appropriate scale with features that are significant with respect to the tested properties, if engineering experience has shown the results of such tests to be suitable for design purposes; when a scale model is used, the need to adjust certain test parameters shall be taken into account; and
 - d) calculation, or reasoned argument, when the calculation procedures and parameters are generally considered to be reliable and conservative.

2. Appropriate assessment methods shall be used to assess tests performed on the specimen, prototype or sample. Test assessment must prove compliance with requirements stipulated in Part I and compliance of test procedures with requirements in Part II.

II.2. LEACHING TESTS FOR A GROUP LSA-III MATERIAL WITH LOW SPECIFIC ACTIVITY AND FOR A LOW DISPERSIBLE RADIOACTIVE MATERIAL

3. A solid material sample representing the entire contents of the package shall be immersed for seven days in water at room temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the seven-day test period, the free volume of the unabsorbed and unreacted water remaining shall be at least 10 % of the volume of the solid test sample. The water shall have an initial pH of 6 to 8 and a maximum conductivity of 1 mS/m at 20 °C. The total activity of the free volume of water shall be measured following the seven-day immersion of the test sample.

II.3. TESTS FOR SPECIAL FORM RADIOACTIVE MATERIAL

II.3.1. General requirements

4. Specimens that contain or simulate special form radioactive material shall be subjected to an impact test, the percussion test, the bending test and the heat test specified in Points 5 to 9. A different specimen may be used for each of the tests. Following each test, a leaching assessment or volumetric leakage test shall be performed on the specimen by a method no less sensitive than the methods given in Point 10 for non-dispersible solid material or in Point 11 for encapsulated material.

II.3.2. Test methods

5. Impact test: The specimen shall drop onto the target from a height of 9 m. The target shall be as defined in Point 17.
6. Percussion test: The specimen shall be placed on a sheet of lead that is supported by a smooth solid surface and struck by the flat face of a mild steel bar so as to cause an impact equivalent to that resulting from a free drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of 3.0 ± 0.3 mm. The lead sheet, of hardness number 3.5–4.5 on the Vickers scale and not more than 25 mm thick, shall cover an area greater than that covered by the specimen. A fresh surface of lead shall be used for each impact. The bar shall strike the specimen so as to cause maximum damage.
7. Bending test: The test shall apply only to long, slender sources with both a minimum length of 10 cm and a length to minimum width ratio of not less than 10. The specimen shall be rigidly clamped in a horizontal position so that one half of its length protrudes from the face of the clamp. The orientation of the specimen shall be such that the specimen will suffer maximum damage when its free end is struck by the flat face of a steel bar. The steel bar shall strike the specimen so as to

cause an impact equivalent to that resulting from a free vertical drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of 3.0 ± 0.3 mm.

8. Heat test: The specimen shall be heated in air to a temperature of 800 °C and held at that temperature for a period of 10 min. and shall then be allowed to cool.
9. Specimens that comprise or simulate radioactive material enclosed in a sealed capsule may be excepted from:
 - a) the tests prescribed in Points 5 and 6, provided that the specimens are alternatively subjected to the impact test for the appropriate class pursuant to ISO 2919:2012(E):
 1. the Class 4 impact test if the mass of the special form radioactive material is less than or equal to 200 g; or
 2. the Class 5 impact test if the mass of the special form radioactive material is greater than 200 g but less than 500 g; and
 - b) the tests prescribed in Point 8, provided that the specimens are alternatively subjected to the Class 6 heat test pursuant to ISO 2919:2012(E).

II.3.3. Leaching and volumetric leakage test methods

10. For specimens that comprise or simulate non-dispersible solid material, a leaching assessment shall be performed as follows:
 - a) The specimen shall be immersed for seven days in water at room temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the seven-day test period, the free volume of the unabsorbed and unreacted water remaining shall be at least 10 % of the volume of the solid test sample itself. The water shall have an initial pH of 6 to 8 and a maximum conductivity of 1 mS/m at 20 °C;
 - b) Then the water with the specimen shall then be heated to a temperature of 50 ± 5 °C and maintained at this temperature for 4 h;
 - c) Then the activity of the water shall then be determined;
 - d) Then the specimen shall then be kept for at least seven days in still air at not less than 30 °C and with a relative humidity of not less than 90 %;
 - e) Then the specimen shall then be immersed in water of the same specification as that in (a) and the water with the specimen heated to 50 ± 5 °C and maintained at this temperature for 4 hours;
 - f) Lastly the activity of the water shall then be determined.
11. For specimens that comprise or simulate radioactive material enclosed in a sealed capsule, either a leaching assessment or a volumetric leakage assessment shall be performed as follows:
 - a) a leaching test:

The specimen shall be immersed in water at room temperature. The water shall have an initial pH of 6 to 8 and a maximum conductivity of 1 mS/m at 20 °C;

 1. Then the water with the specimen shall then be heated to a temperature of 50 ± 5 °C and maintained at this temperature for 4 h;
 2. Then the activity of the water shall then be determined;

3. Then the specimen shall then be kept for at least seven days in still air at not less than 30 °C and with a relative humidity of not less than 90 %;
 4. The process according to Points 1, 2, and 3 shall be repeated once;
- b) The alternative volumetric leakage assessment shall include any of the tests prescribed in ISO 9978:1992(E).

II.4. TESTS FOR LOW DISPERSIBLE RADIOACTIVE MATERIAL

12. A specimen that comprises or simulates low dispersible radioactive material shall be subjected to the enhanced thermal test specified in Point 36 and the impact test specified in Point 37. A different specimen may be used for each of the tests. Following the test in the first sentence, the specimen shall be subjected to the leach test specified in point 3. After each test it shall be determined if the applicable requirements of Point 5 of Part I have been met.

II.5. TESTS FOR PACKAGES

II.5.1. Test specimen preparation

13. All specimens shall be inspected before testing in order to identify and record faults or damage, including the following:
- a) divergence from design;
 - b) manufacturing defects;
 - c) corrosion or other damage; and
 - d) deformation.
14. The containment system of the package shall be clearly specified.
15. The external features of the specimen shall be clearly identified so that reference may be made simply and clearly to any part of such a specimen.

II.5.2. Testing the integrity of the containment system and shielding and assessing criticality safety

16. After performance of tests specified in Points 18 to 37:
- a) faults and damage shall be identified and recorded;
 - b) it shall be determined whether the integrity of the containment system and shielding has been retained to the extent required in Part I for the package under test; and
 - c) for a package containing fissile material, it shall be determined whether the assumptions and conditions used in the assessments required by Points 73 to 86 of Part I also apply to the tested package.

II.5.3. Target for drop tests

17. The target for the drop test specified in Points 5, 22, 25(a), 27 and 35 shall be a flat, horizontal surface of such a character that any increase in its resistance to displacement or deformation upon impact by the specimen would not significantly increase damage to the specimen.

II.5.4. Test for package designed to contain uranium hexafluoride

18. Specimens that comprise or simulate packagings designed to contain 0.1 kg or more of uranium hexafluoride shall be tested hydraulically at an internal pressure of at least 1.38 MPa. For stipulated periodic review of packaging, an equivalent non-destructive test may be applied that is stipulated in documentation used as the basis for a packaging type approval decision issued by the Office, and, in the case of international carriage, also by the relevant authority of the state that the carriage concerns.

II.5.5. Tests demonstrating the ability to withstand normal transport conditions

19. Tests demonstrating the ability to withstand normal conditions of transport are the water spray test, the free drop test, the stacking test and the penetration test. A specimen of the package shall be subjected to the free drop test, the stacking test and the penetration test, preceded in each case by the water spray test. One specimen may be used for all the tests pursuant to the first sentence, provided that the requirements of Point 20 are fulfilled.
20. The time interval between the conclusion of the water spray test and the subsequent test shall 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 any evidence to the contrary, this interval shall be taken to be 2 h if the water spray is applied from four directions simultaneously. However, if the water spray is applied from each of the four directions consecutively, the subsequent test shall be performed immediately after the end of the water spray test.
21. Water spray test: The specimen shall be subjected to a water spray test that simulates exposure to rainfall of approximately 5 cm per hour for at least 1 h.
22. Free drop test: The specimen shall drop onto the target so as to suffer maximum damage in respect of the safety features to be tested:
- a) The height of drop measured from the lowest point of the specimen to the upper surface of the target shall be not less than the distance specified in Table 3 for the applicable package mass. The target shall meet the requirements of Point 17; and
 - b) for rectangular fibreboard or wood packages not exceeding a mass of 50 kg, a separate specimen shall be subjected to a free drop onto each corner from a height of 0.3 m; or
 - c) for cylindrical fibreboard not exceeding a mass of 100 kg, a separate specimen shall be subjected to a free drop onto each of the quarters of each rim from a height of 0.3 m.
23. Stacking test: Unless the shape of the packaging effectively prevents stacking, the specimen shall be subjected, for a period of 24 h, to a compressive load greater of the following:
- a) force equivalent to five times the maximum weight of the package; or
 - b) force equivalent to the product of the vertically projected area of the package and a pressure of 13 kPa.

Table 3 Free drop distance for tests proving the ability of a package to withstand normal conditions of transport

Mass of packaging with rated content (kg)	Free drop distance (m)
less than 5 000	1.2
greater than or equal to 5 000 and less than 10 000	0.9
greater than or equal to 10 000 and less than 15 000	0.6
greater than or equal to 15 000	0.3

24. Penetration test: The specimen shall be placed on a rigid, flat, horizontal surface that will not move significantly while the test is being carried out:
- a bar 3.2 cm in diameter with a hemispherical end and a mass of 6 kg shall be dropped and directed to fall, with its longitudinal axis vertical, onto the centre of the weakest part of the specimen, so that, if it penetrates sufficiently far, it will hit the containment system. The bar shall not be significantly deformed by the test performance; and
 - the height of drop of the bar measured from its lower end to the intended point of impact on the upper surface of the specimen shall be 1 m.

II.5.6. Additional tests for Type A package designed for liquids and gases

25. A specimen, or separate specimens, shall be subjected to tests specified in (a) and (b). If it can be demonstrated that one test is more severe for the specimen, the specimen shall be subjected to the more severe test:
- Free drop test: the specimen shall drop onto the target so as to cause the most damage to the containment system. The height of the drop measured from the lowest part of the specimen to the upper surface of the target shall be 9 m. The target shall be as defined in Part 17; and
 - Penetration test: the specimen shall be subjected to the test specified in Point 24 with a drop height of 1.7 m.

II.5.7. Tests demonstrating the ability to withstand accident conditions during transport

26. The specimen shall be subjected to the cumulative effects of the tests specified in Points 27 and 28, in that order. Following these tests, either this specimen or another separate specimen shall be subjected to the water immersion test as specified in Point 29, and in the case of a Type B(U) or Type B(M) package containing more than 10^5 A₂ and a Type C package, also the test as specified in Point 30.
27. Mechanical test: the mechanical test consists of three different drop tests:
- drop test I: the specimen shall drop onto the target so as to suffer maximum damage, and the height of the drop measured from the lowest point of the specimen to the upper surface of the target shall be 9 m. The target shall be as defined Point 17.
 - drop test II: the specimen shall drop onto a bar rigidly mounted perpendicularly on the target so as to suffer maximum damage. The height of the drop measured from the intended point of impact of the specimen to the upper surface of the bar shall be 1 m. The bar shall be of solid mild steel of circular section, 15.0 ± 0.5 cm in diameter and 20 cm long, unless a longer bar would cause greater damage. Otherwise a bar of sufficient length to cause maximum damage shall be used. The upper end of the bar shall be flat and horizontal with

its edge rounded off to a radius of not more than 6 mm. The target shall meet the requirements of Point 17;

- c) drop test III: the specimen shall be subjected to a dynamic crush test by positioning the specimen on the target so as to suffer maximum damage by the drop of a 500 kg mass from 9 m onto the specimen. The mass shall consist of a 1 m × 1 m solid mild steel plate and shall fall in a horizontal attitude. The lower face of the steel plate shall have its edges and corners rounded off to a radius of not more than 6 mm. The height of the drop shall be measured from the underside of the plate to the highest point of the specimen. The target shall meet the requirements of Point 17.

Each specimen shall be subjected to the applicable drops, as specified in Point 59 or 85 of Part I. The order of the drop tests shall be such that, on completion of the mechanical test, the specimen shall have suffer maximum damage in the thermal test that follows.

- 28. Thermal test: the specimen shall be in thermal equilibrium under conditions of an ambient temperature of 38 °C, subject to insolation conditions specified in Table 1 and subject to the design maximum rate of internal heat generation within the package from the radioactive contents. Any of these parameters are allowed to have different values prior to, and during, the test, provided due account is taken of them in the subsequent assessment of package response. The specimen must be exposed to the following in the specified order:

- a) for a period of 30 min. to a thermal environment that provides a heat flux at least equivalent to that of a hydrocarbon fuel-air fire in sufficiently quiescent ambient conditions to give a minimum average flame emissivity coefficient of 0.9 and an average temperature of at least 800 °C, fully engulfing the specimen, with a surface absorptivity coefficient of 0.8 or that value that the package may be demonstrated to possess if exposed to the fire specified; and
- b) an ambient temperature of 38 °C, subject to insolation conditions specified in Table 1 and subject to the design maximum rate of internal heat generation within the package by the radioactive contents for a sufficient period to ensure that temperatures in the specimen are everywhere decreasing and/or are approaching initial steady state conditions. Any of these parameters are allowed to have different values prior to, and during, the test, provided due account is taken of them in the subsequent assessment of package response. During and following the test, the specimen shall not be artificially cooled and any combustion of materials of the specimen shall be permitted to proceed naturally.

- 29. Water immersion test: the specimen shall be immersed under at least 15 m of water for a period of not less than 8 h in the attitude that will lead to maximum damage. For demonstration purposes, an external gauge pressure of at least 150 kPa shall be considered to meet these conditions.

II.5.8. Enhanced water immersion test for Type B(U) and Type B(M) packages containing more than 10^5 A₂ and for Type C packages

- 30. Water immersion test: the specimen shall be immersed under at least 200 m of water for a period of not less than 1 h. For demonstration purposes, an external gauge pressure of at least 2 MPa shall be considered to meet these conditions.

II.5.9. Water immersion test for radioactive packages containing fissile material

31. A package for which it has been assumed for purposes of assessment under Points 80 to 85 of Part I that water leaks in and out to the extent that results in greatest reactivity shall be excepted from the test specified in Point 33.
32. Before the specimen is subjected to the water leakage test specified in Point 33, it shall be subjected to the tests in Point 27(b) and Point 27(a), or 727(c) and 28.
33. The specimen shall be immersed under at least 0.9 m of water for a period of not less than 8 h in the attitude for which maximum leakage is expected.

II.5.10. Tests for type C packages

34. Specimens shall be subjected to the following series of tests:
 - a) as specified Points 27(a), 27(c), 35, and 36, in that order; and
 - b) as specified in (37).Separate specimens may be used for the series of tests in (a) and for the test in (b).
35. Puncture-tearing test: the specimen shall be subjected to the damaging effects of a vertical solid probe made of mild steel. The orientation of the package specimen and the impact point on the package surface shall be such as to cause maximum damage at the conclusion of the test sequence specified in Point 34(a).
 - a) A specimen representing a package having a mass of less than 250 kg, shall be placed on a target and subjected to a probe having a mass of 250 kg falling from a height of 3 m above the intended impact point. For this test the probe shall be a 20 cm diameter cylindrical bar with the striking end forming the frustum of a right circular cone with the following dimensions: 30 cm height and 2.5 cm diameter at the top with its edge rounded off to a radius of not more than 6 mm. The target on which the specimen is placed shall be as specified in Point 17.
 - b) For a package having a mass of 250 kg or more, the base of the probe shall be placed on a target and the specimen dropped onto the probe. The height of the drop, measured from the point of impact with the specimen to the upper surface of the probe, shall be 3 m. The probe for this test shall have the same properties and dimensions as specified in (a), except that the length and mass of the probe shall be such as to cause maximum damage to the specimen. The target on which the specimen is placed shall be as specified in Point 17.
36. Enhanced thermal test: the conditions for this test shall be as specified in Point 28, except that the exposure to the thermal environment shall be for a period of 1 hour.
37. Impact test: The specimen shall be subject to an impact on a target at a velocity of not less than 90 m/s, at such an orientation as to suffer maximum damage. The target shall be as defined in Point 17, except that the target surface may be at any orientation as long as the surface is normal to the specimen path.

REQUIREMENTS FOR TYPE D AND S PACKAGES

1. Type D and S packaging:
 - a) shall have mechanical ruggedness demonstrably enough with regard to designed manner of manipulation; and
 - b) shall be manufactured from materials whose service life demonstrably corresponds to the designed service life of the packaging. Materials with a shorter service life may be used for packaging components if are readily replaceable during the operation of the storage facility for radioactive waste or spent fuel or the radioactive waste repository.
2. The contents of Type D or Type S packaging shall be sufficiently dried out and surrounded by a defined medium. The Office shall decide on the dryness criteria and parameters of this medium in the type approval decision when requested by the applicant.
3. A Type D or S packaging shall be designed to comply with limits and conditions for the handling of radioactive waste, including relevant acceptability criteria, approved by the Office.
4. Type S packaging shall be manufactured:
 - a) to meet the requirements specified in Points 7 to 11 and 13 to 16 of Part I of Annex 1 to this decree, and other requirements stipulated by the Office in the type approval decision, taking into account manner of use;
 - b) to ensure feasibility of checking package leak-tightness during the operation of the storage facility for radioactive waste or spent fuel;
 - c) to preserve adequate shielding during normal operation, abnormal operation, design basis accidents and beyond design basis accidents that are not serious accidents. The shielding of the package shall ensure that the radiation level on the exterior does not exceed 10 mSv/h, even at the maximum design contents of radioactive content;
 - d) so that the heat generated inside the packaging by its radioactive contents does not under the normal conditions and at the ambient temperature of 38 °C have a negative effect on compliance with leak-tightness and shielding criteria if the packaging and its contents are left unattended for seven days;
 - e) to eliminate the influence of generated heat, the heat shall not:
 1. change the spacing, geometrical form or physical state of the radioactive contents, or if radionuclides are sealed within special capsule – cause deformation or melting of this capsule or its radioactive contents;
 2. reduce the efficiency of the packaging through differential thermal expansion, cracking, or melting of the shielding material;
 3. accelerate corrosion when combined with moisture; and
 4. cause the interruption of the residual heat removal; elimination of residual heat shall also be ensured also under beyond design basis accident conditions that are not serious accidents.

ACTIVITY LIMITS AND CLASSIFICATION

1. GENERAL REQUIREMENTS

1. A radioactive or fissile material is assigned one of the UN numbers listed in Table 1, in accordance with the requirements of Points 8 to 34.

Table 1 Selected UN numbers, names and descriptions

UN number	NAME ^{a)} and description
Excepted packages	
UN 2908	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - EMPTY PACKAGINGS
UN 2909	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - PRODUCTS OF NATURAL URANIUM or DEPLETED URANIUM or THORIUM
UN 2910	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - A LIMITED AMOUNT OF MATERIAL
UN 2911	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - DEVICES or PRODUCTS
UN 3507	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – URANIUM HEXAFLUORIDE, less than 0.1 kg in a package, excepted fissile material or non-fissile material
Materials with low specific activity	
UN 2912	RADIOACTIVE MATERIAL, MATERIAL WITH LOW SPECIFIC ACTIVITY (LSA-I) excepted fissile material or non-fissile material
UN 3321	RADIOACTIVE MATERIAL, MATERIAL WITH LOW SPECIFIC ACTIVITY (LSA-II) excepted fissile material or non-fissile material
UN 3322	RADIOACTIVE MATERIAL, MATERIAL WITH LOW SPECIFIC ACTIVITY (LSA-III) excepted fissile material or non-fissile material
UN 3324	RADIOACTIVE MATERIAL, MATERIAL WITH LOW SPECIFIC ACTIVITY (LSA-II), FISSILE MATERIAL
UN 3325	RADIOACTIVE MATERIAL, MATERIAL WITH LOW SPECIFIC ACTIVITY (LSA-III), FISSILE MATERIAL
Surface contaminated objects	
UN 2913	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), excepted fissile substance or non-fissile substance
UN 3326	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), FISSILE SUBSTANCE
Type A packages	
UN 2915	RADIOACTIVE MATERIAL, TYPE A PACKAGE other than special form radioactive material, exceptions of fissile material or non-fissile material
UN 3327	RADIOACTIVE MATERIAL, TYPE A PACKAGE, FISSILE MATERIAL other than special form radioactive material
UN 3332	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM RADIOACTIVE MATERIAL, exceptions of fissile material or non-fissile material
UN 3333	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM RADIOACTIVE MATERIAL, FISSILE MATERIAL
Type B(U) packages	
UN 2916	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE exceptions of fissile material or non-fissile material
UN 3328	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, FISSILE MATERIAL

Type B(M) packages	
UN 2917	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE exceptions of fissile material or non-fissile material
UN 3329	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, FISSILE MATERIAL
Type C packages	
UN 3323	RADIOACTIVE MATERIAL, TYPE C PACKAGE exceptions of fissile material or non-fissile material
UN 3330	RADIOACTIVE MATERIAL, TYPE C PACKAGE, FISSILE MATERIAL
Transport under special arrangement	
UN 2919	RADIOACTIVE MATERIAL, TRANSPORT UNDER SPECIAL ARRANGEMENT excepted fissile material or non-fissile material
UN 3331	RADIOACTIVE MATERIAL, TRANSPORT UNDER SPECIAL ARRANGEMENT, FISSILE MATERIAL
Uranium hexafluoride	
UN 2977	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE MATERIAL
UN 2978	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE excepted fissile material or non-fissile material

Legend:

^{a)} NAME can be found in the 'NAME and description' field and is limited to the part written in CAPITAL LETTERS. In Items UN 2909, UN 2911, UN 2913, and UN 3326, only the appropriate NAME from alternative NAMES separated by the conjunction 'or'.

2. BASIC RADIONUCLIDE VALUES

2. Table 2 lists basic radionuclide values:

- a) A_1 and A_2 in TBq;
- b) activity concentration limits for exceptions of material in Bq/g; and
- c) activity limits for exceptions of material in Bq.

Table 2 Basic radionuclide values

Radionuclide (atomic number)	A_1 [TBq]	A_2 [TBq]	Activity concentration limits for exceptions of material [Bq/g]	Activity limits for an exceptions of consignment [Bq]
Actinium (89)				
Ac-225a)	8×10^{-1}	6×10^{-3}	1×10^1	1×10^4
Ac-227 (a)	9×10^{-1}	9×10^{-5}	1×10^{-1}	1×10^3
Ac-228	6×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Silver (47)				
Ag-105	2×10^0	2×10^0	1×10^2	1×10^6
Ag-108m (a)	7×10^{-1}	7×10^{-1}	1×10^1 (b)	1×10^6 (b)
Ag-110m (a)	4×10^{-1}	4×10^{-1}	1×10^1	1×10^6
Ag-111	2×10^0	6×10^{-1}	1×10^3	1×10^6
Aluminium (13)				
Al-26	1×10^{-1}	1×10^{-1}	1×10^1	1×10^5

Americium (95)				
Am-241	1×10^1	1×10^{-3}	1×10^0	1×10^4
Am-242m (a)	1×10^1	1×10^{-3}	1×10^0 (b)	1×10^4 (b)
Am-243 (a)	5×10^0	1×10^{-3}	1×10^0 (b)	1×10^3 (b)
Argon (18)				
Ar-37	4×10^1	4×10^1	1×10^6	1×10^8
Ar-39	4×10^1	2×10^1	1×10^7	1×10^4
Ar-41	3×10^{-1}	3×10^{-1}	1×10^2	1×10^9
Arsenic (33)				
As-72	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
As-73	4×10^1	4×10^1	1×10^3	1×10^7
As-74	1×10^0	9×10^{-1}	1×10^1	1×10^6
As-76	3×10^{-1}	3×10^{-1}	1×10^2	1×10^5
As-77	2×10^1	7×10^{-1}	1×10^3	1×10^6
Astatine (85)				
At-211 (a)	2×10^1	5×10^{-1}	1×10^3	1×10^7
Gold (79)				
Au-193	7×10^0	2×10^0	1×10^2	1×10^7
Au-194	1×10^0	1×10^0	1×10^1	1×10^6
Au-195	1×10^1	6×10^0	1×10^2	1×10^7
Au-198	1×10^0	6×10^{-1}	1×10^2	1×10^6
Au-199	1×10^1	6×10^{-1}	1×10^2	1×10^6
Barium (56)				
Ba-131 (a)	2×10^0	2×10^0	1×10^2	1×10^6
Ba-133	3×10^0	3×10^0	1×10^2	1×10^6
Ba-133m	2×10^1	6×10^{-1}	1×10^2	1×10^6
Ba-140 (a)	5×10^{-1}	3×10^{-1}	1×10^1 (b)	1×10^5 (b)
Beryllium (4)				
Be-7	2×10^1	2×10^1	1×10^3	1×10^7
Be-10	4×10^1	6×10^{-1}	1×10^4	1×10^6
Bismuth (83)				
Bi-205	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Bi-206	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Bi-207	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Bi-210	1×10^0	6×10^{-1}	1×10^3	1×10^6
Bi-210m (a)	6×10^{-1}	2×10^{-2}	1×10^1	1×10^5
Bi-212 (a)	7×10^{-1}	6×10^{-1}	1×10^1 (b)	1×10^5 (b)
Berkelium (97)				
Bk-247	8×10^0	8×10^{-4}	1×10^0	1×10^4
Bk-249 (a)	4×10^1	3×10^{-1}	1×10^3	1×10^6
Bromine (35)				
Br-76	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Br-77	3×10^0	3×10^0	1×10^2	1×10^6
Br-82	4×10^{-1}	4×10^{-1}	1×10^1	1×10^6
Carbon (6)				
C-11	1×10^0	6×10^{-1}	1×10^1	1×10^6
C-14	4×10^1	3×10^0	1×10^4	1×10^7

Calcium (20)				
Ca-41	Unlimited	Unlimited	1×10^5	1×10^7
Ca-45	4×10^1	1×10^0	1×10^4	1×10^7
Ca-47 (a)	3×10^0	3×10^{-1}	1×10^1	1×10^6
Cadmium (48)				
Cd-109	3×10^1	2×10^0	1×10^4	1×10^6
Cd-113m	4×10^1	5×10^{-1}	1×10^3	1×10^6
Cd-115 (a)	3×10^0	4×10^{-1}	1×10^2	1×10^6
Cd-115m	5×10^{-1}	5×10^{-1}	1×10^3	1×10^6
Cerium (58)				
Ce-139	7×10^0	2×10^0	1×10^2	1×10^6
Ce-141	2×10^1	6×10^{-1}	1×10^2	1×10^7
Ce-143	9×10^{-1}	6×10^{-1}	1×10^2	1×10^6
Ce-144 (a)	2×10^{-1}	2×10^{-1}	1×10^2 (b)	1×10^5 (b)
Californium (98)				
Cf-248	4×10^1	6×10^{-3}	1×10^1	1×10^4
Cf-249	3×10^0	8×10^{-4}	1×10^0	1×10^3
Cf-250	2×10^1	2×10^{-3}	1×10^1	1×10^4
Cf-251	7×10^0	7×10^{-4}	1×10^0	1×10^3
Cf-252	1×10^{-1}	3×10^{-3}	1×10^1	1×10^4
Cf-253 (a)	4×10^1	4×10^{-2}	1×10^2	1×10^5
Cf-254	1×10^{-3}	1×10^{-3}	1×10^0	1×10^3
Chlorine (17)				
Cl-36	1×10^1	6×10^{-1}	1×10^4	1×10^6
Cl-38	2×10^{-1}	2×10^{-1}	1×10^1	1×10^5
Curium (96)				
Cm-240	4×10^1	2×10^{-2}	1×10^2	1×10^5
Cm-241	2×10^0	1×10^0	1×10^2	1×10^6
Cm-242	4×10^1	1×10^{-2}	1×10^2	1×10^5
Cm-243	9×10^0	1×10^{-3}	1×10^0	1×10^4
Cm-244	2×10^1	2×10^{-3}	1×10^1	1×10^4
Cm-245	9×10^0	9×10^{-4}	1×10^0	1×10^3
Cm-246	9×10^0	9×10^{-4}	1×10^0	1×10^3
Cm-247 (a)	3×10^0	1×10^{-3}	1×10^0	1×10^4
Cm-248	2×10^{-2}	3×10^{-4}	1×10^0	1×10^3
Cobalt (27)				
Co-55	5×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Co-56	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Co-57	1×10^1	1×10^1	1×10^2	1×10^6
Co-58	1×10^0	1×10^0	1×10^1	1×10^6
Co-58m	4×10^1	4×10^1	1×10^4	1×10^7
Co-60	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Chromium (24)				
Cr-51	3×10^1	3×10^1	1×10^3	1×10^7
Caesium (55)				
Cs-129	4×10^0	4×10^0	1×10^2	1×10^5
Cs-131	3×10^1	3×10^1	1×10^3	1×10^6

Cs-132	1×10^0	1×10^0	1×10^1	1×10^5
Cs-134	7×10^{-1}	7×10^{-1}	1×10^1	1×10^4
Cs-134m	4×10^1	6×10^{-1}	1×10^3	1×10^5
Cs-135	4×10^1	1×10^0	1×10^4	1×10^7
Cs-136	5×10^{-1}	5×10^{-1}	1×10^1	1×10^5
Cs-137 (a)	2×10^0	6×10^{-1}	1×10^1 (b)	1×10^4 (b)
Copper (29)				
Cu-64	6×10^0	1×10^0	1×10^2	1×10^6
Cu-67	1×10^1	7×10^{-1}	1×10^2	1×10^6
Dysprosium (66)				
Dy-159	2×10^1	2×10^1	1×10^3	1×10^7
Dy-165	9×10^{-1}	6×10^{-1}	1×10^3	1×10^6
Dy-166 (a)	9×10^{-1}	3×10^{-1}	1×10^3	1×10^6
Erbium (68)				
Er-169	4×10^1	1×10^0	1×10^4	1×10^7
Er-171	8×10^{-1}	5×10^{-1}	1×10^2	1×10^6
Europium (63)				
Eu-147	2×10^0	2×10^0	1×10^2	1×10^6
Eu-148	5×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Eu-149	2×10^1	2×10^1	1×10^2	1×10^7
Eu-150 (with short half-life)	2×10^0	7×10^{-1}	1×10^3	1×10^6
Eu-150 (with long half-life)	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Eu-152	1×10^0	1×10^0	1×10^1	1×10^6
Eu-152m	8×10^{-1}	8×10^{-1}	1×10^2	1×10^6
Eu-154	9×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Eu-155	2×10^1	3×10^0	1×10^2	1×10^7
Eu-156	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Fluorine (9)				
F-18	1×10^0	6×10^{-1}	1×10^1	1×10^6
Iron (26)				
Fe-52 (a)	3×10^{-1}	3×10^{-1}	1×10^1	1×10^6
Fe-55	4×10^1	4×10^1	1×10^4	1×10^6
Fe-59	9×10^{-1}	9×10^{-1}	1×10^1	1×10^6
Fe-60 (a)	4×10^1	2×10^{-1}	1×10^2	1×10^5
Gallium (31)				
Ga-67	7×10^0	3×10^0	1×10^2	1×10^6
Ga-68	5×10^{-1}	5×10^{-1}	1×10^1	1×10^5
Ga-72	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Gadolinium (64)				
Gd-146 (a)	5×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Gd-148	2×10^1	2×10^{-3}	1×10^1	1×10^4
Gd-153	1×10^1	9×10^0	1×10^2	1×10^7
Gd-159	3×10^0	6×10^{-1}	1×10^3	1×10^6
Germanium (32)				
Ge-68 (a)	5×10^{-1}	5×10^{-1}	1×10^1	1×10^5
Ge-71	4×10^1	4×10^1	1×10^4	1×10^8
Ge-77	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5

Hafnium (72)				
Hf-172 (a)	6×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Hf-175	3×10^0	3×10^0	1×10^2	1×10^6
Hf-181	2×10^0	5×10^{-1}	1×10^1	1×10^6
Hf-182	Unlimited	Unlimited	1×10^2	1×10^6
Mercury (80)				
Hg-194 (a)	1×10^0	1×10^0	1×10^1	1×10^6
Hg-195m (a)	3×10^0	7×10^{-1}	1×10^2	1×10^6
Hg-197	2×10^1	1×10^1	1×10^2	1×10^7
Hg-197m	1×10^1	4×10^{-1}	1×10^2	1×10^6
Hg-203	5×10^0	1×10^0	1×10^2	1×10^5
Holmium (67)				
Ho-166	4×10^{-1}	4×10^{-1}	1×10^3	1×10^5
Ho-166m	6×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Iodine (53)				
I-123	6×10^0	3×10^0	1×10^2	1×10^7
I-124	1×10^0	1×10^0	1×10^1	1×10^6
I-125	2×10^1	3×10^0	1×10^3	1×10^6
I-126	2×10^0	1×10^0	1×10^2	1×10^6
I-129	Unlimited	Unlimited	1×10^2	1×10^5
I-131	3×10^0	7×10^{-1}	1×10^2	1×10^6
I-132	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
I-133	7×10^{-1}	6×10^{-1}	1×10^1	1×10^6
I-134	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
I-135 (a)	6×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Indium (49)				
In-111	3×10^0	3×10^0	1×10^2	1×10^6
In-113m	4×10^0	2×10^0	1×10^2	1×10^6
In-114m (a)	1×10^1	5×10^{-1}	1×10^2	1×10^6
In-115m	7×10^0	1×10^0	1×10^2	1×10^6
Iridium (77)				
Ir-189 (a)	1×10^1	1×10^1	1×10^2	1×10^7
Ir-190	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Ir-192	1×10^0 (c)	6×10^{-1}	1×10^1	1×10^4
Ir-194	3×10^{-1}	3×10^{-1}	1×10^2	1×10^5
Potassium (19)				
K-40	9×10^{-1}	9×10^{-1}	1×10^2	1×10^6
K-42	2×10^{-1}	2×10^{-1}	1×10^2	1×10^6
K-43	7×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Krypton (36)				
Kr-79	4×10^1	2×10^0	1×10^3	1×10^5
Kr-81	4×10^1	4×10^1	1×10^4	1×10^7
Kr-85	1×10^1	1×10^1	1×10^5	1×10^4
Kr-85m	8×10^0	3×10^0	1×10^3	1×10^{10}
Kr-87	2×10^{-1}	2×10^{-1}	1×10^2	1×10^9
Lanthanum (57)				
La-137	3×10^1	6×10^0	1×10^3	1×10^7

La-140	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Lutetium (71)				
Lu-172	6×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Lu-173	8×10^0	8×10^0	1×10^2	1×10^7
Lu-174	9×10^0	9×10^0	1×10^2	1×10^7
Lu-174m	2×10^1	1×10^1	1×10^2	1×10^7
Lu-177	3×10^1	7×10^{-1}	1×10^3	1×10^7
Magnesium (12)				
Mg-28 (a)	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Manganese (25)				
Mn-52	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Mn-53	Unlimited	Unlimited	1×10^4	1×10^9
Mn-54	1×10^0	1×10^0	1×10^1	1×10^6
Mn-56	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Molybdenum (42)				
Mo-93	4×10^1	2×10^1	1×10^3	1×10^8
Mo-99 (a)	1×10^0	6×10^{-1}	1×10^2	1×10^6
Nitrogen (7)				
N-13	9×10^{-1}	6×10^{-1}	1×10^2	1×10^9
Sodium (11)				
Na-22	5×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Na-24	2×10^{-1}	2×10^{-1}	1×10^1	1×10^5
Niobium (41)				
Nb-93m	4×10^1	3×10^1	1×10^4	1×10^7
Nb-94	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Nb-95	1×10^0	1×10^0	1×10^1	1×10^6
Nb-97	9×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Neodymium (60)				
Nd-147	6×10^0	6×10^{-1}	1×10^2	1×10^6
Nd-149	6×10^{-1}	5×10^{-1}	1×10^2	1×10^6
Nickel (28)				
Ni-59	Unlimited	Unlimited	1×10^4	1×10^8
Ni-63	4×10^1	3×10^1	1×10^5	1×10^8
Ni-65	4×10^{-1}	4×10^{-1}	1×10^1	1×10^6
Neptunium (93)				
Np-235	4×10^1	4×10^1	1×10^3	1×10^7
Np-236 (with short half-life)	2×10^1	2×10^0	1×10^3	1×10^7
Np-236 (with long half-life)	9×10^0	2×10^{-2}	1×10^2	1×10^5
Np-237	2×10^1	2×10^{-3}	1×10^0 (b)	1×10^3 (b)
Np-239	7×10^0	4×10^{-1}	1×10^2	1×10^7
Osmium (76)				
Os-185	1×10^0	1×10^0	1×10^1	1×10^6
Os-191	1×10^1	2×10^0	1×10^2	1×10^7
Os-191m	4×10^1	3×10^1	1×10^3	1×10^7
Os-193	2×10^0	6×10^{-1}	1×10^2	1×10^6
Os-194 (a)	3×10^{-1}	3×10^{-1}	1×10^2	1×10^5
Phosphorus (15)				

P-32	5×10^{-1}	5×10^{-1}	1×10^3	1×10^5
P-33	4×10^1	1×10^0	1×10^5	1×10^8
Protactinium (91)				
Pa-230 (a)	2×10^0	7×10^{-2}	1×10^1	1×10^6
Pa-231	4×10^0	4×10^{-4}	1×10^0	1×10^3
Pa-233	5×10^0	7×10^{-1}	1×10^2	1×10^7
Lead (82)				
Pb-201	1×10^0	1×10^0	1×10^1	1×10^6
Pb-202	4×10^1	2×10^1	1×10^3	1×10^6
Pb-203	4×10^0	3×10^0	1×10^2	1×10^6
Pb-205	Unlimited	Unlimited	1×10^4	1×10^7
Pb-210 (a)	1×10^0	5×10^{-2}	1×10^1 (b)	1×10^4 (b)
Pb-212 (a)	7×10^{-1}	2×10^{-1}	1×10^1 (b)	1×10^5 (b)
Palladium (46)				
Pd-103 (a)	4×10^1	4×10^1	1×10^3	1×10^8
Pd-107	Unlimited	Unlimited	1×10^5	1×10^8
Pd-109	2×10^0	5×10^{-1}	1×10^3	1×10^6
Promethium (61)				
Pm-143	3×10^0	3×10^0	1×10^2	1×10^6
Pm-144	7×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Pm-145	3×10^1	1×10^1	1×10^3	1×10^7
Pm-147	4×10^1	2×10^0	1×10^4	1×10^7
Pm-148m (a)	8×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Pm-149	2×10^0	6×10^{-1}	1×10^3	1×10^6
Pm-151	2×10^0	6×10^{-1}	1×10^2	1×10^6
Polonium (84)				
Po-210	4×10^1	2×10^{-2}	1×10^1	1×10^4
Praseodymium (59)				
Pr-142	4×10^{-1}	4×10^{-1}	1×10^2	1×10^5
Pr-143	3×10^0	6×10^{-1}	1×10^4	1×10^6
Platinum (78)				
Pt-188 (a)	1×10^0	8×10^{-1}	1×10^1	1×10^6
Pt-191	4×10^0	3×10^0	1×10^2	1×10^6
Pt-193	4×10^1	4×10^1	1×10^4	1×10^7
Pt-193m	4×10^1	5×10^{-1}	1×10^3	1×10^7
Pt-195m	1×10^1	5×10^{-1}	1×10^2	1×10^6
Pt-197	2×10^1	6×10^{-1}	1×10^3	1×10^6
Pt-197m	1×10^1	6×10^{-1}	1×10^2	1×10^6
Plutonium (94)				
Pu-236	3×10^1	3×10^{-3}	1×10^1	1×10^4
Pu-237	2×10^1	2×10^1	1×10^3	1×10^7
Pu-238	1×10^1	1×10^{-3}	1×10^0	1×10^4
Pu-239	1×10^1	1×10^{-3}	1×10^0	1×10^4
Pu-240	1×10^1	1×10^{-3}	1×10^0	1×10^3
Pu-241 (a)	4×10^1	6×10^{-2}	1×10^2	1×10^5
Pu-242	1×10^1	1×10^{-3}	1×10^0	1×10^4
Pu-244 (a)	4×10^{-1}	1×10^{-3}	1×10^0	1×10^4

Radium (88)				
Ra-223 (a)	4×10^{-1}	7×10^{-3}	1×10^2 (b)	1×10^5 (b)
Ra-224 (a)	4×10^{-1}	2×10^{-2}	1×10^1 (b)	1×10^5 (b)
Ra-225 (a)	2×10^{-1}	4×10^{-3}	1×10^2	1×10^5
Ra-226 (a)	2×10^{-1}	3×10^{-3}	1×10^1 (b)	1×10^4 (b)
Ra-228 (a)	6×10^{-1}	2×10^{-2}	1×10^1 (b)	1×10^5 (b)
Rubidium (37)				
Rb-81	2×10^0	8×10^{-1}	1×10^1	1×10^6
Rb-83 (a)	2×10^0	2×10^0	1×10^2	1×10^6
Rb-84	1×10^0	1×10^0	1×10^1	1×10^6
Rb-86	5×10^{-1}	5×10^{-1}	1×10^2	1×10^5
Rb-87	Unlimited	Unlimited	1×10^4	1×10^7
Rb (natural)	Unlimited	Unlimited	1×10^4	1×10^7
Rhenium (75)				
Re-184	1×10^0	1×10^0	1×10^1	1×10^6
Re-184m	3×10^0	1×10^0	1×10^2	1×10^6
Re-186	2×10^0	6×10^{-1}	1×10^3	1×10^6
Re-187	Unlimited	Unlimited	1×10^6	1×10^9
Re-188	4×10^{-1}	4×10^{-1}	1×10^2	1×10^5
Re-189(a)	3×10^0	6×10^{-1}	1×10^2	1×10^6
Re (natural)	Unlimited	Unlimited	1×10^6	1×10^9
Rhodium (45)				
Rh-99	2×10^0	2×10^0	1×10^1	1×10^6
Rh-101	4×10^0	3×10^0	1×10^2	1×10^7
Rh-102	5×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Rh-102m	2×10^0	2×10^0	1×10^2	1×10^6
Rh-103m	4×10^1	4×10^1	1×10^4	1×10^8
Rh-105	1×10^1	8×10^{-1}	1×10^2	1×10^7
Radon (86)				
Rn-222 (a)	3×10^{-1}	4×10^{-3}	1×10^1 (b)	1×10^8 (b)
Ruthenium (44)				
Ru-97	5×10^0	5×10^0	1×10^2	1×10^7
Ru-103 (a)	2×10^0	2×10^0	1×10^2	1×10^6
Ru-105	1×10^0	6×10^{-1}	1×10^1	1×10^6
Ru-106 (a)	2×10^{-1}	2×10^{-1}	1×10^2 (b)	1×10^5 (b)
Sulfur (16)				
S-35	4×10^1	3×10^0	1×10^5	1×10^8
Antimony (51)				
Sb-122	4×10^{-1}	4×10^{-1}	1×10^2	1×10^4
Sb-124	6×10^{-1}	6×10^{-1}	1×10^1	1×10^6
Sb-125	2×10^0	1×10^0	1×10^2	1×10^6
Sb-126	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Scandium (21)				
Sc-44	5×10^{-1}	5×10^{-1}	1×10^1	1×10^5
Sc-46	5×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Sc-47	1×10^1	7×10^{-1}	1×10^2	1×10^6
Sc-48	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5

Selenium (34)				
Se-75	3×10^0	3×10^0	1×10^2	1×10^6
Se-79	4×10^1	2×10^0	1×10^4	1×10^7
Silicon (14)				
Si-31	6×10^{-1}	6×10^{-1}	1×10^3	1×10^6
Si-32	4×10^1	5×10^{-1}	1×10^3	1×10^6
Samarium (62)				
Sm-145	1×10^1	1×10^1	1×10^2	1×10^7
Sm-147	Unlimited	Unlimited	1×10^1	1×10^4
Sm-151	4×10^1	1×10^1	1×10^4	1×10^8
Sm-153	9×10^0	6×10^{-1}	1×10^2	1×10^6
Tin (50)				
Sn-113 (a)	4×10^0	2×10^0	1×10^3	1×10^7
Sn-117m	7×10^0	4×10^{-1}	1×10^2	1×10^6
Sn-119m	4×10^1	3×10^1	1×10^3	1×10^7
Sn-121m (a)	4×10^1	9×10^{-1}	1×10^3	1×10^7
Sn-123	8×10^{-1}	6×10^{-1}	1×10^3	1×10^6
Sn-125	4×10^{-1}	4×10^{-1}	1×10^2	1×10^5
Sn-126 (a)	6×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Strontium (38)				
Sr-82 (a)	2×10^{-1}	2×10^{-1}	1×10^1	1×10^5
Sr-85	2×10^0	2×10^0	1×10^2	1×10^6
Sr-85m	5×10^0	5×10^0	1×10^2	1×10^7
Sr-87m	3×10^0	3×10^0	1×10^2	1×10^6
Sr-89	6×10^{-1}	6×10^{-1}	1×10^3	1×10^6
Sr-90 (a)	3×10^{-1}	3×10^{-1}	1×10^2 (b)	1×10^4 (b)
Sr-91 (a)	3×10^{-1}	3×10^{-1}	1×10^1	1×10^5
Sr-92 (a)	1×10^0	3×10^{-1}	1×10^1	1×10^6
Tritium (1)				
T(H-3)	4×10^1	4×10^1	1×10^6	1×10^9
Tantalum (73)				
Ta-178 (with long half-life)	1×10^0	8×10^{-1}	1×10^1	1×10^6
Ta-179	3×10^1	3×10^1	1×10^3	1×10^7
Ta-182	9×10^{-1}	5×10^{-1}	1×10^1	1×10^4
Terbium (65)				
Tb-157	4×10^1	4×10^1	1×10^4	1×10^7
Tb-158	1×10^0	1×10^0	1×10^1	1×10^6
Tb-160	1×10^0	6×10^{-1}	1×10^1	1×10^6
Technetium (43)				
Tc-95m (a)	2×10^0	2×10^0	1×10^1	1×10^6
Tc-96	4×10^{-1}	4×10^{-1}	1×10^1	1×10^6
Tc-96m (a)	4×10^{-1}	4×10^{-1}	1×10^3	1×10^7
Tc-97	Unlimited	Unlimited	1×10^3	1×10^8
Tc-97m	4×10^1	1×10^0	1×10^3	1×10^7
Tc-98	8×10^{-1}	7×10^{-1}	1×10^1	1×10^6
Tc-99	4×10^1	9×10^{-1}	1×10^4	1×10^7
Tc-99m	1×10^1	4×10^0	1×10^2	1×10^7

Tellurium (52)				
Te-121	2×10^0	2×10^0	1×10^1	1×10^6
Te-121m	5×10^0	3×10^0	1×10^2	1×10^6
Te-123m	8×10^0	1×10^0	1×10^2	1×10^7
Te-125m	2×10^1	9×10^{-1}	1×10^3	1×10^7
Te-127	2×10^1	7×10^{-1}	1×10^3	1×10^6
Te-127m (a)	2×10^1	5×10^{-1}	1×10^3	1×10^7
Te-129	7×10^{-1}	6×10^{-1}	1×10^2	1×10^6
Te-129m (a)	8×10^{-1}	4×10^{-1}	1×10^3	1×10^6
Te-131m (a)	7×10^{-1}	5×10^{-1}	1×10^1	1×10^6
Te-132 (a)	5×10^{-1}	4×10^{-1}	1×10^2	1×10^7
Thorium (90)				
Th-227	1×10^1	5×10^{-3}	1×10^1	1×10^4
Th-228 (a)	5×10^{-1}	1×10^{-3}	1×10^0 (b)	1×10^4 (b)
Th-229	5×10^0	5×10^{-4}	1×10^0 (b)	1×10^3 (b)
Th-230	1×10^1	1×10^{-3}	1×10^0	1×10^4
Th-231	4×10^1	2×10^{-2}	1×10^3	1×10^7
Th-232	Unlimited	Unlimited	1×10^1	1×10^4
Th-234 (a)	3×10^{-1}	3×10^{-1}	1×10^3 (b)	1×10^5 (b)
Th (natural)	Unlimited	Unlimited	1×10^0 (b)	1×10^3 (b)
Titanium (22)				
Ti-44 (a)	5×10^{-1}	4×10^{-1}	1×10^1	1×10^5
Thallium (81)				
Tl-200	9×10^{-1}	9×10^{-1}	1×10^1	1×10^6
Tl-201	1×10^1	4×10^0	1×10^2	1×10^6
Tl-202	2×10^0	2×10^0	1×10^2	1×10^6
Tl-204	1×10^1	7×10^{-1}	1×10^4	1×10^4
Thulium (69)				
Tm-167	7×10^0	8×10^{-1}	1×10^2	1×10^6
Tm-170	3×10^0	6×10^{-1}	1×10^3	1×10^6
Tm-171	4×10^1	4×10^1	1×10^4	1×10^8
Uranium (92)				
U-230 (rapid lung retention) (a)(d)	4×10^1	1×10^{-1}	1×10^1 (b)	1×10^5 (b)
U-230 (medium lung retention) (a)(e)	4×10^1	4×10^{-3}	1×10^1	1×10^4
U-230 (slow lung retention) (a)(f)	3×10^1	3×10^{-3}	1×10^1	1×10^4
U-232 (rapid lung retention) (d)	4×10^1	1×10^{-2}	1×10^0 (b)	1×10^3 (b)
U-232 (medium lung retention) (e)	4×10^1	7×10^{-3}	1×10^1	1×10^4
U-232 (slow lung retention) (f)	1×10^1	1×10^{-3}	1×10^1	1×10^4
U-233 (rapid lung retention) (d)	4×10^1	9×10^{-2}	1×10^1	1×10^4
U-233 (medium lung retention) (e)	4×10^1	2×10^{-2}	1×10^2	1×10^5
U-233 (slow lung retention) (f)	4×10^1	6×10^{-3}	1×10^1	1×10^5
U-234 (rapid lung retention) (d)	4×10^1	9×10^{-2}	1×10^1	1×10^4
U-234 (medium lung retention) (e)	4×10^1	2×10^{-2}	1×10^2	1×10^5
U-234 (slow lung retention) (f)	4×10^1	6×10^{-3}	1×10^1	1×10^5
U-235 (all types of lung retention) (a)(d)(e)(f)	Unlimited	Unlimited	1×10^1 (b)	1×10^4 (b)
U-236 (quick retention) (d)	Unlimited	Unlimited	1×10^1	1×10^4

U-236 (medium retention rate) (e)	4×10^1	2×10^{-2}	1×10^2	1×10^5
U-236 (slow retention) (f)	4×10^1	6×10^{-3}	1×10^1	1×10^4
U-238 (all types of lung retention) (d)(e)(f)	Unlimited	Unlimited	1×10^1 (b)	1×10^4 (b)
U (natural)	Unlimited	Unlimited	1×10^0 (b)	1×10^3 (b)
U (enriched up to 20 % or less) (g)	Unlimited	Unlimited	1×10^0	1×10^3
U (depleted)	Unlimited	Unlimited	1×10^0	1×10^3
Vanadium (23)				
V-48	4×10^{-1}	4×10^{-1}	1×10^1	1×10^5
V-49	4×10^1	4×10^1	1×10^4	1×10^7
Wolfram (74)				
W-178 (a)	9×10^0	5×10^0	1×10^1	1×10^6
W-181	3×10^1	3×10^1	1×10^3	1×10^7
W-185	4×10^1	8×10^{-1}	1×10^4	1×10^7
W-187	2×10^0	6×10^{-1}	1×10^2	1×10^6
W-188 (a)	4×10^{-1}	3×10^{-1}	1×10^2	1×10^5
Xenon (54)				
Xe-122 (a)	4×10^{-1}	4×10^{-1}	1×10^2	1×10^9
Xe-123	2×10^0	7×10^{-1}	1×10^2	1×10^9
Xe-127	4×10^0	2×10^0	1×10^3	1×10^5
Xe-131m	4×10^1	4×10^1	1×10^4	1×10^4
Xe-133	2×10^1	1×10^1	1×10^3	1×10^4
Xe-135	3×10^0	2×10^0	1×10^3	1×10^{10}
Yttrium (39)				
Y-87 (a)	1×10^0	1×10^0	1×10^1	1×10^6
Y-88	4×10^{-1}	4×10^{-1}	1×10^1	1×10^6
Y-90	3×10^{-1}	3×10^{-1}	1×10^3	1×10^5
Y-91	6×10^{-1}	6×10^{-1}	1×10^3	1×10^6
Y-91m	2×10^0	2×10^0	1×10^2	1×10^6
Y-92	2×10^{-1}	2×10^{-1}	1×10^2	1×10^5
Y-93	3×10^{-1}	3×10^{-1}	1×10^2	1×10^5
Ytterbium (70)				
Yb-169	4×10^0	1×10^0	1×10^2	1×10^7
Yb-175	3×10^1	9×10^{-1}	1×10^3	1×10^7
Zinc (30)				
Zn-65	2×10^0	2×10^0	1×10^1	1×10^6
Zn-69	3×10^0	6×10^{-1}	1×10^4	1×10^6
Zn-69m (a)	3×10^0	6×10^{-1}	1×10^2	1×10^6
Zirconium (40)				
Zr-88	3×10^0	3×10^0	1×10^2	1×10^6
Zr-93	Unlimited	Unlimited	1×10^3 (b)	1×10^7 (b)
Zr-95 (a)	2×10^0	8×10^{-1}	1×10^1	1×10^6
Zr-97 (a)	4×10^{-1}	4×10^{-1}	1×10^1 (b)	1×10^5 (b)

Legend:

(a) For the listed parent radionuclides, the values A_1 and A_2 include contributions from radioactive decay products with a decay half-life of less than 10 days:

Mg-28 Al-28
 Ar-42 K-42
 Ca-47 Sc-47

Ti-44	Sc-44
Fe-52	Mn-52m
Fe-60	Co-60m
Zn-69m	Zn-69
Ge-68	Ga-68
Rb-83	Kr-83m
Sr-82	Rb-82
Sr-90	Y-90
Sr-91	Y-91m
Sr-92	Y-92
Y-87	Sr-87m
Zr-95	Nb-95m
Zr-97	Nb-97m, Nb-97
Mo-99	Tc-99m
Tc-95m	Tc-95
Tc-96m	Tc-96
Ru-103	Rh-103m
Ru-106	Rh-106
Pd-103	Rh-103m
Ag-108m	Ag-108
Ag-110m	Ag-110
Cd-115	In-115m
In-114m	In-114
Sn-113	In-113m
Sn-121m	Sn-121
Sn-126	Sb-126m
Te-118	Sb-118
Te-127m	Te-127
Te-129m	Te-129
Te-131m	Te-131
Te-132	I-132
I-135	Xe-135m
Xe-122	I-122
Cs-137	Ba-137m
Ba-131	Cs-131
Ba-140	La-140
Ce-144	Pr-144m, Pr-144
Pm-148m	Pm-148
Gd-146	Eu-146
Dy-166	Ho-166
Hf-172	Lu-172
W-178	Ta-178
W-188	Re-188
Re-189	Os-189m
Os-194	Ir-194
Ir-189	Os-189m
Pt-188	Ir-188
Hg-194	Au-194
Hg-195m	Hg-195
Pb-210	Bi-210
Pb-212	Bi-212, Tl-208, Po-212
Bi-210m	Tl-206
Bi-212	Tl-208, Po-212
At-211	Po-211
Rn-222	Po-218, Pb-214, At-218, Bi-214, Po-214
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Po-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Ra-225	Ac-225, Fr-221, At-217, Bi-213, Tl-209, Po-213, Pb-209
Ra-226	Rn-222, Po-218, Pb-214, At-218, Bi-214, Po-214
Ra-228	Ac-228

Ac-225	Fr-221, At-217, Bi-213, Tl-209, Po-213, Pb-209
Ac-227	Fr-223
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Th-234	Pa-234m, Pa-234
Pa-230	Ac-226, Th-226, Fr-222, Ra-222, Rn-218, Po-214
U-230	Th-226, Ra-222, Rn-218, Po-214
U-235	Th-231
Pu-241	U-237
Pu-244	U-240, Np-240m
Am-242m	Am-242, Np-238
Am-243	Np-239
Cm-247	Pu-243
Bk-249	Am-245
Cf-253	Cm-249

(b) Parent radionuclides and products of their radioactive decay corresponding to permanent equilibrium:

Sr-90	Y-90
Zr93	Nb-93m
Zr-97	Nb-97
Ru-106	Rh-106
Ag-108m	Ag-108
Cs-137	Ba-137m
Ce-144	Pr-144
Ba-140	La-140
Bi-212	Tl-208 (0.36), Po-212 (0.64)
Pb-210	Bi-210, Po-210
Pb-212	Bi-212, Tl-208 (0.36), Po-212 (0.64)
Rn-222	Po-218, Pb-214, Bi-214, Po-214
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
Ra-226	Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Ra-228	Ac-228
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
Th-229	Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209
Th natural	Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208(0.36), Po-212(0.64)
Th-234	Pa-234m
U-230	Th-226, Ra-222, Rn-218, Po-214
U-232	Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)
U-235	Th-231
U-238	Th-234, Pa-234m
U natural	Th-234, Pa-234m, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210
Np-237	Pa-233
Am-242m	Am-242
Am-243	Np-239

(c) Activity may be determined from a measurement of the rate of decay or a measurement of the radiation level at a prescribed distance from the radionuclide source of ionising radiation.

(d) These values apply only to uranium compounds UF_6 , U_2F_2 and $UO_2(NO_3)_2$ in both normal and accident conditions of transport.

(d) These values apply only to uranium compounds UO_3 , UF_4 , UCl_4 and hexavalent uranium compounds in both normal and accident conditions of transport.

(f) These values apply to all compounds of uranium other than those specified in (d) and (e).

(g) These values apply to unirradiated uranium only.

3. DETERMINATION OF BASIC RADIONUCLIDE VALUES

3. 1. For a radionuclide not listed in Table 2, specific activity limits for material exception and activity limits for package exception shall be calculated in accordance with principles and methods stipulated in Annex 6 to this decree, or

values in Table 3 shall be used. The value of A_2 may also be calculated using the dose coefficient for the relevant lung absorption type, according to International Atomic Energy Agency recommendations, where the calculation shall take into account the chemical form of each radionuclide under normal conditions of transport and under accident conditions of transport.

2. For a radionuclide enclosed or contained in an instrument or product that meets the requirements of Point 23(c), an alternative basic value may be used to the basic value for the specific activity limit for material exception listed in Table 2. This alternative value shall be calculated in accordance with procedures and methods described in Annex 6 to this decree.

4. In the calculations of A_1 and A_2 for a radionuclide not in Table 2:
- a) a single radioactive decay chain in which the radionuclides are present in their naturally occurring proportions, and in which no daughter nuclide has a half-life either longer than 10 days or longer than that of the parent nuclide shall be considered as a single radionuclide; and the activity to be taken into account and the A_1 and A_2 values to be applied shall be those corresponding to the parent nuclide of that chain; or
 - b) a radioactive decay chain in which any daughter nuclide has a half-life either longer than 10 days or greater than that of the parent nuclide, the parent and such daughter nuclides shall be considered as mixtures of different nuclides.
5. For mixtures of radionuclides for which basic radionuclide values are provided in Table 2, basic values shall be determined using the formula:

$$X_m = \frac{1}{\sum_i \frac{f(i)}{X(i)}}$$

Where $f(i)$ is the fraction of activity or activity concentration of radionuclide i in the mixture;

$X(i)$ is the appropriate value of A_1 or A_2 or the activity concentration for exempt material or the activity limit for an exempt consignment for the relevant radionuclide i ; and

X_m is the basic value derived for a mixture from A_1 or A_2 , or the activity concentration for exempt material or the activity limit for an exempt consignment.

6. When the identity of each radionuclide is known but the individual activities of some of the radionuclides are not known, the radionuclides may be grouped according to the type of emitted radiation (alpha, beta, or gamma) with known overall activities for the given group, and calculations may be performed according to formulas in Points 5 and 30 using appropriate lowest radionuclide values from A_1 , A_2 , specific activity limits for exempt material, or activity limits for the exempt consignment in each group. For groups based on total alpha activity, the lowest radionuclide values for alpha emitters in the given group shall be used. For groups based on the total beta or gamma activity, the lowest radionuclide values for radionuclide sources emitting beta or gamma radiation (hereinafter an "beta or gamma emitter") in the given group shall be used.

7. For radionuclides or for mixtures of radionuclides for which relevant data for the use of Table 2 is not available, the values shown in Table 3 shall be used.

Table 3 Basic radionuclide values for unknown radionuclides or mixtures

Radioactive contents	A ₁	A ₂	Activity concentration limits for exception of material	Activity limits for an exempt consignment
	[TBq]	[TBq]	[Bq/g]	[Bq]
Only beta or gamma emitters are known to be present	0.1	0.02	1x10 ¹	1x10 ⁴
Alpha emitters are known to be present, but radionuclide sources emitting neutrons are not known to be present	0.2	9x10 ⁻⁵	1x10 ⁻¹	1x10 ³
Radionuclide sources emitting neutrons are known to be present or no relevant data are available	0.001	9x10 ⁻⁵	1x10 ⁻¹	1x10 ³

4. MATERIAL CLASSIFICATION

4.1. Materials with low specific activity

8. A radioactive or fissile material is classified as material with low specific activity if
- it conforms to the definition in § 2(j);
 - it meets the requirements of Points 9 to 11; and
 - it meets relevant requirements of Points 17 to 22 of Annex 4 to this decree.
9. 1. A material with low specific activity is classified in group LSA-I, LSA-II, or LSA-III.
2. Group LSA-I includes:
- uranium and thorium ores, their concentrates, and other ores containing naturally occurring radionuclides;
 - natural or depleted uranium, natural thorium or their compounds or mixtures, which have not been irradiated and are in solid or liquid form;
 - a radioactive material for which A₂ is unlimited; of fissile material, only an exempt fissile material may be included; and
 - other radioactive material in which activity is uniformly distributed throughout their volume, and the calculated mean specific activity does not exceed 30 times the specific activity limit for material exemption stipulated pursuant to Points 2 and 7, where external shielding materials surrounding the LSA material are not taken into account in determining the mean specific activity; of fissile material, only an exempt fissile material may be included.
3. Group LSA-II includes:
- water with tritium with concentration up to 0.8 TBq/l; and

- b) other materials in which activity is uniformly distributed throughout their volume, and the calculated mean specific activity does not exceed 10^{-4} A₂/g for solids and gases and 10^{-5} A₂/g for liquids, where external shielding materials surrounding the LSA material are not taken into account in determining the mean specific activity.
4. Group LSA-III includes solids, except for powdered materials, that meet the requirements of Point 1 of Part I of Annex 1 to this decree, and in which:
- a) the radioactive or fissile material is uniformly distributed throughout the volume of the solid material or in an array of several solid objects, or is relatively uniformly distributed in a compact bonding agent;
 - b) the radioactive or fissile material is relatively insoluble or is contained in a relatively insoluble matrix in such a manner that even in the event of loss of packaging, the loss of radioactive or fissile material from one package through leaching in water for 7 days does not exceed 0.1 A₂; and
 - c) the calculated mean specific activity of solid material without shielding does not exceed $2 \cdot 10^{-3}$ A₂/g, where external shielding materials surrounding the LSA material are not taken into account in determining the mean specific activity.
10. A package with non-flammable solid material of group LSA-II or LSA-III must not contain activity greater than 3 000 A₂ when being transported by air.
11. The radioactive contents in a single package of LSA material shall be so restricted that the radiation level specified in Point 17 of Annex 4 to this decree shall not be exceeded, and the activity in a single package shall be so restricted that the activity limits for a conveyance specified in Point 22 of Annex 4 to this decree shall not be exceeded.
- 4.2. Surface contaminated object
12. A radioactive or fissile material is classified as a surface contaminated object (SCO) if:
- a) it conforms to the definition in § 2(m);
 - b) it meets the requirements of Points 13 and 14; and
 - c) it meets relevant requirements of Points 17 to 22 of Annex 4 to this decree.
13. 1. A surface contaminated object is classified in group SCO-I or SCO-II.
2. Group SCO-I includes a solid object for which:
- a) non-fixed contamination on the accessible surface averaged over 300 cm² (or the entire surface if less than 300 cm²) does not exceed:
 - 1. 4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters;
 - 2. or 0.4 Bq/cm² for all other alpha emitters;
 - b) fixed contamination on the accessible surface averaged over 300 cm² (or the entire surface if less than 300 cm²) does not exceed:
 - 1. $4 \cdot 10^4$ Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or
 - 2. $4 \cdot 10^3$ Bq/cm² for all other alpha emitters; and
 - c) the sum of fixed and non-fixed contamination on the accessible surface averaged over 300 cm² (or the entire surface if less than 300 cm²) does not exceed:

1. 4.10^4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or
 2. 4.10^3 Bq/cm² for all other alpha emitters.
3. Group SCO-II includes a solid object on which either the fixed or non-fixed contamination on the surface exceeds the applicable limits specified in (2) and for which:
- a) non-fixed contamination on the accessible surface averaged over 300 cm² (or the entire surface if less than 300 cm²) does not exceed:
 1. 400 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters;
 2. 40 Bq/cm² for all other alpha emitters;
 - b) fixed contamination on the accessible surface averaged over 300 cm² (or the entire surface if less than 300 cm²) does not exceed:
 1. 8.10^5 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or
 2. 8.10^4 Bq/cm² for all other alpha emitters; and
 - c) the sum of fixed and non-fixed contamination on the accessible surface averaged over 300 cm² (or the entire surface if less than 300 cm²) does not exceed:
 1. 8.10^5 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or
 2. 8.10^4 Bq/cm² for all other alpha emitters.
14. The radioactive contents in a package with an SCO shall be so restricted that the radiation level specified in Point 17 of Annex 4 to this decree shall not be exceeded, and the activity in a single package shall be so restricted that the activity limits for a conveyance specified in Point 22 of Annex 4 to this decree shall not be exceeded.
- 4.3. Special form radioactive material
15. A radioactive or fissile material is classified as a special form radioactive material if:
- a) it meets the requirements of Points 2 to 4 of Part I of Annex 1 to this decree, and
 - b) it is type-approved as a special form radioactive material pursuant to § 137(1)(b) of the Atomic Act.
- 4.4. Low dispersible radioactive material
16. A radioactive or fissile material is classified as a slow dispersible radioactive material if:
- a) it meets the requirements of Point 5 of Part I of Annex 1 to this decree;
 - b) it is type-approved as a low dispersible radioactive material pursuant to § 137(1)(c) of the Atomic Act; and
 - c) the package containing it meets the requirements of Point 65 of Part I of Annex 1 to this decree.
- 4.5. Fissile material
17. Fissile material and a package containing fissile material shall be classified as FISSILE MATERIAL under the relevant entry in Table 1. Assuming that they are

transported in packages that meet the requirements of Point 36 of Part I of Annex 1 to this decree, and pursuant to the requirements of Point 70 of Annex 4 to this decree, the following are exempt from the above requirement:

- a) uranium enriched with ^{235}U to a maximum of 1 % by mass, and with a total plutonium and ^{233}U content not exceeding 1 % of the mass of ^{235}U provided that the fissile nuclides are distributed essentially homogeneously throughout the material. If ^{235}U is present in metallic, oxide or carbide forms, it shall not form a lattice arrangement.
- b) liquid solutions of uranyl nitrate enriched with ^{235}U to a maximum of 2 % by mass, with a total plutonium and ^{233}U content not exceeding 0.002 % of the mass of uranium, and with a minimum nitrogen (N) to uranium (U) atomic ratio of 2 ($2 \leq \text{N/U}$);
- c) uranium enriched with ^{235}U to a maximum of 5 % by mass, assuming:
 1. the mass of ^{235}U is no greater than 3.5 g per package;
 2. total plutonium and ^{233}U content does not exceed 1 % of the mass of ^{235}U per package; and
 3. transport of the package is restricted by limits for a consignment specified in Point 70(c) of Annex 4 to this decree;
- d) fissile radionuclides with total mass not exceeding 2 g per package, assuming that transport of the package is restricted by limits for a consignment specified in Point 70(d) of Annex 4 to this decree;
- e) fissile radionuclides with a total mass not exceeding 45 g in packaging or unpackaged, assuming that transport is restricted by limits for a consignment specified in Point 70(e) of Annex 4 to this decree; and
- f) fissile materials that meet the requirements of Point 70(b) of Annex 4 to this decree and Point 6 of Part I of Annex 1 to this decree;
if they are transported, except for unpackaged fissile radionuclides pursuant to (e), in a package whose smallest external overall dimension is greater than or equal to 10 cm.

18. The contents of a package containing fissile material must meet the requirements stipulated for package design by this decree or a type approval decision.

4.6. Uranium hexafluoride

19. Uranium hexafluoride is classified under one of the following UN numbers:
- a) UN 2977, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE MATERIAL;
 - b) UN 2978, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, exempt fissile material or non-fissile material;
 - c) UN 3507 URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, PACKAGE EXCEPTIONS – less than 0.1 kg in package, exempt fissile material or non-fissile material.
20. Packages containing uranium hexafluoride shall comply with the following:
- a) the mass of uranium hexafluoride shall correspond to this permitted mass for the given package type;
 - b) the mass of uranium hexafluoride shall not be greater than a value that would lead to an ullage smaller than 5 % at the maximum temperature of the package as specified for facilities where the package shall be used; and

- c) the uranium hexafluoride shall be in solid form and the internal pressure shall not be greater than atmospheric pressure when handed over for carriage.

5. CLASSIFICATION OF PACKAGES

21. The quantity of radioactive or fissile material in a package shall not exceed the relevant limits for the given package type in Points 22 to 33.

5.1. Classification as a package exception

22. A packages is classified as a package exception if:
- it is an empty package that had contained radioactive material;
 - it contains an instrument or product whose activity does not exceed limits specified in Table 4;
 - it contains a product manufactured from natural uranium, depleted uranium, or natural thorium;
 - it contains a radioactive material whose activity does not exceed the limits specified in Table 4; or
 - it contains less than 0.1 kg of uranium hexafluoride, whose activity does not exceed the limits specified in the column 'Materials - Package limits' in Table 4.

Table 4 Activity limits for package exception

Physical state of contents (phase)	Device or product		Materials - Package limits ^{a)}
	Item limits ^{a)}	Package limits ^{a)}	
Solids:			
special form radioactive material	$10^{-2}A_1$	A_1	$10^{-3}A_1$
radioactive material other than special form	$10^{-2}A_2$	A_2	$10^{-3}A_2$
Liquid	$10^{-3}A_2$	$10^{-1}A_2$	$10^{-4}A_2$
Gases:			
Tritium (^3H)	$2 \times 10^{-2}A_2$	$2 \times 10^{-1}A_2$	$2 \times 10^{-2}A_2$
special form radioactive material	$10^{-3}A_1$	$10^{-2}A_1$	$10^{-3}A_1$
radioactive material other than special form	$10^{-3}A_2$	$10^{-2}A_2$	$10^{-3}A_2$

Legend:

^{a)} For mixtures of radionuclides, see Points 4 to 6.

23. 1. Radioactive material that is enclosed in or contained in an instrument or product may be classified under UN 2911, RADIOACTIVE MATERIAL, PACKAGE EXCEPTION - DEVICES or PRODUCTS, if:
- the radiation level at 10 cm from any point on the external surface of any unpackaged instrument or product is less than or equal to 0.1 mSv/h;
 - each device or product is marked 'RADIOACTIVE'. Marking is not required for:
 - the faces of timepieces or other devices marked with radioluminescent paint;
 - consumer products that have either received type approval from the Office or do not individually exceed the activity limit for an exempt

consignment in the column marked “Activity limit for an exempt consignment [Bq]” in Table 2, provided that they are transported in a package that is marked “RADIOACTIVE” on an internal surface in such a manner that it is visible when the package is opened; and

3. other devices or products that are too small to be marked with “RADIOACTIVE”, if they are transported in packaging that is marked “RADIOACTIVE” on an internal surface in such a manner that is visible when the package is opened;
 - c) the radioactive material is completely enclosed by a non-active compound; a device performing the sole function of containing radioactive material shall not be considered to be an instrument or product pursuant to Point 23; and
 - d) the activity limits specified in the column ‘Item limits’ in Table 4 are met for an instrument or product, and the activity limits specified in the column ‘Package limits’ in Table 4 are met for a package.
24. Radioactive material in forms other than as specified in Point 23 and with an activity not exceeding the limits specified in the column ‘Materials - Package limits’ of Table 4 is classified under UN 2910, RADIOACTIVE MATERIAL, PACKAGE EXCEPTION - LIMITED QUANTITY OF MATERIAL, provided that:
- a) the package retains its radioactive contents under routine conditions of transport; and
 - b) the package is marked “RADIOACTIVE”
 1. on an internal surface in such a manner that is visible when the package is opened, or
 2. elsewhere than on the package if marking the internal surface is not feasible.
25. Uranium hexafluoride, if its activity does not exceed the limits specified in the column ‘Materials - Package limits’ of Table 4 is classified under UN 3507 URANIUM HEXAFLUORIDE, RADIOACTIVE MATERIAL, PACKAGE EXCEPTION – less than 0.1 kg in the package, exempt fissile material or non-fissile material, if:
- a) the mass of uranium hexafluoride in the package is less than 0.1 kg, and
 - b) the requirements of Points 20 and 24 are met.
26. Articles manufactured of natural uranium, depleted uranium or natural thorium and articles in which the sole radioactive material is unirradiated natural uranium, unirradiated depleted uranium or unirradiated natural thorium may be classified under UN 2909, RADIOACTIVE MATERIAL, PACKAGE EXCEPTION - PRODUCTS MADE FROM NATURAL URANIUM or DEPLETED URANIUM or THORIUM, if the outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or some other substantial material.
- 5.2. Additional requirements and controls for transport of empty packagings
27. An empty packaging that had previously contained radioactive material may be classified under UN 2908, RADIOACTIVE MATERIAL, PACKAGE EXCEPTION - EMPTY PACKAGING, if:
- a) it is defect-free condition and securely closed;

- b) 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;
- c) the level of internal non-fixed contamination does not exceed one hundred times the limits specified in Point 8 of Annex 4 to this decree; and
- d) any labels which may have been displayed on it in conformity with Point 38 of Annex 4 to this decree are no longer visible.

5.3. Classification as a Type A radioactive package

28. A package containing radioactive or fissile material is classified as a Type A package if it adheres to the requirements of Points 29 and 30.
29. Type A packages shall not contain activities greater than the following::
a) A_1 for special form radioactive material; and
b) A_2 for radioactive material other than special form.
30. For mixtures of radionuclides whose identities and activities are known, the following condition shall apply to the radioactive contents of a Type A package:

$$\sum_i \frac{B(i)}{A_1(i)} + \sum_j \frac{C(j)}{A_2(j)} \leq 1$$

where $B(i)$ is the activity of radionuclide i as special form radioactive material;

$A_1(i)$ value of A_1 for radionuclide i ;

$C(j)$ is the activity of radionuclide j as other than special form radioactive material;
and

$A_2(j)$ is the value of A_2 for radionuclide j .

5.4. Classification as a Type B(U), B(M), and C radioactive package

31. A Type B(U), Type B(M) and Type C package shall be classified in accordance with a type approval decision issued by the Office or in accordance with document issued by a competent authority of the country of origin of design.
32. A Type B(U), Type B(M) and Type C package shall meet specifications in a type approval decision issued by the Office or specifications in a document issued by a competent authority of the country of origin of the design.
33. A Type B(U) and Type B(M) package, if transported by air, shall meet the requirements of Point 32 and shall not contain activities greater than the following:
a) for low dispersible radioactive material, activity values approved for the given design;
b) for special form radioactive material, 3 000 A_1 or 100 000 A_2 , whichever is less;
c) for other than special form radioactive material, 3000 A_2 .

6. TRANSPORT UNDER SPECIAL ARRANGEMENTS

34. Radioactive or fissile material shall be classified as transported under special arrangements if it is carried pursuant to § 9(4)(c) of the Atomic Act.

TECHNICAL AND ORGANISATIONAL CONDITIONS OF CARRIAGE AND TRANSPORT OF RADIOACTIVE OR FISSILE MATERIAL

1. REQUIREMENTS BEFORE THE FIRST SHIPMENT

1. Before a packaging is first used to transport radioactive or fissile material:
 - a) it shall be confirmed that it has been manufactured in conformity with design specifications, and
 - b) meets the following requirements:
 1. if the design pressure of the containment system exceeds 35 kPa, the containment system of each packaging shall conform to approved design requirements relating to the capability of that system to maintain its integrity under that pressure;
 2. the effectiveness of shielding and containment and, where necessary, the heat transfer characteristics and the effectiveness of the confinement system of packaging intended for use as a Type B(U), Type B(M) or Type C package and packaging intended for the carriage of fissile material shall be within the limits of the approved design; and
 3. packaging intended for the carriage of fissile material it shall be capable of ensuring effectiveness of the criticality safety features within the limits applicable to or specified for the design. Where, in order to comply with the requirements of Point 73 of Part I of Annex 1 to this decree, neutron poisons are included in the packaging, checks shall be performed to confirm the presence and distribution of those neutron poisons.

2. REQUIREMENTS BEFORE EACH SHIPMENT

2. Before shipment of a package, it shall be ensured that it contain:
 - a) radionuclides different from those specified for the package design; and
 - b) contents in a form, or physical or chemical state, different from those specified for the package design.
3. Before shipment of a package:
 - a) lifting attachments that do not meet the requirements of Point 8 of Part I of Annex 1 to this decree shall be removed or otherwise rendered incapable of being used for lifting the package, in accordance with Point 9 of Part I of Annex 1 to this decree;
 - b) a Type B(U), Type B(M) and Type C package shall achieve equilibrium conditions sufficient to demonstrate compliance with the requirements for temperature and pressure, pursuant to the packaging type approval decision issued by the Office or a relevant authority of the state of origin of the packaging;
 - c) closures, valves or other openings of the containment system through which the radioactive contents of a Type B(U), B(M) or C package might escape are closed and, where feasible, sealed in a manner where checks or suitable tests

are capable of demonstrating compliance with the requirements of Points 59 and 71 of Part I of Annex 1 to this decree; and

- d) for a package containing fissile material, the measurements specified in Point 77(b) of Part I of Annex 1 to this decree and the tests to demonstrate closure of the package as specified in Point 80 of Part I of Annex 1 to this decree shall be performed.

3. TRANSPORT OF OTHER GOODS

4. A package may contain only instruments necessary for the handling of the radioactive content. The interaction between these instruments and the package, under the conditions of transport applicable to its design, shall not reduce the its safety.
5. Freight containers, IBCs, packagings, and overpacks used for the transport of radioactive or fissile material may be used for the storage or transport of other goods if after their decontamination, the value of non-fixed surface contamination:
- a) is less than 0.4 Bq/cm^2 for beta and gamma emitters and low-toxicity alpha emitters; and
 - b) is less than 0.04 Bq/cm^2 for all other alpha emitters.
6. A consignment shall be segregated from other dangerous goods during transport in compliance with the relevant regulations for carriage of dangerous goods of the country of origin, transit and destination; regulations of a qualified carrier may also be used if they ensure the same or a greater level of protection.

4. OTHER DANGEROUS PROPERTIES OF CONTENTS

7. Any other dangerous properties of the contents of the package, such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness, shall be taken into account in the packing, labelling, marking, placarding, storage and transport.

5. REQUIREMENTS FOR DETECTING CONTAMINATION AND FOR SECURING LEAKING PACKAGES

8. The non-fixed contamination on the external surfaces of a package shall be kept as low as practicable and, under routine conditions of transport, shall not exceed the following limits:
- a) 4.0 Bq/cm^2 for gamma and beta emitters and low-toxicity alpha emitters; and
 - b) 0.4 Bq/cm^2 for all other alpha emitters;
- these limits are applicable when averaged over any area of 300 cm^2 of any part of the surface.
9. The level of non-fixed contamination on the external and internal surfaces of a freight container, IBC, packaging, and overpack shall not exceed the limits specified in Point 8.

10. If there is suspicion or it is evident that a package is damaged or that radioactive contents are leaking, access to the package shall be restricted and a qualified person shall assess the extent of contamination and the resultant radiation level of the package. The assessment shall include the package, the conveyance, the adjacent loading and unloading areas and, if necessary, all other material that has been carried on or in the conveyance.
11. A damaged package or a package leaking radioactive contents in excess of allowable limits for normal conditions of transport shall be repaired or otherwise restored to a functional state and decontaminated prior to being forwarded for further carriage. Until it is forwarded for further carriage, it may be temporarily placed in a monitored location.
12. A conveyance and equipment used regularly for the transport of radioactive or fissile material shall be periodically checked to determine the level of contamination. The frequency of such checks shall be correspond to the likelihood of contamination and the extent to which radioactive or fissile material is being transported.
13. A conveyance, part thereof, or equipment that has become contaminated above the limits specified in Point 8 during the transport of radioactive or fissile material, or that shows a radiation level in excess of 5 $\mu\text{Sv/h}$, shall be decontaminated by a qualified person. They may be reused if:
 - a) non-fixed contamination does not exceed the limits specified in Point 8;
 - b) the radiation level resulting from fixed contamination does not exceed 5 $\mu\text{Sv/h}$ on the external surface.
14. A freight container, tank, IBC or conveyance dedicated to the transport of unpackaged material under exclusive use shall be excepted from the requirements for non-fixed contamination on the internal surface of Points 9 and 13 for as long as it remains under exclusive use.

6. REQUIREMENTS AND CONTROLS FOR TRANSPORT OF PACKAGE EXCEPTIONS

15.
 1. A package exception need only meet the requirements of Points 3 to 5, 7 to 13, 16, 30 to 33, 45, 46 introductory sentence, 46(a), 46(k), 50, 53, 55, 56, 61, 64, 82 and 83; all other relevant requirements of this decree shall be met.
 2. If the package exception contains fissile material, one of the conditions in Point 17(a) to (f) of Annex 3 to this decree for an exempt fissile material must be met.
16. The radiation level at any point on the external surface of a package exception shall not exceed 5 $\mu\text{Sv/h}$.

7. REQUIREMENTS AND CONTROLS FOR TRANSPORT OF LSA MATERIAL AND SCO ITEMS IN INDUSTRIAL PACKAGES OR UNPACKAGED

17. The quantity of LSA material or SCO in a single Type IP-1, IP-2, IP-3 package, or object or collection of objects shall be so restricted that the external radiation level at 3 m from the unshielded material or object or collection of objects does not exceed 10 mSv/h.
18. LSA material and SCO that are or contain fissile material that do not meet conditions for use in one of the exceptions pursuant to Point 17(a) to (f) of Annex 3 to this decree for an exempt fissile material shall meet the applicable requirements of Points 68 and 69.
19. LSA material and SCO that are or contain fissile material shall meet the applicable requirements of Point 73.
20. LSA material and SCO in groups LSA-I and SCO-I may be transported, unpackaged, under the following conditions:
 - a) other than ores containing only naturally occurring radionuclides, they are transported in such a manner that under routine conditions of transport there will be no escape of the radioactive contents from the conveyance nor loss of shielding;
 - b) they conveyance shall 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 the limit specified in Point 8;
 - c) for SCO-I where it is suspected that non-fixed contamination exists on inaccessible surfaces in excess of the values specified in Point 13(2)(a) of Annex 3 to this decree, measures shall be taken to ensure that the radioactive or fissile material is not released into the conveyance; and
 - d) unpackaged fissile material meets the requirements of Point 17(e) of Annex 3 to this decree.
21. LSA material and SCO, except as otherwise specified in Point 20, shall be packaged in accordance with the requirements of Table 1.

Table 1 Industrial package requirements for materials with low mass activity and surface contaminated items

Radioactive contents	Industrial package type	
	Transport under exclusive use	Transport not under exclusive use
LSA-I Solid ^{a)}	Type IP-1	Type IP-1
Liquid	Type IP-1	Type IP-2
LSA-II Solid	Type IP-2	Type IP-2
Liquid and gas	Type IP-2	Type IP-3
LSA-III	Type IP-2	Type IP-3
SCO-I ^{a)}	Type IP-1	Type IP-1
SCO-II	Type IP-2	Type IP-2

Legend:

^{a)} Under the conditions specified in Point 20, LSA-I material and SCO-I may be transported unpackaged.

22. The total activity in a single hold or compartment of an inland waterway craft, or in another conveyance, for carriage of LSA material or SCO in a Type IP-1, IP-2 or IP-3 package or unpackaged, shall not exceed the limits shown in Table 2.

Table 2 Activity limits for materials with low mass activity and surface contaminated items in industrial packages or transported as unpackaged

Type of material or object	Activity limit for conveyances other than inland waterway craft	Activity limit for a hold or compartment of an inland waterway craft
LSA-I	Unlimited	Unlimited
LSA-II and LSA-III non-combustible solids	Unlimited	100 A ₂
LSA-II and LSA-III combustible solids and all liquids and gases	100 A ₂	10 A ₂
SCO	100 A ₂	10 A ₂

8. DETERMINATION OF THE TRANSPORT INDEX

23. The transport index for a package, freight container, overpack, unpackaged material in group LSA-I or unpackaged object in group SCO-I is a number derived in accordance with the following procedure:
- multiply the maximum radiation level in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the package, freight container, overpack or unpackaged LSA-I or SCO-I by 100. For uranium and thorium ores and their concentrates, the maximum radiation level at any point 1 m from the external surface of the load may alternatively be taken as:
 - 0.4 mSv/h for ores and physical concentrates of uranium and thorium;
 - 0.3 mSv/h for chemical concentrates of thorium;
 - 0.02 mSv/h for chemical concentrates of uranium, other than uranium hexafluoride;
 - for tanks, freight containers and unpackaged LSA-I materials and unpackaged SCO-I items, the value determined in step (a) shall be multiplied by the appropriate factor from Table 3; and
 - the value obtained in steps (a) and (b) shall be rounded up to the first decimal place, except for values of 0.05 or less, which may be considered to be zero.

Table 3 Multiplication factors for large loads

Load dimensions ^{a)}	Multiplication factor
load dimensions $\leq 1 \text{ m}^2$	1
$1 \text{ m}^2 < \text{load dimensions} \leq 5 \text{ m}^2$	2
$5 \text{ m}^2 < \text{load dimensions} \leq 20 \text{ m}^2$	3
load dimensions $> 20 \text{ m}^2$	10

Legend:

^{a)} Largest cross-sectional area of the load being measured.

24. The transport index shall be determined, for:
- a) a non-rigid overpack, as the sum of the TIs of packages it contains; and
 - b) a freight container, overpack or conveyance, as either the sum of the TIs of all the packages it contains, or by direct measurement of radiation level.

9. DETERMINATION OF THE CRITICALITY SAFETY INDEX FOR FREIGHT CONTAINERS, OVERPACKS, AND CONSIGNMENTS

25. The critical safety index for a freight container, overpack, consignment, or conveyance shall be determined as the sum of the individual critical safety indexes of all the packages it contains.

10. LIMITS FOR THE TRANSPORT INDEX, CRITICALITY SAFETY INDEX, AND RADIATION LEVELS FOR PACKAGES AND OVERPACKS

26. 1. Except for consignments under exclusive use, the transport index of any package or overpack shall not exceed 10.
2. The critical safety index of any package or overpack shall not exceed 50.
27. The radiation level at any point on the external surface of a package or overpack shall not exceed 2 Sv/h. The requirement of the introductory sentence does not apply to packages or overpacks transported under exclusive use by rail or by road in accordance with the conditions specified in Point 73(a), or under exclusive use and special arrangement by vessel or by air in accordance with the conditions specified in Point 75 or 79.
28. The radiation level at any point on the external surface of a package or overpack transported under exclusive use shall not exceed 10 Sv/h.

11. CATEGORY

29. Packages, freight containers and overpacks shall be placed in either category I-WHITE, II-YELLOW, or III-YELLOW pursuant to the requirements specified in Table 4 and pursuant to the requirements of (a) to (d):
- a) if the transport index satisfies the condition for one category but the surface radiation level satisfies the condition for a different category, the package, freight container or overpack shall be assigned to the higher category; category I-WHITE is regarded as the lowest category;
 - b) the TI shall be determined via the procedures specified in Points 23 and 24;
 - c) except for Point 30, a package transported under special arrangements is placed in category III-YELLOW; and
 - d) except for Point 30, an overpack containing packages transported under special arrangement is placed in category III-YELLOW.

Table 4 Categories of packages and overpacks

Conditions		Category
Transport index	Maximum radiation level at any point on the external surface	
0 ^{a)}	at most 0.0005 mSv/h	I-WHITE
more than 0, but not more than 1 ^{a)}	more than 0.005 mSv/h, but not more than 0.5 mSv/h	II-YELLOW
more than 1, but not more than 10	more than 0.5 mSv/h, but not more than 2 mSv/h	III-YELLOW
more than 10	more than 2 mSv/h, but not more than 10 mSv/h	III-YELLOW ^{b)}

Legend:

^{a)} If the measured transport index is not greater than 0.05, the TI value may be considered to be zero in accordance with Point 23(c).

^{b)} Shall also be transported under exclusive use except for freight containers, see Table 6.

12. MARKING, LABELLING, AND PLACARDING

30. 1. A package or overpack shall be assigned a UN number and named pursuant to Table 1 of Annex 3 to this decree.

2. In cases of international transport of packages requiring competent authority approval of design or shipment, for which packaging type approval or transport authorisation by the relevant authority of the country the shipment concerns, the UN number, proper shipping name, categorisation, labelling and marking shall be in accordance with the decision of the relevant authority of the country of origin of the design.

12.1. Marking

31. 1. A package shall be legibly and durably marked on the outside of the packaging with an identification of either the consignor or consignee, or both.

2. If the markings of all the packages within the overpack are not clearly visible, the outside of the overpack shall be legibly and durably marked with an identification of either the consignor or consignee, or both.

32. 1. A package shall be legibly and durably marked on the outside with the UN marking as specified in Table 5.

2. If the markings of all the packages within the overpack are not clearly visible, the overpack shall be legibly and durably marked with the word 'OVERPACK' and the UN marking as specified in Table 5.

Table 5 UN markings for packages and overpacks

Item	UN marking ^{a)}
Package (other than a package exception)	UN number, preceded by the letters 'UN', □ and its proper shipping name
Package exception	UN number, preceded by the letters 'UN'
Overpack (other than an overpack)	UN number, preceded by the letters 'UN' □

containing only package exceptions)	for each applicable UN number in the overpack, followed by the proper shipping name in the case of a non-excepted package
Overpack containing only package exceptions	UN number, preceded by the letters 'UN' □ for each applicable UN number in the overpack

Legend:

^{a)} for a list of UN numbers and proper shipping names, see Table 1 of Annex 3 to this decree.

33. A package of gross mass exceeding 50 kg shall have its permissible gross mass legibly and durably marked on the external surface.
34. A package that conforms to:
- a) an IP-1, IP-2, or IP-3 design shall be legibly and durably marked on the outside of the packaging with 'TYPE IP-1', 'TYPE IP-2' or 'TYPE IP-3', as appropriate;
 - b) a Type A package design shall be legibly and durably marked on the outside of the packaging with 'TYPE A';
 - c) an IP-2, IP-3, or a Type A package design shall be legibly and durably marked on the outside of the packaging with the international vehicle registration code (VRI code) of the country of origin of design and either the name of the manufacturer or identification of the packaging specified by the Office.
35. The packaging manufactured pursuant to a type approval decision shall be legibly and durably marked with the following on the outside surface:
- a) the type identification mark in accordance with a type approval decision issued by the Office;
 - b) a serial number to uniquely identify each packaging of approved type; and
 - c) for Type B(U), B(M), and C packages, 'TYPE B(U)', 'TYPE B(M)', and 'TYPE C', as applicable.
36. A package that conforms to a Type B(U), Type B(M), and Type C design shall have the outside of its packaging marked by embossing, stamping or other means resistant to the effects of fire and water with the trefoil symbol. Table 1 contains an example of the trefoil symbol.
37. LSA-I material or an SCO-I object that is contained in receptacles or wrapping materials and is transported under exclusive use pursuant to Point 20 shall be marked on the outer surface of these receptacles or wrapping materials with 'RADIOACTIVE LSA-I' or 'RADIOACTIVE SCO-I', as appropriate.

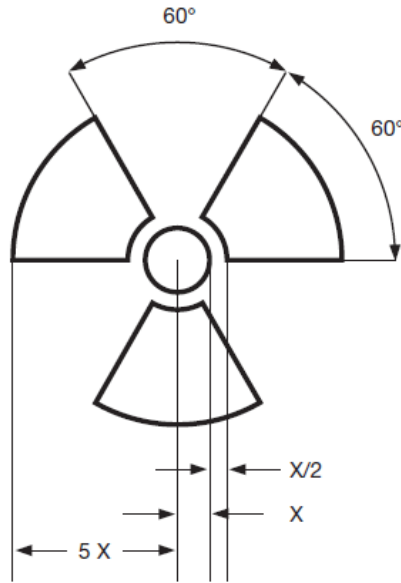


Figure 1 Basic trefoil symbol with proportions based on a central circle of radius X. The minimum permitted size of X is 4 mm.

12.2. Labelling

- 38.
1. Except for Point 43, a package, overpack, and freight container shall bear labels conforming to the models in:
 - a) Figure 2 for the category I-WHITE;
 - b) Figure 3 for the category II-YELLOW;
 - c) Figure 4 for the category III-YELLOW.
 2. Except for an exempt fissile material pursuant to Point 17 of Annex 3 to this decree, a package, overpack, and freight container containing fissile material shall also bear labels conforming to the model in Figure 5.
 3. Other labels that are not related to the contents shall be removed or covered.
- 39.
1. Labels conforming to the models in Figures 2, 3 or 4 shall be affixed to two opposite sides of the outside of a package or overpack or on the outside of all four sides of a freight container or tank.
 2. The label conforming to the model in Figure 5 shall be affixed adjacent to the labels specified in (1).
 3. The labels shall not cover the markings specified in Points 31 to 36.

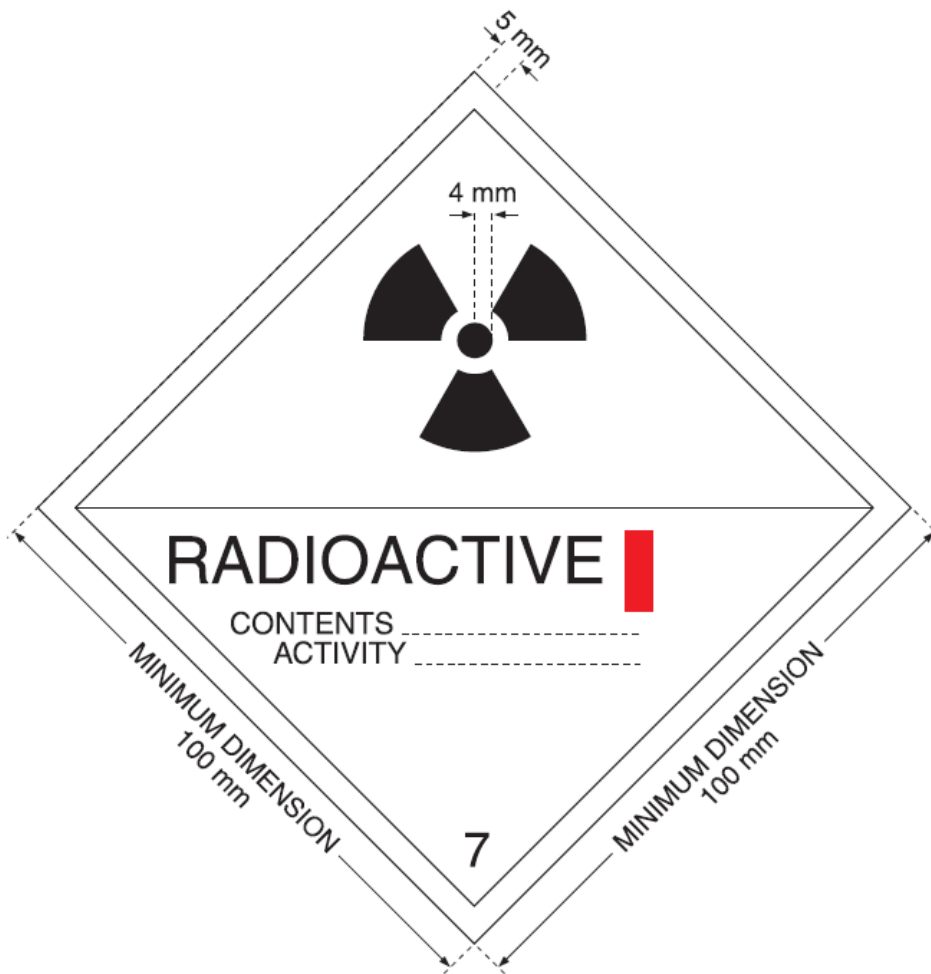


Figure 2 Category I-WHITE label. The background colour of the label shall be white, the colour of the trefoil and the printing shall be black, and the colour of the category bar shall be red.

12.3. Labelling for radioactive contents

40. Each label conforming to the models in Figures 2, 3 and 4 shall be completed with the following information on

a) content:

1. except for LSA-I material, the names of the radionuclides pursuant to Table 2 of Annex 3 to this decree, using the symbols prescribed therein. For mixtures of radionuclides, the most restrictive nuclides must be listed to the extent the space on the line permits. For materials in an LSA group or objects in an SCO group, the names of the radionuclides shall be followed by "LSA-II", "LSA-III", "SCO-I", or "SCO-II" as applicable; and
2. for LSA-I material, the term 'LSA-I' shall be filled in.

b) activity: the maximum activity of the radioactive contents during transport expressed in units of becquerels with the appropriate SI prefix symbol. For fissile material, the total mass of fissile nuclides in units of grams, or multiples thereof, may be used in place of activity. For an overpack or freight container, the 'contents' and 'activity' entries on the label shall bear the information in

- accordance with Letter (a) and (b). Labels for an overpack or freight container containing a mixed load of packages containing different radionuclides, entries in the content and activity rows may read: "See Transport Documents"; and
- c) transport index: the number determined in accordance with Points 23 and 24; no transport index entry is required for Category I-WHITE.

12.4. Labelling for criticality safety

41. Each label conforming to the model in Figure 5 shall be completed with the critical safety index as stated in the transport authorisation or packaging type approval decision issued by the Office, in a decision issued by the relevant authority of the country of origin of the packaging or the country of origin of carriage in the case of international carriage, or in accordance with the requirements of Point 74 or 75 of Part I to Annex 1 to this decree.
42. For an overpack or freight container, the label conforming to the model in Figure 5 shall bear the sum of the critical safety indexes of all the packages contained therein.

12.5. Placarding

43. A large freight container carrying packages other than package exceptions, and a tank shall bear placards that conform to the model given in Figure 6. The placards shall be affixed in a vertical orientation to the front, each side wall and to the rear wall of the large freight container or tank. Other labels that do not relate to the contents shall be removed. Instead of using both labels and placards, it is possible to use only enlarged labels as shown in Figures 2, 3, 4, or 5, enlarged so they have the minimum dimensions as specified in the model in Figure 6.

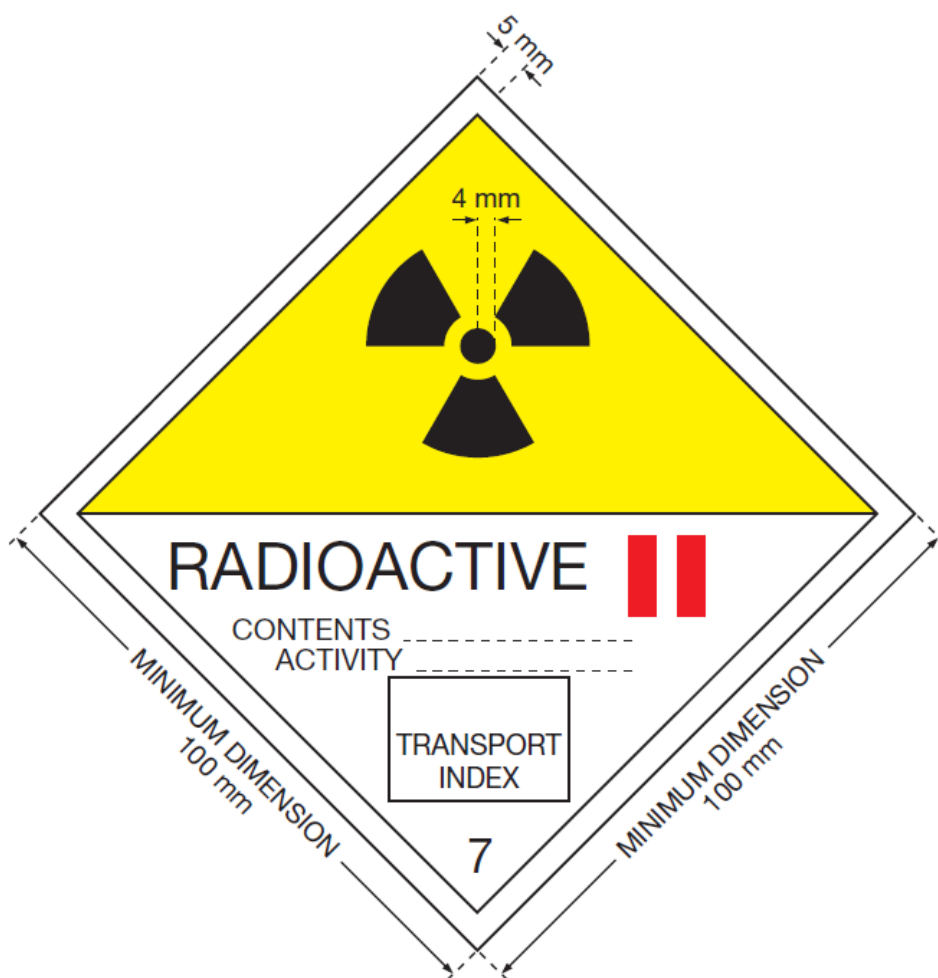


Figure 3 Category II-YELLOW label. The background colour of the upper half of the label shall be yellow and the lower half white, the colour of the trefoil and the printing shall be black, and the colour of the category bars shall be red.

- 44.
1. Where a consignment of unpackaged LSA-I or SCO-I being shipped in a freight container or tank is or a consignment of packaged radioactive material being shipped under exclusive use can be marked with a single UN number, the UN number for the consignment shall be displayed in black digits not less than 65 mm high:
 - a) in the lower half of the placard shown in Figure 6 on a white background; or
 - b) on a placard pursuant to the model shown in Figure 7.
 2. When marking pursuant to (1)(b), the subsidiary placard pursuant to the model in Figure 7 shall be affixed immediately adjacent to the main placard pursuant to the model in Figure 6 on all four sides of the freight container or tank.

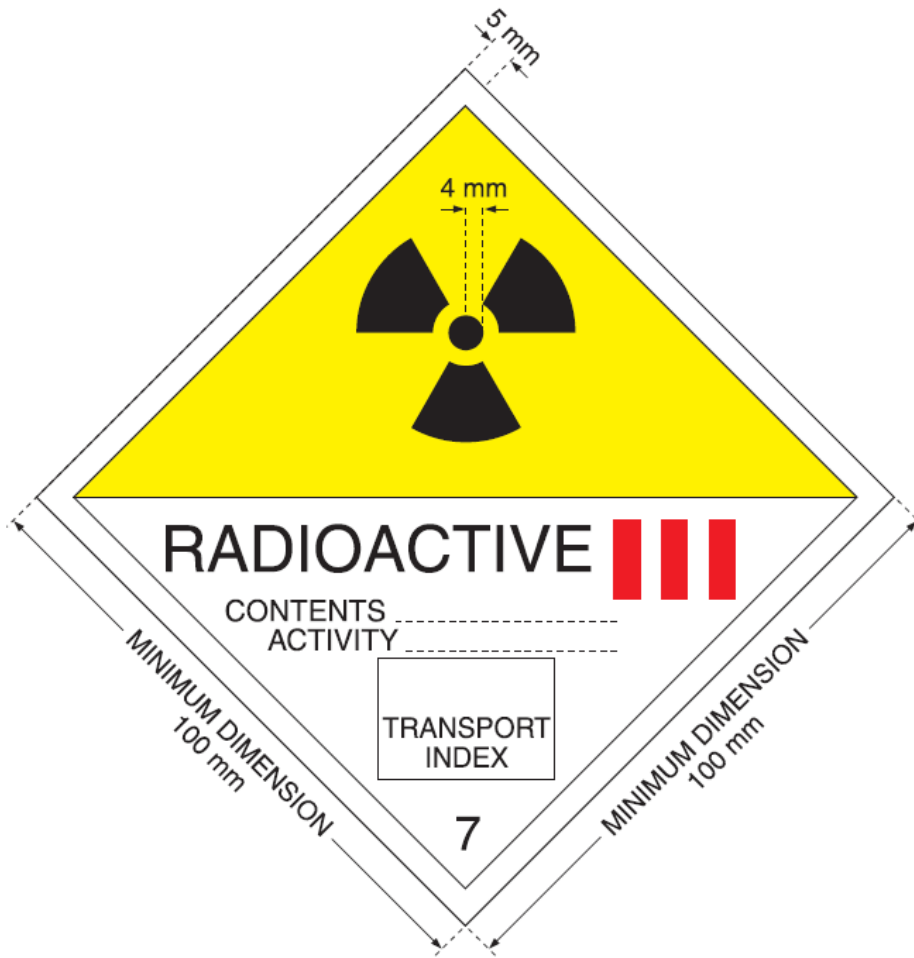


Figure 4 Category III-YELLOW label. The background colour of the upper half of the label shall be yellow and the lower half white, the colour of the trefoil and the printing shall be black, and the colour of the category bars shall be red.

13. THE CARRIER'S OBLIGATIONS

45. Unless otherwise specified in this decree, no radioactive or fissile material shall be provided for transport unless it is properly marked, labelled, placarded, described in transport documents, includes a declaration of the carrier or confirmation of freight container or conveyance loading, as applicable, and is in every aspect suitable for transport.

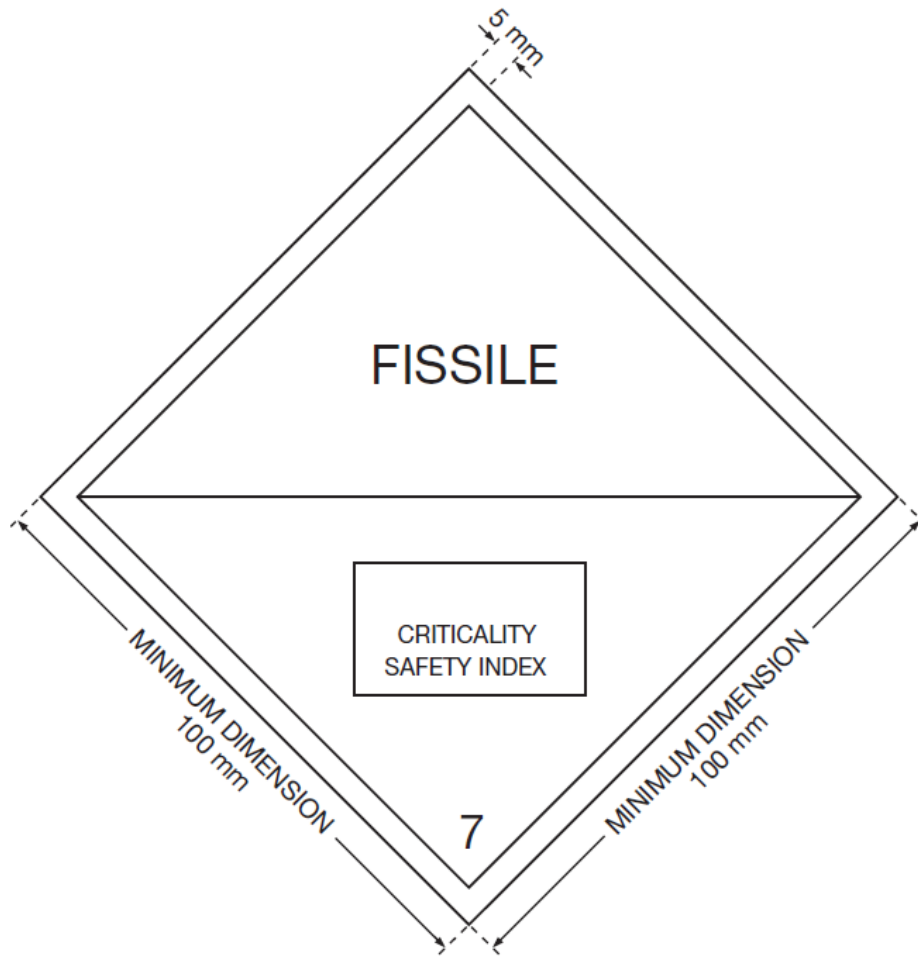


Figure 5 Criticality safety index label. The background colour of the label shall be white, the colour of the printing shall be black.

13.1. Particulars of consignment description in the carriage document

46. 1. In the transport documents accompanying a consignment, the carrier shall include identification of the consignor and consignee, in the case of a natural person their name(s), surname and addresses, and in the case of a corporate entity its name and registered address, and the relevant information in the following order:
- a) the UN number assigned to the radioactive or fissile material, preceded by the letters 'UN';
 - b) the proper shipping name assigned to the radioactive or fissile material;
 - c) UN class number '7';
 - d) subsidiary hazard class numbers corresponding to the label numbers required if the radioactive or fissile material is also classified in other classes or subclasses of dangerous goods; the subsidiary hazard class numbers shall follow the primary hazard class number in brackets;
 - e) the name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides;
 - f) a description of the physical and chemical form of the radioactive or fissile material, or information that the material is special form radioactive material or low dispersible radioactive material; the chemical form may be stated as a chemical formula;

- g) the maximum activity of the radioactive contents during transport expressed in units of becquerels with the appropriate SI prefix symbol. In place of activity, the following may be provided:
 - 1. for fissile material, total mass in grams or multiples thereof; and
 - 2. for a mixture of fissile radionuclides, the mass of each fissile nuclide present in grams or multiples thereof;
- h) the category of the package, i.e. I-white, II-yellow, or III-yellow;
- i) the transport index for categories II-YELLOW and III-YELLOW;
- j) for fissile material:
 - 1. shipped under one of the exceptions in Point 17(a) to (f) of Annex 3 to this decree, a reference to this provision;
 - 2. shipped under one of the exceptions in Point 17(c) to (e) of Annex 3 to this decree, the total mass of fissile radionuclides;
 - 3. shipped in a package with the use of one of the provisions of Point 74(a) to (c) of Annex 1 to this decree, a reference to this provision; and
 - 4. the criticality safety index;
- k) the identification mark of a type approval or transport authorisation decision issued by the Office, and in the case of international transport, also the identification mark of the authorisation of the relevant authority of the country the transport concerns that is required for the consignment;
- l) for a consignment shipped under exclusive use, the statement “EXCLUSIVE USE SHIPMENT”; and
- m) for a consignment of LSA-II, LSA-III, SCO-I and SCO-II, the total activity of the consignment as a multiple of A_2 ; for a consignment of radioactive or fissile material for which the A_2 value is unlimited, the multiple of A_2 is equal to zero.

2. For a consignment of more than one package, the information pursuant to (1)(a) to (k) shall be given for each package. For packages in an overpack, freight container, or conveyance, a detailed statement of the contents of a package within the overpack, freight container or conveyance and, where appropriate, of each overpack, freight container or conveyance shall be included. If packages are to be removed from the overpack, freight container or conveyance at a point of intermediate unloading, appropriate transport documents for these packages shall be made available.

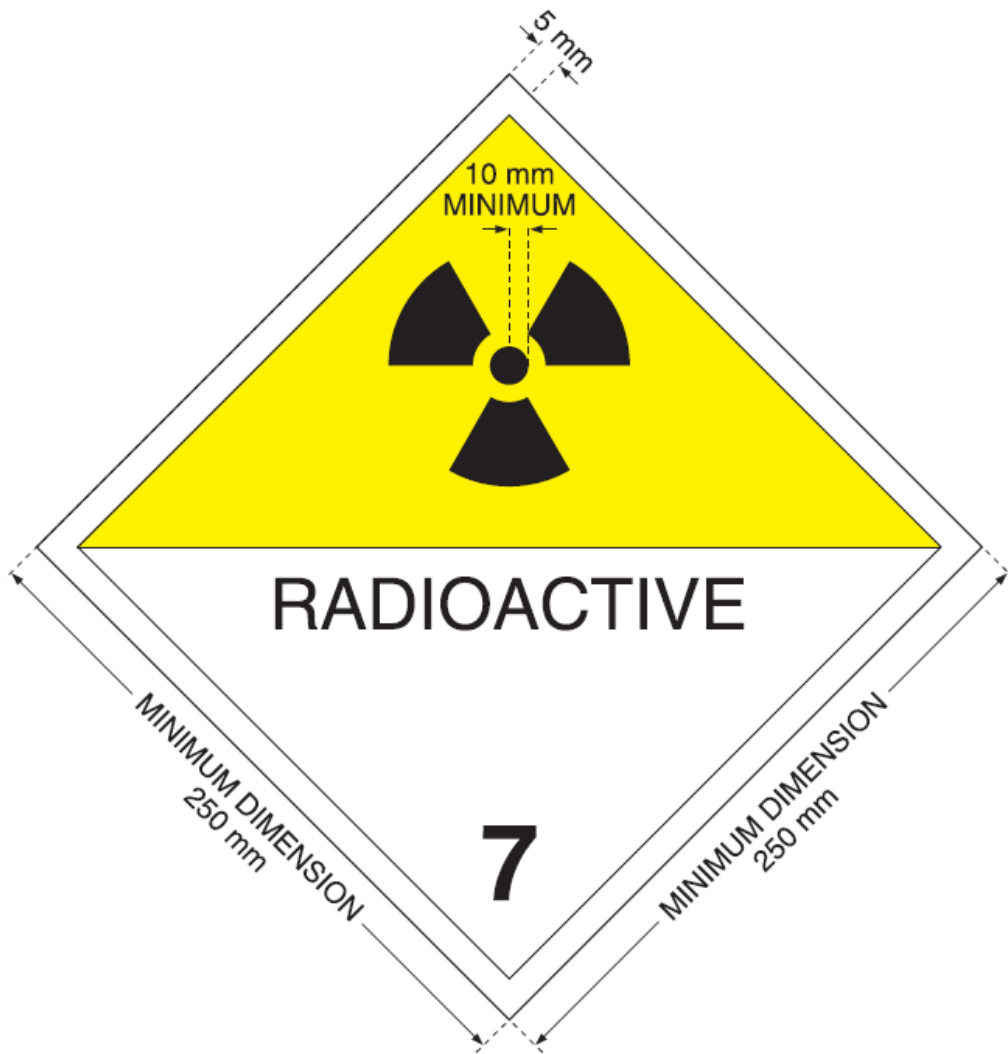


Figure 6 Placard Except for Point 71, minimum dimensions shall be as shown; when different dimensions are used, the relative proportions shall be maintained. The numeral '7' shall not be less than 25 mm high. The background colour of the upper half of the label shall be yellow and the lower half white, the colour of the trefoil and the printing shall be black. The use of the word 'RADIOACTIVE' in the bottom half is optional, to allow the alternative use of this placard to display the appropriate UN number for the consignment.

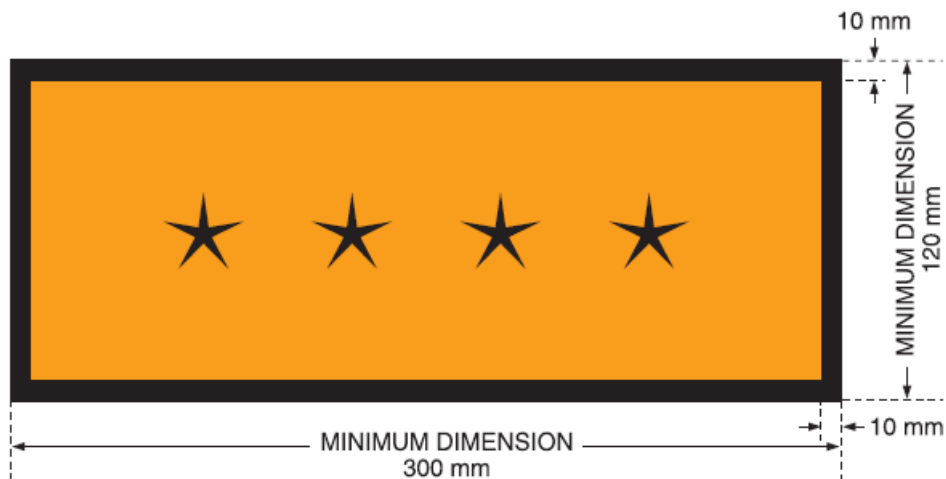


Figure 7 Placard for separate display of UN number. The background colour of the placard shall be orange and the border and UN number shall be black. The symbol ‘★★★★’ denotes the space in which the appropriate UN number for radioactive material is to be displayed, as specified in Table 1 of Annex 3 to this decree.

13.2. Consignor's declaration

47. The consignor shall include the following in the transport documents: “I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport pursuant to applicable international agreements and the legislation of the Czech Republic, and in the case of international transport, also pursuant to the legislation of the state that the carriage concerns.”
48. The consignor need not provide a declaration pursuant to Point 47 for that part of the transport covered by the obligation to provide a declaration with similar content stipulated by an international convention by which the Czech Republic is bound.
49. The declaration pursuant to Point 47 shall be signed and dated by the consignor.
50. Documentation for the transport of dangerous goods may be provided to the carrier in writing, or with his/her approval, electronically.
51. During marine transport of radioactive or fissile material placed or loaded into a freight container or on a vehicle, those responsible for loading the container or vehicle shall provide a container/vehicle packing certificate specifying the container/vehicle identification number and certifying that the operation has been carried out in accordance with international requirements.
52. The information required in the transport documents and the container/vehicle packing certificate may be incorporated into a single document or attached one to each other. If the information is incorporated into a single document, the document shall include a signed declaration stating:
‘I hereby declare that the packing and loading of radioactive or fissile material into the container/vehicle has been carried out in accordance with the applicable provisions.’
53. The declaration pursuant to Point 52 shall be dated and the person signing it shall be identified in the document. The declaration shall be made on the transport document that contains the information specified in Point 46.

13.3. Information for carriers

54. The consignor shall provide in the transport documents instructions regarding actions that must be taken by the carrier. The instructions shall be in the languages required by the carrier, the Office and, in the case of international transport, also the appropriate authority of the country the transport concerns. The instructions include at least the following:

- a) supplementary requirements for loading, stowage, carriage, handling and unloading of the package, overpack, or freight container, including any special stowage provisions for the safe dissipation of heat, or instructions that no such requirements are necessary;
 - b) information regarding restrictions on the mode of transport or conveyance and any necessary routing instructions;
 - c) instructions regarding emergency arrangements for the given consignment.
55. The consignor shall retain a copy of each of the transport documents containing the information specified in Points 46, 47, 51, 52 and 54 for at least three months. When the documents are kept electronically, the consignor shall be able to convert them into paper form.
56. The type approval decision and transport authorisation need not accompany the consignment. However, the consignor shall make them available to the carrier(s) before loading and unloading.
- 13.4. Notification of administrative authorities
57. Before the first shipment of any package requiring type approval or authorisation for transport, the consignor shall ensure that copies of the type approval or authorisation for transport documents have been submitted to the competent authority of the country that the transport concerns.
58. 1. The consignor shall notify the Office, and in the case of international transport, also the competent authority of the country that the transport concerns, regarding transport:
- a) of Type C packages containing radioactive or fissile material with activity greater than $3 \cdot 10^3 A_1$ or $3 \cdot 10^3 A_2$ or 1 000 TBq, whichever is less;
 - b) of Type B(U) packages containing radioactive or fissile material with activity greater than $3 \cdot 10^3 A_1$ or $3 \cdot 10^3 A_2$ or 1 000 TBq, whichever is less;
 - c) of Type B(M) packages; and
 - d) under special arrangement.
2. The Office and other competent authorities must receive notification pursuant to (1) at least seven days prior to the start of transport.
59. The consignment notification shall include:
- a) information enabling the identification of the package or packages, including all identification marks in accordance with a type approval decision issued by the Office, and in the case of international transport, also identification marks for the authorisation of the competent authority of the country that the transport concerns;
 - b) information on the date of shipment, the expected date of arrival, and the proposed route;
 - c) the names of the radioactive or fissile material or radionuclides;
 - d) a description of the physical and chemical form of the radioactive or fissile material, or information that the material is special form radioactive material or low dispersible radioactive material; and

- e) information regarding the maximum activity of the radioactive contents during transport expressed in units of becquerels with the appropriate SI prefix symbol. In place of activity, the following may be provided:
 - 1. for fissile material, total mass in grams or multiples thereof; and
 - 2. for a mixture of fissile radionuclides, the mass of each fissile nuclide present in grams or multiples thereof;

60. The consignor is not required to send a separate notification pursuant to Points 58 and 59 if the required information has been included in the transport approval application.

13.5. Documents and operating rules the consignor must have available

61. The consignor shall have available a copy of a decision of the decision of the Office regarding transport, and in the case of international transport, also a copy of a decision of the competent authority of the country that the transport concerns, a copy of the instructions with regard to the proper closing of the package, and preparations for shipment, before making any shipment.

14. TRANSPORT AND STORAGE IN TRANSIT

14.1. Segregation during transport and storage in transit

62. A package, overpack, or freight containers containing radioactive or fissile material and unpackaged material shall be segregated during transport and during storage in transit from:

- a) workers in regularly occupied working areas by distances calculated using a maximum permissible effective dose criterion of 5 mSv in a year and conservative model parameters;
- b) members of the public in areas where the public has regular access by distances calculated using a maximum permissible effective dose criterion of 1 mSv in a year and conservative model parameters;
- c) undeveloped photographic film by distances calculated using a maximum dose criterion of 0.1 mGy due to the transport of one consignment of radioactive or fissile material on this film; and
- d) other dangerous goods in accordance with Point 6.

63. Category II-YELLOW or III-YELLOW packages or overpacks shall not be carried in compartments occupied by passengers, except those exclusively reserved for couriers specially authorised to accompany such packages or overpacks.

14.2. Stowage on or in the conveyance during transport and storage in transit

64. During transport and storage, the consignment shall be securely stowed so that it cannot move, turn over or fall.

65. 1. A package or overpack may be carried or stored among other packaged cargo without any special stowage provisions, if:

- a) its average surface heat flux does not exceed 15 W/m^2 , and
- b) the immediate surrounding cargo is packaged in a manner other than sacks or bags.

2. The provisions of (1) shall not be applied if the Office, and in the case of international transport, also the competent authority of the country that the transport concerns, specifies otherwise in a type approval decision.

66. For the loading of freight containers and accumulation of packages, overpacks and freight containers, the following applies:
- a) except under the condition of exclusive use, and for consignments of LSA-I material, the total number of packages, overpacks, and freight containers on or in a single conveyance shall not exceed the values shown in Table 6;
 - b) the radiation level under routine conditions of transport shall not exceed 2 mSv/h at any point on, and 0.1 mSv/h at 2 m from, the external surface of the conveyance; for consignments transported under exclusive use by road or rail, radiation limits around the vehicle are stipulated in Points 73(b) and (c); and
 - c) the sum of the critical safety indexes in a freight container and on or in a conveyance shall not exceed the values shown in Table 7.

Table 6 Transport index limits for freight containers and conveyances not under exclusive use

Type of freight container or conveyance	Limit on total sum of transport indexes in a freight container or aboard a conveyance
Freight container small	50
Large	50
Vehicle	50
Aircraft passenger	50
Cargo	200
Inland waterway vessel	50
Seagoing vessel ^{a)}	
(1) Hold, compartment or defined deck area:	
packages, overpacks or small freight containers	50
large freight containers	200
(2) Total vessel:	
packages, overpacks or small freight containers	200
large freight containers	unlimited

Legend:

^{a)} Packages or overpacks on vehicles that meet the requirements of Point 73 may be transported by vessels provided that they are not removed from the vehicle at any time while it is on board the vessel.

67. Packages or overpacks with a transport index greater than 10 and consignments with a criticality safety index greater than 50 shall be transported only under exclusive use.

14.3. Additional transport and storage requirements during transport of fissile material

68. The number total sum of the criticality safety indexes in a group of packages, overpacks or freight containers containing fissile material stored in transit shall not exceed 50 in a storage area. The distance between individual groups pursuant to the first sentence shall be at least 6 m.

Table 7 Critical safety index limits for freight containers and conveyances containing fissile material

Type of freight container or conveyance	Limit on total sum of criticality safety indexes in a freight container or aboard a conveyance	
	Other transport	Transport under exclusive use
Freight container small	50	–
Large	50	100
Vehicle	50	100
Aircraft passenger	50	–
Cargo	50	100
Inland waterway vessel	50	100
Seagoing vessel ^{a)} :		
(1) Hold, compartment or defined deck area		
packages, overpacks or small freight containers	50	100
large freight containers	50	100
(2) Total seagoing vessel		
packages, overpacks or small freight containers	200 ^{b)}	200 ^{c)}
large freight containers	unlimited ^{b)}	unlimited ^{c)}

Legend:

^{a)} Packages or overpacks on a vehicle that meets the requirements of Point 73, may be transported by vessel provided that they are not removed from the vehicle at any time while on board the vessel. In this case the entries under the heading ‘Under exclusive use’ apply.

^{b)} The consignment shall be so handled and stowed that the total sum of critical safety indexes in any group does not exceed 50, and that each group is handled and stowed so that the groups are separated from each other by at least 6 m.

^{c)} The consignment shall be so handled and stowed that the total sum of critical safety indexes in any group does not exceed 100, and that each group is handled and stowed so that the groups are separated from each other by at least 6 m. The intervening space between groups may be occupied by other cargo in accordance with Point 6.

69. Where the total sum of the criticality safety indexes on board a conveyance or in a freight container exceeds 50, storage shall be such as to maintain a spacing of at least 6 m from other groups of packages, overpacks or freight containers containing fissile material or other conveyances carrying radioactive material.

70. Additional requirements relating to transport of fissile material classified pursuant to one of Point 17(a) to (f) of Annex 3 to this decree are as follows:

a) for a consignment, one in Point 17(a) to (f) of Annex 3 to this decree may be used;

b) a consignment may carry only one exempted fissile material in packages pursuant to Point 17(f) of Annex 3 to this decree, unless specified otherwise by the Office, and in the case of international transport, also the competent authority of the country that the transport concerns, in the authorisation for transport;

- c) exempted fissile material in packages pursuant to Point 17(c) of Annex 3 to this decree shall be transported in a consignment containing at most 45 g of fissile radionuclides;
- d) exempted fissile material in packages pursuant to Point 17(d) of Annex 3 to this decree shall be transported in a consignment containing at most 15 g of fissile radionuclides; and
- e) unpackaged and packaged exempted fissile material in packages pursuant to Point 17(e) of Annex 3 to this decree shall be transported in a consignment containing at most 45 g of fissile radionuclides, and must be transported under exclusive use.

14.4. Additional requirements relating to transport by rail and road

71. 1. Rail and road vehicles carrying packages, overpacks or freight containers labelled with any of the labels shown in Figure 2, 3, 4 or 5 or carrying consignments under exclusive use shall display the placards shown in Figure 6:
- a) on the two external lateral walls in the case of a rail vehicle; or
 - b) on the two external lateral walls and the rear wall in the case of a road vehicle.
2. In the case of a vehicle without sides, the placards may be affixed directly on the chassis carrying the cargo provided that they are readily visible; in the case of large-volume tanks or freight containers, the placards shall be placed only on them. In the case of vehicles which have insufficient area to allow the fixing of larger placards with dimensions as described in Figure 6, the dimensions the sides of the placard may be reduced to 100 mm. Other labels that do not relate to the radioactive contents of the vehicle shall be removed.
72. 1. Where a consignment of unpackaged LSA-I or SCO-I being on or in a vehicle or a consignment of packaged radioactive or fissile material being shipped under exclusive use on or in a vehicle can be marked with a single UN number, the UN number for the consignment shall be displayed in black digits not less than 65 mm high:
- a) on a white background in the lower half of the placard shown in Figure 6; or
 - b) on a placard pursuant to the model shown in Figure 7.
2. When marking pursuant to (1)(b), the placard pursuant to the model in Figure 7 shall be affixed immediately adjacent to the main placard pursuant to the model in Figure 6 on the two external lateral walls in the case of a rail vehicle or on the two external lateral walls and the rear wall in the case of a road vehicle.
73. For consignments under exclusive use, the radiation level shall not exceed:
- a) 10 mSv/h at any point on the external surface of any package or overpack; the radiation level shall however not exceed 2 mSv/h in the following situations:
 - 1. the vehicle is not equipped with an enclosure that during routine conditions of transport prevents unauthorised persons from accessing the interior of the enclosure;
 - 2. provisions are not made to secure the package or overpack so that its position within the vehicle remains fixed during routine conditions of transport; and
 - 3. there is loading or unloading during the shipment;
 - b) 2 mSv/h at any point:

1. on the outer surfaces of an enclosed vehicle, including roof and floor areas; or
 2. on a vertical plane projected from the outer edge of an open vehicle, the surface of the load and the lower external surface of the vehicle; and
- c) 0.1 mSv/h at any point 2 m from:
1. the external surface of a vertical plane of an enclosed vehicle; or
 2. the vertical plane that intersects the external edge of an open vehicle.
74. In the case of road vehicles, no persons other than the driver and assistants shall be permitted in vehicles carrying packages, overpacks or freight containers bearing category II-YELLOW or III-YELLOW labels.
- 14.5. Additional requirements relating to transport by vessels
75. Packages or overpacks having a surface radiation level greater than 2 mSv/h shall not be transported by vessel. The provision of the first sentence does not apply to packages or overpacks:
- a) transported under exclusive use in accordance with Table 6, column "Transport under exclusive use" or on a vehicle that meets the requirements of Point 73, provided that they are not unloaded from the vehicle during its presence on board the vessel; or
 - b) transported under special arrangement.
76. The transport of consignments by means of a special use vessel is exempt from the requirements specified in Point 66 if:
- a) a radiation protection programme for the shipment has been drawn up and has been approved by the Office or a competent authority of the flag state of the vessel, if the operator of the special use vessel is a foreign entity, and also, if requested, by the competent authority at each port of call;
 - b) stowage arrangements shall be predetermined for the entire route including any consignments to be loaded at ports of call en route;
 - c) the loading, carriage and unloading of the consignments shall be supervised by persons qualified in the transport of radioactive and fissile material.
- 14.6. Additional requirements relating to air transport
77. Type B(M) packages and consignments under exclusive use shall not be transported on passenger aircraft.
78. Vented Type B(M) packages, packages that require external cooling by an auxiliary cooling system, packages subject to operational controls during transport, and packages containing liquid pyrophoric material shall not be transported by air.
79. Packages or overpacks having a surface radiation level greater than 2 mSv/h shall not be transported by aircraft. The provision of the first sentence does not apply to packages or overpacks transported under special arrangements.
- 14.7. Transport by post
80. The transport of radioactive or fissile material via post is prohibited in the Czech Republic.

15. OTHER REQUIREMENTS

81. Customs inspection of the radioactive contents of a package shall be performed in a location with facilities required to limit and monitor radiation exposure, and in the presence of qualified individuals.
82. A package opened upon the instructions of the Customs Office must be returned to its original condition prior to being handed over for further transport.
83. A package that cannot be delivered must be placed in a safe location. The Office must be informed of this fact immediately.

16. CARRIAGE DOCUMENTS KEPT BY AND AVAILABLE FROM THE CARRIER

84. A carrier shall not accept a consignment for transport unless copies of the transport documents, other documents, or information have been handed over, or provided electronically.
85. The information applicable to the consignment shall accompany the consignment to final destination and must be given to the consignee upon delivery.
86. Information applicable to the consignment given to the carrier in electronic form shall be available to the carrier at all times during transport to the final destination, and it must be possible convert it into paper form at any time.
87. The carrier shall retain a copy of the transport document and additional information and documentation pursuant to this decree for at least three months.
88. When the documents pursuant to this decree are kept electronically, the consignor shall be able to convert them into paper form.

SAMPLES OF STANDARD DOCUMENTS

General Comments

Parts A-1 to A-6 are filled in for shipment of radioactive waste

Parts B-1 to B-6 are filled in for shipment of spent fuel (including spent fuel intended for final deposit, which is therefore classified as waste).

Part A-1 or B-1 (application for shipment authorisation): filled in by the applicant, which depending on the type of shipment, is

- a holder in the case of shipment between Member States (Type MM) or export from the Community to third countries (type ME);
- a recipient in the case of import to the Community from a third country (Type IM);
- a person responsible for shipment in a Member State through which radioactive waste or spent fuel enters the Community in the case of transit through the Community (Type TT).

Part A-2 or B-2 (acknowledgement of receipt): to be filled in by the competent authorities, which depending on the type of shipment, are the competent authorities of

- the country of origin in the case of a Type MM or ME shipment;
- the destination country in the case of Type IM shipment;
- the country where the shipment first enters the Community in the case of a Type TT shipment, and all competent authorities of any transit Member States.

Part A-3 or B-3 (consent or refusal): to be filled in by all relevant competent authorities.

Part A-4a/A-4b or B-4a/B-4b (consent or refusal of transport): to be filled in by the competent authority responsible for issuing the authorisation, which depending on the type of shipment, is the competent authority of

- the country of origin in the case of Type MM and ME shipment;
- the destination Member State in the case of type IM shipment; or
- the first Member State where the shipment enters the Community, in the case of a Type TT shipment.

Part A-5 or B-5 (a description of the consignment/list of packagings): filled in by the applicant stipulated in Part A-1 or B-1.

Part A-6 or B-6 (acknowledgement of receipt of the shipment): to be filled in by the recipient (for shipment Type MM and IM) or the holder (for a Type ME shipment), or the person responsible for shipment (in the case of a Type TT shipment).

Registration No: _____
(to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION A-1

Application for authorisation of shipment(s) of radioactive waste

1.	Type of shipment (tick the appropriate box): <input type="checkbox"/> type MM: shipment between Member States (via one or more Member States or third countries) <input type="checkbox"/> type IM: import into the Community <input type="checkbox"/> type ME: export out of the Community <input type="checkbox"/> type TT: transit through the Community
2.	Application for authorisation for (tick the appropriate box): <input type="checkbox"/> a single shipment _____ Planned period of execution: _____ <input type="checkbox"/> several shipments: number (planned) _____ Planned period of execution: _____
3.	<input type="checkbox"/> Not applicable. <input type="checkbox"/> Type MM shipment(s) via one or more third countries: Frontier post of exit from the Community (*): _____ Frontier post of entry to third country (*) (first country crossed): _____ Frontier post of exit from third country (*) (last country crossed): _____ Frontier post of return to the Community (*): _____ (* These frontier posts must be identical for all shipments covered by the application unless otherwise agreed by the competent authorities.
4.	Applicant (trade name): _____ <input type="checkbox"/> Holder (for types MM, ME) <input type="checkbox"/> Consignee (for type IM) <input type="checkbox"/> Other (for type TT), to be specified _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____
5.	Location of the radioactive waste before shipment (trade name): _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____
6.	Consignee (trade name): _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____
7.	Location of radioactive waste after shipment (trade name): _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____

8.	Nature of radioactive waste: _____ Physicochemical characteristics (tick as appropriate): <input type="checkbox"/> solid, <input type="checkbox"/> liquid, <input type="checkbox"/> gaseous, <input type="checkbox"/> other (e.g. fissile, low dispersible, ...), to be specified _____ Main radionuclides: _____ Maximum alpha activity: per shipment (GBq) _____ per package (GBq) _____ Maximum beta/gamma activity: per shipment (GBq) _____ per package (GBq) _____ Total alpha activity (GBq): _____ Total beta/gamma activity (GBq): _____ (These values are estimates if the application relates to several shipments)			
9.	Total number of packages: _____ Total net mass of shipment (kg): _____ Total gross mass of shipment (kg): _____ (These values are estimates if the application relates to several shipments) Description of consignment: <input type="checkbox"/> Plastic bags, <input type="checkbox"/> metal drums (m ³): _____, <input type="checkbox"/> ISO transport container (m ³): _____, <input type="checkbox"/> other, to be specified _____ Type of package ⁽¹⁾ (if known): _____ Means of identification of the packages (if labelling is used, annex examples): _____ <small>(¹) According to Regulations for the Safe Transport of Radioactive Material 2005 Edition, Safety Requirements No TS-R-1 IAEA, Vienna, 2005.</small>			
10.	Type of activity giving rise to the radioactive waste (tick as appropriate): <input type="checkbox"/> medicine, <input type="checkbox"/> research, <input type="checkbox"/> (non-nuclear) industry, <input type="checkbox"/> nuclear industry, <input type="checkbox"/> other activity (to be specified): _____			
11.	Purpose of the shipment: <input type="checkbox"/> return of radioactive waste after (re)treatment or reprocessing of spent fuel <input type="checkbox"/> return of radioactive waste after treatment of radioactive waste <input type="checkbox"/> treatment, e.g. (re)packaging, conditioning, volume reduction <input type="checkbox"/> interim storage <input type="checkbox"/> return after interim storage <input type="checkbox"/> final disposal <input type="checkbox"/> other purpose (to be specified): _____			
12.	Proposed mode of transport (road, rail, sea, air, inland waterway)	Point of departure	Point of arrival	Proposed carrier (if known)
	1.			
	2.			
	3.			
	4.			
	5.			
	6.			
	7.			
	8.			

13.	Sequential list of countries concerned in the shipment (the first country is that where the radioactive waste is held and the last is the country of destination)			
	1.	3.	5.	7.
	2.	4.	6.	8.
14.	<p>In accordance with the provisions of Directive 2006/117/Euratom, I, the applicant, hereby:</p> <ol style="list-style-type: none">1. apply for authorisation to make the shipment(s) of radioactive waste described above; <i>and</i>2. certify that the information provided above is correct to the best of my knowledge and that the shipment(s) will be carried out in accordance with all the relevant statutory provisions; <i>and</i>3. (*) (Where the shipment is of type MM or ME) undertake to take back the radioactive waste if the shipment(s) cannot take place or if the conditions for shipment cannot be fulfilled; <i>or</i> (*) (Where the shipment is of type IM or TT) attach hereto the evidence of the arrangement between the consignee and the holder of the radioactive waste established in the third country, which has been accepted by the competent authority of the third country, stating that the holder in the third country will take back the radioactive waste if the shipment(s) cannot take place or if the conditions for shipment cannot be fulfilled, unless an alternative safe arrangement can be made. <hr/> <p>(Date and place) (Stamp) (Signature)</p> <p>(*) Only one of the asterisked statements can apply: delete as applicable.</p>			

Registration No: _____
(to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION A-2

Acknowledgement of receipt of application for radioactive waste shipment — Request for missing information

15.	<p>Name of the competent authority responsible for issuing the authorisation: _____ Member State: _____ <input type="checkbox"/> of origin ⁽¹⁾, <input type="checkbox"/> of destination ⁽²⁾, <input type="checkbox"/> where the shipment first enters the Community ⁽³⁾ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____</p> <hr/> <p>Date of receipt/registration: _____ (dd/mm/yyyy)</p> <p>⁽¹⁾ In case of a type MM or type ME shipment. ⁽²⁾ In case of a type IM shipment. ⁽³⁾ In case of a type TT shipment.</p>
16.	<p>Name of the competent authority concerned: _____ Member State or country of (tick as appropriate) <input type="checkbox"/> destination, <input type="checkbox"/> transit, <input type="checkbox"/> where the shipment first enters the Community, or <input type="checkbox"/> origin ⁽¹⁾: _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____</p> <p>⁽¹⁾ Not required by the Directive, Country of origin may be consulted on a voluntary basis in case of type TT and IM shipments.</p>
17.	<p>In accordance with the provisions of Directive 2006/117/Euratom, I hereby consider the application of _____ (dd/mm/yyyy), received on _____ (dd/mm/yyyy)</p> <p>(a) (*) not duly completed and request the following missing information: (Attach complete list of missing information (items), if space is not sufficient) _____ _____ _____ _____ _____ _____ _____ _____</p> <p>_____ (Date and place) (Stamp) (Signature)</p> <p>(b) (*) duly completed and acknowledge the receipt thereof.</p> <p>_____ (Date and place) (Stamp) (Signature)</p> <p>(*) Only one of the asterisked statements can apply: delete as applicable.</p>

Registration No: _____
 (to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION A-3

Refusal or consent of the radioactive waste shipment by the competent authorities concerned

18.	<p>Name of the competent authority concerned: _____</p> <p>Member State or Country (tick and fill in as appropriate): _____</p> <p><input type="checkbox"/> of origin ⁽¹⁾, <input type="checkbox"/> of destination ⁽²⁾, <input type="checkbox"/> of transit ⁽³⁾</p> <p>Address: _____</p> <p>Postcode: _____ Town: _____ Country: _____</p> <p>Tel. _____ Fax _____ E-mail: _____</p> <p>Contact person: Mr/Ms _____</p> <p>⁽¹⁾ Not required by the Directive, country of origin may be consulted on a voluntary basis in case of type TT and IM shipments. ⁽²⁾ In case of a type MM or ME shipment. ⁽³⁾ In case of type MM, IM, ME or TT shipments, if one or more Member States of transit are concerned.</p>
19.	<p>(*) General deadline for automatic approval _____ (dd/mm/yyyy)</p> <p>(*) Request for additional period of not more than one month, extended deadline for automatic approval: _____ (dd/mm/yyyy)</p> <p>_____</p> <p>_____</p> <p>(Date and place) (Stamp) (Signature)</p> <p>(*) Only one of the asterisked statements can apply: delete as applicable.</p>
20.	<p>In accordance with the provisions of Directive 2006/117/Euratom, I hereby:</p> <p>(*) refuse consent for the following reasons (attach complete list of reasons, if space is not sufficient): _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(Date and place) (Stamp) (Signature)</p> <p>(*) grant consent under the following conditions (attach complete list, if space is not sufficient): _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(Date and place) (Stamp) (Signature)</p> <p>(*) Only one of the asterisked statements can apply: delete as applicable.</p>

Registration No: _____
 (to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION A-4a

Authorisation of radioactive waste shipment

21.	Name of competent authority responsible for issuing the authorisation of the shipment: _____ Member State (fill in and tick as appropriate): _____ <input type="checkbox"/> of origin, <input type="checkbox"/> of destination, <input type="checkbox"/> by way of which the waste enters the Community Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____																																				
22.	Sequential list of consents and/or refusals of the countries concerned in the shipment: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 25%;">Member State/country</th> <th style="width: 15%;">Consent granted?</th> <th style="width: 40%;">List of conditions for consent, if any</th> <th style="width: 20%;">Reference to attachments</th> </tr> </thead> <tbody> <tr><td>1.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>2.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>3.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>4.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>5.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>6.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>7.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>8.</td><td>YES/NO (*)</td><td></td><td></td></tr> </tbody> </table> <p style="font-size: small; margin-top: 5px;">(*) Only one asterisked statement can apply, delete as appropriate.</p>	Member State/country	Consent granted?	List of conditions for consent, if any	Reference to attachments	1.	YES/NO (*)			2.	YES/NO (*)			3.	YES/NO (*)			4.	YES/NO (*)			5.	YES/NO (*)			6.	YES/NO (*)			7.	YES/NO (*)			8.	YES/NO (*)		
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23.	The decision adopted and recorded in this section has been reached in accordance with the provisions of Directive 2006/117/Euratom ⁽¹⁾ . The competent authorities of the countries concerned are informed that the single shipment (*) several shipments (*) of the radioactive waste as described in Section A-1, has/have been <p style="text-align: center; margin: 10px 0;">AUTHORISED</p> Date of expiry of authorisation: _____ (dd/mm/yyyy) <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/> <div style="display: flex; justify-content: space-between; font-size: small;"> (Date and place) (Stamp) (Signature) </div> <p style="font-size: x-small; margin-top: 5px;">(*) Only one asterisked statement can apply, delete as appropriate. ⁽¹⁾ This authorisation in no way diminishes the responsibility of the holder, carrier, owner, consignee or any other physical or legal person concerned in the shipment.</p>																																				

Registration No: _____
 (to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION A-4b

Refusal of radioactive waste shipment

24.	Name of competent authority responsible for issuing the refusal of the shipment: _____ Member State (fill in and tick as appropriate): _____ <input type="checkbox"/> of origin, <input type="checkbox"/> of destination, <input type="checkbox"/> of transit, or <input type="checkbox"/> by way of which the waste enters the Community Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____																																				
25.	Sequential list of consents and/or refusals of the countries concerned: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 25%;">Member State/country</th> <th style="width: 15%;">Consent granted?</th> <th style="width: 40%;">List of conditions for consent, if any, or reasons for refusal</th> <th style="width: 20%;">Reference to attachments</th> </tr> </thead> <tbody> <tr><td>1.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>2.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>3.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>4.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>5.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>6.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>7.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>8.</td><td>YES/NO (*)</td><td></td><td></td></tr> </tbody> </table> <p style="margin-top: 10px;">The decision adopted and recorded in this section has been reached in accordance with the provisions of Directive 2006/117/Euratom.</p> <p>The competent authorities of the countries concerned are informed that the single shipment (*) several shipments (*) of the radioactive waste as described in Section A-1, has/have been</p> <p style="text-align: center; margin: 10px 0;">REFUSED</p> <hr style="border: 0; border-top: 1px solid black; margin: 10px 0;"/> <div style="display: flex; justify-content: space-between; margin: 0;"> (Date and place) (Stamp) (Signature) </div> <p style="font-size: small; margin-top: 5px;">(*) Only one asterisk statement can apply, delete as appropriate.</p>	Member State/country	Consent granted?	List of conditions for consent, if any, or reasons for refusal	Reference to attachments	1.	YES/NO (*)			2.	YES/NO (*)			3.	YES/NO (*)			4.	YES/NO (*)			5.	YES/NO (*)			6.	YES/NO (*)			7.	YES/NO (*)			8.	YES/NO (*)		
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Registration No: _____
 (to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION A-5

Description of radioactive waste consignment and list of packages

26.	Applicant (trade name): _____ <input type="checkbox"/> holder, <input type="checkbox"/> consignee, <input type="checkbox"/> other, to be specified _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____				
27.	Date of expiry of the authorisation _____ (dd/mm/yyyy) covering <input type="checkbox"/> a single shipment, or <input type="checkbox"/> several shipments, serial number of the shipment: _____				
28.	Nature of radioactive waste Physicochemical characteristics (tick as appropriate): <input type="checkbox"/> solid, <input type="checkbox"/> liquid, <input type="checkbox"/> gaseous, <input type="checkbox"/> other (e.g. fissile, low dispersible), to be specified _____ Main radionuclides: _____ Maximum alpha activity/package (GBq): _____ Maximum beta/gamma activity/package (GBq): _____ Total alpha activity (GBq): _____ Total beta/gamma activity (GBq): _____				
29.	(*) Identification No	(*) Type ⁽¹⁾	(*) Gross mass (kg)	(*) Net mass (kg)	(*) Activity (GBq)
	Total number:	Total/type:	Total:	Total:	Total:
	(*) To be completed for each package, attach separate list, if space is not sufficient. (1) According to Regulations for the Safe Transport of Radioactive Material 2005 Edition, Safety Requirements TS-R-1, IAEA, Vienna, 2005.				
30.	Date of dispatch of the shipment: _____ (dd/mm/yyyy) I hereby certify that the information provided in this section (and in the attached list or documents) is correct to the best of my knowledge. <div style="display: flex; justify-content: space-between; margin-top: 20px;"> _____ (Date and place) _____ (Stamp) _____ (Signature) </div>				

Registration No: _____
 (to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION A-6

Acknowledgement of receipt of the radioactive waste

31.	Consignee (trade name): _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____
32.	Location where the radioactive waste is held after the shipment (trade name): _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____
33.	Authorisation granted for (tick as appropriate): <input type="checkbox"/> a single shipment of type MM or IM, <input type="checkbox"/> a single shipment of type ME or TT <input type="checkbox"/> several shipments of type MM or IM, Serial number of shipment: _____ Last shipment covered by the authorisation: <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> several shipments of type ME or TT, Serial number of shipment: _____ Last shipment covered by the authorisation: <input type="checkbox"/> yes <input type="checkbox"/> no
34.	<input type="checkbox"/> Not applicable. <input type="checkbox"/> Shipments of type ME or TT (this item may be replaced by a separate declaration, fill in reference to attachment): _____ Frontier post of entry to the third country of destination or transit: _____ Third country: _____ Frontier post: _____
35.	Depending on the type of shipment, the consignee must send the acknowledgement of receipt together with section A-5: — (type MM or IM): to the competent authority of the Member State of destination, — (type ME or TT): to the applicant (type ME: to the holder, type TT: to the person responsible for the shipment in the Member State by way of which the waste enters the Community) as referred to as in item 4 (section A-1). Date of receipt of the radioactive waste: _____ (dd/mm/yyyy) Date of dispatch of the acknowledgement of receipt: _____ (dd/mm/yyyy) I, the consignee, hereby certify that the information provided in this section (and the attached list) is correct to the best of my knowledge. <hr/> <div style="display: flex; justify-content: space-between;"> (Date and place) (Stamp) (Signature) </div>

<p>36.</p> <p><input type="checkbox"/> Not applicable.</p> <p><input type="checkbox"/> Shipments of type ME or TT: the applicant forwards the acknowledgement of receipt and, where appropriate, the consignee's declaration to the authority which issued the authorisation.</p> <p>1. A consignee located outside the European Union may acknowledge receipt of the radioactive waste by means of a declaration or certificate providing at least the information contained in items 31 to 36.</p> <p>2. The competent authority which receives the original acknowledgement of receipt must send copies of it to the other competent authorities.</p> <p>3. The originals of Sections A-5 and A-6 must be sent finally to the competent authority which issued the authorisation.</p> <p>4. For shipments between Member States, the competent authority of the Member State of origin or where the shipment first enters the Community must send a copy of the acknowledgement of receipt to the holder.</p>	<p>Date of forwarding of the acknowledgement of receipt (together with section A-5): _____ (dd/mm/yyyy)</p>		<p>Frontier post of exit from the Community:</p>	
	<p>Country:</p>		<p>Post:</p>	
	<p>_____</p>			<p>_____</p>
	<p>(Date and place)</p>	<p>(Stamp)</p>	<p>(Signature of the applicant)</p>	

Registration No: _____
(to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION B-1

Application for authorisation of shipment(s) of spent fuel

1.	Type of shipment (tick the appropriate box): <input type="checkbox"/> type MM: shipment between Member States (via one or more Member States or third countries) <input type="checkbox"/> type IM: import into the Community <input type="checkbox"/> type ME: export out of the Community <input type="checkbox"/> type TT: transit through the Community
2.	Application for authorisation for (tick the appropriate box): <input type="checkbox"/> a single shipment _____ Planned period of execution: _____ <input type="checkbox"/> several shipments: number (planned) _____ Planned period of execution: _____
3.	<input type="checkbox"/> Not applicable. <input type="checkbox"/> Type MM shipment(s) via one or more third countries: Frontier post of exit from the Community (*): _____ Frontier post of entry to third country (*) (first country crossed): _____ Frontier post of exit from third country (*) (last country crossed): _____ Frontier post of return to the Community (*): _____ (*) These frontier posts must be identical for all shipments covered by the application unless otherwise agreed by the competent authorities.
4.	Applicant (trade name): _____ <input type="checkbox"/> Holder (for types MM, ME), <input type="checkbox"/> Consignee (for type IM), <input type="checkbox"/> Other (for type TT), to be specified _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____
5.	Location of the spent fuel before shipment (trade name): _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____
6.	Consignee (trade name): _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____
7.	Location of spent fuel after shipment (trade name): _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____

8.	Type of spent fuel:			
	<input type="checkbox"/> uranium metal, <input type="checkbox"/> uranium dioxide, <input type="checkbox"/> mixed oxide (MOX), <input type="checkbox"/> other, please specify _____			
	Original fissile content:			
9.	<input type="checkbox"/> uranium-235 _____ (maximum enrichment _____ %)			
	<input type="checkbox"/> MOX _____ (nominal uranic enrichment _____ %)			
	<input type="checkbox"/> _____ (maximum plutonium content _____ %)			
<input type="checkbox"/> other, please specify _____				
Fuel burn up (average or typical range): _____ MWdays/teHM				
Total number of packages (e.g. flasks, ...): _____				
Total number of assemblies/bundles/elements/rods (specify): _____				
Total net mass (kg): _____				
Total gross mass (kg): _____				
(These values are estimates if the application relates to several shipments)				
Description of consignment (e.g. flasks): _____				
Type of package ⁽¹⁾ (if known): _____				
Maximum spent fuel content per package (kg): _____				
Means of identification of the packages (if labelling is used, annex examples): _____				
⁽¹⁾ According to Regulations for the Safe Transport of Radioactive Material 2005 Edition, Safety Requirements TS-R-1, IAEA, Vienna, 2005.				
10.	Type of activity giving rise to the spent fuel (tick as appropriate):			
<input type="checkbox"/> research, <input type="checkbox"/> commercial nuclear power, <input type="checkbox"/> other activity (to be specified): _____				
11.	Purpose of the spent fuel shipment:			
<input type="checkbox"/> (re)treatment or reprocessing <input type="checkbox"/> interim storage <input type="checkbox"/> return after interim storage <input type="checkbox"/> final disposal <input type="checkbox"/> other purpose (to be specified): _____				
12.	Proposed mode of transport (road, rail, sea, air, inland waterway)	Point of departure	Point of arrival	Proposed carrier (if known)
	1.			
	2.			
	3.			
	4.			
	5.			
	6.			
	7.			
	8.			

13.	Sequential list of countries concerned in the spent fuel shipment (the first country is where the spent fuel is held and the last is the country of destination)			
	1.	3.	5.	7.
	2.	4.	6.	8.
14.	<p>In accordance with the provisions of Directive 2006/117/Euratom, I, the applicant, hereby:</p> <p>1. apply for authorisation to make the shipment(s) of spent fuel described above; <i>and</i></p> <p>2. certify that the information provided above is correct to the best of my knowledge and that the shipment(s) will be carried out in accordance with all the relevant statutory provisions; <i>and</i></p> <p>3. (*) (Where the shipment is of type MM or ME) undertake to take back the spent fuel if the shipment(s) cannot take place or if the conditions for shipment cannot be fulfilled; <i>or</i></p> <p>(*) (Where the shipment is of type IM or TT) attach hereto the evidence of the arrangement between the consignee and the holder of the spent fuel established in the third country, which has been accepted by the competent authority of the third country, stating that the holder in the third country will take back the spent fuel if the shipment(s) cannot take place or if the conditions for shipment cannot be fulfilled.</p>			
(Date and place)	(Stamp)		(Signature)	
(*) Only one of the asterisked statements can apply: delete as applicable.				

Registration No: _____
 (to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION B-2

Acknowledgement of receipt of application for spent fuel shipment(s) — Request for missing information

<p>15.</p>	<p>Name of the competent authority responsible for issuing the authorisation: _____</p> <p>Member State: _____</p> <p><input type="checkbox"/> of origin ⁽¹⁾, <input type="checkbox"/> of destination ⁽²⁾, or <input type="checkbox"/> where the spent fuel first enters the Community ⁽³⁾</p> <p>Address: _____</p> <p>Postcode: _____ Town: _____ Country: _____</p> <p>Tel. _____ Fax _____ E-mail: _____</p> <p>Contact person: Mr/Ms _____</p> <hr/> <p>Date of receipt/registration: _____ (dd/mm/yyyy)</p> <p><small>(¹) In case of a type MM or type ME shipment. (²) In case of a type IM shipment. (³) In case of a type IM or TT shipment.</small></p>
<p>16.</p>	<p>Name of the competent authority concerned: _____</p> <p>Member State or country of (tick as appropriate) <input type="checkbox"/> destination, <input type="checkbox"/> transit, <input type="checkbox"/> where the shipment first enters the Community, or <input type="checkbox"/> origin ⁽¹⁾: _____</p> <p>Address: _____</p> <p>Postcode: _____ Town: _____ Country: _____</p> <p>Tel. _____ Fax _____ E-mail: _____</p> <p>Contact person: Mr/Ms _____</p> <p><small>(¹) Not required by the Directive, Country of origin may be consulted on a voluntary basis in case of type TT and IM shipments.</small></p>
<p>17.</p>	<p>In accordance with the provisions of Directive 2006/117/Euratom, I hereby consider the application of _____ (dd/mm/yyyy), received on _____ (dd/mm/yyyy)</p> <p>(a) (*) not duly completed and request the following missing information: (attach complete list of missing information (items), if space is not sufficient) _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <hr/> <p style="text-align: center;">(Date and place) (Stamp) (Signature)</p> <p>(b) (*) duly completed and acknowledge the receipt thereof.</p> <p>_____</p> <p style="text-align: center;">(Date and place) (Stamp) (Signature)</p> <p><small>(*) Only one of the asterisked statements can apply: delete as applicable.</small></p>

Registration No: _____
(to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION B-3

Refusal or consent of spent fuel shipment(s) by the competent authorities concerned

18.	<p>Name of the competent authority concerned: _____</p> <p>Member State or Country of (tick and fill in as appropriate): _____</p> <p><input type="checkbox"/> origin ⁽¹⁾, <input type="checkbox"/> destination ⁽²⁾, <input type="checkbox"/> transit ⁽³⁾</p> <p>Address: _____</p> <p>Postcode: _____ Town: _____ Country: _____</p> <p>Tel. _____ Fax _____ E-mail: _____</p> <p>Contact person: Mr/Ms _____</p> <p><small>(¹) Not required by the Directive, country of origin may be consulted on a voluntary basis in case of type TT and IM shipments. (²) In case of a type MM or ME shipments. (³) In case of type MM, IM, ME or TT shipment, if one or more Member States of transit are concerned.</small></p>
19.	<p>(*) General deadline for automatic approval: _____ (dd/mm/yyyy)</p> <p>(*) Request for additional period of not more than one month, extended deadline for automatic approval: _____ (dd/mm/yyyy)</p> <p>_____</p> <p>(Date and place) (Stamp) (Signature)</p> <p><small>(*) Only one of the asterisked statements can apply: delete as applicable.</small></p>
20.	<p>In accordance with the provisions of Directive 2006/117/Euratom, I hereby:</p> <p>(*) refuse consent for the following reasons (attach complete list of reasons, if space is not sufficient): _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(Date and place) (Stamp) (Signature)</p> <p>(*) grant consent under the following conditions (attach complete list, if space is not sufficient): _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(Date and place) (Stamp) (Signature)</p> <p><small>(*) Only one of the asterisked statements can apply: delete as applicable.</small></p>

Registration No: _____
 (to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION B-4a

Authorisation of spent fuel shipment(s)

21.	Name of competent authority responsible for issuing the authorisation of the shipment: _____ Member State (fill in and tick as appropriate): _____ <input type="checkbox"/> of origin, <input type="checkbox"/> of destination, <input type="checkbox"/> by way of which the spent fuel enters the Community Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____																																				
22.	Sequential list of consents and/or refusals of the countries concerned in the shipment: <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <thead> <tr> <th style="width: 25%;">Member State/country</th> <th style="width: 15%;">Consent granted?</th> <th style="width: 40%;">List of conditions for consent, if any</th> <th style="width: 20%;">Reference to attachments</th> </tr> </thead> <tbody> <tr><td>1.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>2.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>3.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>4.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>5.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>6.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>7.</td><td>YES/NO (*)</td><td></td><td></td></tr> <tr><td>8.</td><td>YES/NO (*)</td><td></td><td></td></tr> </tbody> </table> <p style="font-size: small; margin-top: 5px;">(*) Only one asterisked statement can apply, delete as appropriate.</p>	Member State/country	Consent granted?	List of conditions for consent, if any	Reference to attachments	1.	YES/NO (*)			2.	YES/NO (*)			3.	YES/NO (*)			4.	YES/NO (*)			5.	YES/NO (*)			6.	YES/NO (*)			7.	YES/NO (*)			8.	YES/NO (*)		
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Registration No: _____
 (to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION B-4b

Refusal of spent fuel shipment(s)

24.	Name of competent authority responsible for issuing the refusal of the shipment: _____ Member State (fill in and tick as appropriate): _____ <input type="checkbox"/> of origin, <input type="checkbox"/> of destination, <input type="checkbox"/> of transit or <input type="checkbox"/> by way of which the spent fuel enters the Community Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____																																				
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Registration No: _____
 (to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION B-5

Description of spent fuel consignment and list of packages

26.	Applicant (trade name): _____ <input type="checkbox"/> holder, <input type="checkbox"/> consignee, <input type="checkbox"/> other, to be specified _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____																																																																						
27.	Date of expiry of the authorisation _____ (dd/mm/yyyy) covering <input type="checkbox"/> a single shipment, or <input type="checkbox"/> several shipments, serial number of the shipment: _____																																																																						
28.	Type of spent fuel: <input type="checkbox"/> uranium metal, <input type="checkbox"/> uranium dioxide, <input type="checkbox"/> mixed oxide (MOX), <input type="checkbox"/> other, please specify _____ <hr/> Original fissile content: <input type="checkbox"/> uranium-235 _____ (maximum enrichment _____ %) <input type="checkbox"/> MOX _____ (nominal U-enrichment _____ %) _____ (maximum Pu content _____ %) <input type="checkbox"/> other, please specify _____ <hr/> Fuel burn up (average or typical range): _____ MWd/tHM Total number of assemblies/bundles/elements/rods (specify): _____ Maximum spent fuel content per package (kg): _____																																																																						
29.	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;">(*) Identification No</th> <th style="width: 15%;">(*) Type (*)</th> <th style="width: 15%;">(*) Gross mass (kg)</th> <th style="width: 15%;">(*) Net mass (kg)</th> <th style="width: 15%;">(*) Activity (GBq)</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr> <td>Total number:</td> <td>Total/type:</td> <td>Total:</td> <td>Total:</td> <td>Total:</td> </tr> </tbody> </table> <p>(*) To be completed for each package, attach separate list, if space is not sufficient. (*) According to Regulations for the Safe Transport of Radioactive Material 2005 Edition, Safety Requirements TS-R-1, IAEA, Vienna, 2005.</p>	(*) Identification No	(*) Type (*)	(*) Gross mass (kg)	(*) Net mass (kg)	(*) Activity (GBq)																																																													Total number:	Total/type:	Total:	Total:	Total:
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Total number:	Total/type:	Total:	Total:	Total:																																																																			
30.	Date of dispatch of the shipment: _____ (dd/mm/yyyy) I hereby certify that the information provided in this section (and in the attached list or documents) is correct to the best of my knowledge. <hr style="width: 80%; margin-left: 0;"/> <div style="display: flex; justify-content: space-between; width: 80%; margin-left: 0;"> (Date and place) (Stamp) (Signature) </div>																																																																						

Registration No: _____
(to be completed by the competent authority responsible for issuing the shipments authorisation)

SECTION B-6

Acknowledgement of receipt of the spent fuel

31.	Consignee (trade name): _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____
32.	Location where the spent fuel is held after the shipment (trade name): _____ Address: _____ Postcode: _____ Town: _____ Country: _____ Tel. _____ Fax _____ E-mail: _____ Contact person: Mr/Ms _____
33.	Authorisation granted for (tick as appropriate): <input type="checkbox"/> a single shipment of type MM or IM, <input type="checkbox"/> a single shipment of type ME or TT <input type="checkbox"/> several shipments of type MM or IM, Serial number of shipment: _____ Last shipment covered by the authorisation: <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> several shipments of type ME or TT, Serial number of shipment: _____ Last shipment covered by the authorisation: <input type="checkbox"/> yes <input type="checkbox"/> no
34.	<input type="checkbox"/> Not applicable. <input type="checkbox"/> For shipments of type ME or TT (this item may be replaced by a separate declaration, fill in reference to attachment): _____ Frontier post of entry to the third country of destination or transit: _____ Third country: _____ Frontier post: _____
35.	Depending on the type of shipment, the consignee must send the acknowledgement of receipt together with section B-5: — type MM or IM: to the competent authority of the Member State of destination, — type ME or TT: to the applicant (type ME: to the holder, type TT: to the person responsible for the shipment in the Member State by way of which the spent fuel enters the Community) as referred to as in item 4 (Section B-1). Date of receipt of the spent fuel: _____ (dd/mm/yyyy) Date of dispatch of the acknowledgement of receipt: _____ (dd/mm/yyyy) I, the consignee, hereby certify that the information provided in this section (and the attached list) is correct to the best of my knowledge. _____ (Date and place) (Stamp) (Signature)

36.	<input type="checkbox"/> Not applicable. <input type="checkbox"/> For shipments of type ME or TT: the applicant forwards the acknowledgement of receipt and, where appropriate, the consignee's declaration to the authority which issued the authorisation.				
	<ol style="list-style-type: none"> 1. A consignee located outside the European Communities may acknowledge receipt of the spent fuel by means of a declaration or certificate providing at least the information contained in items 31 to 36. 2. The competent authority which receives the original acknowledgement of receipt must send copies of it to the other competent authorities. 3. The originals of Sections B-5 and B-6 must be sent finally to the competent authority which issued the authorisation. 4. For shipments between Member States, the competent authority of the Member State of origin or where the shipment first enters the Community must send a copy of the acknowledgement of receipt to the holder. 				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">Date of forwarding of the acknowledgement of receipt (together with Section B-5): _____ (dd/mm/yyyy)</td> <td style="width: 50%; padding: 5px;">Frontier post of exit from the Community:</td> </tr> <tr> <td style="padding: 5px;">Country:</td> <td style="padding: 5px;">Post:</td> </tr> </table>	Date of forwarding of the acknowledgement of receipt (together with Section B-5): _____ (dd/mm/yyyy)	Frontier post of exit from the Community:	Country:	Post:
Date of forwarding of the acknowledgement of receipt (together with Section B-5): _____ (dd/mm/yyyy)	Frontier post of exit from the Community:				
Country:	Post:				
	<div style="border: 1px solid black; height: 40px; margin-bottom: 5px;"></div> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; border-top: 1px solid black; text-align: center; padding-top: 5px;">(Date and place)</td> <td style="width: 33%; border-top: 1px solid black; text-align: center; padding-top: 5px;">(Stamp)</td> <td style="width: 33%; border-top: 1px solid black; text-align: center; padding-top: 5px;">(Signature of the applicant)</td> </tr> </table>	(Date and place)	(Stamp)	(Signature of the applicant)	
(Date and place)	(Stamp)	(Signature of the applicant)			

**REQUIREMENTS FOR CALCULATION OF ACTIVITY VALUES FOR
EXCEPTION OF A PACKAGE FOR TRANSPORT OF RADIOACTIVE OR FISSILE
MATERIAL IN INSTRUMENTS OR PRODUCTS**

Principles and methods for calculation of activity values for exception of a package for transport of radioactive or fissile material in instruments or products are stipulated in IAEA document Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, General Safety Requirements, IAEA Safety Standards Series No. GSR, Part 3, International Atomic Energy Agency, Vienna, 2014.