TRANSSC 33, INF-02c
Part 1 Section II – Definitions

Section II
DEFINITIONS

The following definitions shall apply for the purposes of this safety guidance document and are aligned with the definitions in the Regulations:

$A_1$ and $A_2$

201. $A_1$ shall mean the activity value of *Special form radioactive material* that is listed in Table 2 or derived in Section IV and is used to determine the activity limits for the requirements of these Regulations. $A_2$ shall mean the activity value of *radioactive material*, other than *Special form radioactive material*, that is listed in Table 2 or derived in Section IV and is used to determine the activity limits for the requirements of these Regulations.

Aircraft

202. Cargo *aircraft* shall mean any *aircraft*, other than a passenger *aircraft*, that is carrying goods or property.

203. Passenger *aircraft* shall mean an *aircraft* that carries any person other than a crew member, a carrier’s employee in an official capacity, an authorized representative of an appropriate national authority, or a person accompanying a *consignment* or other cargo.

Approval

204. *Multilateral approval* shall mean *approval* by the relevant competent authority of the country of origin of the *design* or *shipment*, as applicable, and also, where the *consignment* is to be transported through or into any other country, *approval* by the competent authority of that country.

205. *Unilateral approval* shall mean an *approval* of a *design* that is required to be given by the competent authority of the country of origin of the *design* only.

Carrier

206. *Carrier* shall mean any person, organization or government undertaking the carriage of *radioactive material* by any means of transport. The term includes both *carriers* for hire or reward (known as common or contract *carriers* in some countries) and *carriers* on own account (known as private *carriers* in some countries).

Competent authority

207. *Competent authority* shall mean any body or authority designated or otherwise recognized as such for any purpose in connection with these Regulations.

Compliance assurance

208. *Compliance assurance* shall mean a systematic programme of measures applied by a competent authority that is aimed at ensuring that the provisions of these Regulations are met in practice.

Confinement system

209. *Confinement system* shall mean the assembly of *fissile material* and *packaging* components specified by the *designer* and agreed to by the competent authority as intended to preserve criticality safety.
Consignee

210. Consignee shall mean any person, organization or government that is entitled to take delivery of a consignment.

Consignment

211. Consignment shall mean any package or packages, or load of radioactive material, presented by a consignor for transport.

Consignor

212. Consignor shall mean any person, organization or government that prepares a consignment for transport.

Containment system

213. Containment system shall mean the assembly of components of the packaging specified by the designer as intended to retain the radioactive material during transport.

Contamination

214. Contamination shall mean the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm² for all other alpha emitters.

215. Non-fixed contamination shall mean contamination that can be removed from a surface during routine conditions of transport.

216. Fixed contamination shall mean contamination other than non-fixed contamination.

Conveyance

217. Conveyance shall mean:

(a) For transport by road or rail: any vehicle.
(b) For transport by water: any vessel, or any hold, compartment, or defined deck area of a vessel.
(c) For transport by air: any aircraft.

Criticality safety index

218. Criticality safety index (CSI) assigned to a package, Overpack or freight container containing fissile material shall mean a number that is used to provide control over the accumulation of packages, Overpacks or freight containers containing fissile material.

Defined deck area

219. Defined deck area shall mean the area of the weather deck of a vessel, or of a vehicle deck of a roll-on/roll-off ship or ferry, that is allocated for the stowage of radioactive material.

Design

220. Design shall mean the description of fissile material excepted under para. 417(f), Special form radioactive material, low dispersible radioactive material, package or packaging that enables such an item to be fully identified.
The description may include specifications, engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant documentation.

Dose Equivalent Rate

220 bis. *Dose equivalent rate* shall mean the ambient dose equivalent or the directional dose equivalent, as appropriate, per unit time, measured at the point of interest and expressed in millisieverts per hour or microsieverts per hour.

Exclusive use

221. *Exclusive use* shall mean 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 and *Shipment* are carried out in accordance with the directions of the *consignor* or *consignee*, where so required by these Regulations.

Fissile nuclides and fissile material

222. *Fissile nuclides* shall mean uranium-233, uranium-235, plutonium-239 and plutonium-241. *Fissile material* shall mean a material containing any of the *fissile nuclides*. Excluded from the definition of *fissile material* are the following:

(a) *Natural uranium* or *depleted uranium* that is unirradiated;
(b) *Natural uranium* or *depleted uranium* that has been irradiated in thermal reactors only;
(c) Material with *fissile nuclides* less than a total of 0.25 g;
(d) Any combination of (a), (b) and/or (c).

These exclusions are only valid if there is no other material with *fissile nuclides* in the *package* or in the *consignment* if shipped unpackaged.

Freight container — small, large

223. *Freight container* shall mean an article of transport equipment that is of a permanent character and accordingly strong enough to be suitable for repeated use; specially designed to facilitate the transport of goods, by one or other modes of transport, without intermediate reloading, designed to be secured and/or readily handled, having fittings for these purposes. The term “*freight container*” does not include the *vehicle*.

A *small freight container* shall mean a *freight container* that has an internal volume of not more than 3 m$^3$. A *large freight container* shall mean a *freight container* that has an internal volume of more than 3 m$^3$.

Intermediate bulk container

224. *Intermediate bulk container* (*IBC*) shall mean a portable *packaging* that:

(a) Has a capacity of not more than 3 m$^3$;
(b) Is designed for mechanical handling;
(c) Is resistant to the stresses produced in handling and transport, as determined by tests.

Low dispersible radioactive material

225. *Low dispersible radioactive material* shall mean either a solid *radioactive material* or a solid *radioactive material* in a sealed capsule, that has limited dispersibility and is not in powder form.
Low Specific activity material

226. Low specific activity (LSA) material shall mean radioactive material that by its nature has a limited specific activity, or radioactive material for which limits of estimated average specific activity apply. External shielding materials surrounding the LSA material shall not be considered in determining the estimated average specific activity.

Low toxicity alpha emitters

227. Low toxicity alpha emitters are: natural uranium, depleted uranium, natural thorium, uranium-235, uranium-238, thorium-232, thorium-228 and thorium-230 when contained in ores or physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.

Management system

228. Management system shall mean a set of interrelated or interacting elements (system) for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner.

Maximum normal operating pressure

229. Maximum normal operating pressure shall mean the maximum pressure above atmospheric pressure at mean sea level that would develop in the containment system in a period of one year under the conditions of temperature and solar radiation corresponding to environmental conditions in the absence of venting, external cooling by an ancillary system, or operational controls during transport.

Overpack

230. Overpack shall mean an enclosure used by a single consignor to contain one or more packages and to form one unit for convenience of handling and stowage during transport.

Package

231. Package shall mean the complete product of the packing operation, consisting of the packaging and its contents prepared for transport. The types of package covered by these Regulations that are subject to the activity limits and material restrictions of Section IV and meet the corresponding requirements are:

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

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

Packaging

232. Packaging shall mean one or more receptacles and any other components or materials necessary for the receptacles to perform the containment and other safety functions.
Dose Equivalent Rate [to be moved to 220bis]

233. *Dose equivalent rate* shall mean the ambient dose equivalent or the directional dose equivalent, as appropriate, per unit time, measured at the point of interest and expressed in millisieverts per hour or microsieverts per hour.

Radiation protection programme

234. *Radiation protection programme* shall mean systematic arrangements that are aimed at providing adequate consideration of radiation protection measures.

Radioactive contents

235. *Radioactive contents* shall mean the radioactive material together with any contaminated or activated solids, liquids and gases within the packaging.

Radioactive material

236. *Radioactive material* shall mean any material containing radionuclides where both the activity concentration and the total activity in the consignment exceed the values specified in paras 402–407.

402. The following basic values for individual radionuclides are given in Table 2:

(a) \(A_1\) and \(A_2\) in TBq;

(b) Activity concentration limits for exempt material in Bq/g;

(c) Activity limits for exempt consignments in Bq.

403. For individual radionuclides:

(a) That are not listed in Table 2, the determination of the basic radionuclide values referred to in para. 402 shall require multilateral approval. For these radionuclides, activity concentrations for exempt material and activity limits for exempt consignments shall be calculated in accordance with the principles established in the BSS [2]. It is permissible to use an \(A_2\) value calculated using a dose coefficient for the appropriate lung absorption type, as recommended by the International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of transport are taken into consideration. Alternatively, the radionuclide values in Table 3 [Appendix X] may be used without obtaining competent authority approval.

(b) In instruments or articles in which the radioactive material is enclosed in or is included as a component part of the instrument or other manufactured article and which meets para. 423(e), alternative basic radionuclide values to those in Table 2 for the activity limit for an exempt consignment are permitted and shall require multilateral approval. Such alternative activity limits for an exempt consignment shall be calculated in accordance with the principles set out in the BSS [2].

402. The following basic values for individual radionuclides are given in Table 2:

(a) \(A_1\) and \(A_2\) in TBq;

(b) Activity concentration limits for exempt material in Bq/g;

(c) Activity limits for exempt consignments in Bq
Radioactive material that is enclosed in or is included as a component part of an instrument or other manufactured article, may be classified under UN 2911, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE — INSTRUMENTS or ARTICLES, provided that:

(a) The radiation level dose equivalent rate at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h.

(b) Each instrument or article bears the marking “RADIOACTIVE” on its external surface except for the following:

(i) Radioluminescent timepieces or devices do not require markings.

(ii) Consumer products that have either received regulatory approval in accordance with para. 107(e) or do not individually exceed the activity limit for an exempt consignment in Table 2 (column 5) do not require markings, provided that such products are transported in a package that bears the marking “RADIOACTIVE” on its internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package.

(iii) Other instruments or articles too small to bear the marking “RADIOACTIVE” do not require markings, provided that they are transported in a package that bears the marking “RADIOACTIVE” on its internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package.

(c) The active material is completely enclosed by non-active components (a device performing the sole function of containing radioactive material shall not be considered to be an instrument or manufactured article).

(d) The limits specified in columns 2 and 3 of Table 4 are met for each individual item and each package, respectively.

(e) For transport by post, the total activity in each excepted package shall not exceed one tenth of the relevant limits specified in column 3 of Table 4.

(f) If the package contains fissile material, one of the provisions of para. 417 shall apply.

In the calculations of $A_1$ and $A_2$ for a radionuclide not listed in Table 2, 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 $A_1$ or $A_2$ value to be applied shall be that corresponding to the parent nuclide of that chain. In the case of radioactive decay chains in which any daughter nuclide has a half-life either longer than 10 days or longer than that of the parent nuclide, the parent and such daughter nuclides shall be considered as mixtures of different nuclides.
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**405.** For mixtures of radionuclides, the basic radionuclide values referred to in para. **402** may be determined as follows:

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

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 limit for exempt material or the activity limit for an exempt consignment as appropriate for the radionuclide \( i \).

\( X_m \) is the derived value of \( A_1 \) or \( A_2 \), or the activity concentration limit for exempt material or the activity limit for an exempt consignment in the case of a mixture.

**402.** The following basic values for individual radionuclides are given in Table 2:

(a) \( A_1 \) and \( A_2 \) in TBq;

(b) Activity concentration limits for exempt material in Bq/g;

(c) Activity limits for exempt consignments in Bq.

**406.** 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 and the lowest radionuclide value, as appropriate for the radionuclides in each group, may be used in applying the formulas in paras **405** and **430**. Groups may be based on the total alpha activity and the total beta/gamma activity when these are known, using the lowest radionuclide values for the alpha emitters or beta/gamma emitters, respectively.

**405.** For mixtures of radionuclides, the basic radionuclide values referred to in para. **402** may be determined as follows:

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

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 limit for exempt material or the activity limit for an exempt consignment as appropriate for the radionuclide \( i \).

\( X_m \) is the derived value of \( A_1 \) or \( A_2 \), or the activity concentration limit for exempt material or the activity limit for an exempt consignment in the case of a mixture.

**402.** The following basic values for individual radionuclides are given in Table 2:

(a) \( A_1 \) and \( A_2 \) in TBq;
(b) Activity concentration limits for exempt material in Bq/g;
(c) Activity limits for exempt consignments in Bq

For mixtures of radionuclides whose identities and respective activities are known, the following condition shall apply to the radioactive contents of a Type A package:

$$\sum \frac{B(i)}{A_1(i)} + \sum \frac{C(j)}{A_2(j)}$$

where

- $B(i)$ is the activity of radionuclide $i$ as special form radioactive material;
- $A_1(i)$ is the $A_1$ value for radionuclide $i$;
- $C(j)$ is the activity of radionuclide $j$ as other than special form radioactive material;
- $A_2(j)$ is the $A_2$ value for radionuclide $j$.

For individual radionuclides or for mixtures of radionuclides for which relevant data are not available, the values shown in Table 3 shall be used.

**Shipment**

237. *Shipment* shall mean the specific movement of a consignment from origin to destination.

**Special arrangement**

238. *Special arrangement* shall mean those provisions, approved by the competent authority, under which consignments that do not satisfy all the applicable requirements of these Regulations may be transported.

**Special form radioactive material**

239. *Special form radioactive material* shall mean either an indispersible solid radioactive material or a sealed capsule containing radioactive material.

**Specific activity**

240. *Specific activity* of a radionuclide shall mean 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 essentially uniformly distributed.

**Surface contaminated object**

241. *Surface contaminated object (SCO)* shall mean a solid object that is not itself radioactive but which has radioactive material distributed on its surface.

**Tank**

242. *Tank* shall mean a portable Tank (including a Tank container), a road Tank vehicle, a rail Tank wagon or a receptacle that contains solids, liquids, or gases, having a capacity of not less than 450 L when used for the transport of gases.

**Through or into**
243. Through or into shall mean through or into the countries in which a consignment is transported but specifically excludes countries over which a consignment is carried by air, provided that there are no scheduled stops in those countries.

Transport index

244. Transport index (TI) assigned to a package, overpack or freight container, or to unpackaged LSA-I, SCO-I or SCO-III, shall mean a number that is used to provide control over radiation exposure.

Unirradiated thorium

245. Unirradiated thorium shall mean thorium containing not more than $10^{-7}$ g of uranium-233 per gram of thorium-232.

Unirradiated uranium

246. Unirradiated uranium shall mean uranium containing not more than $2 \times 10^3$ Bq of plutonium per gram of uranium-235, not more than $9 \times 10^6$ Bq of fission products per gram of uranium-235 and not more than $5 \times 10^{-3}$ g of uranium-236 per gram of uranium-235.

Uranium — natural, depleted, enriched

247. Natural uranium shall mean uranium (which may be chemically separated) containing the naturally occurring distribution of uranium isotopes (approximately 99.28% uranium-238 and 0.72% uranium-235, by mass).

Depleted uranium shall mean uranium containing a lesser mass percentage of uranium-235 than natural uranium. Enriched uranium shall mean uranium containing a greater mass percentage of uranium-235 than 0.72%. In all cases, a very small mass percentage of uranium-234 is present.

Vehicle

248. Vehicle shall mean a road vehicle (including an articulated vehicle, i.e. a tractor and semi-trailer combination), railroad car or railway wagon. Each trailer shall be considered as a separate vehicle.

Vessel

249. Vessel shall mean any seagoing vessel or inland waterway craft used for carrying cargo.