Pursuant to Article 18 of the Law on Radiation and Nuclear Safety in Bosnia and Herzegovina ("Official Gazette of BiH" 88/07) and Article 61(2) of the Law on Administration ("Official Gazette of BiH" 32/02 and 102/09), the director of the State Regulatory Agency for Radiation and Nuclear Safety issues:

REGULATION
ON THE TRANSPORT SAFETY OF RADIOACTIVE MATERIAL

PART ONE – GENERAL PROVISIONS

Article 1
(Subject)

This regulation shall govern the safe transport of radioactive material that is imported, exported or transported in the territory of Bosnia and Herzegovina; the measures that are carried out for its safe transport; the activity limits for radioactive material and packages in transport; the way of division, packing and labelling of radioactive material and packages in transport; determination of the transport index and the category of packages for transport; the responsibilities of individuals involved in transport; the way of controlling the transport, contamination and leaking packages; the obligations during transport and storage during transit, and other important matters related to the transport of radioactive material.

Article 2
(Objective)

The objective of this regulation shall be the protection of the people, property and the environment from harmful effects of ionizing radiation during the transport of radioactive material.

Article 3
(Scope of application)

(1) The provisions of this regulation shall apply to the transport of radioactive material where the total activity exceeds the activity limits for special form radioactive material and to the radioactive material other than the special form radioactive material listed in table 1 of Annex 1 to this regulation.

(2) The provisions of this regulation shall not apply to:

a) the transport of radioactive material that is an integral part of the conveyance;
b) the transport of radioactive material that is moved within an establishment of a legal person or organization authorized by the State Regulatory Agency for Radiation and Nuclear Safety (hereinafter: Agency) for the purpose of carrying out a relevant practice in accordance with applicable legislation, and where the movement does not involve public roads or railway;
c) the transport of radioactive material implanted or incorporated into a person or an animal for diagnosis or treatment;
d) the transport of radioactive material in consumer products which have received the Agency's approval for sale as widely used goods;
e) the transport of natural material and ores containing naturally occurring radionuclides either in their natural state or processed for purposes other than for extraction of the radionuclides, provided that the activity concentration of the material does not exceed 10 times the values specified

in table 1 of Annex 1;

f) the transport of non-radioactive solid objects with radioactive substances present on any surfaces in quantities not in excess of 0.4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm^2 for other alpha emitters.

Article 4
(Definitions)

The terms, as used in this regulation, shall have the following meaning:

a) *Low specific activity (LSA) material*: Radioactive material which by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply. This material is divided into the following groups:

- LSA-I material:
  - Uranium and thorium ores and concentrates of such ores, and other ores containing naturally occurring radionuclides which are intended to be processed for the use of these radionuclides;
  - Natural uranium, depleted uranium, natural thorium or their compounds or mixtures, that are unirradiated and in solid or liquid form;
  - Radioactive material for which the A_2 value is unlimited;
  - Other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the values for activity concentration specified in tables 1 and 2 of Annex 1.

- LSA-II material:
  - Water with a tritium concentration of up to 0.8 TBq/l;
  - Other material in which the activity is distributed throughout and the estimated average specific activity does not exceed 10^{-4} A_2/g for solids and gasses, and 10^{-5} A_2/g for liquids.

- LSA-III material:
  Solids (consolidated wastes, activated materials), excluding powders, as follows:
  - The radioactive material that is distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen, ceramic, etc.);
  - The radioactive material that is relatively insoluble, or it is intrinsically contained in a relatively insoluble matrix, so that, even under loss of packaging, the loss of radioactive material per package by leaching when placed in water for seven days would not exceed 0.1 A_2;
  - The estimated average specific activity of the solid, excluding any shielding material, does not exceed 2 x 10^{-3} A_2/g.

b) *Surface contaminated objects (SCO)*: Solid object that are not themselves radioactive but that have radioactive material distributed on their surfaces, and are divided into:

1) SCO-I that include the solid objects on which:

- the non-fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 0,4 Bq/cm^2 for all other alpha emitters;
- the fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 4 x 10^4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 4 x 10^3 Bq/cm^2 for all other alpha emitters;
- the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 4 x 10^4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 4 x 10^3 Bq/cm^2 for all other alpha emitters.

2) SCO-II that include the solid objects on which either the fixed or non-fixed contamination on the surface exceeds the applicable limits specified for SCO-I and on which:

- the non-fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 400 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 40 Bq/cm^2 for all other alpha emitters;
- the fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 8 x 10^5 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 8 x 10^4 Bq/cm^2 for all other alpha emitters;
- the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 8 x 10^5 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 8 x 10^4 Bq/cm^2 for all other alpha emitters.

c) *Special form radioactive material*: Either an indispersible solid radioactive material or a sealed capsule containing radioactive material. A radioactive material may be classified as special form radioactive material only if it meets the following requirements:

- at least one dimension of not less than 5 mm;
- so designed that it must meet all necessary requirements of resistance if it is subjected to the bending test, heat test, etc.;
- A sealed capsule constituting part of the special form radioactive material shall be so manufactured that it can be opened only by destroying it.

d) *Low dispersible radioactive material*: Either a solid radioactive material or a solid radioactive material in a sealed capsule, that has limited dispersibility and is not in powder form. Radioactive material may be classified as low dispersible radioactive material only if the radiation level at 3 m from the unshielded radioactive material does not exceed 10 mSv/h.

e) *Fissile material:* Uranium-233, uranium-235, plutonium-239, plutonium-241 or any combination of those radionuclides. Excluded from the definition are natural uranium or depleted uranium, and natural uranium or depleted uranium which has been irradiated in thermal reactors only.

f) A_1: The activity value of special form radioactive material which is listed in table 1 of Annex 1 and is used to determine the activity limits for radioactive

material.

g) A_2: The activity value of radioactive material, other than special form radioactive material, which is listed in table 1 of Annex 1 and is used to determine the activity limits for radioactive material.

h) *Design*: The description of special form radioactive material, low dispersible radioactive material, package or packaging which enables such an item to be fully identified. The description may include specifications, engineering drawings, reports, etc.

i) *Exclusive use*: The sole use, by a single consignor, of a conveyance or of a large freight container, in respect of which all initial, intermediate and final loading and unloading is carried out in accordance with the directions of the consignor or consignee.

j) *Contamination*: The presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm^2 for all other alpha emitters.

k) *Non-fixed contamination*: Contamination that can be removed from a surface during routine conditions of transport.

l) *Fixed contamination*: Contamination other than non-fixed contamination.

m) *Freight container*: An article of transport equipment that is designed to facilitate the transport of goods, either packaged or unpackaged, by one or more modes of transport without intermediate reloading. It shall be of a permanent enclosed character, rigid and strong enough for repeated use, and must be fitted with devices facilitating its handling, particularly in transfer between conveyances and from one mode of transport to another. A small freight container is that which has either any overall outer dimension less than 1.5 m, or an internal volume of not more than 3 m^3. Any other freight container is considered to be a large freight container.

n) *Low toxicity alpha emitters*: Natural uranium, natural thorium; uranium-235 or uranium-238, thorium-232 and thorium-230 when contained in ores or physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.

o) *Radiation level*: The corresponding dose rate expressed in millisieverts per hour.

p) *Package*: The packaging with radioactive content prepared for transport.

q) *Overpack*: An enclosure used by a single consignor to contain one or more packages, serving for convenience of handling and loading during transport.

r) *Packaging*: A set of components necessary to perform full containment and to ensure other safety functions.

s) *Consignor*: Any natural or legal person which prepares a consignment for transport and is indicated as "consignor" in the transport documentation.

t) *Consignment*: Any package or packages, or load of radioactive material, presented by a consignor for transport.

u) *Carrier*: Any legal person authorized for the transport of radioactive material.

v) *Consignee*: Any licensed legal person which takes delivery of a consignment and is indicated as "consignee" in the transport documentation.

w) *Radiation protection instruction*: A systematic arrangement with the aim of ensuring the application of relevant radiation protection measures.

x) *Radioactive material*: Any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in table 1 of Annex 1.

y) *Specific activity of a radionuclide*: The activity per unit mass of that nuclide. The specific activity of a material shall mean the activity per unit mass of the material in which the radionuclides are uniformly distributed.

z) *Transport index* (TI): Indicated on the package, overpack or freight container, or on unpackaged LSA-I or SCO-I; a number used to provide control over radiation exposure.

aa) *Conveyance*: A road or railway vehicle, or railway compartment. Any trailer is considered a separate vehicle.

Article 5
(Primary responsibility)

Primary responsibility for the safe transport of radioactive material shall rest with the consignor, that is, the importer.

Article 6
(Radiation protection instruction)

(1) The carrier shall have a radiation protection instruction for the transport of radioactive material, which shall be applicable for any type of transport he performs.

(2) The instruction referred to in paragraph (1) shall be prepared by the consignor, that is, the importer, which shall send it to the carrier in one of the official languages in BiH.

(3) The carrier shall ensure that the instruction referred to in paragraph (1) is always in the conveyance during the transport of radioactive material, and that the driver be acquainted with its content and proper actions in case of an emergency.

(4) The instruction referred to in paragraph (3) shall contain:

a) optimization principles and dose limitations for exposed workers;
b) the requirements referred to in Article 55, related to the segregation of cargo during transport and storage in transit;
c) the measures of response to an emergency.

Article 7
(Distance)

During transport, the packages, overpacks and freight containers containing radioactive material shall be at the maximum possible distance from individuals involved in the transport, depending on the conveyance and taking into account the principle of optimization of exposure to radiation.

Article 8
(Specially approved transport)

The Agency may give special approval for the transport of the consignments that cannot be transported under the provisions of this regulation, provided that all radiation protection measures in transport are carried out in accordance with international standards.

PART TWO – ACTIVITY LIMITS AND THE DIVISION OF RADIOACTIVE MATERIAL

CHAPTER I – BASIC RADIONUCLIDE VALUES

Article 9
(UN numbers)

(1) Radioactive material presented for transport shall be assigned to a UN number specified in table 3 of Annex 1.

(2) The UN number referred to in paragraph (1) shall be determined depending on the activity level of the radionuclides contained in a package, the fissile or non-fissile properties of these radionuclides, the type of package to be presented for transport, and the nature or form of the contents of the package, or special arrangements governing the transport operation.

Article 10
(Basic radionuclide values)

The A1 and A2 values, activity concentration for exempt material and activity limits for exempt consignments are specified in table 1 of Annex 1.

Article 11
(Mixtures of radionuclides)

For the material containing mixtures of radionuclides, the activity concentration for exempt material and activity limits for exempt consignment shall be determined under 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 radionuclides 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 as appropriate for the radionuclide i. Xm is the derived value of A_1 or A_2 or the for exempt material or the activity limit for an exempt consignment in the case of a mixture of radionuclides.

Article 12
(Unknown radionuclides)

As for unknown radionuclides or mixtures, higher restrictive values of activity concentration for exempt material or the activity limit for an exempt consignment shall be used, as specified in table 2 of Annex.

CHAPTER II – DIVISION OF RADIOACTIVE MATERIAL

Article 13
(Division of radioactive material)

Radioactive material presented for transport is divided into:

a) LSA (low specific activity material);
b) SCO (surface contaminated objects);
c) Special form radioactive material;
d) Low dispersible radioactive material;
e) Fissile material.

Article 14
(Unpackaged consignments)

LSA and SCO shall be transported unpackaged under the conditions of exclusive use only if all unpackaged material other than ores containing only naturally occurring radionuclides is transported in such a manner that under routine conditions of transport there will be neither escape of the radioactive contents from the conveyance nor any loss of shielding.

Article 15
(Fissile material)

The transport of fissile material shall require a special approval of the Agency.

PART THREE – PACKAGES

Article 16
(Types of package)

The following packages shall be used in the transport of radioactive material:

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

Article 17
(Limitation for the amount of material)

(1) The amount of radioactive material in the package shall not exceed the limits for the given type of package.

(2) Radioactive material may be transported in the packages that provide higher protection than the one required for the given radioactive material.

Article 18
(Excepted packages)

The following packages shall be classified as excepted:

a) Empty packages having contained radioactive material;
b) Packages containing instruments or articles in limited quantities as specified in table 4 of Annex 1;
c) Packages containing articles manufactured of natural uranium, depleted uranium or natural thorium;
d) Packages containing radioactive material in limited quantities as specified in table 4 of Annex 1.

Article 19
(Type A package)

(1) A package containing radioactive material shall be classified as type A provided that the provisions referred in paras (2) and (3) are fulfilled.

(2) The Type A package shall not contain activities greater than the following:

a) For special form radioactive material – A_1;
b) For all other material - A_2.

(3) For mixtures of radionuclides whose identities and respective activities are known, the following condition shall apply to the radioactive contents of the 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; $A_1(i)$ is A_1 value for radionuclide (i); C (j) is the activity of radionuclide (j) as other than special form radioactive material; $A_2(j)$ is A_2 value for radionuclide (j).

Article 20
(Certificate)

Type B(U), Type B(M) and Type C packages shall be classified in accordance with the competent authority approval certificate for the package issued by the country of origin of design.

Article 21
(Type B(U) package)

(1) Type B(U) packages shall not contain:

a) activities greater than those authorized for the package design;
b) radionuclides different from those authorized for the package design;
c) contents in a form or a physical or chemical state different from those authorized for the package design.

(2) Type B(U) packages shall have only the contents as specified in the certificate of approval.

Article 22
(Type B(M) package)

(1) Type B(M) package shall not contain:

a) activities greater than those authorized for the package design;
b) radionuclides different from those authorized for the package design;
c) contents in a form or a physical or chemical state different from those authorized for the package design.

(3) Type B(M) package shall have only the contents as specified in the certificate of approval.

Article 23
(Transport by air)

Type B(U) and Type B(M) packages transported by air shall meet the requirements referred to in Articles 21 and 22 and shall not contain activities greater than the following:

a) for low dispersible radioactive material – as authorized for the package design and as specified in the certificate of approval;
a) for special form radioactive material – 3000 A_1 or 100 000 A_2, whichever is the lower;
b) for other radioactive material – 3000 A_2.

Article 24
(Type C package)

(1) Type C packages shall not contain:

a) activities greater than those authorized for the package design;
b) radionuclides different from those authorized for the package design;
c) contents in a form or a physical or chemical state different from those authorized for the package design.

(2) Type C packages shall have only the contents as specified in the certificate of approval.

PART FOUR – REQUIREMENTS AND CONTROLS FOR THE TRANSPORT

CHAPTER I – REQUIREMENTS AND CONTROLS FOR CONTAMINATION AND LEAKING PACKAGES

Article 25
(Contamination limits)

Packagings, including IBCs and tanks used for the transport of radioactive material shall not be used for the storage or transport of other goods unless decontaminated below the level of 0.4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm^2 for all other alpha emitters.

Article 26
(Non-fixed contamination)

(1) The non-fixed contamination on the external surfaces of any package shall be kept as low as practicable and, under routine conditions of transport, shall not

exceed the following limits:

a) 4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters;
b) 0,4 Bq/cm^2 for all other alpha emitters.

(2) These limits are applicable when averaged over any area of 300 cm^2 of any part of the package surface.

Article 27
(Levels of non-fixed contamination)

Other than the exemption provided for in Article 31, the level of non-fixed contamination on the external and internal surfaces of overpacks, freight containers, tanks, IBCs and conveyances shall not exceed the limits specified in Article 26.

Article 28
(Damaged packages)

(1) If it is evident that a package is damaged or leaking, or if it is suspected that the package may have leaked or been damaged, access to the package shall be restricted and a qualified person shall, as soon as possible, assess the extent of contamination and the resultant radiation level of the package.

(2) The assessments referred to in paragraph (1) shall include the package, the conveyance, the loading and unloading areas and, if necessary, all other material which has been carried in the conveyance.

(3) When necessary, additional steps for the protection of persons, property and the environment, in accordance with the applicable legislation, shall be taken to overcome and minimize the consequences of such leakage or damage.

(4) Packages which are damaged or leaking radioactive contents in excess of allowable limits for normal conditions of transport shall be removed to an acceptable interim location under supervision, but shall not be forwarded until repaired or reconditioned and decontaminated.

Article 29
(Check for contamination)

(1) The conveyance used for the transport of radioactive material shall be equipped with a portable radiation survey, personal protective equipment, and the field marking equipment.

(2) The conveyance and equipment that are routinely used for the transport of radioactive material shall be periodically checked by the carrier to detect possible radioactive contamination.

(3) The frequency of such checks shall be related to the likelihood of contamination and the amount of radioactive material that is being transported.

Article 30
(Decontamination of conveyances)

(1) Other than the exemption as provided for in Article 31, any conveyance, or equipment or part thereof which has become contaminated during the transport of radioactive material above the limit referred to in Article 26, or which shows a radiation level in excess of 5 μSv/h at the surface, should be

decontaminated by a qualified person as soon as possible.

(2) The conveyances or equipment referred to in paragraph (1) shall not be reused unless the non-fixed contamination does not exceed the limits specified in Article 26 and the radiation level resulting from the fixed contamination on surfaces after decontamination is less than 5 μSv/h at the surface.

Article 31
(Requirements for exclusive use)

A freight container, tank, IBC or conveyance dedicated to the transport of unpackaged radioactive material under exclusive use shall be excepted from the requirements referred to in Articles 27 and 30 solely with regard to its internal surfaces and only for as long as it remains under that specific exclusive use.

CHAPTER II – TRANSPORT WITH OTHER GOODS

Article 32
(Transport with other goods)

(1) The package shall not contain any items other than those that are necessary for the use of the transported radioactive material, in which the interaction between these items and the package shall not reduce the safety of the package.

(2) Radioactive material consignments shall be segregated from other dangerous goods consignments in accordance with the applicable legislation on the transport of dangerous goods.

Article 33
(Other dangerous properties of contents)

In addition to the radioactive and fissile properties, any other properties of the dangerous 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 in order to be in compliance with the relevant legislation for the transport of dangerous goods of each of the countries through or into which the material will be transported.

CHAPTER III – REQUIREMENTS AND CONTROLS FOR THE TRANSPORT OF EXCEPTED PACKAGES, LSA AND SCO MATERIAL

Article 34
(Excepted package)

The radiation level at any point on the external surface of an excepted package shall not exceed 5 μSv/h.

Article 35
(LSA and SCO material)

The quantity of LSA material or SCO in a single Type IP-1, Type IP-2, Type IP-3 package, or object or collection of objects, whichever is appropriate, 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.

Article 36
(Unpackaged LSA-I and SCO-I)

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

a) All unpackaged material other than ores containing only naturally occurring radionuclides shall be transported in such a manner that under routine conditions of transport there will be no escape of the radioactive contents from the conveyance.
b) Each transport shall be under exclusive use, except when transporting only SCO-I on which the contamination on the accessible and the inaccessible surfaces is not greater than ten times the level of contamination.
c) For SCO-I where it is suspected that non-fixed contamination exists on inaccessible surfaces in excess of the values specified in Article 26, measures shall be taken to ensure that the radioactive material is not released into the conveyance.

Article 37
(Requirements for LSA and SCO)

Unless otherwise set forth in Article 36, LSA material and SCO shall be packaged in accordance with table 5 of Annex 1.

CHAPTER IV – LIMITATION OF THE TRANSPORT INDEX VALUE AND RADIATION LEVEL FOR PACKAGES AND OVERPACKS

Article 38
(Determination of transport index)

(1) In order to ensure control of the exposure to radiation in transport, the transport index (TI) for a package, overpack or freight container, or for unpackaged LSA-I or SCO-I, shall be the determined in the following way:

a) The value of 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, overpack, freight container or unpackaged LSA-I and SCO-I shall be multiplied by 100, and the resulting number is the transport index. For uranium and thorium ores and their concentrates, the maximum radiation level at 1 m from the external surface of the load shall be taken as follows:

1) 0.4 mSv/h for ores and physical concentrates of uranium and thorium;
2) 0.3 mSv/h for chemical concentrates of thorium;
3) 0.02 mSv/h for chemical concentrates of uranium, other than uranium hexafluoride.

b) For tanks, freight containers and unpackaged LSA-I and SCO-I, the value determined in step (a) shall be multiplied by the appropriate factor from table 6 of Annex 1.

c) The value obtained in steps a) and b) shall be rounded up to the first decimal place, except that a value of 0.05 or less may be considered as zero.

(2) The TI for each overpack, freight container or conveyance shall be determined as either the sum of the TIs of all the packages contained, or by direct measurement of radiation level, except in the case of non-rigid overpacks, for which the TI shall be determined only as the sum of the TIs of all the packages.

Article 39
(Limitation of TI)

Except for consignments under exclusive use, the TI of any package or overpack shall not exceed 10.

Article 40
(Maximum radiation level)

(1) The maximum radiation level at any point on the external surface of a package or overpack shall not exceed 2 mSv/h, except for packages or overpacks transported under exclusive use or a specially approved transport.

(2) The maximum radiation level at any point on the external surface of a package or overpack under exclusive use shall not exceed 10 mSv/h.

CHAPTER V – CATEGORIES OF PACKAGES AND OVERPACKS

Article 41
(Categories of packages and overpacks)

Packages and overpacks shall be assigned to one of the following categories:

a) I-WHITE;
b) II-YELLOW;
c) III-YELLOW.

Article 42
(Categorization)

The categories referred to in Article 41 shall be assigned in accordance with table 7 of Annex 1 and the following requirements:

a) For a package or overpack, both the TI and the surface radiation level shall be taken into account.
b) Where the transport index satisfies the condition for one category but the surface radiation level satisfies the condition for a different category, a package or overpack shall be assigned to a higher category. For this purpose, category I-WHITE shall be regarded as the lowest category.
c) The TI shall be determined under Article 38.
d) If the surface radiation level is greater than 2 mSv/h, the package or overpack shall be transported under exclusive use or as a shipment under special arrangement.
e) A package transported as a shipment under special arrangement shall be assigned to category III-YELLOW.
f) An overpack which contains packages transported as a shipment under special arrangement shall be assigned to category III-YELLOW

CHAPTER VI – MARKINGS, LABELS AND PLACARDS

Article 43
(General marking)

(1) Each package or overpack shall be assigned to the UN number and proper shipping name in accordance with table 3 of Annex 1.

(2) Packages shall be legibly and durably marked on the outside of the packaging with an identification of either the consignor or consignee, or both.

(3) Package and overpacks shall be legibly and durably marked on the outside with the UN marking as specified in table 8 of Annex 1.

Article 44
(Markings for package types)

(1) Industrial packages 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 to the package type.

(2) Type A package shall be legibly and durably marked on the outside of the packaging with "TYPE A."

(3) IP-2, IP-3 or a Type A package shall be legibly and durably marked on the outside of the packaging with the international vehicle registration code (VRI code).

(4) The package that conforms to the approved design of type B(U), B(M) or C shall be legibly and durably marked on the outside of the packaging with the identification mark of that package type and a serial number.

(5) Packages of types B(U), B(M) or C shall be marked with the trefoil symbol for radioactive material, shown in figure 1 of Annex 1, which shall be so designed to be fire and water resistant.

Article 45
(Package mass)

The package of gross mass exceeding 50 kg shall have its permissible gross mass legibly and durably marked on the outside of the packaging.

Article 46
(Markings for LSA and SCO)

Where LSA-I or SCO-I material is transported unpacked, the outer surface of the box or packaging material may bear the marking "RADIOACTIVE LSA-I" or "RADIOACTIVE SCO-I."

Article 47
(Labels)

(1) Labels need not be affixed to excepted packages.

(2) Labels shall be assigned in accordance with the category of a package or overpack referred to in Article 41.

(3) Package, overpack and freight container shall bear the labels as shown on figures 2, 3 and 4 of Annex 2.

(4) All labels not relating to the package contents shall be removed or covered to make them not visible.

(5) The labels referred to in paragraph (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.

Article 48
(Label entries)

The labels referred to in Article 47 shall be filled in with the following information:

a) The field CONTENTS: Except for LSA-I material, the symbol of the radionuclide as shown in table 1 of Annex 1. For mixtures of radionuclides, the most restrictive nuclides shall be listed to the extent the space on the line permits. If necessary, the symbols LSA-II, LSA-III, SCO-I and SCO-II shall be used following the radionuclide symbol. For LSA-I material, the term "LSA-I" is used only, while the name of the radionuclide is not necessary.

b) The field ACTIVITY: The maximum activity of the radioactive contents during transport expressed in the SI units of becquerels (Bq), with an appropriate SI prefix. For fissile material, the mass of fissile material (or mass of each fissile nuclide for mixtures when appropriate) in units of grams (g) may be used in place of activity.

c) For overpacks and freight containers, the fields "CONTENTS" and "ACTIVITY" shall contain the total value of the package or freight container contents unless a large number of different packages containing different radionuclide are transported, in which case the entry may read "See Transport Documents."

d) The field TRANSPORT INDEX: The number indicating the transport index that is determined under Article 38. (This field need not be filled in for Category I-WHITE.)

Article 49
(Placarding)

(1) The conveyance transporting radioactive material shall bear placards conforming to figure 5 of Annex 2.

(2) The placards referred to in paragraph (1) shall be affixed to each side wall of the conveyance, and in case of road vehicles on the rear side as well.

(3) Instead of using labels and placards, only the label referred to in Article 51 may be used, provided that it shall have minimum dimensions as the placard referred to in paragraph (1).

Article 50
(Specific transport)

Where the consignment in the freight container or tank is unpackaged LSA-I or SCO-I, or if the consignment is transported under exclusive use, and radioactive material with a single UN number is packed, an appropriate UN number listed in table 3 of Annex 1 shall be indicated in black digits not less than 65 mm high, either in the lower half of

the placard against the white background or on the placard shown in figure 6 of Annex 2, which shall be affixed immediately to the main placard on each side.

CHAPTER VII – CONSIGNOR'S RESPONSIBILITIES

Article 51
(Consignor)

The consignor shall prepare radioactive material for transport, properly mark it by affixing a label and a placard, and attach filled and certified transport documents.

Article 52
(Particulars of consignment)

The consignor shall include in the transport documents with each consignment the names and addresses of the consignor and consignee, and the following information in the order given:

a) The UN number assigned to the material under Article 43, preceded by the letters "UN";
b) The proper shipping name in accordance with table 3 of Annex 1;
c) The UN class number "7";
d) The name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides;
e) A description of the physical and chemical form of the material, or a notation that the material is special form radioactive material or low dispersible radioactive material, in which a generic chemical description is acceptable for chemical form;
f) The maximum activity of the radioactive contents during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol;
g) The category of the package, i.e., I-WHITE, II-YELLOW, III-YELLOW;
h) The transport index (TI) for categories II-YELLOW and III-YELLOW;
i) The number of certificate issued by a relevant authority for the given consignment (special form radioactive material, low dispersible radioactive material, special arrangement, design of package or consignment);
j) For consignments of more than one package, the information contained in lines a) to j) shall be given for each individual package;
k) A consignment to be shipped under exclusive use shall bear the statement "EXCLUSIVE USE SHIPMENT";
l) For LSA-II, LSA-III, SCO-I and SCO-II, the total activity of the consignment as a multiple of A_2 value. For radioactive material for which the A_2 value is unlimited, the multiple of A_2 is zero.

Article 53
(Consignor's declaration)

(1) The consignor shall include the following declaration in the transport documents[1]: „Ovim izjavljujem da je gore navedeni sadržaj ove pošiljke u potpunosti i tačno opisan propisnim nazivom robe u otpremnici, da je klasificiran, upakovan, označen, da su stavljene naljepnice/plakati i da je na svaki način pravilno pripremljen za transport u skladu sa važećim međunarodnim i državnim propisima."

(2) In international transport the declaration must be in English and read as follows: "I hereby declare that the contents of this consignment are fully and

[1] Translator's comment: The text that follows is the declaration from paragraph (2) in local language.

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 according to the applicable international and national governmental regulations."

(3) The declaration referred to in paragraph (1) or (2) shall be signed and dated by the consignor.

(4) The consignor's declaration shall be on the transport documents with each consignment.

Article 54
(Information for carriers)

The consignor shall provide transport documents and instructions on possible actions to be taken by the carrier in relation to:

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 a statement that no such requirements are necessary;
b) restrictions on the mode of transport or delivery;
c) an emergency arrangement appropriate to the consignment.

CHAPTER VIII – RESPONSIBILITIES DURING TRANSPORT AND STORAGE IN TRANSIT

Article 55
(Segregation of cargo during transport and storage in transit)

(1) Packages, overpacks and freight containers containing radioactive material and unpackaged radioactive material shall be segregated during transport and during storage in transit, as follows:

a) From workers in regular working areas by distances calculated using a dose criterion of 5 mSv in a year and conservative model parameters;
b) From members of the critical group of the public, in areas where the public has regular access, by distances calculated using a dose criterion of 1 mSv in a year and conservative model parameters;
c) From undeveloped photographic film by distances calculated using a radiation exposure criterion for undeveloped photographic film due to the transport of radioactive material of 0.1 mSv per consignment of such film; and
d) From other dangerous goods in accordance with the regulations for the transport of dangerous goods.

(2) 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 authorized to accompany such packages or overpacks.

Article 56
(Stowage during transport and storage in transit)

(1) Consignments shall be securely stowed during transport.

(2) Packages or overpacks may be moved or stowed among general cargo without any special stowage provisions, provided that:

a) they are not easily flammable (average surface heat flux does not exceed 15 W/m^2);
b) the immediate surrounding cargo is not in sacks or bags;
c) there are no special requirements by the consignor.

(3) Loading of freight containers and accumulation of packages, overpacks and freight containers shall be controlled by the consignor as follows:

a) Except under the condition of exclusive use, and for consignments of LSA-I material, the total number of packages, overpacks and freight containers aboard a single conveyance shall be so limited that the sum of all TIs aboard does not exceed the values shown in table 9 of Annex 1.
b) The radiation level under routine conditions of transport shall not exceed 2 mSv/h at any point on the conveyance, and 0.1 mSv/h at 2 m from the external surface of the conveyance, except for consignments transported under exclusive use by road or rail, for which the radiation limits around the vehicle are set forth in Article 64.

(4) Any package or overpack having a TI greater than 10 shall be transported only under the conditions of exclusive use.

Article 57
(Additional requirements relating to transport by rail and by road)

(1) Rail and road vehicles carrying packages, overpacks or freight containers labelled with any of the labels shown in figures 2, 3 or 4 of Annex 2, or transporting consignments under exclusive use, shall display the placard shown in figure 5 of Annex 2 on each of:

a) two external side walls in the case of rail vehicle;
b) two external side walls and the external rear wall in the case of road vehicle.

(2) In the case of a vehicle without sides, the placards may be affixed directly on the cargo, provided that they are readily visible, and in the case of large tanks or freight containers, the placards on the tanks or freight containers shall suffice.

(3) If a vehicle has insufficient area for the fixing of larger placards, the dimensions of the placard shown in figure 5 of Annex 2 may be reduced to 100 mm.

(4) Any placard not related to the contents shall be removed.

Article 58
(Markings for specific transport)

(1) Where the consignment in or on the vehicle is unpackaged LSA-I material or SCO-I or where a consignment is to be shipped under exclusive use, or radioactive material with a single UN number is packaged, that UN number shall also be displayed, in black digits not less than 65 mm high, either:

a) in the lower half of the placard shown in figure 5 of Annex 2 against the white background; or
b) on the placard shown in figure 6 of Annex 2.

(2) When the alternative (b) is used, the subsidiary placard shall be affixed immediately adjacent to the main placard, either on two external side walls in the case of a rail vehicle, or on two external side walls and external rear wall in the case of a road vehicle.

Article 59
(Consignments under exclusive use)

(1) 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, and may only exceed 2 mSv/h provided that:

1) the vehicle is equipped with a safety lock which, during routine conditions of transport, prevents the access of unauthorized persons to the interior of the enclosure,
2) provisions are made to secure the package or overpack in such a position within the vehicle that the safety lock remains fixed during routine conditions of transport;
3) there is no loading or unloading during the shipment.

b) 2 mSv/h at any point on the outer surfaces of the vehicle, including the upper and lower surfaces, or, in the case of an open vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load, and on the lower external surface of the vehicle.

c) 0,1 mSv/h at any point 2 m from the vertical planes represented by the outer lateral surfaces of the vehicle, or, if the load is transported in an open vehicle, at any point 2 m from the vertical planes projected from the outer edges of the vehicle.

Article 60
(Presence in the vehicle)

(1) The road vehicles carrying radioactive material shall have the driver and the security guard, both possessing a relevant ADR certificate.

(2) 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.

Article 61
(Additional requirements relating to transport by air)

1) Type B(M) packages and consignments under exclusive use shall not be transported on passenger aircraft.

2) Vented Type B(M) packages, packages which require external cooling by an ancillary cooling system, packages subject to operational controls during transport and packages containing liquid pyrophoric materials shall not be transported by air.

3) Packages or overpacks having a surface radiation level greater than 2 mSv/h shall not be transported by air except with special approval.

Article 62
(Additional requirements relating to transport by post)

(1) A consignment that conforms with the requirements for the excepted package and in which the activity of the radioactive contents does not exceed one tenth of the limits prescribed in table 4 of Annex 1 may be accepted for domestic movement by national postal authorities, subject to such additional requirements as those authorities may prescribe.

(2) A consignment that conforms with the requirements for the excepted package and in which the activity of the radioactive contents does not exceed one tenth of the limits prescribed in table 4 of Annex 1 may be accepted for international movement by post, subject in particular to the following additional requirements:

a) It shall be deposited with the postal service only by consignors authorized by the Agency.
b) It shall be dispatched by the quickest route.
c) It shall be plainly and durably marked on the outside with the words "RADIOACTIVE MATERIAL — QUANTITIES PERMITTED FOR MOVEMENT BY POST." These words shall be crossed out if the packaging is returned empty.
d) It shall carry on the outside the name and address of the consignor with the request that the consignment be returned in the case of non-delivery.
e) The name and address of the consignor and the contents of the consignment shall be indicated on the internal packaging.

Article 63
(Customs control procedure)

(1) Customs clearance and control of the radioactive contents of a package shall be carried out only in a place where adequate means of controlling radiation exposure are provided and in the presence of qualified persons.

(2) Any package opened on customs instructions shall, before being forwarded to the consignee, be restored to its original condition.

Article 64
(Undeliverable consignments)

Where a consignment is undeliverable, it shall be placed in a safe location and the Agency shall be informed as soon as possible and a request made for instructions on further action.

PART FIVE – REQUIREMENTS FOR PACKAGING AND PACKAGES

Article 65
(Package design)

The design of packages presented for transport shall meet the following requirements:

a) that it can be easily and safely transported in relation to its mass, volume and shape;
b) that it can be properly secured in or on the conveyance during transport;
c) that any lifting attachments on the package will not damage the package when used properly, and that if the attachments fail, the resistance of the package

shall not be reduced;

d) that any other features on the outer surface of the package which could be used to lift shall be designed either to support its mass, or shall be removable or otherwise rendered incapable of being used during transport;
e) that the outer layer of the package shall be so designed as to prevent the collection and the retention of water;
f) that any features added to the package at the time of transport which are not part of the package shall not reduce its safety;
g) that the package is capable of withstanding acceleration, vibration or vibration resonance which may arise under routine conditions of transport. In particular, nuts, bolts and other securing devices shall be so designed as to prevent them from becoming loose or being released unintentionally, even after repeated use.
h) that ambient temperatures and pressures that are likely to be encountered in routine conditions of transport are taken into account;
i) for radioactive material having other dangerous properties, the package design shall take into account those properties.

Article 66
(Packaging design)

(1) The packaging shall be so designed and finished that the external surfaces are free from protruding features and can be easily decontaminated.

(2) The materials of the packaging and any components or structures shall be physically and chemically compatible with each other and with the radioactive contents.

(3) All valves through which the radioactive contents could escape shall be protected against unauthorized operation.

PART 6 – FINAL PROVISIONS

Article 67
(Penalties)

Any violation of the provisions of this regulation shall be punished under the applicable legislations.

Article 68
(Entering into force)

This regulation shall enter into force on the eighth day following that of its publication in the "Official Gazette of BiH."

No.: 01-02-919/12/12 **D I R E C T O R**

Sarajevo, 22 November 2012 Emir Dizdarevic

ANNEX 1

Table 1 Basic radionuclide values

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Actinium (89)				
Ac-225 (a)	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}

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
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}

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
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}	$7 \times 10^{-}1$	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}	$3 \times 10^{-}1$	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}

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
Eu-150 (short lived)	2×10^{0}	7×10^{-1}	1×10^{3}	1×10^{6}
Eu-150 (long lived)	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}

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
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}	$4 \times 10^{-}1$	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}	1×1^{06}
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^{0}	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}

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
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 (short lived)	2×10^{1}	2×10^{0}	1×10^{3}	1×10^{7}
Np-236 (long lived)	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}

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
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)
Paladium (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}

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
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 (nat)	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 (nat)	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)
Sulphur (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	$5 \times 10^{-}1$	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}

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
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 (long lived)	1×10^0	8×10^{-1}	1×10^1	1×10^6
Ta-179	3×10^1	3×101	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

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
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 (nat)	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 (fast lung absorption)(a)(d)	4×10^{1}	1×10^{-1}	1×10^{1} (b)	1×10^{5}(b)
U-230(medium lung absorption)(a)(e)	4×10^{1}	4×10^{-3}	1×10^{1}	1×10^{4}
U-230 (slow lung absorption)(a)(f)	3×10^{1}	3×10^{-3}	1×10^{1}	1×10^{4}
U-232 (fast lung absorption)(d)	4×10^{1}	1×10^{-2}	1×10^{0} (b)	1×10^{3} (b)
U-232 (medium lung absorption)(e)	4×10^{1}	7×10^{-3}	1×10^{1}	1×10^{4}
U-232 (slow lung absorption)(f)	1×10^{1}	1×10^{-3}	1×10^{1}	1×10^{4}
U-233 (fast lung absorption)(d)	4×10^{1}	9×10^{-2}	1×10^{1}	1×10^{4}
U-233 (medium lung absorption)(e)	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
U-233 (slow lung absorption)(f)	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{5}
U-234 (fast lung absorption)(d)	4×10^{1}	9×10^{-2}	1×10^{1}	1×10^{4}
U-234(medium lung absorption)(e)	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
U-234 (slow lung absorption)(f)	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{5}
U-235(all lung absorption types) (a)(d)(e)(f)	Unlimited	Unlimited	1×10^{1} (b)	1×10^{4} (b)
U-236 (fast lung absorption)(d)	Unlimited	Unlimited	1×10^{1}	1×10^{4}
U-236(medium lung absorption)(e)	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
U-236 (slow lung absorption)(f)	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{4}
U-238 (all lung absorption types) (d)(e)(f)	Unlimited	Unlimited	1×10^{1} (b)	1×10^{4} (b)
U (nat)	Unlimited	Unlimited	1 × 100 (b)	1×10^{3} (b)
U (enriched to 20% or less)(g)	Unlimited	Unlimited	1×10^{0}	1×10^{3}
U (dep)	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}
Tungsten (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}

Radionuclide (atomic number)	A_1 (TBq)	A_2 (TBq)	Activity concentration for exempt material (Bq/g)	Activity limit for an exempt consignment (Bq)
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)

(a) A_1 and/or A_2 values for these parent radionuclides include contributions from daughter radionuclides with half-lives less than 10 days, as listed in the following:

Parent radionuclide	**Daughter radionuclide(s)**
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

Parent radionuclide	Daughter radionuclide(s)
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

Parent radionuclide	Daughter radionuclide(s)
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 nuclides and their progeny included in secular equilibrium are listed in the following:

Parent radionuclide	Progeny included in secular equilibrium
Sr-90	Y-90
Zr-93	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-nat	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-nat	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) The quantity may be determined from a measurement of the rate of decay or a measurement of the radiation level at a prescribed distance from the source.

(d) These values apply only to compounds of uranium that take the chemical form of UF_6 , UO_2F_2 and $UO_2(NO_3)_2$ in both normal and accident conditions of transport.

(e) These values apply only to compounds of uranium that take the chemical form of UO_3, UF_4, UCl_4 and hexavalent 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) above.

(g) These values apply to unirradiated uranium only, i.e. uranium containing not more than $2 \cdot 10^3$ Bq of plutonium per gram of U-235, not more than $9 \cdot 10^6$ Bq of fission products per gram of U-235 and not more than $5 \cdot 10^{-3}$ grams of U-236 per gram of U-235.

Table 2 Basic radionuclide values for unknown radionuclides or mixtures

Radioactive content	**A_1 (TBq)**	**A_2 (TBq)**	**Activity concentration for exempt material (Bq/g)**	**Activity limit for an exempt consignment (Bq)**
Only beta or gamma emitting nuclides are known to be present	0,1	0,2	1×10^1	1×10^4
Alpha emitting nuclides, but no neutron emitters, are known to be present	0,2	9×10^{-5}	1×10^{-1}	1×10^3
Neutron emitting nuclides are known to be present or no relevant data are available	0,001	9×10^{-5}	1×10^{-1}	1×10^3

Table 3 Excerpts from list of UN numbers, proper shipping names and descriptions

UN number	**PROPER SHIPPING NAME and description**
Excepted package	
UN 2908	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE — EMPTY PACKAGING
UN 2909	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE — ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM
UN 2910	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE — LIMITED QUANTITY OF MATERIAL
UN 2911	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE — INSTRUMENTS or ARTICLES
LSA material	
UN 2912	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I), non-fissile or fissile-excepted
UN 3321	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), non-fissile or fissile-excepted
UN 3322	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), non-fissile or fissile-excepted
SCO	
UN 2913	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II), non-fissile or fissile-excepted
Type A package	
UN 2915	RADIOACTIVE MATERIAL, TYPE A PACKAGE, non-special form, non-fissile or fissile-excepted
UN 3332	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, non-fissile or fissile-excepted
Type B(U) package	
UN 2916	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, non-fissile or fissile-excepted
Type B(M) package	
UN 2917	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, non-fissile or fissile-excepted
Type C package	
UN 3323	RADIOACTIVE MATERIAL, TYPE C PACKAGE, non-fissile or fissile-excepted
Special arrangement	
UN 2919	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, non-fissile or fissile-excepted

Table 4 Activity limits for excepted packages

Physical state of contents	Instrument or article		Materials
	Item limits	**Package limits**	**Package limits**
Solids:			
Special form	$10^{-2}A_1$	A_1	$10^{-3}A_1$
Other form	$10^{-2}A_2$	A_2	$10^{-3}A_2$
Liquids	$10^{-3}A_2$	$10^{-1}A_2$	$10^{-4}A_2$
Gases:			
Tritium	$2 \times 10^{-2}A_2$	$2 \times 10^{-1}A_2$	$2 \times 10^{-2}A_2$
Special form	$10^{-3}A_1$	$10^{-2}A_1$	$10^{-3}A_1$
Other form	$10^{-3}A_2$	$10^{-2}A_2$	$10^{-3}A_2$

Table 5 Industrial package requirements for LSA material and SCO

Radioactivne contents	Industrial package type	
	Exclusive use	**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

[a] Under the conditions specified in Article 14, LSA-I material and SCO-I may be transported unpackaged

Table 6 Multiplication factors for tanks, freight containers, and unpackaged LSA-I and SCO-I

Size of load[a]	Multiplication factor
size of load ≤ 1 m^2	1
1 m^2 < size of load ≤ 5 m^2	2
5 m^2 < size of load ≤ 20 m^2	3
20 m^2 < size of load	10

[a] Largest cross-sectional area of the load being measured

Table 7 Categories of packages and overpacks

Conditions		Category
Transport index TI	**Maximum radiation level at any point on external surface**	
0[a]	Not more than 0,005 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]

[a] If the measured TI is not greater than 0.05, the value quoted may be zero.
[b] Shall also be transported under exclusive use.

Table 8 UN marking for packages and overpacks

Item	UN marking (according to Table 3)
Package (other than an excepted package)	UN number, preceded by the letters "UN", and the proper shipping name
Excepted package (other than those in consignments accepted for movement by post)	UN number, preceded by the letters "UN"
Overpack (other than an overpack containing only excepted packages)	UN number, preceded by the letters "UN" 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 excepted packages (other than consignments accepted for movement by post)	UN number, preceded by the letters "UN". If more than one UN number is carried within the overpack, then each applicable UN number preceded by the letters "UN"
Consignment accepted for movement by post	The requirement of Article 62

Table 9 Transport index limits for freight containers and conveyances not under exclusive use

Type of freight container or conveyance	Limit on sum of TIs in a freight container or aboard a conveyance
Freight container	50
Vehicle	50
Aircraft: Passenger Cargo	 50 200

ANNEX 2

FIG. 1. Basic trefoil symbol with proportions based on a central circle of radius X. The minimum allowable size of X shall be 4 mm.

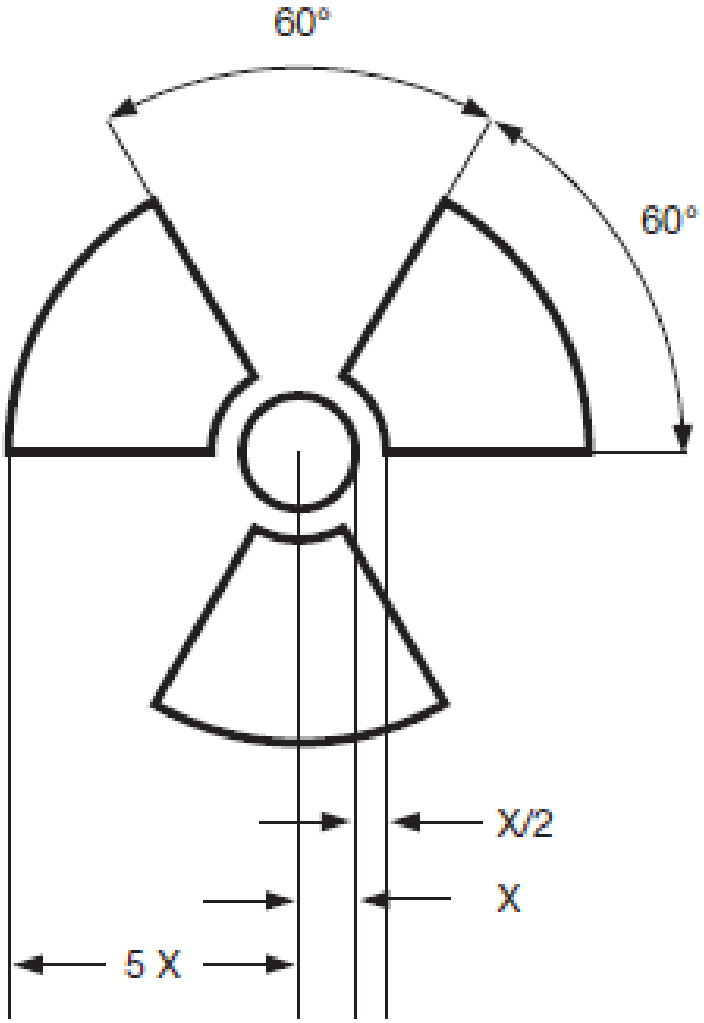

FIG. 2. Category I-WHITE label. The background colour of the label shall be white, the colour of the trefoil and the printing shall be black, and the colour of the category bar shall be red. Minimum dimensions shall be as shown.

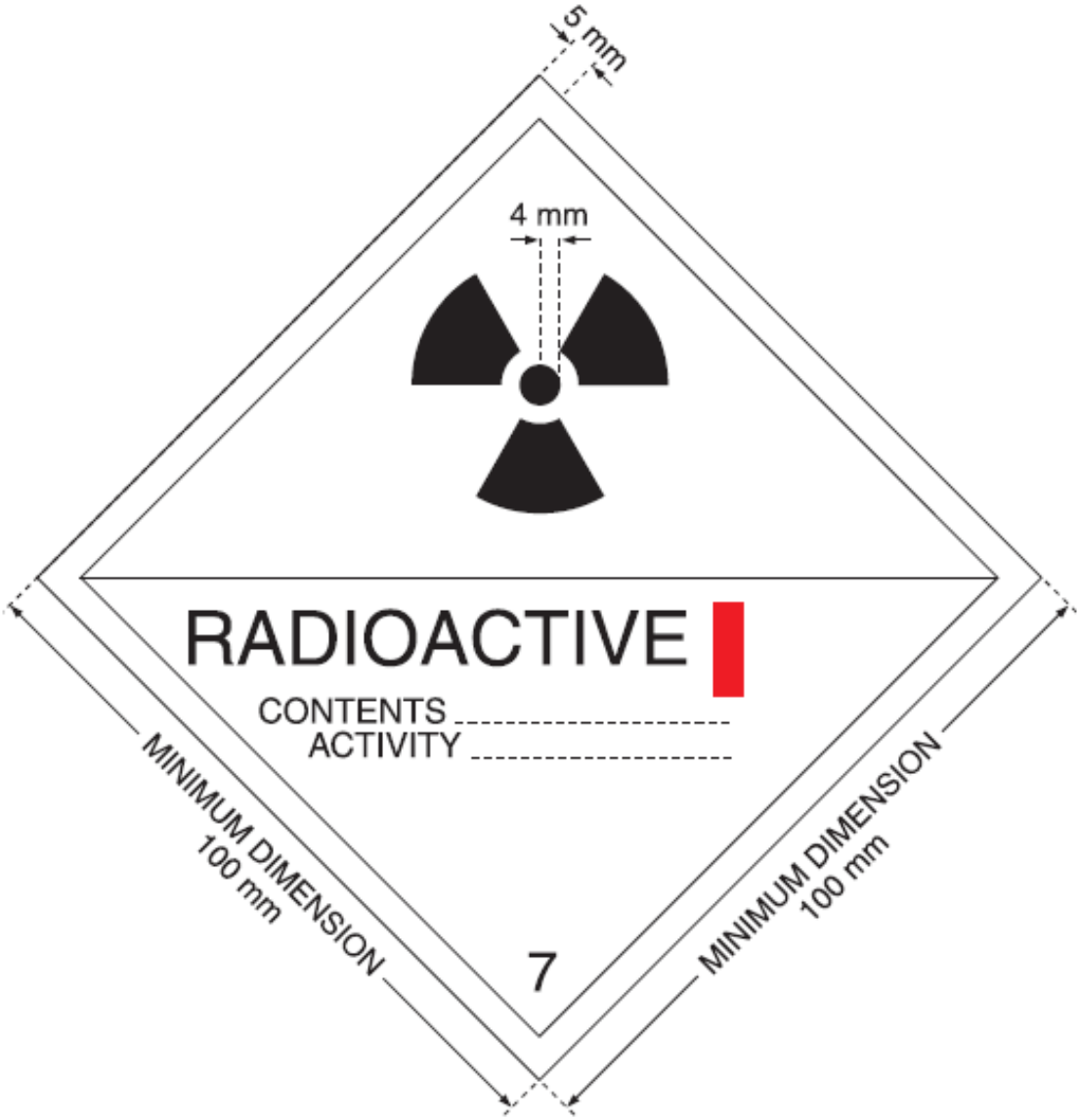

FIG. 3. Category II-YELLOW label. The background colour of the upper half of the label shall be yellow and the lower half white, the colour of the trefoil and the printing shall be black, and the colour of the category bars shall be red. Minimum dimensions shall be as shown.

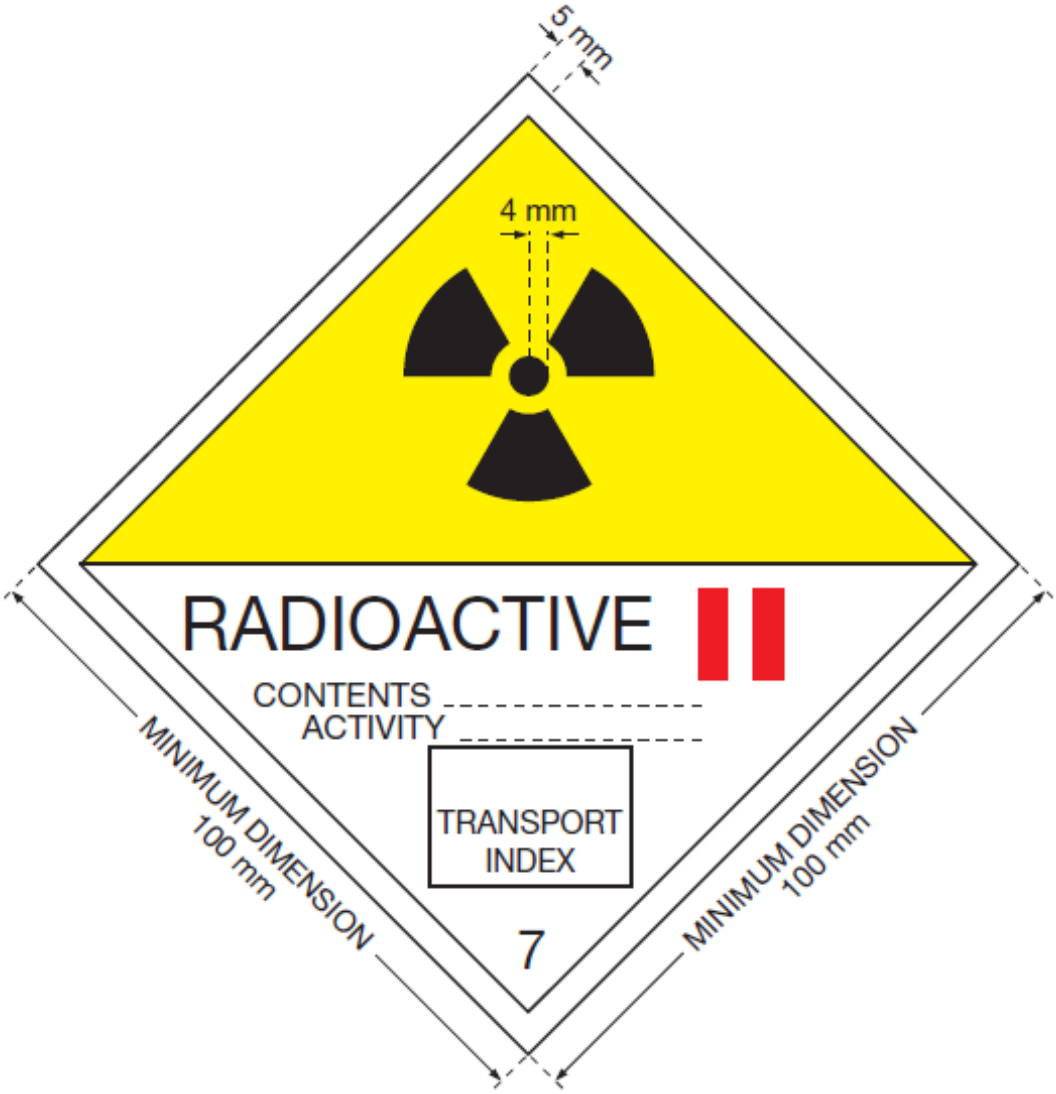

FIG. 4. Category III-YELLOW label. The background colour of the upper half of the label shall be yellow and the lower half white, the colour of the trefoil and the printing shall be black, and the colour of the category bars shall be red. Minimum dimensions shall be as shown.

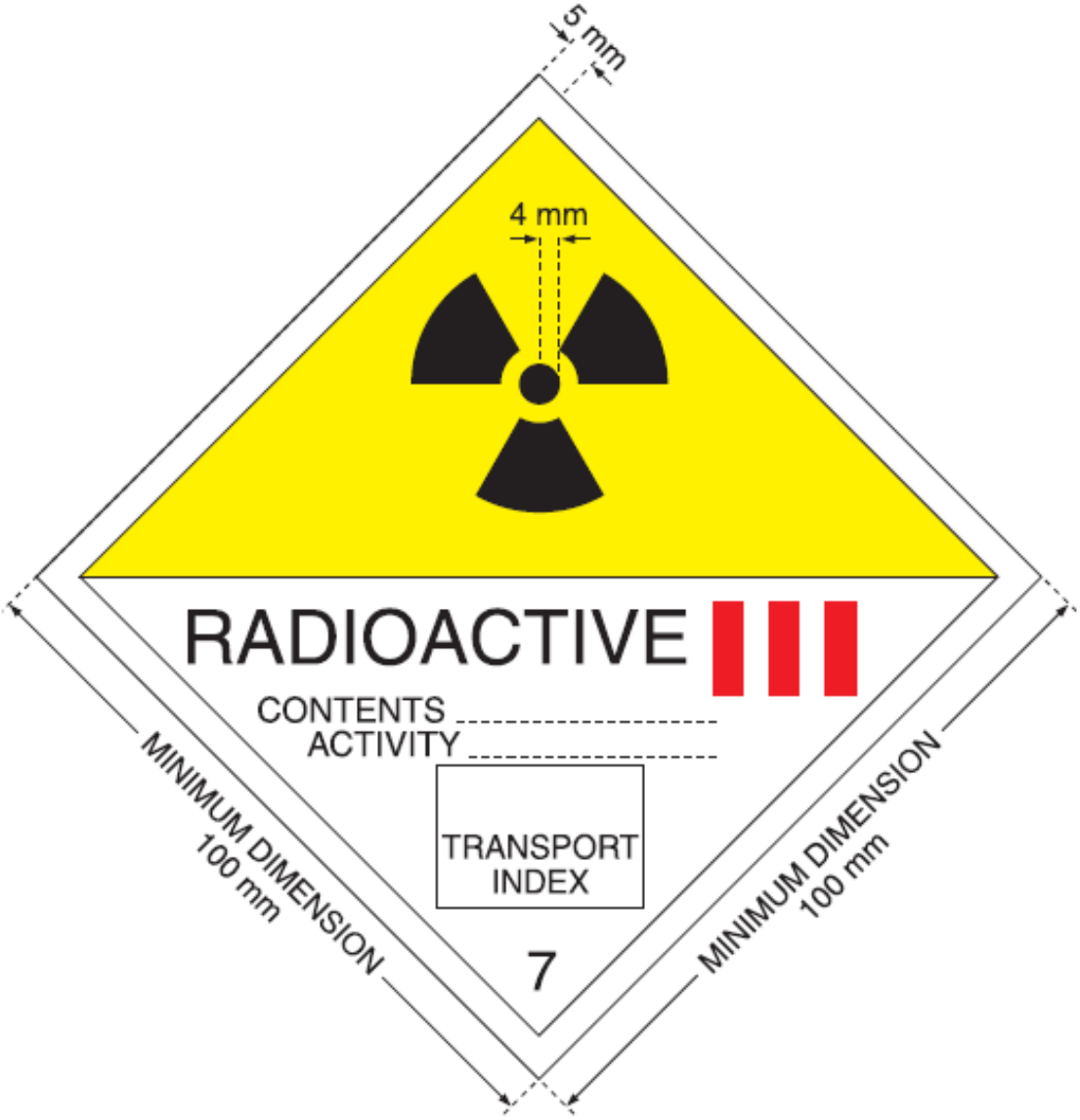

FIG. 5. Placard. Except as permitted by para. (3) Article 57 of this Regulation, minimum dimensions shall be as shown; when different dimensions are used, the relative proportions must be maintained. The number "7" shall not be less than 25 mm high. The background colour of the upper half of the placard shall be yellow and of 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.

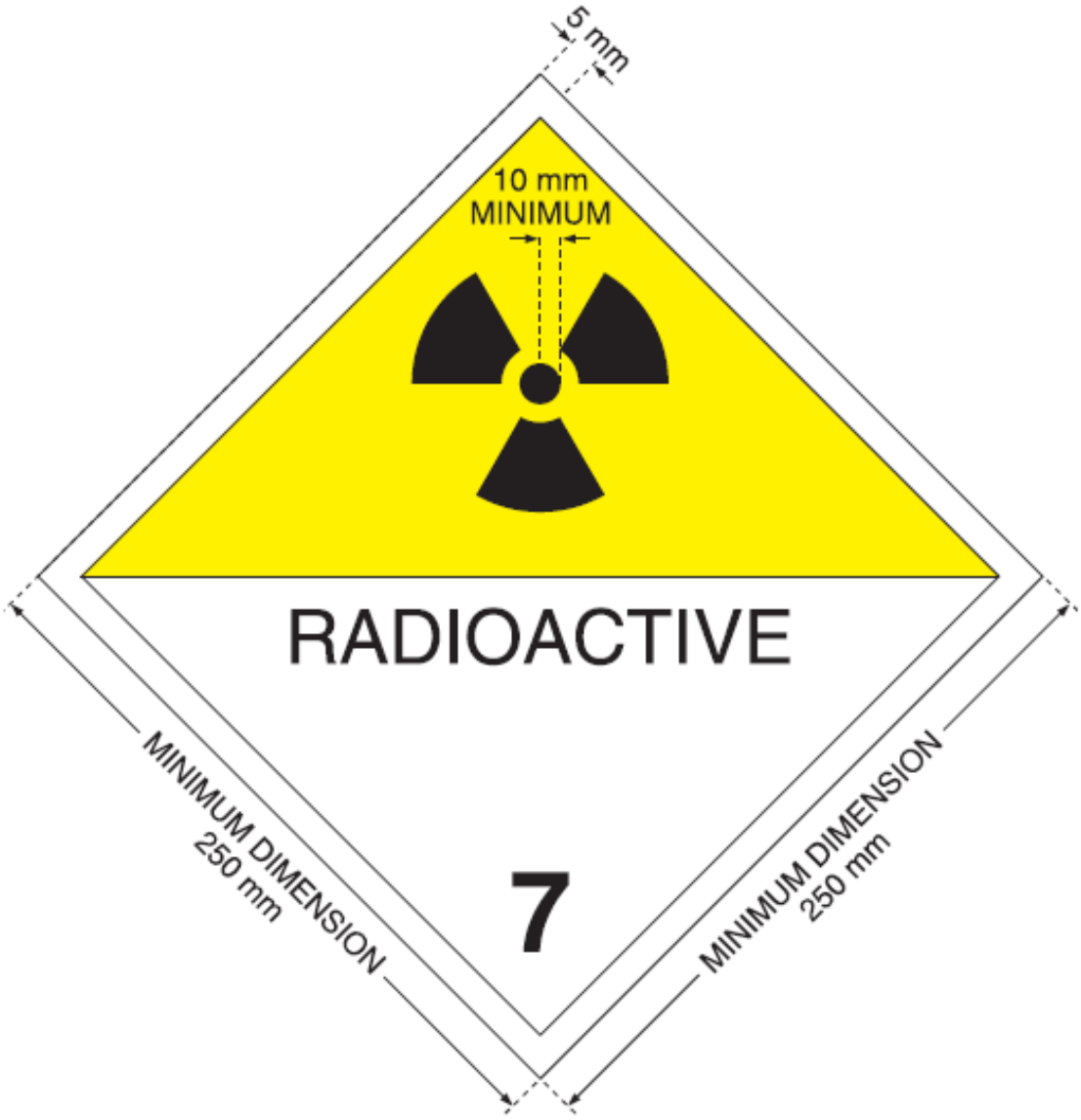

FIG. 6. Placard for separate display of UN number. The background colour of the placard shall be orange and the border and UN number shall be black. The symbol "****" denotes the space in which the appropriate UN number for radioactive material shall be displayed. Minimum dimensions shall be as shown.