

# **UN/SCETDG/40/INF.25/Add.2**

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## **Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals**

**Sub-Committee of Experts on the Transport of Dangerous Goods**

**25 November 2011**

**Fortieth session**

Geneva, 28 November – 7 December 2011

Item 6 of the provisional agenda

**Cooperation with the International Atomic Energy Agency**

## **Regulations for the Safe Transport of Radioactive Material**

### **Transmitted by the International Atomic Energy Agency**

Attached is a table of changes comparing the current version of the IAEA Regulations and the forthcoming version which is still subject to approval by the Board of Governors in March 2012.

# IAEA Regulations for the Safe Transport of Radioactive Material TS-R-1

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**Note:**

1) In the second column: “~~Quality assurance~~” means- deleted paras or words. “[Management system](#)” means inserted paras or words.

2)

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## Section I INTRODUCTION

Section I	Section I	
INTRODUCTION	INTRODUCTION	
BACKGROUND	BACKGROUND	
<p>101. These Regulations establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the transport of <i>radioactive material</i>. These Regulations are based on the Fundamental Safety Principles, Safety Fundamentals No. SF-1 [1], jointly sponsored by the European Atomic Energy Community (EAEC), the Food and Agriculture Organization of the United Nations (FAO), the IAEA, the International Labour Organization (ILO), the International Maritime Organization (IMO), the OECD Nuclear Energy Agency (NEA), the Pan American Health Organization (PAHO), the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) and on the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No. 115 [2], jointly sponsored by the FAO, the IAEA, the ILO, the NEA, the PAHO and the WHO. Thus, compliance with these Regulations is deemed to satisfy the principles of the Basic Safety Standards in respect of transport. In accordance with Ref. [1], the prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risks.</p>	<p>101. These Regulations establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the transport of <i>radioactive material</i>. These Regulations are based on the Fundamental Safety Principles, Safety Fundamentals No. SF-1 [1], jointly sponsored by the European Atomic Energy Community (EAEC), the Food and Agriculture Organization of the United Nations (FAO), the IAEA, the International Labour Organization (ILO), the International Maritime Organization (IMO), the OECD Nuclear Energy Agency (NEA), the Pan American Health Organization (PAHO), the United Nations Environment Programme (UNEP) and the World Health Organization (WHO) and on the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No. 115 [2], jointly sponsored by the FAO, the IAEA, the ILO, the NEA, the PAHO and the WHO. Thus, compliance with these Regulations is deemed to satisfy the principles of the Basic Safety Standards in respect of transport. In accordance with Ref. [1], the prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risks.</p>	
<p>102. This Safety Standard is supplemented by a hierarchy of Safety Guides including Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.1 (Rev. 1) [3]; Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material, IAEA Safety Standards Series No. TS-G-1.2 (ST-3) [4]; Compliance Assurance for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.5 [5]; The Management System for the Safe Transport of Radioactive Material, IAEA Safety Standards Series</p>	<p>102. This Safety Standard is supplemented by a hierarchy of Safety Guides including Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.1 (Rev. 1) [3]; Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material, IAEA Safety Standards Series No. TS-G-1.2 (ST-3) [4]; Compliance Assurance for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.5 [5]; The Management System for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No.</p>	

No. TS-G-1.4 [6]; and Radiation Protection Programmes for the Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.3 [7].	TS-G-1.4 [6]; and Radiation Protection Programmes for the Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.3 [7].	
103. In certain parts of these Regulations, a particular action is prescribed, but the responsibility for carrying out the action is not specifically assigned to any particular legal person. Such responsibility may vary according to the laws and customs of different countries and the international conventions into which these countries have entered. For the purpose of these Regulations, it is not necessary to make this assignment, but only to identify the action itself. It remains the prerogative of each government to assign this responsibility.	103. In certain parts of these Regulations, a particular action is prescribed, but the responsibility for carrying out the action is not specifically assigned to any particular legal person. Such responsibility may vary according to the laws and customs of different countries and the international conventions into which these countries have entered. For the purpose of these Regulations, it is not necessary to make this assignment, but only to identify the action itself. It remains the prerogative of each government to assign this responsibility.	
OBJECTIVE	OBJECTIVE	
<p>104. The objective of these Regulations is to establish requirements that must be satisfied to ensure safety and to protect persons, property and the environment from the effects of radiation in the transport of <i>radioactive material</i>. This protection is achieved by requiring:</p> <p>(a) Containment of the <i>radioactive contents</i>;</p> <p>(b) Control of external <i>radiation levels</i>;</p> <p>(c) Prevention of criticality; and</p> <p>(d) Prevention of damage caused by heat.</p> <p>These requirements are satisfied firstly by applying a graded approach to contents limits for <i>packages</i> and <i>conveyances</i> and to performance standards applied to <i>package designs</i>, depending upon the hazard of the <i>radioactive contents</i>. Secondly, they are satisfied by imposing requirements on the <i>design</i> and operation of <i>packages</i> and on the maintenance of <i>packagings</i>, including consideration of the nature of the <i>radioactive contents</i>. Finally, they are satisfied by requiring administrative controls, including, where appropriate, <i>approval</i> by</p>	<p>104. The objective of these Regulations is to establish requirements that must be satisfied to ensure safety and to protect persons, property and the environment from the effects of radiation in the transport of <i>radioactive material</i>. This protection is achieved by requiring:</p> <p>(a) Containment of the <i>radioactive contents</i>;</p> <p>(b) Control of external <i>radiation levels</i>;</p> <p>(c) Prevention of criticality; <del>and</del></p> <p>(d) Prevention of damage caused by heat.</p> <p>These requirements are satisfied firstly by applying a graded approach to contents limits for <i>packages</i> and <i>conveyances</i> and to performance standards applied to <i>package designs</i>, depending upon the hazard of the <i>radioactive contents</i>. Secondly, they are satisfied by imposing requirements on the <i>design</i> and operation of <i>packages</i> and on the maintenance of <i>packagings</i>, including consideration of the nature of the <i>radioactive contents</i>. Finally, they are satisfied by requiring administrative controls, including, where appropriate, approval by</p>	



<i>competent authorities.</i>	<i>competent authorities.</i>	
105. In the transport of <i>radioactive material</i> the safety of persons and the protection of property and the environment are assured when these Regulations are complied with. Confidence in this regard is achieved through <i>quality assurance</i> and <i>compliance assurance</i> programmes.	105. In the transport of <i>radioactive material</i> , the safety of persons and the protection of property and the environment are assured when these Regulations are complied with. Confidence in this regard is achieved through <del>quality assurance</del> <u>management system</u> and <i>compliance assurance</i> programmes.	
SCOPE	SCOPE	
<p>106. These Regulations apply to the transport of <i>radioactive material</i> by all modes on land, water, or in the air, including transport which is incidental to the use of the <i>radioactive material</i>. Transport comprises all operations and conditions associated with, and involved in, the movement of <i>radioactive material</i>; these include the <i>design</i>, manufacture, maintenance and repair of <i>packaging</i>, and the preparation, consigning, loading, carriage including in-transit storage, unloading and receipt at the final destination of loads of <i>radioactive material</i> and <i>packages</i>. A graded approach is applied in specifying the performance standards in these Regulations which are characterized in terms of three general severity levels:</p> <p>(a) Routine conditions of transport (incident free);</p> <p>(b) Normal conditions of transport (minor mishaps);</p> <p>(c) Accident conditions of transport.</p>	<p>106. These Regulations apply to the transport of <i>radioactive material</i> by all modes on land, water, or in the air, including transport <del>which</del> <u>that</u> is incidental to the use of the <i>radioactive material</i>. Transport comprises all operations and conditions associated with, and involved in, the movement of <i>radioactive material</i>; these include the <i>design</i>, manufacture, maintenance and repair of <i>packaging</i>, and the preparation, consigning, loading, carriage including in-transit storage, unloading and receipt at the final destination of loads of <i>radioactive material</i> and <i>packages</i>. A graded approach is applied in specifying the performance standards in these Regulations, which are characterized in terms of three general severity levels:</p> <p>(a) Routine conditions of transport (incident free);</p> <p>(b) Normal conditions of transport (minor mishaps);</p> <p>(c) Accident conditions of transport.</p>	
<p>107. These Regulations do not apply to:</p> <p>(a) <i>Radioactive material</i> that is an integral part of the means of transport;</p> <p>(b) <i>Radioactive material</i> moved within an establishment which is</p>	<p>107. These Regulations do not apply to <u>any of the following</u>:</p> <p>(a) <i>Radioactive material</i> that is an integral part of the means of transport;</p> <p>(b) <i>Radioactive material</i> moved within an establishment <del>which</del> <u>that</u></p>	

<p>subject to appropriate safety regulations in force in the establishment and where the movement does not involve public roads or railways;</p> <p>(c) <i>Radioactive material</i> implanted or incorporated into a person or live animal for diagnosis or treatment;</p> <p>(d) <i>Radioactive material</i> in consumer products which have received regulatory approval, following their sale to the end user;</p> <p>(e) Natural material and ores containing naturally occurring radionuclides which are either in their natural state, or have only been processed for purposes other than for extraction of the radionuclides, and which are not intended to be processed for use of these radionuclides, provided the activity concentration of the material does not exceed 10 times the values specified in Table 2, or calculated in accordance with paras 403–407;</p> <p>(f) Non-radioactive solid objects with radioactive substances present on any surfaces in quantities not in excess of the levels defined in para. 214.</p>	<p>is subject to appropriate safety regulations in force in the establishment and where the movement does not involve public roads or railways;</p> <p>(c) <i>Radioactive material</i> implanted or incorporated into a person or live animal for diagnosis or treatment;</p> <p><u>(d) <i>Radioactive material in or on a person who is to be transported for medical treatment because the person has been subject to accidental or deliberate intake of radioactive material or to contamination;</i></u></p> <p><u>(e) <i>Radioactive material</i> in consumer products <del>which</del> <u>that</u> have received regulatory approval, following their sale to the end user;</u></p> <p><u>(f) Natural material and ores containing naturally occurring radionuclides, which <del>are either in their natural state, or</del> <u>may</u> have only been processed, for purposes other than for extraction of the radionuclides, and which are not intended to be processed for use of these radionuclides, provided the activity concentration of the material does not exceed 10 times the values specified in Table 2, or calculated in accordance with paras <u>403(a) and 404</u>–407. <u>For natural materials and ores containing naturally occurring radionuclides that are not in secular equilibrium the calculation of the activity concentration shall be subject to performed in accordance with para. 405;</u></u></p> <p><u>(g) Non-radioactive solid objects with radioactive substances present on any surface in quantities not in excess of the levels defined in para. 214.</u></p>	
<p>108. These Regulations do not specify controls such as routing or physical protection which may be instituted for reasons other than radiological safety. Any such controls shall take into account radiological and non-radiological hazards, and shall not detract from the standards of safety which these Regulations are intended to provide.</p>	<p>108. These Regulations do not specify controls such as routing or physical protection <del>which</del> <u>that</u> may be instituted for reasons other than radiological safety. Any such controls shall take into account radiological and non-radiological hazards, and shall not detract from the standards of safety <del>which</del> <u>that</u> these Regulations are intended to provide.</p>	

109. Measures should be taken to ensure that <i>radioactive material</i> is kept secure in transport so as to prevent theft or damage and to ensure that control of the material is not relinquished inappropriately (see Annex I).	109. Measures should be taken to ensure that <i>radioactive material</i> is kept secure in transport so as to prevent theft or damage and to ensure that control of the material is not relinquished inappropriately (see Annex I).	
110. For <i>radioactive material</i> having subsidiary risks, and for transport of <i>radioactive material</i> with other dangerous goods, the relevant transport regulations for dangerous goods shall apply in addition to these Regulations.	110. For <i>radioactive material</i> having subsidiary risks, and for transport of <i>radioactive material</i> with other dangerous goods, the relevant transport regulations for dangerous goods shall apply in addition to these Regulations.	
STRUCTURE	STRUCTURE	
111. This publication is structured so that Section II defines the terms that are required for the purposes of these Regulations; Section III provides general provisions; Section IV provides activity limits and material restrictions used throughout these Regulations; Section V provides requirements and controls for transport; Section VI provides requirements for <i>radioactive material</i> and for <i>packagings</i> and <i>packages</i> ; Section VII provides requirements for test procedures; and Section VIII provides requirements for approvals and administration.	111. This publication is structured so that Section II defines the terms that are required for the purposes of these Regulations; Section III provides general provisions; Section IV provides activity limits and material restrictions used throughout these Regulations; Section V provides requirements and controls for transport; Section VI provides requirements for <i>radioactive material</i> and for <i>packagings</i> and <i>packages</i> ; Section VII provides requirements for test procedures; and Section VIII provides requirements for approvals and administration.	

## Section II DEFINITIONS

Section II	Section II	
DEFINITIONS	DEFINITIONS	
The following definitions shall apply for the purposes of these Regulations:	The following definitions shall apply for the purposes of these Regulations:	
<p><i>A<sub>1</sub> and A<sub>2</sub></i></p> <p>201. <i>A<sub>1</sub></i> shall mean the activity value of <i>special form radioactive material</i> which is listed in Table 2 or derived in Section IV and is used to determine the activity limits for the requirements of these Regulations. <i>A<sub>2</sub></i> shall mean the activity value of <i>radioactive material</i>, other than <i>special form radioactive material</i>, which is listed in Table 2 or derived in Section IV and is used to determine the activity limits for the requirements of these Regulations.</p>	<p><i>A<sub>1</sub> and A<sub>2</sub></i></p> <p>201. <i>A<sub>1</sub></i> shall mean the activity value of <i>special form radioactive material</i> <del>which</del> <a href="#">that</a> is listed in Table 2 or derived in Section IV and is used to determine the activity limits for the requirements of these Regulations. <i>A<sub>2</sub></i> shall mean the activity value of <i>radioactive material</i>, other than <i>special form radioactive material</i>, <del>which</del> <a href="#">that</a> is listed in Table 2 or derived in Section IV and is used to determine the activity limits for the requirements of these Regulations.</p>	
<p><i>Aircraft</i></p> <p>202. <i>Cargo aircraft</i> shall mean any aircraft, other than a <i>passenger aircraft</i>, which is carrying goods or property.</p>	<p><i>Aircraft</i></p> <p>202. <i>Cargo aircraft</i> shall mean any aircraft, other than a <i>passenger aircraft</i>, <del>which</del> <a href="#">that</a> is carrying goods or property.</p>	
<p>203. <i>Passenger aircraft</i> shall mean an aircraft that carries any person other than a crew member, a <i>carrier's</i> employee in an official capacity, an authorized representative of an appropriate national authority, or a person accompanying a <i>consignment</i> or other cargo.</p>	<p>203. <i>Passenger aircraft</i> shall mean an aircraft that carries any person other than a crew member, a <i>carrier's</i> employee in an official capacity, an authorized representative of an appropriate national authority, or a person accompanying a <i>consignment</i> or other cargo.</p>	
<p><i>Approval</i></p> <p>204. <i>Multilateral approval</i> shall mean approval by the relevant <i>competent authority</i> of the country of origin of the <i>design</i> or <i>shipment</i>,</p>	<p><i>Approval</i></p> <p>204. <i>Multilateral approval</i> shall mean approval by the relevant <i>competent authority</i> of the country of origin of the <i>design</i> or <i>shipment</i>,</p>	

as applicable, and also, where the <i>consignment</i> is to be transported <i>through or into</i> any other country, approval by the <i>competent authority</i> of that country.	as applicable, and also, where the <i>consignment</i> is to be transported <i>through or into</i> any other country, approval by the <i>competent authority</i> of that country.	
205. <i>Unilateral approval</i> shall mean an approval of a <i>design</i> which is required to be given by the <i>competent authority</i> of the country of origin of the <i>design</i> only.	205. <i>Unilateral approval</i> shall mean an approval of a <i>design</i> <del>which</del> <a href="#">that</a> is required to be given by the <i>competent authority</i> of the country of origin of the <i>design</i> only.	
<i>Carrier</i> 206. <i>Carrier</i> shall mean any person, organization or government undertaking the carriage of <i>radioactive material</i> by any means of transport. The term includes both <i>carriers</i> for hire or reward (known as common or contract <i>carriers</i> in some countries) and <i>carriers</i> on own account (known as private <i>carriers</i> in some countries).	<i>Carrier</i> 206. <i>Carrier</i> shall mean any person, organization or government undertaking the carriage of <i>radioactive material</i> by any means of transport. The term includes both <i>carriers</i> for hire or reward (known as common or contract <i>carriers</i> in some countries) and <i>carriers</i> on own account (known as private <i>carriers</i> in some countries).	
<i>Competent authority</i> 207. <i>Competent authority</i> shall mean any body or authority designated or otherwise recognized as such for any purpose in connection with these Regulations.	<i>Competent authority</i> 207. <i>Competent authority</i> shall mean any body or authority designated or otherwise recognized as such for any purpose in connection with these Regulations.	
<i>Compliance assurance</i> 208. <i>Compliance assurance</i> shall mean a systematic programme of measures applied by a <i>competent authority</i> which is aimed at ensuring that the provisions of these Regulations are met in practice.	<i>Compliance assurance</i> 208. <i>Compliance assurance</i> shall mean a systematic programme of measures applied by a <i>competent authority</i> <del>which</del> <a href="#">that</a> is aimed at ensuring that the provisions of these Regulations are met in practice.	
<i>Confinement system</i> 209. <i>Confinement system</i> shall mean the assembly of <i>fissile material</i> and <i>packaging</i> components specified by the designer and agreed to by the <i>competent authority</i> as intended to preserve criticality safety.	<i>Confinement system</i> 209. <i>Confinement system</i> shall mean the assembly of <i>fissile material</i> and <i>packaging</i> components specified by the designer and agreed to by the <i>competent authority</i> as intended to preserve criticality safety.	

<p><i>Consignee</i></p> <p>210. <i>Consignee</i> shall mean any person, organization or government which is entitled to take delivery of a <i>consignment</i>.</p>	<p><i>Consignee</i></p> <p>210. <i>Consignee</i> shall mean any person, organization or government <del>which</del> <u>that</u> is entitled to take delivery of a <i>consignment</i>.</p>	
<p><i>Consignment</i></p> <p>211. <i>Consignment</i> shall mean any <i>package</i> or <i>packages</i>, or load of <i>radioactive material</i>, presented by a <i>consignor</i> for transport.</p>	<p><i>Consignment</i></p> <p>211. <i>Consignment</i> shall mean any <i>package</i> or <i>packages</i>, or load of <i>radioactive material</i>, presented by a <i>consignor</i> for transport.</p>	
<p><i>Consignor</i></p> <p>212. <i>Consignor</i> shall mean any person, organization or government which prepares a <i>consignment</i> for transport.</p>	<p><i>Consignor</i></p> <p>212. <i>Consignor</i> shall mean any person, organization or government <del>which</del> <u>that</u> prepares a <i>consignment</i> for transport.</p>	
<p><i>Containment system</i></p> <p>213. <i>Containment system</i> shall mean the assembly of components of the <i>packaging</i> specified by the designer as intended to retain the <i>radioactive material</i> during transport.</p>	<p><i>Containment system</i></p> <p>213. <i>Containment system</i> shall mean the assembly of components of the <i>packaging</i> specified by the designer as intended to retain the <i>radioactive material</i> during transport.</p>	
<p><i>Contamination</i></p> <p>214. <i>Contamination</i> shall mean the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 0.04 Bq/cm<sup>2</sup> for all other alpha emitters.</p>	<p><i>Contamination</i></p> <p>214. <i>Contamination</i> shall mean the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 0.04 Bq/cm<sup>2</sup> for all other alpha emitters.</p>	
<p>215. <i>Non-fixed contamination</i> shall mean <i>contamination</i> that can be removed from a surface during routine conditions of transport.</p>	<p>215. <i>Non-fixed contamination</i> shall mean <i>contamination</i> that can be removed from a surface during routine conditions of transport.</p>	

216. <i>Fixed contamination</i> shall mean <i>contamination</i> other than <i>non-fixed contamination</i> .	216. <i>Fixed contamination</i> shall mean <i>contamination</i> other than <i>non-fixed contamination</i> .	
<p><i>Conveyance</i></p> <p>217. <i>Conveyance</i> shall mean</p> <p>(a) For transport by road or rail: any <i>vehicle</i>,</p> <p>(b) For transport by water: any <i>vessel</i>, or any hold, compartment, or <i>defined deck area</i> of a <i>vessel</i>, and</p> <p>(c) For transport by air: any <i>aircraft</i>.</p>	<p><i>Conveyance</i></p> <p>217. <i>Conveyance</i> shall mean:</p> <p>(a) For transport by road or rail: any <i>vehicle</i>;</p> <p>(b) For transport by water: any <i>vessel</i>, or any hold, compartment, or <i>defined deck area</i> of a <i>vessel</i>; <del>and</del></p> <p>(c) For transport by air: any <i>aircraft</i>.</p>	
<p><i>Criticality safety index</i></p> <p>218. <i>Criticality safety index (CSI)</i> assigned to a <i>package</i>, <i>overpack</i> or <i>freight container</i> containing <i>fissile material</i> shall mean a number which is used to provide control over the accumulation of <i>packages</i>, <i>overpacks</i> or <i>freight containers</i> containing <i>fissile material</i>.</p>	<p><i>Criticality safety index</i></p> <p>218. <i>Criticality safety index (CSI)</i> assigned to a <i>package</i>, <i>overpack</i> or <i>freight container</i> containing <i>fissile material</i> shall mean a number <del>which</del> <u>that</u> is used to provide control over the accumulation of <i>packages</i>, <i>overpacks</i> or <i>freight containers</i> containing <i>fissile material</i>.</p>	
<p><i>Defined deck area</i></p> <p>219. <i>Defined deck area</i> shall mean the area of the weather deck of a <i>vessel</i>, or of a <i>vehicle</i> deck of a roll-on/roll-off ship or ferry, which is allocated for the stowage of <i>radioactive material</i>.</p>	<p><i>Defined deck area</i></p> <p>219. <i>Defined deck area</i> shall mean the area of the weather deck of a <i>vessel</i>, or of a <i>vehicle</i> deck of a roll-on/roll-off ship or ferry, <del>which</del> <u>that</u> is allocated for the stowage of <i>radioactive material</i>.</p>	
<p><i>Design</i></p> <p>220. <i>Design</i> shall mean the description of <i>special form radioactive material</i>, <i>low dispersible radioactive material</i>, <i>package</i> or <i>packaging</i> which enables such an item to be fully identified. The description may include specifications, engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant</p>	<p><i>Design</i></p> <p>220. <i>Design</i> shall mean the description of <u><i>fissile material excepted under para. 417 (f)</i></u>, <i>special form radioactive material</i>, <i>low dispersible radioactive material</i>, <i>package</i> or <i>packaging</i> <del>which</del> <u>that</u> enables such an item to be fully identified. The description may include specifications,</p>	

documentation.	engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant documentation.	
<p><i>Exclusive use</i></p> <p>221. <i>Exclusive use</i> shall mean the sole use, by a single <i>consignor</i>, of a <i>conveyance</i> or of a large <i>freight container</i>, in respect of which all initial, intermediate and final loading and unloading is carried out in accordance with the directions of the <i>consignor</i> or <i>consignee</i>.</p>	<p><i>Exclusive use</i></p> <p>221. <i>Exclusive use</i> shall mean the sole use, by a single <i>consignor</i>, of a <i>conveyance</i> or of a <a href="#">large freight container</a>, in respect of which all initial, intermediate and final loading and unloading <a href="#">and shipment</a> <del>is</del> <a href="#">are</a> carried out in accordance with the directions of the <i>consignor</i> or <i>consignee</i>, <a href="#">where so required by these Regulations</a>.</p>	
<p><i>Fissile nuclides and fissile material</i></p> <p>222. <i>Fissile nuclides</i> shall mean uranium-233, uranium-235, plutonium-239, and plutonium-241. <i>Fissile material</i> shall mean a material containing any of the <i>fissile nuclides</i>. Excluded from the definition of <i>fissile material</i> are:</p> <p>(a) <i>Natural uranium</i> or <i>depleted uranium</i> which is unirradiated; and</p> <p>(b) <i>Natural uranium</i> or <i>depleted uranium</i> which has been irradiated in thermal reactors only.</p>	<p><i>Fissile nuclides and fissile material</i></p> <p>222. <i>Fissile nuclides</i> shall mean uranium-233, uranium-235, plutonium-239 and plutonium-241. <i>Fissile material</i> shall mean a material containing any of the <i>fissile nuclides</i>. Excluded from the definition of <i>fissile material</i> are <a href="#">the following</a>:</p> <p>(a) <i>Natural uranium</i> or <i>depleted uranium</i> <del>which</del> <a href="#">that</a> is unirradiated; <del>and</del></p> <p>(b) <i>Natural uranium</i> or <i>depleted uranium</i> <del>which</del> <a href="#">that</a> has been irradiated in thermal reactors only;</p> <p><a href="#">(c) Material with fissile nuclides less than a total of 0.25g;</a></p> <p><a href="#">(d) Any combination of (a), (b) and/or (c).</a></p> <p><a href="#">These exclusions are only valid if there is no other material with fissile nuclides in the package or in the consignment if shipped unpackaged.</a></p>	



<p><i>Freight container</i></p> <p>223. <i>Freight container</i> shall mean 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 which is 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 <i>freight container</i> is that which has either any overall outer dimension less than 1.5 m, or an internal volume of not more than 3 m<sup>3</sup>. Any other <i>freight container</i> is considered to be a large <i>freight container</i>.</p>	<p><i>Freight container – small, large</i></p> <p>223. <i>Freight container</i> shall mean an article of transport equipment that is <u>of a permanent character and accordingly strong enough to be suitable for repeated use; specially</u> designed to facilitate the transport of goods, <del>either packaged or unpackaged, by one or more other</del> modes of transport, without intermediate reloading, <u>designed to be secured</u> <del>which is of a permanent enclosed character rigid and strong enough for repeated use, and/or readily handled, having fittings for these purposes. The term "freight container" does not include the vehicle</del> must be fitted with devices facilitating its handling, particularly in transfer between conveyances and from one mode of transport to another.</p> <p>A <u>small freight container</u> <del>is</del> <u>shall mean a freight container</u> that <del>which</del> has either any overall outer dimension less than 1.5 m, or an internal volume of not more than 3 m<sup>3</sup>. <del>Any larger other freight container is considered to be a</del> <u>A large freight container shall mean a freight container that has an internal volume of more than 3 m<sup>3</sup>.</u></p>	
<p><i>Intermediate bulk container</i></p> <p>224. <i>Intermediate bulk container (IBC)</i> shall mean a portable packaging that:</p> <ul style="list-style-type: none"> <li>(a) Has a capacity of not more than 3 m<sup>3</sup>;</li> <li>(b) Is designed for mechanical handling; and</li> <li>(c) Is resistant to the stresses produced in handling and transport, as determined by tests.</li> </ul>	<p><i>Intermediate bulk container</i></p> <p>224. <i>Intermediate bulk container (IBC)</i> shall mean a portable packaging that:</p> <ul style="list-style-type: none"> <li>(a) Has a capacity of not more than 3 m<sup>3</sup>;</li> <li>(b) Is designed for mechanical handling; <del>and</del></li> <li>(c) Is resistant to the stresses produced in handling and transport, as determined by tests.</li> </ul>	
<p><i>Low dispersible radioactive material</i></p> <p>225. <i>Low dispersible radioactive material</i> shall mean either a solid <i>radioactive material</i> or a solid <i>radioactive material</i> in a sealed capsule, that has limited dispersibility and is not in powder form.</p>	<p><i>Low dispersible radioactive material</i></p> <p>225. <i>Low dispersible radioactive material</i> shall mean either a solid <i>radioactive material</i> or a solid <i>radioactive material</i> in a sealed capsule, that has limited dispersibility and is not in powder form.</p>	

<p><i>Low specific activity material</i></p> <p>226. <i>Low specific activity (LSA) material</i> shall mean <i>radioactive material</i> which by its nature has a limited <i>specific activity</i>, or <i>radioactive material</i> for which limits of estimated average <i>specific activity</i> apply. External shielding materials surrounding the <i>LSA material</i> shall not be considered in determining the estimated average <i>specific activity</i>.</p>	<p><i>Low specific activity material</i></p> <p>226. <i>Low specific activity (LSA) material</i> shall mean <i>radioactive material</i> <del>which</del> <u>that</u> by its nature has a limited <i>specific activity</i>, or <i>radioactive material</i> for which limits of estimated average <i>specific activity</i> apply. External shielding materials surrounding the <i>LSA material</i> shall not be considered in determining the estimated average <i>specific activity</i>.</p>	
<p><i>Low toxicity alpha emitters</i></p> <p>227. <i>Low toxicity alpha emitters</i> are: natural uranium, depleted uranium, natural thorium, uranium-235 or 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.</p>	<p><i>Low toxicity alpha emitters</i></p> <p>227. <i>Low toxicity alpha emitters</i> are: <i>natural uranium, depleted uranium, natural thorium, uranium-235 or uranium-238, thorium-232, thorium-228 and thorium-230</i> when contained in ores or physical and chemical concentrates; or alpha emitters with a half-life of less than 10 days.</p>	
	<p><u><i>Management system</i></u></p> <p><u>228. <i>Management system</i> 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.</u></p>	<p>Replace para. 232 “Quality assurance”</p>
<p><i>Maximum normal operating pressure</i></p> <p>228. <i>Maximum normal operating pressure</i> shall mean the maximum pressure above atmospheric pressure at mean sea level that would develop in the <i>containment system</i> 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.</p>	<p><i>Maximum normal operating pressure</i></p> <p><del>228</del> <u>229.</u> <i>Maximum normal operating pressure</i> shall mean the maximum pressure above atmospheric pressure at mean sea level that would develop in the <i>containment system</i> 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.</p>	

<p><i>Overpack</i></p> <p>229. <i>Overpack</i> shall mean an enclosure used by a single <i>consignor</i> to contain one or more <i>packages</i> and to form one unit for convenience of handling and stowage during transport.</p>	<p><i>Overpack</i></p> <p><del>229</del> 230. <i>Overpack</i> shall mean an enclosure used by a single <i>consignor</i> to contain one or more <i>packages</i> and to form one unit for convenience of handling and stowage during transport.</p>	
<p><i>Package</i></p> <p>230. <i>Package</i> shall mean the complete product of the packing operation, consisting of the <i>packaging</i> and its contents prepared for transport. The types of <i>package</i> covered by these Regulations, which are subject to the activity limits and material restrictions of Section IV and meet the corresponding requirements, are:</p> <ul style="list-style-type: none"> <li>(a) <i>Excepted package</i>;</li> <li>(b) <i>Industrial package Type 1 (Type IP-1)</i>;</li> <li>(c) <i>Industrial package Type 2 (Type IP-2)</i>;</li> <li>(d) <i>Industrial package Type 3 (Type IP-3)</i>;</li> <li>(e) <i>Type A package</i>;</li> <li>(f) <i>Type B(U) package</i>;</li> <li>(g) <i>Type B(M) package</i>;</li> <li>(h) <i>Type C package</i>.</li> </ul> <p><i>Packages</i> containing <i>fissile material</i> or uranium hexafluoride are subject to additional requirements.</p>	<p><i>Package</i></p> <p><del>230</del> 231. <i>Package</i> shall mean the complete product of the packing operation, consisting of the <i>packaging</i> and its contents prepared for transport. The types of <i>package</i> covered by these Regulations, <del>which</del> <u>that</u> are subject to the activity limits and material restrictions of Section IV and meet the corresponding requirements, are:</p> <ul style="list-style-type: none"> <li>(a) <i>Excepted package</i>;</li> <li>(b) <i>Industrial package Type 1 (Type IP-1)</i>;</li> <li>(c) <i>Industrial package Type 2 (Type IP-2)</i>;</li> <li>(d) <i>Industrial package Type 3 (Type IP-3)</i>;</li> <li>(e) <i>Type A package</i>;</li> <li>(f) <i>Type B(U) package</i>;</li> <li>(g) <i>Type B(M) package</i>;</li> <li>(h) <i>Type C package</i>.</li> </ul> <p><i>Packages</i> containing <i>fissile material</i> or uranium hexafluoride are subject to additional requirements.</p>	
<p><i>Packaging</i></p> <p>231. <i>Packaging</i> shall mean one or more receptacles and any other</p>	<p><i>Packaging</i></p>	

components or materials necessary for the receptacles to perform the containment and other safety functions.	<del>231</del> <u>232</u> . <i>Packaging</i> shall mean one or more receptacles and any other components or materials necessary for the receptacles to perform the containment and other safety functions.	
<i>Quality assurance</i> 232. <i>Quality assurance</i> shall mean a systematic programme of controls and inspections applied by any organization or body which is aimed at providing adequate confidence that the standard of safety prescribed in these Regulations is achieved in practice.	<del><i>Quality assurance</i></del> <del>232. <i>Quality assurance</i> a systematic programme of controls and inspections applied by any organization or body which is aimed at providing adequate confidence that the standard of safety prescribed in these Regulations is achieved in practice.</del>	See para. 228 “management system”
<i>Radiation level</i> 233. <i>Radiation level</i> shall mean the corresponding dose rate expressed in millisieverts per hour.	<i>Radiation level</i> 233. <i>Radiation level</i> shall mean the corresponding dose rate expressed in millisieverts per hour <u>or microsieverts per hour</u> .	
<i>Radiation protection programme</i> 234. <i>Radiation protection programme</i> shall mean systematic arrangements which are aimed at providing adequate consideration of radiation protection measures.	<i>Radiation protection programme</i> 234. <i>Radiation protection programme</i> shall mean systematic arrangements <del>which</del> <u>that</u> are aimed at providing adequate consideration of radiation protection measures.	
<i>Radioactive contents</i> 235. <i>Radioactive contents</i> shall mean the <i>radioactive material</i> together with any contaminated or activated solids, liquids and gases within the <i>packaging</i> .	<i>Radioactive contents</i> 235. <i>Radioactive contents</i> shall mean the <i>radioactive material</i> together with any contaminated or activated solids, liquids and gases within the <i>packaging</i> .	
<i>Radioactive material</i> 236. <i>Radioactive material</i> shall mean any material containing radionuclides where both the activity concentration and the total activity in the <i>consignment</i> exceed the values specified in paras 402–407.	<i>Radioactive material</i> 236. <i>Radioactive material</i> shall mean any material containing radionuclides where both the activity concentration and the total activity	

	in the <i>consignment</i> exceed the values specified in paras 402–407.	
<p><i>Shipment</i></p> <p>237. <i>Shipment</i> shall mean the specific movement of a <i>consignment</i> from origin to destination.</p>	<p><i>Shipment</i></p> <p>237. <i>Shipment</i> shall mean the specific movement of a <i>consignment</i> from origin to destination.</p>	
<p><i>Special arrangement</i></p> <p>238. <i>Special arrangement</i> shall mean those provisions, approved by the <i>competent authority</i>, under which <i>consignments</i> which do not satisfy all the applicable requirements of these Regulations may be transported.</p>	<p><i>Special arrangement</i></p> <p>238. <i>Special arrangement</i> shall mean those provisions, approved by the <i>competent authority</i>, under which <i>consignments</i> <del>which</del> <u>that</u> do not satisfy all the applicable requirements of these Regulations may be transported.</p>	
<p><i>Special form radioactive material</i></p> <p>239. <i>Special form radioactive material</i> shall mean either an indispersible solid <i>radioactive material</i> or a sealed capsule containing <i>radioactive material</i>.</p>	<p><i>Special form radioactive material</i></p> <p>239. <i>Special form radioactive material</i> shall mean either an indispersible solid <i>radioactive material</i> or a sealed capsule containing <i>radioactive material</i>.</p>	
<p><i>Specific activity</i></p> <p>240. <i>Specific activity</i> of a radionuclide shall mean the activity per unit mass of that nuclide. The <i>specific activity</i> of a material shall mean the activity per unit mass of the material in which the radionuclides are essentially uniformly distributed.</p>	<p><i>Specific activity</i></p> <p>240. <i>Specific activity</i> of a radionuclide shall mean the activity per unit mass of that nuclide. The <i>specific activity</i> of a material shall mean the activity per unit mass of the material in which the radionuclides are essentially uniformly distributed.</p>	
<p><i>Surface contaminated object</i></p> <p>241. <i>Surface contaminated object (SCO)</i> shall mean a solid object which is not itself radioactive but which has <i>radioactive material</i> distributed on its surfaces.</p>	<p><i>Surface contaminated object</i></p> <p>241. <i>Surface contaminated object (SCO)</i> shall mean a solid object <del>which</del> <u>that</u> is not itself radioactive but which has <i>radioactive material</i> distributed on its surfaces.</p>	

<p><i>Tank</i></p> <p>242. <i>Tank</i> shall mean a portable tank (including a tank container), a road tank <i>vehicle</i>, a rail tank wagon or a receptacle that contains solids, liquids, or gases, having-a capacity of not less than 450 litres when used for the transport of gases.</p>	<p><i>Tank</i></p> <p>242. <i>Tank</i> shall mean a portable tank (including a tank container), a road tank <i>vehicle</i>, a rail tank wagon or a receptacle that contains solids, liquids, or gases, having a capacity of not less than 450 <u>L</u> <del>litres</del> when used for the transport of gases.</p>	
<p><i>Through or into</i></p> <p>243. <i>Through or into</i> shall mean through or into the countries in which a <i>consignment</i> is transported but specifically excludes countries over which a <i>consignment</i> is carried by air, provided that there are no scheduled stops in those countries.</p>	<p><i>Through or into</i></p> <p>243. <i>Through or into</i> shall mean through or into the countries in which a <i>consignment</i> is transported but specifically excludes countries over which a <i>consignment</i> is carried by air, provided that there are no scheduled stops in those countries.</p>	
<p><i>Transport index</i></p> <p>244. <i>Transport index (TI)</i> assigned to a <i>package</i>, <i>overpack</i> or <i>freight container</i>, or to unpackaged <i>LSA-I</i> or <i>SCO-I</i>, shall mean a number which is used to provide control over radiation exposure.</p>	<p><i>Transport index</i></p> <p>244. <i>Transport index (TI)</i> assigned to a <i>package</i>, <i>overpack</i> or <i>freight container</i>, or to unpackaged <i>LSA-I</i> or <i>SCO-I</i>, shall mean a number <del>which</del> <u>that</u> is used to provide control over radiation exposure.</p>	
<p><i>Unirradiated thorium</i></p> <p>245. <i>Unirradiated thorium</i> shall mean thorium containing not more than <math>10^{-7}</math> g of uranium-233 per gram of thorium-232.</p>	<p><i>Unirradiated thorium</i></p> <p>245. <i>Unirradiated thorium</i> shall mean thorium containing not more than <math>10^{-7}</math> g of uranium-233 per gram of thorium-232.</p>	
<p><i>Unirradiated uranium</i></p> <p>246. <i>Unirradiated uranium</i> shall mean uranium containing not more than <math>2 \times 10^3</math> Bq of plutonium per gram of uranium-235, not more than <math>9 \times 10^6</math> Bq of fission products per gram of uranium-235 and not more than <math>5 \times 10^{-3}</math> g of uranium-236 per gram of uranium-235.</p>	<p><i>Unirradiated uranium</i></p> <p>246. <i>Unirradiated uranium</i> shall mean uranium containing not more than <math>2 \times 10^3</math> Bq of plutonium per gram of uranium-235, not more than <math>9 \times 10^6</math> Bq of fission products per gram of uranium-235 and not more than <math>5 \times 10^{-3}</math> g of uranium-236 per gram of uranium-235.</p>	

<p><i>Uranium — natural, depleted, enriched</i></p> <p>247. <i>Natural uranium</i> shall mean uranium (which may be chemically separated) having 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. <i>Enriched uranium</i> 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.</p>	<p><i>Uranium — natural, depleted, enriched</i></p> <p>247. <i>Natural uranium</i> shall mean uranium (which may be chemically separated) <del>having</del> <u>containing</u> 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. <i>Enriched uranium</i> 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.</p>	
<p><i>Vehicle</i></p> <p>248. <i>Vehicle</i> shall mean a road <i>vehicle</i> (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 <i>vehicle</i>.</p>	<p><i>Vehicle</i></p> <p>248. <i>Vehicle</i> 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 <i>vehicle</i>.</p>	
<p><i>Vessel</i></p> <p>249. <i>Vessel</i> shall mean any seagoing <i>vessel</i> or inland waterway craft used for carrying cargo.</p>	<p><i>Vessel</i></p> <p>249. <i>Vessel</i> shall mean any seagoing vessel or inland waterway craft used for carrying cargo.</p>	

## Section III GENERAL PROVISIONS

2009 EDITION	20xx draft 2.51	Remarks
<b>Section III</b>	<b>Section III</b>	
<b>GENERAL PROVISIONS</b>	<b>GENERAL PROVISIONS</b>	
<b>RADIATION PROTECTION</b>	<b>RADIATION PROTECTION</b>	
301. Doses to persons shall be below the relevant dose limits. Protection and safety shall be optimized in order that the magnitude of individual doses, the number of persons exposed, and the likelihood of incurring exposure shall be kept as low as reasonably achievable, economic and social factors being taken into account, within the restriction that the doses to individuals be subject to dose constraints. A structured and systematic approach shall be adopted and shall include consideration of the interfaces between transport and other activities.	301. Doses to persons shall be below the relevant dose limits. Protection and safety shall be optimized in order that the magnitude of individual doses, the number of persons exposed, and the likelihood of incurring exposure shall be kept as low as reasonably achievable, economic and social factors being taken into account, within the restriction that the doses to individuals <del>be</del> <a href="#">are</a> subject to dose constraints. A structured and systematic approach shall be adopted and shall include consideration of the interfaces between transport and other activities.	
302. A <i>radiation protection programme</i> shall be established for the transport of <i>radioactive material</i> . The nature and extent of the measures to be employed in the programme shall be related to the magnitude and likelihood of radiation exposures. The programme shall incorporate the requirements of paras 301, 303-305, 311 and 559. Programme documents shall be available, on request, for inspection by the relevant <i>competent authority</i> .	302. A <i>radiation protection programme</i> shall be established for the transport of <i>radioactive material</i> . The nature and extent of the measures to be employed in the programme shall be related to the magnitude and likelihood of radiation exposures. The programme shall incorporate the requirements of paras 301, 303-305, 311 and <del>559</del> <a href="#">562</a> . Programme documents shall be available, on request, for inspection by the relevant <i>competent authority</i> .	
303. For occupational exposures arising from transport activities, where it is assessed that the effective dose:  (a) Is likely to be between 1 and 6 mSv in a year, a dose assessment programme via workplace monitoring or individual monitoring shall be conducted; or  (b) Is likely to exceed 6 mSv in a year, individual monitoring shall be conducted.	303. For occupational exposures arising from transport activities, where it is assessed that the effective dose <a href="#">either</a> :  (a) Is likely to be between 1 and 6 mSv in a year, a dose assessment programme via workplace monitoring or individual monitoring shall be conducted; or  (b) Is likely to exceed 6 mSv in a year, individual monitoring shall be	



When individual monitoring or workplace monitoring is conducted, appropriate records shall be kept.	conducted.  When individual monitoring or workplace monitoring is conducted, appropriate records shall be kept.	
EMERGENCY RESPONSE	EMERGENCY RESPONSE	
304. In the event of accidents or incidents during the transport of <i>radioactive material</i> , emergency provisions, as established by relevant national and/or international organizations, shall be observed to protect persons, property and the environment. Appropriate guidelines for such provisions are contained in Ref. [4].	304. In the event of accidents or incidents during the transport of <i>radioactive material</i> , emergency provisions, as established by relevant national and/or international organizations, shall be observed to protect persons, property and the environment. Appropriate guidelines for such provisions are contained in Ref. [4].	
305. Emergency procedures shall take into account the formation of other dangerous substances that may result from the reaction between the contents of a <i>consignment</i> and the environment in the event of an accident.	305. Emergency procedures shall take into account the formation of other dangerous substances that may result from the reaction between the contents of a <i>consignment</i> and the environment in the event of an accident.	
QUALITY ASSURANCE	<del>QUALITY ASSURANCE</del> <u>MANAGEMENT SYSTEM</u>	
306. <i>Quality assurance</i> programmes based on international, national or other standards acceptable to the <i>competent authority</i> shall be established and implemented for the <i>design</i> , manufacture, testing, documentation, use, maintenance and inspection of all <i>special form radioactive material</i> , <i>low dispersible radioactive material</i> and <i>packages</i> and for transport and in-transit storage operations to ensure compliance with the relevant provisions of these Regulations. Certification that the <i>design</i> specification has been fully implemented shall be available to the <i>competent authority</i> . The manufacturer, <i>consignor</i> or user shall be prepared to provide facilities for <i>competent authority</i> inspection during manufacture and use and to demonstrate to any cognizant <i>competent authority</i> that:  (a) The manufacturing methods and materials used are in accordance	306. <del>Quality assurance programmes</del> <u>A management system</u> based on international, national or other standards acceptable to the <i>competent authority</i> shall be established and implemented for <u>all activities within the scope of the Regulations, as identified in para. 106.</u> <del>for the design, manufacture, testing, documentation, use, maintenance and inspection of all special form radioactive material, low dispersible radioactive material, and packages and for transport and in-transit storage operations</del> to ensure compliance with the relevant provisions of these Regulations. Certification that the <i>design</i> specification has been fully implemented shall be available to the <i>competent authority</i> . The manufacturer, <i>consignor</i> or user shall be prepared <del>to provide facilities for competent authority inspection during manufacture and use and to demonstrate to any cognizant competent authority that:</del>	

<p>with the approved <i>design</i> specifications; and</p> <p>(b) All <i>packagings</i> are periodically inspected and, as necessary, repaired and maintained in good condition so that they continue to comply with all relevant requirements and specifications, even after repeated use.</p> <p>Where <i>competent authority approval</i> is required, such <i>approval</i> shall take into account and be contingent upon the adequacy of the <i>quality assurance programme</i>.</p>	<p><u>(a) To provide facilities for inspection during manufacture and use;</u></p> <p><u>(b) To demonstrate compliance with these Regulations to the <i>competent authority</i>.</u></p> <p><del>(a) The manufacturing methods and materials used are in accordance with the approved <i>design</i> specifications.; and</del></p> <p><del>(b) All <i>packagings</i> are periodically inspected and, as necessary, repaired and maintained in good condition so that they continue to comply with all relevant requirements and specifications, even after repeated use.</del></p> <p>Where <i>competent authority approval</i> is required, such approval shall take into account and be contingent upon the adequacy of the <del><i>quality assurance programme</i></del> <u><i>management system</i></u>.</p>	
COMPLIANCE ASSURANCE	COMPLIANCE ASSURANCE	
<p>307. The <i>competent authority</i> is responsible for assuring compliance with these Regulations. Means to discharge this responsibility include the establishment and execution of a programme for monitoring the <i>design</i>, manufacture, testing, inspection and maintenance of <i>packaging</i>, <i>special form radioactive material</i> and <i>low dispersible radioactive material</i>, and the preparation, documentation, handling and stowage of <i>packages</i> by <i>consignors</i> and <i>carriers</i>, to provide evidence that the provisions of these Regulations are being met in practice.</p>	<p>307. The <i>competent authority</i> <del>is responsible for</del> <u>shall assure</u>ing compliance with these Regulations. <del>Means to discharge this responsibility include the establishment and execution of a programme for monitoring the design, manufacture, testing, inspection and maintenance of packaging, special form radioactive material and low dispersible radioactive material, and the preparation, documentation, handling and stowage of packages by consignors and carriers, to provide evidence that the provisions of these Regulations are being met in practice.</del></p>	
<p>308. The relevant <i>competent authority</i> shall arrange for periodic assessments of the radiation doses to persons due to the transport of <i>radioactive material</i>, to ensure that the system of protection and safety complies with the Basic Safety Standards [2].</p>	<p>308. The relevant <i>competent authority</i> shall arrange for periodic assessments of the radiation doses to persons due to the transport of <i>radioactive material</i>, to ensure that the system of protection and safety complies with the Basic Safety Standards [2].</p>	
NON-COMPLIANCE	NON-COMPLIANCE	

<p>309. In the event of non-compliance with any limit in these Regulations applicable to <i>radiation level</i> or <i>contamination</i>:</p> <p>(a) the <i>consignor</i> shall be informed of the non-compliance by:</p> <ul style="list-style-type: none"> <li>(i) the <i>carrier</i> if the non-compliance is identified during transport; or</li> <li>(ii) the <i>consignee</i> if the non-compliance is identified at receipt;</li> </ul> <p>(b) the <i>carrier, consignor</i> or <i>consignee</i>, as appropriate, shall:</p> <ul style="list-style-type: none"> <li>(i) take immediate steps to mitigate the consequences of the non-compliance;</li> <li>(ii) investigate the non-compliance and its causes, circumstances and consequences;</li> <li>(iii) take appropriate action to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of circumstances similar to those that led to the non-compliance; and</li> <li>(iv) communicate to the relevant <i>competent authority(ies)</i> on the causes of the non-compliance and on corrective or preventive actions taken or to be taken; and</li> </ul> <p>(c) the communication of the non-compliance to the <i>consignor</i> and the relevant <i>competent authority(ies)</i>, respectively, shall be made as soon as practicable and it shall be immediate whenever an emergency exposure situation has developed or is developing.</p>	<p>309. In the event of non-compliance with any limit in these Regulations applicable to <i>radiation level</i> or <i>contamination</i>:</p> <p>(a) <u>The <i>consignor, consignee, carrier and any organization involved during transport, who may be affected, as appropriate</i>, shall be informed of the non-compliance by:</u></p> <ul style="list-style-type: none"> <li>(i) <u>The <i>carrier</i></u> if the non-compliance is identified during transport; or</li> <li>(ii) <u>The <i>consignee</i></u> if the non-compliance is identified at receipt.</li> </ul> <p>(b) <u>The <i>carrier, consignor</i> or <i>consignee</i>, as appropriate, shall:</u></p> <ul style="list-style-type: none"> <li>(i) <u>Take immediate steps to mitigate the consequences of the non-compliance;</u></li> <li>(ii) <u>Investigate the non-compliance and its causes, circumstances and consequences;</u></li> <li>(iii) <u>Take appropriate action to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of circumstances similar to those that led to the non-compliance; and</u></li> <li>(iv) <u>Communicate to the relevant <i>competent authority(ies)</i> on the causes of the non-compliance and on corrective or preventive actions taken or to be taken; and</u></li> </ul> <p>(c) <u>The communication of the non-compliance to the <i>consignor</i> and the relevant <i>competent authority(ies)</i>, respectively, shall be made as soon as practicable and it shall be immediate whenever an emergency exposure situation has developed or is developing.</u></p>	
SPECIAL ARRANGEMENT	SPECIAL ARRANGEMENT	
<p>310. <i>Consignments</i> for which conformity with the other provisions of these Regulations is impracticable shall not be transported except under <i>special arrangement</i>. Provided the <i>competent authority</i> is satisfied that conformity with the other provisions of these Regulations is impracticable and that the requisite standards of safety established by</p>	<p>310. <i>Consignments</i> for which conformity with the other provisions of these Regulations is impracticable shall not be transported except under <i>special arrangement</i>. Provided the <i>competent authority</i> is satisfied that conformity with the other provisions of these Regulations is impracticable and that the requisite standards of safety established by</p>	

these Regulations have been demonstrated through means alternative to the other provisions, the <i>competent authority</i> may approve <i>special arrangement</i> transport operations for single or a planned series of multiple <i>consignments</i> . The overall level of safety in transport shall be at least equivalent to that which would be provided if all the applicable requirements had been met. For <i>consignments</i> of this type, <i>multilateral approval</i> shall be required.	these Regulations have been demonstrated through means alternative to the other provisions, the <i>competent authority</i> may approve <i>special arrangement</i> transport operations for single or a planned series of multiple <i>consignments</i> . The overall level of safety in transport shall be at least equivalent to that which would be provided if all the applicable requirements had been met. For <i>consignments</i> of this type, <i>multilateral approval</i> shall be required.	
TRAINING	TRAINING	
311. Workers shall receive appropriate training concerning radiation protection including the precautions to be observed in order to restrict their occupational exposure and the exposure of other persons who might be affected by their actions.	311. Workers shall receive appropriate training concerning radiation protection, including the precautions to be observed in order to restrict their occupational exposure and the exposure of other persons who might be affected by their actions.	
312. Persons engaged in the transport of <i>radioactive material</i> shall receive training in the contents of these Regulations commensurate with their responsibilities.	312. Persons engaged in the transport of <i>radioactive material</i> shall receive training in the contents of these Regulations commensurate with their responsibilities.	
<p>313. Individuals such as those who classify <i>radioactive material</i>; pack <i>radioactive material</i>; mark and label <i>radioactive material</i>; prepare transport documents for <i>radioactive material</i>; offer or accept <i>radioactive material</i> for transport; carry or handle <i>radioactive material</i> in transport; mark or placard or load or unload <i>packages</i> of <i>radioactive material</i> into or from transport <i>vehicles</i>, bulk <i>packagings</i> or <i>freight containers</i>; or are otherwise directly involved in the transport of <i>radioactive material</i> as determined by the <i>competent authority</i>; shall receive the following training:</p> <p>(a) General awareness/familiarization training:</p> <p>(i) Each person shall receive training designed to provide familiarity with the general provisions of these Regulations;</p> <p>(ii) Such training shall include a description of the categories of <i>radioactive material</i>; labelling, marking, placarding and <i>packaging</i> and segregation requirements; a description of</p>	<p>313. Individuals such as those who classify <i>radioactive material</i>; pack <i>radioactive material</i>; mark and label <i>radioactive material</i>; prepare transport documents for <i>radioactive material</i>; offer or accept <i>radioactive material</i> for transport; carry or handle <i>radioactive material</i> in transport; mark or placard or load or unload <i>packages</i> of <i>radioactive material</i> into or from transport <i>vehicles</i>, bulk <i>packagings</i> or <i>freight containers</i>; or are otherwise directly involved in the transport of <i>radioactive material</i> as determined by the <i>competent authority</i>; shall receive the following training:</p> <p>(a) General awareness/familiarization training:</p> <p>(i) Each person shall receive training designed to provide familiarity with the general provisions of these Regulations;</p> <p>(ii) Such training shall include a description of the categories of <i>radioactive material</i>; labelling, marking, placarding and <i>packaging</i> and segregation requirements; a description of the purpose and content of the <i>radioactive material</i> transport document; and a description of available emergency</p>	

<p>the purpose and content of the <i>radioactive material</i> transport document; and a description of available emergency response documents;</p> <p>(b) Function specific training: Each person shall receive detailed training concerning specific <i>radioactive material</i> transport requirements which are applicable to the function that person performs;</p> <p>(c) Safety training: Commensurate with the risk of exposure in the event of a release and the functions performed, each person shall receive training on:</p> <ul style="list-style-type: none"> <li>(i) Methods and procedures for accident avoidance, such as proper use of <i>package</i> handling equipment and appropriate methods of stowage of <i>radioactive material</i>;</li> <li>(ii) Available emergency response information and how to use it;</li> <li>(iii) General dangers presented by the various categories of <i>radioactive material</i> and how to prevent exposure to those hazards, including if appropriate the use of personal protective clothing and equipment; and</li> <li>(iv) Immediate procedures to be followed in the event of an unintentional release of <i>radioactive material</i>, including any emergency response procedures for which the person is responsible and personal protection procedures to be followed.</li> </ul>	<p>response documents<del>;</del>.</p> <p>(b) Function specific training: Each person shall receive detailed training concerning specific <i>radioactive material</i> transport requirements <del>which</del> <u>that</u> are applicable to the function that person performs<del>;</del>.</p> <p>(c) Safety training: Commensurate with the risk of exposure in the event of a release and the functions performed, each person shall receive training on:</p> <ul style="list-style-type: none"> <li>(i) Methods and procedures for accident avoidance, such as proper use of <i>package</i> handling equipment and appropriate methods of stowage of <i>radioactive material</i>;</li> <li>(ii) Available emergency response information and how to use it;</li> <li>(iii) General dangers presented by the various categories of <i>radioactive material</i> and how to prevent exposure to those hazards, including, if appropriate, the use of personal protective clothing and equipment; <del>and</del></li> <li>(iv) Immediate procedures to be followed in the event of an unintentional release of <i>radioactive material</i>, including any emergency response procedures for which the person is responsible and personal protection procedures to be followed.</li> </ul>	
<p>314. Records of all safety training undertaken shall be kept by the employer and made available to the employee if requested.</p>	<p>314. Records of all safety training undertaken shall be kept by the employer and made available to the employee if requested.</p>	
<p>315. The training required in para. 313 shall be provided or verified upon employment in a position involving <i>radioactive material</i> transport and shall be periodically supplemented with retraining as deemed</p>	<p>315. The training required in para. 313 shall be provided or verified upon employment in a position involving <i>radioactive material</i> transport and shall be periodically supplemented with retraining as deemed</p>	

appropriate by the <i>competent authority</i> .	appropriate by the <i>competent authority</i> .	

## Section IV ACTIVITY LIMITS AND CLASSIFICATION

Section IV		Section IV							
ACTIVITY LIMITS AND CLASSIFICATION		ACTIVITY LIMITS AND CLASSIFICATION							
GENERAL PROVISIONS		GENERAL PROVISIONS							
401. <i>Radioactive material</i> shall be assigned to one of the UN numbers specified in Table 1 depending on the activity level of the radionuclides contained in a <i>package</i> , the fissile or non-fissile properties of these radionuclides, the type of <i>package</i> to be presented for transport, and the nature or form of the contents of the <i>package</i> , or <i>special arrangements</i> governing the transport operation, in accordance with the provisions laid down in 408 to 435 below.		401. <i>Radioactive material</i> shall be assigned to one of the UN numbers specified in Table 1, <del>depending on the activity level of the radionuclides contained in a <i>package</i>, the fissile or non-fissile properties of these radionuclides, the type of <i>package</i> to be presented for transport, and the nature or form of the contents of the <i>package</i>, or <i>special arrangements</i> governing the transport operation,</del> in accordance with the provisions laid down in 408 to 435 below <a href="#">paras 408–434</a> .							
TABLE 1 EXCERPTS FROM LIST OF UNITED NATIONS NUMBERS, PROPER SHIPPING NAMES AND DESCRIPTIONS									
<table><tr><td>Assignment of UN Numbers</td><td>PROPER SHIPPING NAME and description<sup>a</sup></td></tr><tr><td colspan="2"><i>Excepted package</i></td></tr><tr><td colspan="2"></td></tr></table>				Assignment of UN Numbers	PROPER SHIPPING NAME and description <sup>a</sup>	<i>Excepted package</i>			
Assignment of UN Numbers	PROPER SHIPPING NAME and description <sup>a</sup>								
<i>Excepted package</i>									
<p><sup>a</sup> The “PROPER SHIPPING NAME” is found in the column “PROPER SHIPPING NAME and description” and is restricted to that part shown in CAPITAL LETTERS. In the cases of UN 2909, UN 2911, UN 2913 and UN 3326, where alternative proper shipping names are separated by the word “or”, only the relevant proper shipping name shall be used.</p> <p><sup>b</sup> Fissile-excepted” applies only to those <i>packages</i> complying with para. 417.</p>									
	TABLE 1 EXCERPTS FROM LIST OF <del>UNITED NATIONS</del> <a href="#">UN</a> NUMBERS, PROPER SHIPPING NAMES AND DESCRIPTIONS								
	<table><tr><td>Assignment of UN Numbers</td><td>PROPER SHIPPING NAME and description<sup>a</sup></td></tr><tr><td colspan="2"><i>Excepted package</i></td></tr><tr><td colspan="2"></td></tr></table>	Assignment of UN Numbers	PROPER SHIPPING NAME and description <sup>a</sup>	<i>Excepted package</i>					
Assignment of UN Numbers	PROPER SHIPPING NAME and description <sup>a</sup>								
<i>Excepted package</i>									
	<a href="#">UN 3XXX RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - URANIUM HEXAFLUORIDE,</a>								



	<p><u>less than 0.1 kg per package, non-fissile or fissile-excepted<sup>b</sup></u></p> <hr/> <p><sup>a</sup> The “PROPER SHIPPING NAME” is found in the column “PROPER SHIPPING NAME and description” and is restricted to that part shown in CAPITAL LETTERS. In the cases of UN 2909, UN 2911, UN 2913 and UN 3326, where alternative proper shipping names are separated by the word “or”, only the relevant proper shipping name shall be used.</p> <p><sup>b</sup> <u>The term “fissile-excepted” applies</u> <del>applies</del> <u>refers</u> only to <del>those packages complying with</del> <u>material excepted under</u> para. 417.</p>	
<b>BASIC RADIONUCLIDE VALUES</b>	<b>BASIC RADIONUCLIDE VALUES</b>	
<p>402. The following basic values for individual radionuclides are given in Table 2:</p> <p>(a) <math>A_1</math> and <math>A_2</math> in TBq;</p> <p>(b) Activity concentration for exempt material in Bq/g; and</p> <p>(c) Activity limits for exempt <i>consignments</i> in Bq.</p>	<p>402. The following basic values for individual radionuclides are given in Table 2:</p> <p>(a) <math>A_1</math> and <math>A_2</math> in TBq;</p> <p>(b) Activity concentration <u>limits</u> for exempt material in Bq/g; <del>and</del></p> <p>(c) Activity limits for exempt <i>consignments</i> in Bq.</p>	
<b>DETERMINATION OF BASIC RADIONUCLIDE VALUES</b>	<b>DETERMINATION OF BASIC RADIONUCLIDE VALUES</b>	
<p>403. For individual radionuclides which are not listed in Table 2, the determination of the basic radionuclide values referred to in para. 402 shall require <i>multilateral approval</i>. It is permissible to use an <math>A_2</math> 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 may be used without obtaining <i>competent authority</i> approval.</p>	<p>403. For individual radionuclides: <del>which</del></p> <p><u>(a) That</u> are not listed in Table 2, the determination of the basic radionuclide values referred to in para. 402 shall require <i>multilateral approval</i>. <u>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].</u> It is permissible to use an <math>A_2</math> 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 may be used without obtaining <i>competent authority</i> approval.</p> <p><u>(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 meet para. 423 (c), 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</u></p>	



	<a href="#">set out in the BSS [2].</a>	
404. In the calculations of $A_1$ and $A_2$ for a radionuclide not in Table 2, a single radioactive decay chain in which the radionuclides are present in their naturally occurring proportions, and in which no progeny 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.	404. In the calculations of $A_1$ and $A_2$ for a radionuclide not in Table 2, a single radioactive decay chain in which the radionuclides are present in their naturally occurring proportions, and in which no <del>progeny</del> <a href="#">daughter</a> 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.	
TABLE 2. BASIC RADIONUCLIDE VALUES Activity concentration for exempt material  (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:	TABLE 2. BASIC RADIONUCLIDE VALUES TITLE: Activity concentration <a href="#">limit</a> for exempt material  (a) $A_1$ and/or $A_2$ values for these parent radionuclides include contributions from <a href="#">their progeny</a> <del>daughter radionuclides</del> with half-lives less than 10 days, as listed in the following:	
405. For mixtures of radionuclides, the determination of the basic radionuclide values referred to in para. 402 may be determined as follows: $X_m = \frac{I}{\sum_i \frac{f(i)}{X(i)}}$ where f(i) is the fraction of activity or activity concentration of radionuclide i in the mixture; X(i) is the appropriate value of $A_1$ or $A_2$ , or the activity concentration for exempt material or the activity limit for an exempt <i>consignment</i> as appropriate for the radionuclide i; and $X_m$ is the derived value of $A_1$ or $A_2$ , or the activity concentration for	405. For mixtures of radionuclides, <del>the determination of</del> the basic radionuclide values referred to in para. 402 may be determined as follows: $X_m = \frac{I}{\sum_i \frac{f(i)}{X(i)}}$ where f(i) is the fraction of activity or activity concentration of radionuclide i in the mixture; X(i) is the appropriate value of $A_1$ or $A_2$ , or the activity concentration <a href="#">limit</a> for exempt material or the activity limit for an exempt <i>consignment</i> as appropriate for the radionuclide i; <del>and</del> $X_m$ is the derived value of $A_1$ or $A_2$ , or the activity concentration <a href="#">limit</a>	

exempt material or the activity limit for an exempt <i>consignment</i> in the case of a mixture.	for exempt material or the activity limit for an exempt <i>consignment</i> in the case of a mixture.	
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 429. 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.	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 <del>429</del> <a href="#">430</a> . 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.	
TABLE 3. BASIC RADIONUCLIDE VALUES FOR UNKNOWN RADIONUCLIDES OR MIXTURES	TABLE 3. BASIC RADIONUCLIDE VALUES FOR UNKNOWN RADIONUCLIDES OR MIXTURES	
407. For individual radionuclides or for mixtures of radionuclides for which relevant data are not available, the values shown in Table 3 shall be used.	407. For individual radionuclides or for mixtures of radionuclides for which relevant data are not available, the values shown in Table 3 shall be used.	
CLASSIFICATION OF MATERIAL	CLASSIFICATION OF MATERIAL	
<b>Low specific activity (LSA) material</b>	<b>Low specific activity (LSA) material</b>	
408. <i>Radioactive material</i> may only be classified as <i>LSA material</i> if the conditions of paras 226, 409–411 and 516–520 are met.	408. <i>Radioactive material</i> may only be classified as <i>LSA material</i> if the conditions of paras 226, 409–411 and <del>516</del> <a href="#">517</a> – <del>520</del> <a href="#">522</a> are met.	
409. <i>LSA material</i> shall be in one of three groups: (a) <i>LSA-I</i> (i) 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; (ii) <i>Natural uranium, depleted uranium</i> , natural thorium or their compounds or mixtures, that are unirradiated and in solid or liquid form; (iii) <i>Radioactive material</i> for which the $A_2$ value is unlimited, excluding <i>fissile material</i> not excepted under para. 417; or (iv) Other <i>radioactive material</i> in which the activity is distributed throughout and the estimated average <i>specific activity</i> does not	409. <i>LSA material</i> shall be in one of three groups: (a) <i>LSA-I</i> (i) Uranium and thorium ores and concentrates of such ores, and other ores containing naturally occurring radionuclides <del>which are intended to be processed for the use of these radionuclides;</del> (ii) <i>Natural uranium, depleted uranium</i> , natural thorium or their compounds or mixtures, that are unirradiated and in solid or liquid form; (iii) <i>Radioactive material</i> for which the $A_2$ value is unlimited, <del>excluding fissile material not excepted under para. 417.</del> <a href="#">Fissile material may be included only if excepted under para. 417;</a> <del>or</del> (iv) Other <i>radioactive material</i> in which the activity is distributed	

<p>exceed 30 times the values for activity concentration specified in paras 402–407, excluding <i>fissile material</i> not excepted under para. 417.</p> <p>(b) <i>LSA-II</i></p> <p>(i) Water with a tritium concentration of up to 0.8 TBq/L; or</p> <p>(ii) Other material in which the activity is distributed throughout and the estimated average <i>specific activity</i> does not exceed <math>10^{-4}A_2/g</math> for solids and gases, and <math>10^{-5}A_2/g</math> for liquids.</p> <p>(c) <i>LSA-III</i></p> <p>Solids (e.g. consolidated wastes, activated materials), excluding powders, meeting the requirements of para. 601, in which:</p> <p>(i) The <i>radioactive material</i> 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.);</p> <p>(ii) The <i>radioactive material</i> is relatively insoluble, or it is intrinsically contained in a relatively insoluble matrix, so that, even under loss of <i>packaging</i>, the loss of <i>radioactive material</i> per <i>package</i> by leaching when placed in water for seven days would not exceed <math>0.1A_2</math>; and</p> <p>(iii) The estimated average <i>specific activity</i> of the solid, excluding any shielding material, does not exceed <math>2 \times 10^{-3}A_2/g</math>.</p>	<p>throughout and the estimated average <i>specific activity</i> does not exceed 30 times the values for activity concentration specified in paras 402–407. <del>excluding fissile material not excepted under para. 417.</del> <u>Fissile material may be included only if excepted under para. 417.</u></p> <p>(b) <i>LSA-II</i></p> <p>(i) Water with a tritium concentration of up to 0.8 TBq/L; <del>or</del></p> <p>(ii) Other material in which the activity is distributed throughout and the estimated average <i>specific activity</i> does not exceed <math>10^{-4}A_2/g</math> for solids and gases, and <math>10^{-5}A_2/g</math> for liquids.</p> <p>(c) <i>LSA-III</i></p> <p>Solids (e.g. consolidated wastes, activated materials), excluding powders, <u>that</u> <del>meeting</del> the requirements of para. 601, in which:</p> <p>(i) The <i>radioactive material</i> 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, <u>and</u> ceramic, <del>etc.</del>);</p> <p>(ii) The <i>radioactive material</i> is relatively insoluble, or it is intrinsically contained in a relatively insoluble matrix, so that, even under loss of <i>packaging</i>, the loss of <i>radioactive material</i> per <i>package</i> by leaching when placed in water for seven days would not exceed <math>0.1A_2</math>; <del>and</del></p> <p>(iii) The estimated average <i>specific activity</i> of the solid, excluding any shielding material, does not exceed <math>2 \times 10^{-3}A_2/g</math>.</p>	
<p>410. A single <i>package</i> of non-combustible solid <i>LSA-II</i> or <i>LSA-III material</i>, if carried by air, shall not contain an activity greater than <math>3000 A_2</math>.</p>	<p>410. A single package of non-combustible solid <i>LSA-II</i> or <i>LSA-III material</i>, if carried by air, shall not contain an activity greater than <math>3000 A_2</math>.</p>	
<p>411. The <i>radioactive contents</i> in a single <i>package</i> of <i>LSA material</i> shall be so restricted that the <i>radiation level</i> specified in para. 516 shall not be exceeded, and the activity in a single <i>package</i> shall also be so - restricted that the activity limits for a <i>conveyance</i> specified in para. 520 shall not be exceeded.</p>	<p>411. The <i>radioactive contents</i> in a single <i>package</i> of <i>LSA material</i> shall be so restricted that the <i>radiation level</i> specified in para. <del>516</del> <u>517</u> shall not be exceeded, and the activity in a single <i>package</i> shall also be so restricted that the activity limits for a <i>conveyance</i> specified in para. <del>520</del> <u>522</u> shall not be exceeded.</p>	
<p><b>Surface contaminated object (SCO)</b></p>	<p><b>Surface contaminated object (SCO)</b></p>	
<p>412. Radioactive material may be classified as SCO if the conditions of</p>	<p>412. Radioactive material may be classified as <i>SCO</i> if the conditions</p>	

paras 241, 413, 414 and 516–520 are met.	of paras 241, 413, 414 and <del>516–520</del> <a href="#">517–520</a> <a href="#">522</a> are met.	
<p>413. SCO shall be in one of two groups:</p> <p>(a) <i>SCO-I</i>: A solid object on which:</p> <ul style="list-style-type: none"> <li>(i) The <i>non-fixed contamination</i> on the accessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 4 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 0.4 Bq/cm<sup>2</sup> for all other alpha emitters; and</li> <li>(ii) The <i>fixed contamination</i> on the accessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 4 × 10<sup>4</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 4 × 10<sup>3</sup> Bq/cm<sup>2</sup> for all other alpha emitters; and</li> <li>(iii) The <i>non-fixed contamination</i> plus the <i>fixed contamination</i> on the inaccessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 4 × 10<sup>4</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 4 × 10<sup>3</sup> Bq/cm<sup>2</sup> for all other alpha emitters.</li> </ul> <p>(b) <i>SCO-II</i>: A solid object on which either the <i>fixed</i> or <i>non-fixed</i> contamination on the surface exceeds the applicable limits specified for <i>SCO-I</i> in (a) above and on which:</p> <ul style="list-style-type: none"> <li>(i) The <i>non-fixed contamination</i> on the accessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 400 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 40 Bq/cm<sup>2</sup> for all other alpha emitters; and</li> <li>(ii) The <i>fixed contamination</i> on the accessible surface, averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 8 × 10<sup>5</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 8 × 10<sup>4</sup> Bq/cm<sup>2</sup> for all other alpha emitters; and</li> <li>(iii) The <i>non-fixed contamination</i> plus the <i>fixed contamination</i> on the inaccessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 8 × 10<sup>5</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity</i></li> </ul>	<p>413. SCO shall be in one of two groups:</p> <p>(a) <i>SCO-I</i>: A solid object on which:</p> <ul style="list-style-type: none"> <li>(i) The <i>non-fixed contamination</i> on the accessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 4 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 0.4 Bq/cm<sup>2</sup> for all other alpha emitters; <del>and</del></li> <li>(ii) The <i>fixed contamination</i> on the accessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 4 × 10<sup>4</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or <del>4 × 10<sup>3</sup></del> <a href="#">4000</a> Bq/cm<sup>2</sup> for all other alpha emitters; <del>and</del></li> <li>(iii) The <i>non-fixed contamination</i> plus the <i>fixed contamination</i> on the inaccessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 4 × 10<sup>4</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or <del>4 × 10<sup>3</sup></del> <a href="#">4000</a> Bq/cm<sup>2</sup> for all other alpha emitters.</li> </ul> <p>(b) <i>SCO-II</i>: A solid object on which either the <i>fixed</i> or <i>non-fixed</i> contamination on the surface exceeds the applicable limits specified for <i>SCO-I</i> in (a) above and on which:</p> <ul style="list-style-type: none"> <li>(i) The <i>non-fixed contamination</i> on the accessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 400 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 40 Bq/cm<sup>2</sup> for all other alpha emitters; <del>and</del></li> <li>(ii) The <i>fixed contamination</i> on the accessible surface, averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 8 × 10<sup>5</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, or 8 × 10<sup>4</sup> Bq/cm<sup>2</sup> for all other alpha emitters; <del>and</del></li> <li>(iii) The <i>non-fixed contamination</i> plus the <i>fixed contamination</i> on the inaccessible surface averaged over 300 cm<sup>2</sup> (or the area of the surface if less than 300 cm<sup>2</sup>) does not exceed 8 × 10<sup>5</sup> Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity</i></li> </ul>	

<i>alpha emitters</i> , or $8 \times 10^4$ Bq/cm <sup>2</sup> for all other alpha emitters.	<i>alpha emitters</i> , or $8 \times 10^4$ Bq/cm <sup>2</sup> for all other alpha emitters.	
414. The <i>radioactive contents</i> in a single <i>package</i> of <i>SCO</i> shall be so restricted that the <i>radiation level</i> specified in para. 516 shall not be exceeded, and the activity in a single <i>package</i> shall also be so restricted that the activity limits for a <i>conveyance</i> specified in para. 520 shall not be exceeded.	414. The <i>radioactive contents</i> in a single <i>package</i> of <i>SCO</i> shall be so restricted that the <i>radiation level</i> specified in para. <del>516</del> 517 shall not be exceeded, and the activity in a single <i>package</i> shall also be so restricted that the activity limits for a <i>conveyance</i> specified in para. <del>520</del> 522 shall not be exceeded.	
<b>Special form radioactive material</b>	<b>Special form radioactive material</b>	
415. <i>Radioactive material</i> may be classified as <i>special form radioactive material</i> only if it meets the requirements of paras 602 -604 and 802.	415. <i>Radioactive material</i> may be classified as <i>special form radioactive material</i> only if it meets the requirements of paras 602-604 and 802.	
<b>Low dispersible radioactive material</b>	<b>Low dispersible radioactive material</b>	
416. <i>Radioactive material</i> may be classified as <i>low dispersible radioactive material</i> only if it meets the requirements of para. 605 taking into account the requirements of paras 663 and 802.	416. <i>Radioactive material</i> may be classified as <i>low dispersible radioactive material</i> only if it meets the requirements of para. 605 taking into account the requirements of paras <del>663</del> 665 and 802.	
<b>Fissile material</b>	<b>Fissile material</b>	
<p>417. <i>Packages</i> containing <i>fissile material</i> shall be classified under the relevant entry in Table 1 for <i>fissile material</i> unless the conditions in para 672 and one of the following conditions are met:</p> <p>(a) A mass limit per <i>consignment</i> provided that the smallest external dimension of each <i>package</i> is not less than 10 cm, such that:</p> $\frac{\text{mass of uranium-235(g)}}{X} + \frac{\text{mass of other fissile nuclides (g)}}{Y} < 1$ <p>where X and Y are the mass limits defined in Table 4, provided that either:</p> <p>(i) each individual <i>package</i> contains not more than 15 g of <i>fissile nuclides</i>; for unpackaged material, this quantity limitation shall apply to the <i>consignment</i> being carried in or on the <i>conveyance</i>; or</p>	<p>417. <u><i>Fissile material and packages</i></u> containing <i>fissile material</i> shall be classified under the relevant entry <u>as FISSILE in accordance with</u> <del>the</del> Table 1 <del>for fissile material unless the conditions in para. 672 and</del> <u>excepted by</u> one of the <del>following conditions in</del> <u>provisions of subparas (a)–(f) of this paragraph</u> <del>are met</del> <u>and transported subject to the requirements of para 570. All provisions apply only to material in packages that meets the requirements of para. 636 unless unpackaged material is specifically allowed in the provision.</u></p> <p><del>(a) A mass limit per consignment provided that the smallest external dimension of each package is not less than 10 cm, such that:</del></p> <p><del>where X and Y are the mass limits defined in Table 4, provided that either:</del></p> <p><del>(i) each individual package contains not more than 15 g of fissile</del></p>	

<p>(ii) the <i>fissile material</i> is a homogeneous hydrogenous solution or mixture where the ratio of <i>fissile nuclides</i> to hydrogen is less than 5% by mass; or</p> <p>(iii) there are not more than 5 g of <i>fissile nuclides</i> in any 10 litre volume of material.</p> <p>Beryllium shall not be present in quantities exceeding 1% of the applicable <i>consignment</i> mass limits provided in Table 4 except where the concentration of beryllium in the material does not exceed 1 gram beryllium in any 1000 grams.</p> <p>Deuterium shall also not be present in quantities exceeding 1% of the applicable <i>consignment</i> mass limits provided in Table 4 except where deuterium occurs up to natural concentration in hydrogen.</p> <p>(b) Uranium enriched in uranium-235 to a maximum of 1% by mass, and with a total plutonium and uranium-233 content not exceeding 1% of the mass of uranium-235, provided that the <i>fissile nuclides</i> are distributed essentially homogeneously throughout the material. In addition, if uranium-235 is present in metallic, oxide or carbide forms, it shall not form a lattice arrangement.</p> <p>(c) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2% by mass, with a total plutonium and uranium-233 content not exceeding 0.002% of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2.</p> <p>(d) Plutonium containing not more than 20% of <i>fissile nuclides</i> by mass up to a maximum of 1 kg of plutonium per <i>consignment</i>. Shipments under this exception shall be under <i>exclusive use</i>.</p>	<p><del><i>nuclides</i>; for unpackaged material, this quantity limitation shall apply to the <i>consignment</i> being carried in or on the conveyance; or</del></p> <p><del>(ii) the <i>fissile material</i> is a homogeneous hydrogenous solution or mixture where the ratio of <i>fissile nuclides</i> to hydrogen is less than 5% by mass; or</del></p> <p><del>(iii) there are not more than 5 g of <i>fissile nuclides</i> in any 10 litre volume of material.</del></p> <p><del>Beryllium shall not be present in quantities exceeding 1% of the applicable <i>consignment</i> mass limits provided in Table 4 except where the concentration of beryllium in the material does not exceed 1 gram beryllium in any 1000 grams.</del></p> <p><del>Deuterium shall also not be present in quantities exceeding 1% of the applicable <i>consignment</i> mass limits provided in Table 4 except where deuterium occurs up to natural concentration in hydrogen.</del></p> <p>(<del>b</del>)a) Uranium enriched in uranium-235 to a maximum of 1% by mass, and with a total plutonium and uranium-233 content not exceeding 1% of the mass of uranium-235, provided that the <i>fissile nuclides</i> are distributed essentially homogeneously throughout the material. In addition, if uranium-235 is present in metallic, oxide or carbide forms, it shall not form a lattice arrangement<del>;</del></p> <p>(<del>e</del>)b) Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of 2% by mass, with a total plutonium and uranium-233 content not exceeding 0.002% of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2<del>;</del></p> <p><del>(d) Plutonium containing not more than 20% of <i>fissile nuclides</i> by mass up to a maximum of 1 kg of plutonium per <i>consignment</i>. Shipments under this exception shall be under <i>exclusive use</i>.</del></p> <p><u>(c) Uranium with a maximum uranium enrichment of 5% by mass uranium-235 provided:</u></p> <p><u>(i) There is no more than 3.5 g of uranium-235 per package;</u></p>	
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	<p>(ii) <u>The total plutonium and uranium-233 content does not exceed 1% of the mass of uranium-235 per package;</u></p> <p>(iii) <u>Transport of the <i>package</i> is subject to the <i>consignment limit</i> provided in para 570(c).</u></p> <p>(d) <u><i>Fissile nuclides</i> with a total mass not greater than 2.0 g per <i>package</i> provided the <i>package</i> is transported subject to the <i>consignment limit</i> provided in para. 570(d);</u></p> <p>(e) <u><i>Fissile nuclides</i> with a total mass not greater than 45 g either packaged or unpackaged subject to limits provided in para. 570(e);</u></p> <p>(f) <u>A <i>fissile material</i> that meets the requirements of paras 570(b), 606 and 802.</u></p>	
TABLE 4. CONSIGNMENT MASS LIMITS FOR EXCEPTIONS FROM THE REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL	<del>TABLE 4. CONSIGNMENT MASS LIMITS FOR EXCEPTIONS FROM THE REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL</del>	
<p>418. Unless excepted by para. 417, <i>packages</i> containing <i>fissile material</i> shall not contain:</p> <p>(a) A mass of <i>fissile material</i> (or mass of each <i>fissile nuclide</i> for mixtures when appropriate) different from that authorized for the <i>package design</i>;</p> <p>(b) Any radionuclide or <i>fissile material</i> different from those authorized for the <i>package design</i>; or</p> <p>(c) Contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the <i>package design</i>, as specified in their certificates of approval where appropriate.</p>	<p>418. <del>Unless excepted by para 417,</del> <u>The contents of <i>packages</i> containing <i>fissile material</i> shall be as specified for the <i>package design</i> either directly in these Regulations or in the certificate of approval.</u> <del>not contain:</del></p> <p><del>(a) A mass of fissile material (or mass of each fissile nuclide for mixtures when appropriate) different from that authorized for the package design;</del></p> <p><del>(b) Any radionuclide or fissile material different from those authorized for the package design; or</del></p> <p><del>(c) Contents in a form or physical or chemical state, or in a spatial arrangement, different from those authorized for the package design as specified in their certificates of approval where appropriate.</del></p>	
<b>Uranium hexafluoride</b>	<b>Uranium hexafluoride</b>	
419. Uranium hexafluoride shall only be assigned to UN Nos 2977, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE, or 2978, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile-excepted and shall meet the	419. Uranium hexafluoride shall <del>only</del> be assigned to <u>one of the following UN numbers only:</u>	

requirements of para. 420.	<p>(a) UN <del>No's</del> 2977, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE FISSILE <del>or</del>;</p> <p>(b) UN 2978, RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, non-fissile or fissile-excepted; <del>and shall meet the requirements of para. 420.</del></p> <p>(c) <u>UN 3XXX RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - URANIUM HEXAFLUORIDE, less than 0.1 kg per package, non-fissile or fissile-excepted.</u></p>	
<p>420. <i>Packages</i> containing uranium hexafluoride shall not contain:</p> <p>(a) A mass of uranium hexafluoride different from that authorized for the <i>package design</i>;</p> <p>(b) A mass of uranium hexafluoride greater than a value that would lead to an ullage smaller than 5 % at the maximum temperature of the <i>package</i> as specified for the plant systems where the <i>package</i> shall be used; or</p> <p>(c) Uranium hexafluoride other than in solid form or at an internal pressure above atmospheric pressure when presented for transport.</p>	<p>420. <u>The contents of a <del>p</del>Package</u> containing uranium hexafluoride shall <u>comply with the following requirements</u> <del>not contain</del>:</p> <p>(a) <del>A</del> <u>The</u> mass of uranium hexafluoride <u>shall not be</u> different from that <del>authorized</del> <u>allowed</u> for the <i>package design</i>;</p> <p>(b) <del>A</del> <u>The</u> mass of uranium hexafluoride <u>shall not be</u> greater than a value that would lead to an ullage <del>smaller</del> <u>of less</u> than 5% at the maximum temperature of the <i>package</i> as specified for the plant systems where the <i>package</i> <del>shall</del> <u>might</u> be used; <del>or</del> .</p> <p>(c) <u>The u</u> <del>U</del>ranium hexafluoride <u>shall be</u> <del>other than</del> in solid form <del>or</del> <u>and</u> <del>at an</del> <u>the</u> internal pressure <u>shall not be</u> above atmospheric pressure when presented for transport.</p>	
<b>CLASSIFICATION OF PACKAGES</b>	<b>CLASSIFICATION OF PACKAGES</b>	
421. The quantity of <i>radioactive material</i> in a <i>package</i> shall not exceed the relevant limits for the <i>package</i> type as specified below.	421. The quantity of <i>radioactive material</i> in a <i>package</i> shall not exceed the relevant limits for the <i>package</i> type as specified below.	
<b>Classification as excepted package</b>	<b>Classification as excepted package</b>	
<p>422. <i>Packages</i> may be classified as <i>excepted packages</i> if:</p> <p>(a) They are empty <i>packages</i> having contained <i>radioactive material</i>;</p> <p>(b) They contain instruments or articles in limited quantities as specified in Table 5;</p> <p>(c) They contain articles manufactured of natural uranium, <i>depleted uranium</i> or natural thorium; or</p> <p>(d) They contain <i>radioactive material</i> in limited quantities as specified in Table 5.</p>	<p>422. <u>A <del>p</del>Package</u> may be classified as <u>an excepted package</u> if <u>it meets one of the following conditions</u>:</p> <p>(a) <del>They are</del> <u>It is an</u> empty <i>package</i> having contained <i>radioactive material</i>;</p> <p>(b) <del>They</del> <u>It</u> contains instruments or articles <del>in limited quantities as</del> <u>not exceeding the activity limits</u> specified in Table 5 <del>4</del>;</p> <p>(c) <del>They</del> <u>It</u> contains articles manufactured of <i>natural uranium, depleted uranium</i> or natural thorium; <del>or</del></p>	



	<p>(d) <del>They</del> <u>It</u> contains <u>radioactive material in limited quantities as not exceeding the activity limits</u> specified in Table <del>5</del> <u>4</u>. <del>or</del></p> <p>(e) <u>It contains less than 0.1 kg of uranium hexafluoride not exceeding the activity limits specified in column 4 of Table 4.</u></p>	
TABLE 5. ACTIVITY LIMITS FOR EXCEPTED PACKAGES	TABLE <del>5</del> <u>4</u> . ACTIVITY LIMITS FOR EXCEPTED PACKAGES	
<p>423. <i>Radioactive material</i> which 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, only if:</p> <p>(a) The <i>radiation level</i> at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h;</p> <p>(b) Each instrument or article bears the marking “RADIOACTIVE” except:</p> <p>(i) Radioluminescent time-pieces or devices; or</p> <p>(ii) Consumer products that either have received regulatory approval according to para. 107(d) or do not individually exceed the activity limit for an exempt <i>consignment</i> in Table 2 (column 5), provided such products are transported in a <i>package</i> that bears the marking “RADIOACTIVE” on an internal surface in such a manner that warning of the presence of <i>radioactive material</i> is visible on opening the <i>package</i>;</p> <p>(c) The active material is completely enclosed by non-active components (a device performing the sole function of containing <i>radioactive material</i> shall not be considered to be an instrument or manufactured article);</p> <p>(d) The limits specified in column 2 and 3 of Table 5 are met for each</p>	<p>423. <i>Radioactive material</i> <del>which</del> <u>that</u> 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, <del>only if</del> <u>provided that</u>:</p> <p>(a) The <i>radiation level</i> at 10 cm from any point on the external surface of any unpackaged instrument or article is not greater than 0.1 mSv/h<sub>2</sub>.</p> <p>(b) Each instrument or article bears the marking “RADIOACTIVE” <u>on its external surface</u> except <u>for the following</u>:</p> <p>(i) Radioluminescent timepieces or devices <u>do not require markings</u>.<del>or</del></p> <p>(ii) Consumer products that have either received regulatory approval <del>according to</del> <u>in accordance with</u> para. 107(<del>d</del><u>e</u>) or do not individually exceed the activity limit for an exempt <i>consignment</i> in Table 2 (column 5) <u>do not require markings</u>, provided that such products are transported in a <i>package</i> that bears the marking “RADIOACTIVE” on its <del>an</del> internal surface in such a manner that <u>a</u> warning of the presence of <i>radioactive material</i> is visible on opening the <i>package</i>.</p> <p><u>(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.</u></p> <p>(c) The active material is completely enclosed by non-active components (a device performing the sole function of containing <i>radioactive material</i> shall not be considered to be an instrument or manufactured article)<sub>2</sub>.</p> <p>(d) The limits specified in columns 2 and 3 of Table <del>5</del> <u>4</u> are met for</p>	

individual item and each <i>package</i> , respectively; and (e) For transport by post, the total activity in each <i>excepted package</i> shall not exceed one tenth of the relevant limits specified in column 3 of Table 5.	each individual item and each <i>package</i> , respectively; <del>and</del> (e) For transport by post, the total activity in each <i>excepted package</i> shall not exceed one tenth of the relevant limits specified in column 3 of Table <del>5</del> <u>4</u> .	
424. <i>Radioactive material</i> in forms other than as specified in para. 423 and with an activity not exceeding the limits specified in column 4 of Table 5 may be classified under UN 2910, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – LIMITED QUANTITY OF MATERIAL, provided that:  (a) The <i>package</i> retains its <i>radioactive contents</i> under routine conditions of transport; (b) The <i>package</i> bears the marking “RADIOACTIVE” on an internal surface in such a manner that a warning of the presence of <i>radioactive material</i> is visible on opening the <i>package</i> ; and (c) For transport by post, the total activity in each <i>excepted package</i> shall not exceed one tenth of the relevant limits specified in column 4 of Table 5.	424. <i>Radioactive material</i> in forms other than as specified in para. 423 and with an activity not exceeding the limits specified in column 4 of Table <del>5</del> <u>4</u> may be classified under UN 2910, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – LIMITED QUANTITY OF MATERIAL, provided that:  (a) The <i>package</i> retains its <i>radioactive contents</i> under routine conditions of transport; (b) The <i>package</i> bears the marking “RADIOACTIVE” <u>on either:</u> <u>(i) An internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package; <del>and</del> or</u> <u>(ii) The outside of the package, where it is impractical to mark an internal surface.</u> (c) For transport by post, the total activity in each <i>excepted package</i> shall not exceed one tenth of the relevant limits specified in column 4 of Table <del>5</del> <u>4</u> .	
<i>Not in TS-R-1 (2009).</i>	<u>425. Uranium hexafluoride not exceeding the limits specified in column 4 of Table 4 may be classified under UN 3XXX RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - URANIUM HEXAFLUORIDE, less than 0.1 kg per package, non-fissile or fissile-excepted provided that:</u> <u>(a) The mass of uranium hexafluoride in the package is less than 0.1 kg.</u> <u>(b) The conditions of paras 420 and 424 (a), (b) are met.</u>	
<i>Moved from 426.</i>	426. Articles manufactured of <i>natural uranium, depleted uranium</i> or natural thorium and articles in which the sole <i>radioactive material</i> is unirradiated natural uranium, unirradiated depleted uranium or unirradiated natural thorium may be classified under UN 2909, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – ARTICLES	

	MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM, <del>only if</del> <a href="#">provided that</a> the outer surface of the uranium or thorium is enclosed in an inactive sheath made of metal or some other substantial material.	
<b>Additional requirements and controls for transport of empty packagings</b>	<b>Additional requirements and controls for transport of empty packagings</b>	
431  . An empty <i>packaging</i> which had previously contained <i>radioactive material</i> may be classified under UN 2908, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – EMPTY PACKAGING, only if:  (a) It is in a well-maintained condition and securely closed; (b) The outer surface of any uranium or thorium in its structure is covered with an inactive sheath made of metal or some other substantial material; (c) The level of internal <i>non-fixed contamination</i> does not exceed one hundred times the levels specified in para. 507; and (d) Any labels which may have been displayed on it in conformity with para. 536 are no longer visible.	<del>425</del> <a href="#">427</a> . An empty <i>packaging</i> <del>which</del> <a href="#">that</a> had previously contained <i>radioactive material</i> may be classified under UN 2908, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE – EMPTY PACKAGING, <del>only if</del> <a href="#">provided that</a> :  (a) It is in a well-maintained condition and securely closed; (b) The outer surface of any uranium or thorium in its structure is covered with an inactive sheath made of metal or some other substantial material; (c) The level of internal <i>non-fixed contamination</i> does not exceed <a href="#">100</a> <del>hundred</del> times the levels specified in para. <del>507</del> <a href="#">508</a> ; and (d) Any labels <del>which</del> <a href="#">that</a> may have been displayed on it in conformity with para. <del>536</del> <a href="#">538</a> are no longer visible.	
426. Articles manufactured of <i>natural uranium, depleted uranium</i> or natural thorium and articles in which the sole <i>radioactive material</i> is unirradiated <i>natural uranium</i> , unirradiated <i>depleted uranium</i> or unirradiated natural thorium may be classified under UN 2909, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM, only if the outer surface of the <i>uranium</i> or thorium is enclosed in an inactive sheath made of metal or some other substantial material..	<del>426. Articles manufactured of <i>natural uranium, depleted uranium</i> or natural thorium and articles in which the sole <i>radioactive material</i> is unirradiated <i>natural uranium</i>, unirradiated <i>depleted uranium</i> or unirradiated natural thorium may be classified under UN 2909, RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - ARTICLES MANUFACTURED FROM NATURAL URANIUM or DEPLETED URANIUM or NATURAL THORIUM, only if the outer surface of the <i>uranium</i> or thorium is enclosed in an inactive sheath made of metal or some other substantial material.</del>	Move above para.427
<b>Classification as Type A package</b>	<b>Classification as Type A package</b>	
427. <i>Packages</i> containing <i>radioactive material</i> may be classified as <i>Type A packages</i> provided that the conditions of paras 428 and 429 are met.	<del>427</del> <a href="#">428</a> . <i>Packages</i> containing <i>radioactive material</i> may be classified as <i>Type A packages</i> provided that the conditions of paras <del>428</del> <a href="#">429</a> and <del>429</del> <a href="#">430</a> are met.	

<p>428. <i>Type A packages</i> shall not contain activities greater than the following:</p> <p>(a) For <i>special form radioactive material</i> — <math>A_1</math>; or</p> <p>(b) For all other <i>radioactive material</i> — <math>A_2</math>.</p>	<p><del>428</del> 429. <i>Type A packages</i> shall not contain activities greater than <u>either of</u> the following:</p> <p>(a) For <i>special form radioactive material</i> — <math>A_1</math>; <del>or</del></p> <p>(b) For all other <i>radioactive material</i> — <math>A_2</math>.</p>	
<p>429. For mixtures of radionuclides whose identities and respective activities are known, the following condition shall apply to the <i>radioactive contents</i> of a <i>Type A package</i>:</p> $\sum_i \frac{B(i)}{A_1(i)} + \sum_j \frac{C(j)}{A_2(j)} \leq 1$ <p>where</p> <p><math>B(i)</math> is the activity of radionuclide <math>i</math> as <i>special form radioactive material</i>;</p> <p><math>A_1(i)</math> is the <math>A_1</math> value for radionuclide <math>i</math>;</p> <p><math>C(j)</math> is the activity of radionuclide <math>j</math> as other than <i>special form radioactive material</i>; and</p> <p><math>A_2(j)</math> is the <math>A_2</math> value for radionuclide <math>j</math>.</p>	<p><del>429</del> 430. For mixtures of radionuclides whose identities and respective activities are known, the following condition shall apply to the <i>radioactive contents</i> of a <i>Type A package</i>:</p> $\sum_i \frac{B(i)}{A_1(i)} + \sum_j \frac{C(j)}{A_2(j)} \leq 1$ <p>where</p> <p><math>B(i)</math> is the activity of radionuclide <math>i</math> as <i>special form radioactive material</i>;</p> <p><math>A_1(i)</math> is the <math>A_1</math> value for radionuclide <math>i</math>;</p> <p><math>C(j)</math> is the activity of radionuclide <math>j</math> as other than <i>special form radioactive material</i>; <del>and</del></p> <p><math>A_2(j)</math> is the <math>A_2</math> value for radionuclide <math>j</math>.</p>	
<p><b>Classification as Type B(U), Type B(M) or Type C packages</b></p>	<p><b>Classification as Type B(U), Type B(M) or Type C packages</b></p>	
<p>430. Type B(U), Type B(M) and Type C packages shall be classified in accordance with the <i>competent authority</i> approval certificate for the package issued by the country of origin of <i>design</i>.</p>	<p><del>430</del> 431. <i>Type B(U), Type B(M) and Type C packages</i> shall be classified in accordance with the <i>competent authority</i> <del>approval</del> certificate of approval for the <i>package</i> issued by the country of origin of <i>design</i>.</p>	
<p>431. A <i>Type B(U) package</i> shall not contain:</p> <p>(a) Activities greater than those authorized for the <i>package design</i>;</p> <p>(b) Radionuclides different from those authorized for the <i>package design</i>; or</p> <p>(c) Contents in a form or a physical or chemical state different from those authorized for the <i>package design</i>;</p> <p>as specified in the certificate of approval.</p>	<p><del>431</del> 432. <u>The contents of a <del>A</del> <i>Type B(U), Type B(M) or Type C package</i> shall not contain be as specified in the certificate of approval.</u></p> <p><del>(a) Activities greater than those authorized for the package design;</del></p> <p><del>(b) Radionuclides different from those authorized for the package design; or</del></p> <p><del>(c) Contents in a form or a physical or chemical state different from those authorized for the package design;</del></p> <p><del>as specified in the certificate of approval.</del></p>	
<p>432. A <i>Type B(M) package</i> shall not contain:</p> <p>(a) Activities greater than those authorized for the <i>package design</i>;</p>	<p><del>432. A <i>Type B(M) package</i> shall not contain:</del></p> <p><del>(a) Activities greater than those authorized for the package design;</del></p> <p><del>(b) Radionuclides different from those authorized for the package</del></p>	<p>Merged into para.432</p>

<p>(b) Radionuclides different from those authorized for the <i>package design</i>; or</p> <p>(c) Contents in a form or a physical or chemical state different from those authorized for the <i>package design</i>;</p> <p>as specified in the certificate of approval.</p>	<p><del>design; or</del></p> <p><del>(e) Contents in a form or a physical or chemical state different from those authorized for the <i>package design</i>;</del></p> <p><del>as specified in the certificate of approval.</del></p>	
<p>433. <i>Type B(U) and Type B(M) packages</i>, if transported by air, shall meet the requirements of paras 431 or 432 and shall not contain activities greater than the following:</p> <p>(a) For <i>low dispersible radioactive material</i> — as authorized for the <i>package design</i> as specified in the certificate of approval;</p> <p>(b) For <i>special form radioactive material</i> — 3000A<sub>1</sub> or 100 000A<sub>2</sub>, whichever is the lower; or</p> <p>(c) For all other radioactive material — 3000A<sub>2</sub>.</p>	<p>433. <i>Type B(U) and Type B(M) packages</i>, if transported by air, shall meet the requirements of para. <del>431</del> or 432 and shall not contain activities greater than the following:</p> <p>(a) For <i>low dispersible radioactive material</i> — as authorized for the <i>package design</i> as specified in the certificate of approval;</p> <p>(b) For <i>special form radioactive material</i> — 3000A<sub>1</sub> or <del>100 000</del> 10<sup>5</sup>A<sub>2</sub>, whichever is the lower; <del>or</del></p> <p>(c) For all other radioactive material — 3000 A<sub>2</sub>.</p>	
<p>434. A <i>Type C package</i> shall not contain:</p> <p>(a) Activities greater than those authorized for the <i>package design</i>;</p> <p>(b) Radionuclides different from those authorized for the <i>package design</i>; or</p> <p>(c) Contents in a form or a physical or chemical state different from those authorized for the <i>package design</i>;</p> <p>as specified in the certificate of approval.</p>	<p><del>434. A <i>Type C package</i> shall not contain:</del></p> <p><del>(a) Activities greater than those authorized for the <i>package design</i>;</del></p> <p><del>(b) Radionuclides different from those authorized for the <i>package design</i>; or</del></p> <p><del>(c) Contents in a form or a physical or chemical state different from those authorized for the <i>package design</i>;</del></p> <p><del>as specified in the certificate of approval.</del></p>	Merged into para.432
SPECIAL ARRANGEMENT	SPECIAL ARRANGEMENT	
<p>435. Radioactive material shall be classified as transported under <i>special arrangement</i> when it is intended to be carried in accordance with para. 310.</p>	<p><del>435</del> 434. Radioactive material shall be classified as transported under <i>special arrangement</i> when it is intended to be carried in accordance with para. 310.</p>	

## Section V REQUIREMENTS AND CONTROLS FOR TRANSPORT

2009 EDITION	20xx draft 2.53	Remarks
<b>Section V</b>	<b>Section V</b>	
<b>REQUIREMENTS AND CONTROLS FOR TRANSPORT</b>	<b>REQUIREMENTS AND CONTROLS FOR TRANSPORT</b>	
<b>REQUIREMENTS BEFORE THE FIRST SHIPMENT</b>	<b>REQUIREMENTS BEFORE THE FIRST SHIPMENT</b>	
<p>501. Before a <i>packaging</i> is first used to transport <i>radioactive material</i>, the following requirements shall be fulfilled:</p> <p>(a) If the <i>design</i> pressure of the <i>containment system</i> exceeds 35 kPa (gauge), it shall be ensured that the <i>containment system</i> of each <i>package</i> conforms to the approved <i>design</i> requirements relating to the capability of that system to maintain its integrity under that pressure.</p> <p>(b) For each <i>Type B(U)</i>, <i>Type B(M)</i> and <i>Type C package</i> and for each <i>package</i> containing <i>fissile material</i>, it shall be ensured that the effectiveness of its shielding and containment and, where necessary, the heat transfer characteristics and the effectiveness of the <i>confinement system</i>, are within the limits applicable to or specified for the approved <i>design</i>.</p> <p>(c) For <i>packages</i> containing <i>fissile material</i>, where, in order to comply with the requirements of para. 671, neutron poisons are specifically included as components of the <i>package</i>, checks shall be performed to confirm the presence and distribution of those neutron poisons.</p>	<p>501. Before a <i>packaging</i> is first used to transport <i>radioactive material</i>, <u>it shall be confirmed that it has been manufactured in conformity with the design specifications to ensure compliance with the relevant provisions of these Regulations and any applicable certificate of approval.</u> The following requirements shall also be fulfilled, <u>if applicable</u>:</p> <p>(a) If the <i>design</i> pressure of the <i>containment system</i> exceeds 35 kPa (gauge), it shall be ensured that the <i>containment system</i> of each <del>package</del> <i>packaging</i> conforms to the approved <i>design</i> requirements relating to the capability of that system to maintain its integrity under that pressure.</p> <p>(b) For each <u><i>packaging intended for use as a Type B(U), Type B(M) and or Type C package</i></u> and for each <del>package containing</del> <i>packaging intended to contain</i> <i>fissile material</i>, it shall be ensured that the effectiveness of its shielding and containment and, where necessary, the heat transfer characteristics and the effectiveness of the <i>confinement system</i>, are within the limits applicable to or specified for the approved <i>design</i>.</p> <p>(c) For <del>packages containing</del> <u><i>each packaging intended to contain</i></u> <i>fissile material</i>, <u>it shall be ensured that the effectiveness of the criticality safety features is within the limits applicable to or specified for the design, and in particular</u> where, in order to comply with the requirements of para. <del>671</del> <u>673</u>, neutron poisons are specifically included <del>as components of the package</del>, checks shall be performed to confirm the presence and distribution of those neutron poisons.</p>	
<b>REQUIREMENTS BEFORE EACH SHIPMENT</b>	<b>REQUIREMENTS BEFORE EACH SHIPMENT</b>	
<i>Not in TS-R-1 (2009).</i>	<u>502. Before each shipment of any package, it shall be ensured that the</u>	



	<p><u>package contains neither:</u></p> <p><u>(a) Radionuclides different from those specified for the <i>package design</i>;</u> <u>nor</u></p> <p><u>(b) Contents in a form, or physical or chemical state different from those specified for the <i>package design</i>.</u></p>	
<p>502. Before each <i>shipment</i> of any <i>package</i>, the following requirements shall be fulfilled:</p> <p>(a) For any <i>package</i> it shall be ensured that all the requirements specified in the relevant provisions of these Regulations have been satisfied.</p> <p>(b) It shall be ensured that lifting attachments which do not meet the requirements of para. 607 have been removed or otherwise rendered incapable of being used for lifting the <i>package</i>, in accordance with para. 608.</p> <p>(c) For each <i>package</i> requiring <i>competent authority approval</i>, it shall be ensured that all the requirements specified in the approval certificates have been satisfied.</p> <p>(d) Each <i>Type B(U)</i>, <i>Type B(M)</i> and <i>Type C package</i> shall be held until equilibrium conditions have been approached closely enough to demonstrate compliance with the requirements for temperature and pressure unless an exemption from these requirements has received <i>unilateral approval</i>.</p> <p>(e) For each <i>Type B(U)</i>, <i>Type B(M)</i> and <i>Type C package</i>, it shall be ensured by inspection and/or appropriate tests that all closures, valve and other openings of the <i>containment system</i> through which the <i>radioactive contents</i> might escape are properly closed and, where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of paras 657 and 669 were made.</p>	<p><del>502</del> <u>503.</u> Before each <i>shipment</i> of any <i>package</i>, <del>the following requirements shall be fulfilled:</del> (a) <del>For any <i>package</i> it shall be ensured that all the requirements specified in the relevant provisions of these Regulations</del> <u>and in the applicable certificates of approval</u> have been <del>satisfied</del> <u>fulfilled</u>. <u>The following requirements shall also be fulfilled, if applicable:</u></p> <p>(<del>a</del>) It shall be ensured that lifting attachments <del>which</del> <u>that</u> do not meet the requirements of para. <del>607</del> <u>608</u> have been removed or otherwise rendered incapable of being used for lifting the <i>package</i>, in accordance with para. <del>608</del> <u>609</u>.</p> <p><del>(c)</del> <del>For each <i>package</i> requiring <i>competent authority approval</i>, it shall be ensured that all the requirements specified in the approval certificates have been satisfied.</del></p> <p>(<del>b</del>) Each <i>Type B(U)</i>, <i>Type B(M)</i> and <i>Type C package</i> shall be held until equilibrium conditions have been approached closely enough to demonstrate compliance with the requirements for temperature and pressure unless an exemption from these requirements has received <i>unilateral approval</i>.</p> <p>(<del>c</del>) For each <i>Type B(U)</i>, <i>Type B(M)</i> and <i>Type C package</i>, it shall be ensured by inspection and/or appropriate tests that all closures, valve and other openings of the <i>containment system</i> through which the <i>radioactive contents</i> might escape are properly closed and, where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of paras <del>657</del></p>	

<p>(f) For each <i>special form radioactive material</i>, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied.</p> <p>(g) For <i>packages</i> containing <i>fissile material</i> the measurement specified in para. 674(b) and the tests to demonstrate closure of each <i>package</i> as specified in para. 677 shall be performed where applicable.</p> <p>(h) For each <i>low dispersible radioactive material</i>, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied.</p>	<p><a href="#">659</a> and <del>669</del> <a href="#">671</a> were made.</p> <p><del>(f) For each <i>special form radioactive material</i>, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied.</del></p> <p><del>(d)</del> <a href="#">677</a> <a href="#">677</a> (b) For <i>packages</i> containing <i>fissile material</i> the measurement specified in para. <del>674</del> <a href="#">677</a> (b) and the tests to demonstrate closure of each <i>package</i> as specified in para. <del>677</del> <a href="#">680</a> shall be performed <del>where applicable.</del></p> <p><del>(h) For each <i>low dispersible radioactive material</i>, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied.</del></p>	
TRANSPORT OF OTHER GOODS	TRANSPORT OF OTHER GOODS	
<p>503. A <i>package</i> shall not contain any items other than those that are necessary for the use of the <i>radioactive material</i>. The interaction between these items and the <i>package</i>, under the conditions of transport applicable to the <i>design</i>, shall not reduce the safety of the <i>package</i>.</p>	<p><del>503</del> <a href="#">504</a>. A <i>package</i> shall not contain any items other than those that are necessary for the use of the <i>radioactive material</i>. The interaction between these items and the <i>package</i>, under the conditions of transport applicable to the <i>design</i>, shall not reduce the safety of the <i>package</i>.</p>	
<p>504. <i>Packagings</i>, including <i>IBCs</i>, and <i>tanks</i> used for the transport of <i>radioactive material</i> shall not be used for the storage or transport of other goods unless decontaminated below the level of 0.4 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i> and 0.04 Bq/cm<sup>2</sup> for all other alpha emitters.</p>	<p><del>504</del> <a href="#">505</a>. <i>Packagings</i>, including <a href="#">Freight containers</a>, <i>IBCs</i>, <i>tanks</i>, <a href="#">as well as other packagings and overpacks</a>, used for the transport of <i>radioactive material</i> shall not be used for the storage or transport of other goods unless decontaminated below the level of 0.4 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i> and 0.04 Bq/cm<sup>2</sup> for all other alpha emitters.</p>	
<p>505. <i>Consignments</i> shall be segregated from other dangerous goods during transport in compliance with the relevant transport regulations for dangerous goods of each of the countries <i>through or into</i> which the materials will be transported, and, where applicable, with the regulations of the cognizant transport organizations, as well as these Regulations.</p>	<p><del>505</del> <a href="#">506</a>. <i>Consignments</i> shall be segregated from other dangerous goods during transport in compliance with the relevant transport regulations for dangerous goods of each of the countries <i>through or into</i> which the materials will be transported, and, where applicable, with the regulations of the cognizant transport organizations, as well as these Regulations.</p>	



OTHER DANGEROUS PROPERTIES OF CONTENTS	OTHER DANGEROUS PROPERTIES OF CONTENTS	
<p>506. In addition to the radioactive and fissile properties, any other dangerous properties of the contents of the <i>package</i>, 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 transport regulations for dangerous goods of each of the countries <i>through or into</i> which the materials will be transported, and, where applicable, with the regulations of the cognizant transport organizations, as well as these Regulations.</p>	<p><del>506</del> 507. In addition to the radioactive and fissile properties, any other dangerous properties of the contents of the <i>package</i>, 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 transport regulations for dangerous goods of each of the countries <i>through or into</i> which the materials will be transported, and, where applicable, with the regulations of the cognizant transport organizations, as well as these Regulations.</p>	
REQUIREMENTS AND CONTROLS FOR CONTAMINATION AND FOR LEAKING PACKAGES	REQUIREMENTS AND CONTROLS FOR CONTAMINATION AND FOR LEAKING PACKAGES	
<p>507. The <i>non-fixed contamination</i> on the external surfaces of any <i>package</i> shall be kept as low as practicable and, under routine conditions of transport, shall not exceed the following limits:</p> <p>(a) 4 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>, and</p> <p>(b) 0.4 Bq/cm<sup>2</sup> for all other alpha emitters.</p> <p>These limits are applicable when averaged over any area of 300 cm<sup>2</sup> of any part of the surface.</p>	<p><del>507</del> 508. The <i>non-fixed contamination</i> on the external surfaces of any <i>package</i> shall be kept as low as practicable and, under routine conditions of transport, shall not exceed the following limits:</p> <p>(a) 4 Bq/cm<sup>2</sup> for beta and gamma emitters and <i>low toxicity alpha emitters</i>; <del>and</del></p> <p>(b) 0.4 Bq/cm<sup>2</sup> for all other alpha emitters.</p> <p>These limits are applicable when averaged over any area of 300 cm<sup>2</sup> of any part of the surface.</p>	
<p>508. Except as provided in para. 513, the level of <i>non-fixed contamination</i> on the external and internal surfaces of <i>overpacks</i>, <i>freight containers</i>, <i>tanks</i>, <i>IBCs</i> and <i>conveyances</i> shall not exceed the limits specified in para. 507.</p>	<p><del>508</del> 509. Except as provided in para. <del>513</del>514, the level of <i>non-fixed contamination</i> on the external and internal surfaces of <i>overpacks</i>, <i>freight containers</i>, <i>tanks</i>, <i>IBCs</i> and <i>conveyances</i> shall not exceed the limits specified in para. <del>507</del> 508.</p>	
<p>509. If it is evident that a <i>package</i> is damaged or leaking, or if it is suspected that the <i>package</i> may have leaked or been damaged, access to the <i>package</i> shall be restricted and a qualified person shall, as soon as possible, assess the extent of <i>contamination</i> and the resultant <i>radiation</i></p>	<p><del>509</del> 510. If it is evident that a <i>package</i> is damaged or leaking, or if it is suspected that the <i>package</i> may have leaked or been damaged, access to the <i>package</i> shall be restricted and a qualified person shall, as soon as</p>	

<p>level of the <i>package</i>. The scope of the assessment shall include the <i>package</i>, the <i>conveyance</i>, the adjacent loading and unloading areas, and, if necessary, all other material which has been carried in the <i>conveyance</i>. When necessary, additional steps for the protection of persons, property and the environment, in accordance with provisions established by the relevant <i>competent authority</i>, shall be taken to overcome and minimize the consequences of such leakage or damage.</p>	<p>possible, assess the extent of <i>contamination</i> and the resultant <i>radiation level</i> of the <i>package</i>. The scope of the assessment shall include the <i>package</i>, the <i>conveyance</i>, the adjacent loading and unloading areas, and, if necessary, all other material <del>which</del> <a href="#">that</a> has been carried in the <i>conveyance</i>. When necessary, additional steps for the protection of persons, property and the environment, in accordance with provisions established by the relevant <i>competent authority</i>, shall be taken to overcome and minimize the consequences of such leakage or damage.</p>	
<p>510. <i>Packages</i> which are damaged or leaking <i>radioactive contents</i> in excess of allowable limits for normal conditions of transport may be removed to an acceptable interim location under supervision, but shall not be forwarded until repaired or reconditioned and decontaminated.</p>	<p><del>510</del> <a href="#">511</a>. <i>Packages</i> <del>which</del> <a href="#">that</a> are damaged or leaking <i>radioactive contents</i> in excess of allowable limits for normal conditions of transport may be removed to an acceptable interim location under supervision, but shall not be forwarded until repaired or reconditioned and decontaminated.</p>	
<p>511. A <i>conveyance</i> and equipment used regularly for the transport of <i>radioactive material</i> shall be periodically checked to determine the level of <i>contamination</i>. The frequency of such checks shall be related to the likelihood of <i>contamination</i> and the extent to which <i>radioactive material</i> is transported.</p>	<p><del>511</del> <a href="#">512</a>. A <i>conveyance</i> and equipment used regularly for the transport of <i>radioactive material</i> shall be periodically checked to determine the level of <i>contamination</i>. The frequency of such checks shall be related to the likelihood of <i>contamination</i> and the extent to which <i>radioactive material</i> is transported.</p>	
<p>512. Except as provided in para. 513, any <i>conveyance</i>, or equipment or part thereof which has become contaminated above the limits specified in para. 507 in the course of the transport of <i>radioactive material</i>, or which shows a <i>radiation level</i> in excess of 5 µSv/h at the surface, shall be decontaminated as soon as possible by a qualified person and shall not be re-used unless the <i>non-fixed contamination</i> does not exceed the limits specified in para. 507 and the <i>radiation level</i> resulting from the <i>fixed contamination</i> on surfaces after decontamination is less than 5 µSv/h at the surface.</p>	<p><del>512</del> <a href="#">513</a>. Except as provided in para. <del>513</del> <a href="#">514</a>, any <i>conveyance</i>, or equipment or part thereof <del>which</del> <a href="#">that</a> has become contaminated above the limits specified in para. <del>507</del> <a href="#">508</a> in the course of the transport of <i>radioactive material</i>, or <del>which</del> <a href="#">that</a> shows a <i>radiation level</i> in excess of 5 µSv/h at the surface, shall be decontaminated as soon as possible by a qualified person and shall not be re-used unless <a href="#">the following conditions are fulfilled</a>:</p> <p>(a) <a href="#">The non-fixed contamination</a> <del>does</del> <a href="#">shall</a> not exceed the limits specified in para. <del>507</del><a href="#">508</a>. and</p> <p>(b) <a href="#">The radiation level</a> resulting from the <i>fixed contamination</i> <del>does</del> shall not exceed 5 µSv/h at the surface.</p>	

<p>513. A <i>freight container, tank, intermediate bulk container or conveyance</i> dedicated to the transport of unpackaged <i>radioactive material</i> under <i>exclusive use</i> shall be excepted from the requirements of paras 508 and 512 solely with regard to its internal surfaces and only for as long as it remains under that specific <i>exclusive use</i>.</p>	<p><del>513</del> <u>514</u>. A <i>freight container, tank, IBC or conveyance</i> dedicated to the transport of unpackaged <i>radioactive material</i> under <i>exclusive use</i> shall be excepted from the requirements of paras <del>508</del> <u>509</u> and <del>512</del> <u>513</u> solely with regard to its internal surfaces and only for as long as it remains under that specific <i>exclusive use</i>.</p>	
<p>REQUIREMENTS AND CONTROLS FOR TRANSPORT OF EXCEPTED PACKAGES</p>	<p>REQUIREMENTS AND CONTROLS FOR TRANSPORT OF EXCEPTED PACKAGES</p>	
<p>514 <i>Excepted packages</i> shall be subject only to the following provisions in Sections V and VI:</p> <p>(a) The requirements specified in paras 506, 507, 510, 515, 528–531 and 544(a);</p> <p>(b) The requirements for <i>excepted packages</i> specified in para. 620;</p> <p>(c) If the <i>excepted package</i> contains <i>fissile material</i>, one of the fissile exceptions provided by para. 417 shall apply and the requirement of para. 634 shall be met; and</p> <p>(d) The requirements specified in paras 576 and 577, if transported by post.</p> <p>All relevant provisions of the other sections shall also apply.</p>	<p><del>514</del> <u>515</u>. <i>Excepted packages</i> shall be subject only to the following provisions in Sections V and VI:</p> <p>(a) The requirements specified in <u>paras 503–505, 506, 507, 510, 507–513, 515, 528–531, 516, 530–533, and 545, 546 introductory sentence, 544 546(a) and (k), 550–553, 555, 556, 561, 564, 582 and 583;</u></p> <p>(b) The requirements for <i>excepted packages</i> specified in para. <del>620</del> <u>622</u>;</p> <p><del>(c) If the excepted package contains fissile material, one of the fissile exceptions provided by para. 417 shall apply, and the requirement of This implies that also para. 634–636 shall be complied with met; and</del></p> <p><del>(d)</del> <u>(c)</u> The requirements specified in paras <del>576</del> <u>580</u> and <del>577</del> <u>581</u>, if transported by post.</p> <p>All relevant provisions of the other sections shall <del>also</del> <u>apply to excepted packages. If the excepted package contains fissile material, one of the fissile exceptions provided by para. 417 shall apply.</u></p>	
<p>515. The <i>radiation level</i> at any point on the external surface of an <i>excepted package</i> shall not exceed 5 µSv/h.</p>	<p><del>515</del> <u>516</u>. The <i>radiation level</i> at any point on the external surface of an <i>excepted package</i> shall not exceed 5 µSv/h.</p>	
<p>REQUIREMENTS AND CONTROLS FOR TRANSPORT OF LSA MATERIAL AND SCO IN INDUSTRIAL PACKAGES OR</p>	<p>REQUIREMENTS AND CONTROLS FOR TRANSPORT OF LSA MATERIAL AND SCO IN INDUSTRIAL PACKAGES OR</p>	

UNPACKAGED	UNPACKAGED	
516. The quantity of <i>LSA material</i> or <i>SCO</i> in a single <i>Type IP-1</i> , <i>Type IP-2</i> , <i>Type IP-3 package</i> , or object or collection of objects, whichever is appropriate, shall be so restricted that the external <i>radiation level</i> at 3 m from the unshielded material or object or collection of objects does not exceed 10 mSv/h.	<del>516</del> 517. The quantity of <i>LSA material</i> or <i>SCO</i> in a single <i>Type IP-1</i> , <i>Type IP-2</i> , <i>Type IP-3 package</i> , or object or collection of objects, whichever is appropriate, shall be so restricted that the external <i>radiation level</i> at 3 m from the unshielded material or object or collection of objects does not exceed 10 mSv/h.	
517. For <i>LSA material</i> and <i>SCO</i> which is or contains <i>fissile material</i> , the applicable requirements of paras 565, 566 and 671 shall be met.	<del>517</del> 518. For <i>LSA material</i> and <i>SCO</i> <del>which</del> <u>that is</u> <del>is</del> <u>are</u> or contains <i>fissile material</i> , <u>that is not excepted under para. 417</u> , the applicable requirements of paras <del>565</del> 568 and <del>566</del> 569 <del>and 671</del> shall be met.	
	<u>519. For <i>LSA material</i> and <i>SCO</i> that are or contain <i>fissile material</i>, the applicable requirements of para. 673 shall be met.</u>	
<p>518. <i>LSA material</i> and <i>SCO</i> in groups <i>LSA-I</i> and <i>SCO-I</i> may be transported, unpackaged, under the following conditions:</p> <p>(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 <i>radioactive contents</i> from the <i>conveyance</i> nor will there be any loss of shielding;</p> <p>(b) Each <i>conveyance</i> shall be under <i>exclusive use</i>, except when only transporting <i>SCO-I</i> on which the <i>contamination</i> on the accessible and the inaccessible surfaces is not greater than ten times the applicable level specified in para. 214; and</p> <p>(c) For <i>SCO-I</i> where it is suspected that <i>non-fixed contamination</i> exists on inaccessible surfaces in excess of the values specified in para. 413(a)(i), measures shall be taken to ensure that the <i>radioactive material</i> is not released into the <i>conveyance</i>.</p>	<p><del>518</del> 520. <i>LSA material</i> and <i>SCO</i> in groups <i>LSA-I</i> and <i>SCO-I</i> may be transported, unpackaged, under the following conditions:</p> <p>(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 <i>radioactive contents</i> from the <i>conveyance</i> nor will there be any loss of shielding;</p> <p>(b) Each <i>conveyance</i> shall be under <i>exclusive use</i>, except when only transporting <i>SCO-I</i> on which the <i>contamination</i> on the accessible and the inaccessible surfaces is not greater than <del>ten</del> 10 times the applicable level specified in para. 214; <del>and</del></p> <p>(c) For <i>SCO-I</i> where it is suspected that <i>non-fixed contamination</i> exists on inaccessible surfaces in excess of the values specified in para. 413(a)(i), measures shall be taken to ensure that the <i>radioactive material</i> is not released into the <i>conveyance</i>.</p> <p><u>(d) Unpackaged <i>fissile material</i> shall meet the requirements of para. 417 (e).</u></p>	
TABLE 6. INDUSTRIAL PACKAGE REQUIREMENTS FOR LSA	TABLE <del>6</del> 5. INDUSTRIAL PACKAGE REQUIREMENTS FOR LSA	

<p>MATERIAL AND SCO</p> <p><sup>a</sup> Under the conditions specified in para. 518, <i>LSA-I material</i> and <i>SCO-I</i> may be transported unpackaged.</p>	<p>MATERIAL AND SCO</p> <p><sup>a</sup> Under the conditions specified in para. <del>518</del> 520, <i>LSA-I material</i> and <i>SCO-I</i> may be transported unpackaged.</p>	
<p>519. <i>LSA material</i> and <i>SCO</i>, except as otherwise specified in para. 518, shall be packaged in accordance with Table 6.</p>	<p><del>519</del> 521. <i>LSA material</i> and <i>SCO</i>, except as otherwise specified in para. <del>518</del> 520, shall be packaged in accordance with Table <del>6</del> 5.</p>	
<p>520. The total activity in a single hold or compartment of an inland waterway craft, or in another <i>conveyance</i>, for carriage of <i>LSA material</i> or <i>SCO</i> in a <i>Type IP-1</i>, <i>Type IP-2</i>, <i>Type IP-3</i> package or unpackaged, shall not exceed the limits shown in Table 7.</p>	<p><del>520</del> 522. The total activity in a single hold or compartment of an inland waterway craft, or in another <i>conveyance</i>, for carriage of <i>LSA material</i> or <i>SCO</i> in a <i>Type IP-1</i>, <i>Type IP-2</i>, <i>Type IP-3</i> package or unpackaged, shall not exceed the limits shown in Table <del>7</del> 6.</p>	
<p>DETERMINATION OF TRANSPORT INDEX</p>	<p>DETERMINATION OF TRANSPORT INDEX</p>	
<p>521. The <i>TI</i> for a <i>package</i>, <i>overpack</i> or <i>freight container</i>, or for unpackaged <i>LSA-I</i> or <i>SCO-I</i>, shall be the number derived in accordance with the following procedure:</p> <p>(a) Determine the maximum <i>radiation level</i> in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the <i>package</i>, <i>overpack</i>, <i>freight container</i> or unpackaged <i>LSA-I</i> and <i>SCO-I</i>. The value determined shall be multiplied by 100 and the resulting number is the <i>TI</i>. For uranium and thorium ores and their concentrates, the maximum <i>radiation level</i> at any point 1 m from the external surface of the load may be taken as:</p> <ul style="list-style-type: none"> <li>(i) 0.4 mSv/h for ores and physical concentrates of uranium and thorium;</li> <li>(ii) 0.3 mSv/h for chemical concentrates of thorium;</li> <li>(iii) 0.02 mSv/h for chemical concentrates of uranium, other than uranium hexafluoride.</li> </ul> <p>(b) For <i>tanks</i>, <i>freight containers</i> and unpackaged <i>LSA-I</i> and <i>SCO-I</i>, the value determined in step (a) shall be multiplied by the</p>	<p><del>521</del> 523. The <i>TI</i> for a <i>package</i>, <i>overpack</i> or <i>freight container</i>, or for unpackaged <i>LSA-I</i> or <i>SCO-I</i>, shall be the number derived in accordance with the following procedure:</p> <p>(a) Determine the maximum <i>radiation level</i> in units of millisieverts per hour (mSv/h) at a distance of 1 m from the external surfaces of the <i>package</i>, <i>overpack</i>, <i>freight container</i> or unpackaged <i>LSA-I</i> and <i>SCO-I</i>. The value determined shall be multiplied by 100 and the resulting number is the <i>TI</i>. For uranium and thorium ores and their concentrates, the maximum <i>radiation level</i> at any point 1 m from the external surface of the load may be taken as:</p> <ul style="list-style-type: none"> <li>(i) 0.4 mSv/h for ores and physical concentrates of uranium and thorium;</li> <li>(ii) 0.3 mSv/h for chemical concentrates of thorium;</li> <li>(iii) 0.02 mSv/h for chemical concentrates of uranium, other than uranium hexafluoride.</li> </ul> <p>(b) For <i>tanks</i>, <i>freight containers</i> and unpackaged <i>LSA-I</i> and <i>SCO-I</i>, the value determined in step (a) shall be multiplied by the appropriate factor from Table <del>8</del> 7.</p> <p>(c) The value obtained in steps (a) and (b) shall be rounded up to the first decimal place (e.g. 1.13 becomes 1.2), except that a value of</p>	

appropriate factor from Table 8. (c) The value obtained in steps (a) and (b) shall be rounded up to the first decimal place (e.g. 1.13 becomes 1.2), except that a value of 0.05 or less may be considered as zero.	0.05 or less may be considered as zero.													
TABLE 7. CONVEYANCE ACTIVITY LIMITS FOR LSA MATERIAL AND SCO IN INDUSTRIAL PACKAGES OR UNPACKAGED	TABLE <del>7</del> 6. CONVEYANCE ACTIVITY LIMITS FOR LSA MATERIAL AND SCO IN INDUSTRIAL PACKAGES OR UNPACKAGED													
<table> <tr> <th>Nature of material</th><th>Activity limit for conveyances other than By inland waterway</th><th>Activity limit for a hold or compartment of an inland waterway craft</th></tr> <tr> <td></td><td></td><td></td></tr> </table>	Nature of material	Activity limit for conveyances other than By inland waterway	Activity limit for a hold or compartment of an inland waterway craft				<table> <tr> <th>Nature of material</th><th>Activity limit for conveyances other than <del>By</del> inland waterway <u>craft</u></th><th>Activity limit for a hold or compartment of an inland waterway craft</th></tr> <tr> <td></td><td></td><td></td></tr> </table>	Nature of material	Activity limit for conveyances other than <del>By</del> inland waterway <u>craft</u>	Activity limit for a hold or compartment of an inland waterway craft				
Nature of material	Activity limit for conveyances other than By inland waterway	Activity limit for a hold or compartment of an inland waterway craft												
Nature of material	Activity limit for conveyances other than <del>By</del> inland waterway <u>craft</u>	Activity limit for a hold or compartment of an inland waterway craft												
522. The <i>TI</i> for each <i>overpack</i> , <i>freight container</i> or <i>conveyance</i> shall be determined as either the sum of the <i>TIs</i> of all the <i>packages</i> contained, or by direct measurement of <i>radiation level</i> , except in the case of non-rigid <i>overpacks</i> , for which the <i>TI</i> shall be determined only as the sum of the <i>TIs</i> of all the <i>packages</i> .	<del>522</del> 524. The <i>TI</i> for each <i>overpack</i> , <i>freight container</i> or <i>conveyance</i> shall be determined as either the sum of the <i>TIs</i> of all the <i>packages</i> contained, or by direct measurement of <i>radiation level</i> , except in the case of non-rigid <i>overpacks</i> , for which the <i>TI</i> shall be determined only as the sum of the <i>TIs</i> of all the <i>packages</i> .													
TABLE 8. MULTIPLICATION FACTORS FOR TANKS, FREIGHT CONTAINERS, AND UNPACKAGED LSA-I AND SCO-I	TABLE <del>8</del> 7. MULTIPLICATION FACTORS FOR TANKS, FREIGHT CONTAINERS, AND UNPACKAGED LSA-I AND SCO-I													
DETERMINATION OF CRITICALITY SAFETY INDEX FOR CONSIGNMENTS, FREIGHT CONTAINERS AND OVERPACKS	DETERMINATION OF CRITICALITY SAFETY INDEX FOR CONSIGNMENTS, FREIGHT CONTAINERS AND OVERPACKS													
523. The <i>CSI</i> for each <i>overpack</i> or <i>freight container</i> shall be determined as the sum of the <i>CSIs</i> of all the <i>packages</i> contained. The same procedure shall be followed for determining the total sum of the <i>CSIs</i> in a <i>consignment</i> or aboard a <i>conveyance</i> .	<del>523</del> 525. The <i>CSI</i> for each <i>overpack</i> or <i>freight container</i> shall be determined as the sum of the <i>CSIs</i> of all the <i>packages</i> contained. The same procedure shall be followed for determining the total sum of the <i>CSIs</i> in a <i>consignment</i> or aboard a <i>conveyance</i> .													
LIMITS ON TRANSPORT INDEX, CRITICALITY SAFETY INDEX AND RADIATION LEVELS FOR PACKAGES AND OVERPACKS	LIMITS ON TRANSPORT INDEX, CRITICALITY SAFETY INDEX AND RADIATION LEVELS FOR PACKAGES AND OVERPACKS													
524. Except for <i>consignments</i> under <i>exclusive use</i> , the <i>TI</i> of any <i>package</i> or <i>overpack</i> shall not exceed 10, nor shall the <i>CSI</i> of any <i>package</i> or <i>overpack</i> exceed 50.	<del>524</del> 526. Except for <i>consignments</i> under <i>exclusive use</i> , the <i>TI</i> of any <i>package</i> or <i>overpack</i> shall not exceed 10, nor shall the <i>CSI</i> of any													



	<i>package or overpack</i> exceed 50.	
525. Except for <i>packages</i> or <i>overpacks</i> transported under <i>exclusive use</i> by rail or by road under the conditions specified in para. 569(a), or under <i>exclusive use</i> and <i>special arrangement</i> by vessel or by air under the conditions specified in paras 571 or 575, respectively, the maximum <i>radiation level</i> at any point on the external surface of a <i>package</i> or <i>overpack</i> shall not exceed 2 mSv/h.	<del>525</del> 527. Except for <i>packages</i> or <i>overpacks</i> transported under <i>exclusive use</i> by rail or by road under the conditions specified in para. <del>569</del> 573(a), or under <i>exclusive use</i> and <i>special arrangement</i> by vessel or by air under the conditions specified in paras <del>571</del> 575 or <del>575</del> 579, respectively, the maximum <i>radiation level</i> at any point on the external surface of a <i>package</i> or <i>overpack</i> shall not exceed 2 mSv/h.	
526. The maximum <i>radiation level</i> at any point on the external surface of a <i>package</i> or <i>overpack</i> under <i>exclusive use</i> shall not exceed 10 mSv/h.	<del>526</del> 528. The maximum <i>radiation level</i> at any point on the external surface of a <i>package</i> or <i>overpack</i> under <i>exclusive use</i> shall not exceed 10 mSv/h.	
CATEGORIES	CATEGORIES	
527. <i>Packages</i> and <i>overpacks</i> shall be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table 9 and with the following requirements:  (a) For a <i>package</i> or <i>overpack</i> , both the <i>TI</i> and the surface <i>radiation level</i> conditions shall be taken into account in determining which category is appropriate. Where the <i>TI</i> satisfies the condition for one category but the surface <i>radiation level</i> satisfies the condition for a different category, the <i>package</i> or <i>overpack</i> shall be assigned to the higher category. For this purpose, category I-WHITE shall be regarded as the lowest category.  (b) The <i>TI</i> shall be determined following the procedures specified in paras 521 and 522.  (c) If the surface <i>radiation level</i> is greater than 2 mSv/h, the <i>package</i> or <i>overpack</i> shall be transported under <i>exclusive use</i> and under the provisions of paras 569(a), 571 or 575, as appropriate.  (d) A <i>package</i> transported under a <i>special arrangement</i> shall be	<del>527</del> 529. <i>Packages and overpacks and freight containers</i> shall be assigned to either category I-WHITE, II-YELLOW or III-YELLOW in accordance with the conditions specified in Table <del>9</del> 8 and with the following requirements:  (a) For a <i>package, or overpack or freight container</i> , both the <i>TI</i> and the surface <i>radiation level</i> conditions shall be taken into account in determining which category is appropriate. Where the <i>TI</i> satisfies the condition for one category but the surface <i>radiation level</i> satisfies the condition for a different category, the <i>package, or overpack or freight container</i> shall be assigned to the higher category. For this purpose, category I-WHITE shall be regarded as the lowest category.  (b) The <i>TI</i> shall be determined following the procedures specified in paras <del>521</del> 523 and <del>522</del> 524.  (c) If the surface <i>radiation level</i> is greater than 2 mSv/h, the <i>package</i> or <i>overpack</i> shall be transported under <i>exclusive use</i> and under the	



<p>assigned to category III-YELLOW except under the provisions of para. 528.</p> <p>(e) An <i>overpack</i> which contains <i>packages</i> transported under <i>special arrangement</i> shall be assigned to category III-YELLOW except under the provisions of para. 528.</p>	<p>provisions of paras <del>569</del> 573(a), <del>571</del> 575 or <del>575</del> 579, as appropriate.</p> <p>(d) A <i>package</i> transported under a <i>special arrangement</i> shall be assigned to category III-YELLOW except under the provisions of para. <del>528</del> 530.</p> <p>(e) An <i>overpack</i> <u>or freight container</u> <del>which</del> that contains <i>packages</i> transported under <i>special arrangement</i> shall be assigned to category III-YELLOW except under the provisions of para. <del>528</del> 530.</p>																			
<p>TABLE 9. CATEGORIES OF PACKAGES AND OVERPACKS</p> <table> <tr> <th colspan="3">Conditions</th></tr> <tr> <th><i>TI</i></th><th>Maximum <i>radiation level</i> at any point on external surface</th><th>Category</th></tr> <tr> <td>0<sup>a</sup></td><td>Not more than 0.005 mSv/h</td><td>I-WHITE</td></tr> <tr> <td>More than 0 but not more than 1<sup>a</sup></td><td>More than 0.005 mSv/h but not more than 0.5 mSv/h</td><td>II-YELLOW</td></tr> <tr> <td>More than 1 but not more than 10</td><td>More than 0.5 mSv/h but not more than 2 mSv/h</td><td>III-YELLOW</td></tr> <tr> <td>More than 10</td><td>More than 2 mSv/h but not more than 10 mSv/h</td><td>III-YELLOW<sup>b</sup></td></tr> </table> <p><sup>a</sup> If the measured <i>TI</i> is not greater than 0.05, the value quoted may be zero in accordance with para. 521(c).</p> <p><sup>b</sup> Shall also be transported under <i>exclusive use</i>.</p>	Conditions			<i>TI</i>	Maximum <i>radiation level</i> at any point on external surface	Category	0 <sup>a</sup>	Not more than 0.005 mSv/h	I-WHITE	More than 0 but not more than 1 <sup>a</sup>	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 <sup>b</sup>		
Conditions																				
<i>TI</i>	Maximum <i>radiation level</i> at any point on external surface	Category																		
0 <sup>a</sup>	Not more than 0.005 mSv/h	I-WHITE																		
More than 0 but not more than 1 <sup>a</sup>	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 <sup>b</sup>																		
	<p>TABLE 9. 8. CATEGORIES OF PACKAGES, <del>AND</del> OVERPACKS <u>AND FREIGHT CONTAINERS</u><sup>d</sup></p> <table> <tr> <th colspan="3">Conditions</th></tr> <tr> <th><i>TI</i></th><th>Maximum <i>radiation level</i> at any point on external surface</th><th>Category</th></tr> <tr> <td>0<sup>a</sup></td><td>Not more than 0.005 mSv/h</td><td>I-WHITE</td></tr> </table>	Conditions			<i>TI</i>	Maximum <i>radiation level</i> at any point on external surface	Category	0 <sup>a</sup>	Not more than 0.005 mSv/h	I-WHITE										
Conditions																				
<i>TI</i>	Maximum <i>radiation level</i> at any point on external surface	Category																		
0 <sup>a</sup>	Not more than 0.005 mSv/h	I-WHITE																		

	<p>More than 0 but not more than 1<sup>a</sup>      More than 0.005 mSv/h but not more than 0.5 mSv/h      II-YELLOW</p> <p>More than 1 but not more than 10<sup>e</sup>      More than 0.5 mSv/h but not more than 2 mSv/h      III-YELLOW</p> <p>More than 10<sup>e</sup>      More than 2 mSv/h but not more than 10 mSv/h      III-YELLOW<sup>b</sup></p> <p><sup>a</sup> If the measured <i>TI</i> is not greater than 0.05, the value quoted may be zero in accordance with para. <del>521</del> <u>523</u>(c).</p> <p><sup>b</sup> Shall also be transported under <i>exclusive use</i> <u>except for freight containers, see Table 10.</u></p>	
MARKING, LABELLING AND PLACARDING	MARKING, LABELLING AND PLACARDING	
528. For each <i>package</i> or <i>overpack</i> the UN number and proper shipping name shall be determined (see Table 1). In all cases of international transport of <i>packages</i> requiring <i>competent authority design</i> or <i>shipment</i> approval, for which different approval types apply in the different countries concerned by the <i>shipment</i> , the UN number, proper shipping name, categorization, labelling and marking shall be in accordance with the certificate of the country of origin of <i>design</i> .	<del>528</del> <u>530</u> . For each <i>package</i> or <i>overpack</i> the UN number and proper shipping name shall be determined (see Table 1). In all cases of international transport of <i>packages</i> requiring <i>competent authority approval</i> of <i>design</i> or <i>shipment approval</i> , for which different approval types apply in the different countries concerned by the <i>shipment</i> , the UN number, proper shipping name, categorization, labelling and marking shall be in accordance with the certificate of the country of origin of <i>design</i> .	
Marking	Marking	
529. Each <i>package</i> shall be legibly and durably marked on the outside of the <i>packaging</i> with an identification of either the <i>consignor</i> or <i>consignee</i> , or both.	<del>529</del> <u>531</u> . Each <i>package</i> shall be legibly and durably marked on the outside of the <i>packaging</i> with an identification of either the <i>consignor</i> or <i>consignee</i> , or both. <u>Each overpack shall be legibly and durably marked on the outside of the overpack with an identification of either the consignor or consignee, or both unless these markings of all the packages within the overpack are clearly visible.</u>	
530. Each <i>package</i> and <i>overpack</i> shall be legibly and durably marked on the outside with the UN marking as specified in Table 10. Additionally, each <i>overpack</i> shall be legibly and durably marked with the word “OVERPACK”.	<del>530</del> <u>532</u> . Each <i>package</i> <del>and overpack</del> shall be legibly and durably marked on the outside with the UN marking as specified in Table <del>10</del> <u>9</u> . Additionally, each <i>overpack</i> shall be legibly and durably marked with the word “OVERPACK” <u>and the UN marking as specified in Table 9 unless all markings of the packages within the overpack are clearly</u>	

		<a href="#">visible.</a>	
TABLE 10. UN MARKING FOR PACKAGES AND OVERPACKS			
Item	UN marking <sup>a</sup>		
<i>Package</i> (other than an <i>excepted package</i> )	UN number, preceded by the letters “UN”, and the proper shipping name.		
<i>Excepted package</i> (other than those in <i>consignments</i> accepted for international movement by post)	UN number, preceded by the letters “UN”		
<i>Overpack</i> (other than an <i>overpack</i> containing only <i>excepted packages</i> )	UN number, preceded by the letters “UN” for each applicable United Nations number in the <i>overpack</i> , followed by the proper shipping name in the case of a non- <i>excepted package</i>		
<i>Overpack</i> containing only <i>excepted packages</i> (other than <i>consignments</i> accepted for international movement by post)	UN number, preceded by the letters “UN”. If more than one UN number is carried within the <i>overpack</i> , then each applicable UN number preceded by the letters “UN”.		
<i>Consignment</i> accepted for international movement by post	The requirement of para. 577.		
* See Table 1 for listing of UN number and proper shipping name.			
	TABLE 9. UN MARKING FOR PACKAGES AND OVERPACKS		
	Item	UN marking <sup>a</sup>	
	<i>Package</i> (other than an <i>excepted package</i> )	UN number, preceded by the letters “UN”, and the proper shipping name.	

	<p><i>Excepted package</i> (other than those in <i>consignments</i> accepted for international movement by post)</p> <p><i>Overpack</i> (other than an <i>overpack</i> containing only <i>excepted packages</i>)</p> <p><i>Overpack</i> containing only <i>excepted packages</i> (other than <i>consignments</i> accepted for international movement by post)</p> <p><i>Consignment</i> accepted for international movement by post</p> <hr/> <p>* See Table 1 for listing of UN numbers<u>s</u> and proper shipping names<u>s</u>.</p>	<p>UN number, preceded by the letters “UN”</p> <p>UN number, preceded by the letters “UN” for each applicable UN number in the <i>overpack</i>, followed by the proper shipping name in the case of a non-excepted <i>package</i></p> <p>UN number, preceded by the letters “UN”.<del>—If more than one UN number is carried within the overpack, then each applicable UN number preceded by the letters “UN”</del> <u>for each applicable UN number in the overpack</u></p> <p>The requirement of para. <del>577</del> <u>581</u>.</p>	
531. Each <i>package</i> of gross mass exceeding 50 kg shall have its permissible gross mass legibly and durably marked on the outside of the <i>packaging</i> .	<del>531</del> <u>533</u> . Each <i>package</i> of gross mass exceeding 50 kg shall have its permissible gross mass legibly and durably marked on the outside of the <i>packaging</i> .		
532. Each <i>package</i> which conforms to:  (a) An <i>IP-1</i> , <i>IP-2</i> or <i>IP-3 design</i> shall be legibly and durably marked on the outside of the <i>packaging</i> with “TYPE IP-1”, “TYPE IP-2” or “TYPE IP-3” as appropriate;  (b) A <i>Type A package design</i> shall be legibly and durably marked on the outside of the <i>packaging</i> with “TYPE A”;  (c) An <i>IP-2</i> , <i>IP-3</i> or a <i>Type A package design</i> shall be legibly and	<del>532</del> <u>534</u> . Each <i>package</i> <del>which</del> <u>that</u> conforms to:  (a) An <i>IP-1</i> , <i>IP-2</i> or <i>IP-3 design</i> shall be legibly and durably marked on the outside of the <i>packaging</i> with “TYPE IP-1”, “TYPE IP-2” or “TYPE IP-3” as appropriate <del>;</del> .  (b) A <i>Type A package design</i> shall be legibly and durably marked on the outside of the <i>packaging</i> with “TYPE A” <del>;</del> .  (c) An <i>IP-2</i> , <i>IP-3</i> or a <i>Type A package design</i> shall be legibly and		

\* See Table 1 for listing of UN numbers and proper shipping names.

durably marked on the outside of the <i>packaging</i> with the international vehicle registration code (VRI code) of the country of origin of <i>design</i> and either the name of the manufacturer or other identification of the <i>packaging</i> specified by the <i>competent authority</i> of the country of origin of <i>design</i> .	durably marked on the outside of the <i>packaging</i> with the international vehicle registration code (VRI code) of the country of origin of <i>design</i> and either the name of the manufacturer or other identification of the <i>packaging</i> specified by the <i>competent authority</i> of the country of origin of <i>design</i> .	
<p>533. Each <i>package</i> which conforms to a <i>design</i> approved under paras 805–814 or 816, 817 shall be legibly and durably marked on the outside of the <i>packaging</i> with:</p> <p>(a) The identification mark allocated to that <i>design</i> by the <i>competent authority</i>;</p> <p>(b) A serial number to identify uniquely each <i>packaging</i> which conforms to that <i>design</i>;</p> <p>(c) In the case of a <i>Type B(U)</i> or <i>Type B(M)</i> package design, with “TYPE B(U)” or “TYPE B(M)”; and</p> <p>(d) In the case of a <i>Type C</i> package design, with “TYPE C”.</p>	<p><del>533</del> 535. Each <i>package</i> <del>which</del> <u>that</u> conforms to a <i>design</i> approved under <u>one or more of the</u> paras <del>805–814</del> <u>807–816</u> <del>or</del> <u>and</u> <del>816</del> <u>820</u>, <del>817</del> shall be legibly and durably marked on the outside of the <i>packaging</i> with <u>the following information</u>:</p> <p>(a) The identification mark allocated to that <i>design</i> by the <i>competent authority</i>;</p> <p>(b) A serial number to <u>uniquely</u> identify <del>uniquely</del> each <i>packaging</i> <del>which</del> <u>that</u> conforms to that <i>design</i>;</p> <p>(c) <u>“TYPE B(U)”, “TYPE B(M)”, or “TYPE C”</u>, <del>in the case of a Type B(U), or Type B(M) or Type C package design, with “TYPE B(U)” or “TYPE B(M)”, and.</del></p> <p><del>(d) In the case of a Type C package design, with “TYPE C”.</del></p>	
534. Each <i>package</i> which conforms to a <i>Type B(U)</i> , <i>Type B(M)</i> or <i>Type C</i> package design shall have the outside of the outermost receptacle, which is resistant to the effects of fire and water, plainly marked by embossing, stamping or other means resistant to the effects of fire and water with the trefoil symbol shown in Fig. 1.	<del>534</del> 536. Each <i>package</i> <del>which</del> <u>that</u> conforms to a <i>Type B(U)</i> , <i>Type B(M)</i> or <i>Type C</i> package design shall have the outside of the outermost receptacle, <del>which</del> <u>that</u> is resistant to the effects of fire and water, plainly marked by embossing, stamping or other means resistant to the effects of fire and water with the trefoil symbol shown in Fig. 1.	
535. Where <i>LSA-I</i> or <i>SCO-I</i> material is contained in receptacles or wrapping materials and is transported under <i>exclusive use</i> as permitted by para. 518, the outer surface of these receptacles or wrapping materials may bear the marking “RADIOACTIVE LSA-I” or “RADIOACTIVE SCO-I” as appropriate.	<del>535</del> 537. Where <i>LSA-I</i> or <i>SCO-I</i> material is contained in receptacles or wrapping materials and is transported under <i>exclusive use</i> as permitted by para. <del>518</del> <u>520</u> , the outer surface of these receptacles or wrapping materials may bear the marking “RADIOACTIVE LSA-I” or “RADIOACTIVE SCO-I” as appropriate.	
FIG. 1. Basic trefoil symbol with proportions based on a central circle of radius <i>X</i> . The minimum allowable size of <i>X</i> shall be 4 mm.	FIG. 1. Basic trefoil symbol with proportions based on a central circle of radius <i>X</i> . The minimum allowable size of <i>X</i> shall be 4 mm.	

Labelling	Labelling	
536. Each <i>package</i> , <i>overpack</i> and <i>freight container</i> shall bear the labels which conform to the models in Figs 2, 3 or 4, except as allowed under the alternative provisions of para. 541 for large <i>freight containers</i> and <i>tanks</i> , according to the appropriate category. In addition, each <i>package</i> , <i>overpack</i> and <i>freight container</i> containing <i>fissile material</i> , other than <i>fissile material</i> excepted under the provisions of para. 417, shall bear labels which conform to the model in Fig. 5. Any labels which do not relate to the contents shall be removed or covered. For <i>radioactive material</i> having other dangerous properties see para. 506.	<del>536</del> 538. Each <i>package</i> , <i>overpack</i> and <i>freight container</i> shall bear the labels <del>which</del> conforming to the <a href="#">applicable</a> models in Figs 2, <del>3 or</del> 4, except as allowed under the alternative provisions of para. <del>541</del> 543 for large <i>freight containers</i> and <i>tanks</i> , according to the appropriate category. In addition, each <i>package</i> , <i>overpack</i> and <i>freight container</i> containing <i>fissile material</i> , other than <i>fissile material</i> excepted under the provisions of para. 417, shall bear labels <del>which</del> conforming to the model in Fig. 5. Any labels <del>which</del> <a href="#">that</a> do not relate to the contents shall be removed or covered. For <i>radioactive material</i> having other dangerous properties see para. <del>506</del> 507.	
537. The labels conforming to the models in Figs 2, 3 and 4 shall be affixed to two opposite sides of the outside of a <i>package</i> or <i>overpack</i> or on the outside of all four sides of a <i>freight container</i> or <i>tank</i> . The labels conforming to the model in Fig. 5, where applicable, shall be affixed adjacent to the labels conforming to the models in Figs 2, 3 and 4. The labels shall not cover the markings specified in paras 529–534.	<del>537</del> 539. The labels conforming to the <a href="#">applicable</a> models in Figs 2, <del>3 and</del> 4 shall be affixed to two opposite sides of the outside of a <i>package</i> or <i>overpack</i> or on the outside of all four sides of a <i>freight container</i> or <i>tank</i> . The labels conforming to the model in Fig. 5, where applicable, shall be affixed adjacent to the labels conforming to the <a href="#">applicable</a> models in Figs <del>2, 3 and 4</del> 2–4. The labels shall not cover the markings specified in paras <del>529–534</del> 531–536.	
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.	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.	
Labelling for radioactive contents	Labelling for radioactive contents	
538. Each label conforming to the models in Figs 2–4 shall be completed with the following information:  (a) Contents: (i) Except for <i>LSA-I</i> material, the name(s) of the radionuclide(s) as taken from Table 2, using the symbols prescribed therein. For mixtures of radionuclides, the most restrictive nuclides must be listed to the extent the space on	<del>538</del> 540. Each label conforming to the <a href="#">applicable</a> models in Figs 2–4 shall be completed with the following information:  (a) Contents: (i) Except for <i>LSA-I</i> material, the name(s) of the radionuclide(s) as taken from Table 2, using the symbols prescribed therein. For mixtures of radionuclides, the most restrictive nuclides	

<p>the line permits. The group of <i>LSA</i> or <i>SCO</i> shall be shown following the name(s) of the radionuclide(s). The terms “<i>LSA-II</i>”, “<i>LSA-III</i>”, “<i>SCO-I</i>” and “<i>SCO-II</i>” shall be used for this purpose.</p> <p>(ii) For <i>LSA-I</i> material, the term “<i>LSA-I</i>” is all that is necessary; the name of the radionuclide is not necessary.</p> <p>(b) Activity: The maximum activity of the <i>radioactive contents</i> during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol (see Annex II). For <i>fissile material</i>, the mass of <i>fissile material</i> (or mass of each <i>fissile nuclide</i> for mixtures when appropriate) in units of grams (g), or multiples thereof, may be used in place of activity.</p> <p>(c) For <i>overpacks</i> and <i>freight containers</i> the “contents” and “activity” entries on the label shall bear the information required in paras 538(a) and (b), respectively, totalled together for the entire contents of the <i>overpack</i> or <i>freight container</i> except that on labels for <i>overpacks</i> or <i>freight containers</i> containing mixed loads of <i>packages</i> containing different radionuclides, such entries may read “See Transport Documents”.</p> <p>(d) <i>TI</i>: The number determined in accordance with paras 521 and 522 (no <i>TI</i> entry is required for Category I-WHITE).</p>	<p>must be listed to the extent the space on the line permits. The group of <i>LSA</i> or <i>SCO</i> shall be shown following the name(s) of the radionuclide(s). The terms “<i>LSA-II</i>”, “<i>LSA-III</i>”, “<i>SCO-I</i>” and “<i>SCO-II</i>” shall be used for this purpose.</p> <p>(ii) For <i>LSA-I</i> material, the term “<i>LSA-I</i>” is all that is necessary; the name of the radionuclide is not necessary.</p> <p>(b) Activity: The maximum activity of the <i>radioactive contents</i> during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol (see Annex II). For <i>fissile material</i>, the <u>total</u> mass of <i>fissile material</i> <u>nuclides</u> <del>(or mass of each fissile nuclide for mixtures when appropriate)</del> in units of grams (g), or multiples thereof, may be used in place of activity.</p> <p>(c) For <i>overpacks</i> and <i>freight containers</i> the “contents” and “activity” entries on the label shall bear the information required in paras <del>538</del> <u>540</u>(a) and (b), respectively, totalled together for the entire contents of the <i>overpack</i> or <i>freight container</i> except that on labels for <i>overpacks</i> or <i>freight containers</i> containing mixed loads of <i>packages</i> containing different radionuclides, such entries may read “See Transport Documents”.</p> <p>(d) <i>TI</i>: The number determined in accordance with paras <del>521 and 522</del> <u>523 and 524</u> (no <i>TI</i> entry is required for Category I-WHITE).</p>	
<p><i>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.</i></p>	<p><i>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.</i></p>	
<p><i>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.</i></p>	<p><i>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.</i></p>	
<p><b>Labelling for criticality safety</b></p>	<p><b>Labelling for criticality safety</b></p>	
<p>539. Each label conforming to the model in Fig. 5 shall be completed</p>	<p><del>539</del> <u>541</u>. Each label conforming to the model in Fig. 5 shall be</p>	



with the <i>CSI</i> as stated in the certificate of approval for <i>special arrangement</i> or the certificate of approval for the <i>package design</i> issued by the <i>competent authority</i> .	completed with the <i>CSI</i> as stated in the certificate of approval <u>applicable in the countries through or into which the consignment is transported and</u> <del>for special arrangement or the certificate of approval for the package design</del> issued by the <i>competent authority</i> <u>or as specified in paras 674 or 675</u> .	
<i>FIG. 5. CSI label. The background colour of the label shall be white, the colour of the printing shall be black.</i>	<i>FIG. 5. CSI label. The background colour of the label shall be white, the colour of the printing shall be black.</i>	
540. For <i>overpacks</i> and <i>freight containers</i> , the <i>CSI</i> on the label shall bear the information required in para. 539 totalled together for the fissile contents of the <i>overpack</i> or <i>freight container</i> .	<del>540</del> <u>542</u> . For <i>overpacks</i> and <i>freight containers</i> , <del>the CSI on</del> the label <u>conforming to the model in Fig. 5</u> shall bear the <u>sum of the CSIs</u> of <u>all the packages contained therein</u> <del>information required in para. 539 totalled together for the fissile contents of overpack or freight container.</del>	
Placarding	Placarding	
541. Large <i>freight containers</i> carrying <i>packages</i> other than <i>excepted packages</i> , and <i>tanks</i> , shall bear four placards which conform to the model given in Fig. 6. The placards shall be affixed in a vertical orientation to each side wall and each end wall of the large <i>freight container</i> or <i>tank</i> . Any placards which do not relate to the contents shall be removed. Instead of using both labels and placards, it is permitted as an alternative to use enlarged labels only, where appropriate, as shown in Figs 2, 3, 4 and 5, except having the minimum size dimensions shown in Fig. 6.	<del>541</del> <u>543</u> . Large <i>freight containers</i> carrying <i>packages</i> other than <i>excepted packages</i> , and <u>tanks</u> , shall bear four placards <del>which</del> <u>that</u> conform to the model given in Fig. 6. The placards shall be affixed in a vertical orientation to each side wall and to each end wall of the large <i>freight container</i> or <i>tank</i> . Any placards <del>which</del> <u>that</u> do not relate to the contents shall be removed. Instead of using both labels and placards, it is permitted as an alternative to use enlarged labels only, where appropriate, as shown in Figs 2, <del>3, and 4</del> <u>and 5</u> , except having the minimum size <del>dimensions</del> shown in Fig. 6.	
542. Where the <i>consignment</i> in the <i>freight container</i> or <i>tank</i> is unpackaged <i>LSA-I</i> or <i>SCO-I</i> or where a <i>consignment</i> in a <i>freight container</i> is required to be shipped under <i>exclusive use</i> and is packaged <i>radioactive material</i> with a single UN number, the appropriate UN number for the <i>consignment</i> (see Table 1) shall also be displayed, in black digits not less than 65 mm high, either:  (a) In the lower half of the placard shown in Fig. 6 and against the white background; or	<del>542</del> <u>544</u> . Where the <i>consignment</i> in the <i>freight container</i> or <i>tank</i> is unpackaged <i>LSA-I</i> or <i>SCO-I</i> or where a <i>consignment</i> in a <i>freight container</i> is required to be shipped under <i>exclusive use</i> and is packaged <i>radioactive material</i> with a single UN number, the appropriate UN number for the <i>consignment</i> (see Table 1) shall also be displayed, in black digits not less than 65 mm high, either:  (a) In the lower half of the placard shown in Fig. 6 and against the white background; or	

<p>(b) On the placard shown in Fig. 7.</p> <p>When the alternative given in (b) is used, the subsidiary placard shall be affixed immediately adjacent to the main placard, on all four sides of the <i>freight container or tank</i>.</p>	<p>(b) On the placard shown in Fig. 7.</p> <p>When the alternative given in (b) is used, the subsidiary placard shall be affixed immediately adjacent to the main placard, on all four sides of the <i>freight container or tank</i>.</p>	
<p><b>CONSIGNOR'S RESPONSIBILITIES</b></p>	<p><b>CONSIGNOR'S RESPONSIBILITIES</b></p>	
<p>543. Except as otherwise provided in these Regulations, no person may offer <i>radioactive material</i> for transport unless it is properly marked, labelled, placarded, described and certified on a transport document, and otherwise in a condition for transport as required by these Regulations.</p>	<p><del>543</del> <a href="#">545</a>. Except as otherwise provided in these Regulations, no person may offer <i>radioactive material</i> for transport unless it is properly marked, labelled, placarded, described and certified on a transport document, and otherwise in a condition for transport as required by these Regulations.</p>	
<p><b>Particulars of consignment</b></p>	<p><b>Particulars of consignment</b></p>	
<p>544. The <i>consignor</i> shall include in the transport documents with each <i>consignment</i> the identification of the <i>consignor</i> and <i>consignee</i>, including their names and addresses and the following information, as applicable, in the order given:</p> <p>(a) The UN number assigned to the material as specified in accordance with the provisions of paras 401 and 528, preceded by the letters "UN".</p> <p>(b) The proper shipping name, as specified in accordance with the provisions of paras 401 and 528.</p> <p>(c) The UN class number "7".</p> <p>(d) The name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the</p>	<p><del>544</del> <a href="#">546</a>. The <i>consignor</i> shall include in the transport documents with each <i>consignment</i> the identification of the <i>consignor</i> and <i>consignee</i>, including their names and addresses and the following information, as applicable, in the order given:</p> <p>(a) The UN number assigned to the material as specified in accordance with the provisions of paras 401 and <del>528</del> <a href="#">530</a>, preceded by the letters "UN";</p> <p>(b) The proper shipping name, as specified in accordance with the provisions of paras 401 and <del>528</del> <a href="#">530</a>;</p> <p>(c) The UN class number "7";</p> <p><a href="#">(d) The subsidiary hazard class or division number(s) corresponding to the subsidiary risk label(s) required to be applied, when assigned, shall be entered following the primary hazard class or division and shall be enclosed in parenthesis;</a></p>	

<p>most restrictive nuclides.</p> <p>(e) A description of the physical and chemical form of the material, or a notation that the material is <i>special form radioactive material</i> or <i>low dispersible radioactive material</i>. A generic chemical description is acceptable for chemical form.</p> <p>(f) The maximum activity of the <i>radioactive contents</i> during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol (see Annex II). For <i>fissile material</i>, the mass of <i>fissile material</i> (or mass of each <i>fissile nuclide</i> for mixtures when appropriate) in units of grams (g), or appropriate multiples thereof, may be used in place of activity.</p> <p>(g) The category of the package, i.e. I-WHITE, II-YELLOW, III-YELLOW.</p> <p>(h) The <i>TI</i> (categories II-YELLOW and III-YELLOW only).</p> <p>(i) For <i>consignments</i> including <i>fissile material</i> other than <i>consignments</i> excepted under para. 417, the <i>CSI</i>.</p> <p>(j) The identification mark for each <i>competent authority approval</i> certificate (<i>special form radioactive material</i>, <i>low dispersible radioactive material</i>, <i>special arrangement</i>, <i>package design</i> or <i>shipment</i>) applicable to the <i>consignment</i>.</p>	<p>(<del>e</del>) The name or symbol of each radionuclide or, for mixtures of radionuclides, an appropriate general description or a list of the most restrictive nuclides<sub>1</sub>.</p> <p>(<del>e</del>f) A description of the physical and chemical form of the material, or a notation that the material is <i>special form radioactive material</i> or <i>low dispersible radioactive material</i>. A generic chemical description is acceptable for chemical form<sub>1</sub>.</p> <p>(<del>e</del>g) The maximum activity of the <i>radioactive contents</i> during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol (see Annex II). For <i>fissile material</i>, the mass of <i>fissile material</i> (or mass of each <i>fissile nuclide</i> for mixtures when appropriate) in units of grams (g), or appropriate multiples thereof, may be used in place of activity<sub>1</sub>.</p> <p>(<del>e</del>h) The category of the <i>package</i>, i.e. I-WHITE, II-YELLOW, III-YELLOW<sub>1</sub>.</p> <p>(<del>h</del>i) The <i>TI</i> (categories II-YELLOW and III-YELLOW only)<sub>1</sub>.</p> <p>(<del>j</del>i) For <del>consignments</del> including <i>fissile material</i> other than <del>consignments</del> excepted under para. 417, the <del>CSI</del> <u><i>fissile material</i></u>:</p> <p>(i) <u>Shipped under one exception of sub-paras 417(a)–(f), reference to that para;</u></p> <p>(ii) <u>Shipped under para. 417(c)–(e), the total mass of <i>fissile nuclides</i>;</u></p> <p>(iii) <u>Contained in a <i>package</i> for which one of paras 674(a)–(c) or 675 is applied, reference to that para.;</u></p> <p>(iv) <u>The <i>CSI</i>, where applicable.</u></p> <p>(<del>j</del>k) The identification mark for each <i>competent authority approval</i> certificate <u>of approval</u> (<i>special form radioactive material</i>, <i>low dispersible radioactive material</i>, <u><i>fissile material</i> excepted under para. 417(f)</u>, <i>special arrangement</i>, <i>package design</i> or <i>shipment</i>) applicable to the <i>consignment</i><sub>1</sub>.</p>	
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<p>(k) For <i>consignments</i> of more than one <i>package</i>, the information contained in paras 544(a)–(j) shall be given for each <i>package</i>. For <i>packages</i> in an <i>overpack</i>, <i>freight container</i> or <i>conveyance</i>, a detailed statement of the contents of each <i>package</i> within the <i>overpack</i>, <i>freight container</i> or <i>conveyance</i> and, where appropriate, of each <i>overpack</i>, <i>freight container</i> or <i>conveyance</i> shall be included. If <i>packages</i> are to be removed from the <i>overpack</i>, <i>freight container</i> or <i>conveyance</i> at a point of intermediate unloading, appropriate transport documents shall be made available.</p> <p>(l) Where a <i>consignment</i> is required to be shipped under <i>exclusive use</i>, the statement “EXCLUSIVE USE SHIPMENT”; and</p> <p>(m) For <i>LSA-II</i>, <i>LSA-III</i>, <i>SCO-I</i> and <i>SCO-II</i>, the total activity of the <i>consignment</i> as a multiple of <math>A_2</math>. For <i>radioactive material</i> for which the <math>A_2</math> value is unlimited, the multiple of <math>A_2</math> shall be zero.</p>	<p>(<del>k</del>l) For <i>consignments</i> of more than one <i>package</i>, the information contained in paras <del>544</del> 546(a)–(<del>k</del>) shall be given for each <i>package</i>. For <i>packages</i> in an <i>overpack</i>, <i>freight container</i> or <i>conveyance</i>, a detailed statement of the contents of each <i>package</i> within the <i>overpack</i>, <i>freight container</i> or <i>conveyance</i> and, where appropriate, of each <i>overpack</i>, <i>freight container</i> or <i>conveyance</i> shall be included. If <i>packages</i> are to be removed from the <i>overpack</i>, <i>freight container</i> or <i>conveyance</i> at a point of intermediate unloading, appropriate transport documents shall be made available<del>;</del>.</p> <p>(<del>l</del>m) Where a <i>consignment</i> is required to be shipped under <i>exclusive use</i>, the statement “EXCLUSIVE USE SHIPMENT”; <del>and</del></p> <p>(<del>m</del>n) For <i>LSA-II</i>, <i>LSA-III</i>, <i>SCO-I</i> and <i>SCO-II</i>, the total activity of the <i>consignment</i> as a multiple of <math>A_2</math>. For <i>radioactive material</i> for which the <math>A_2</math> value is unlimited, the multiple of <math>A_2</math> shall be zero.</p>	
<p>FIG. 6. Placard. Except as permitted by para. 567, 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.</p>	<p>FIG. 6. Placard. Except as permitted by para. <del>567</del> 571, 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.</p>	
<p>FIG. 7. Placard for separate display of UN number. The background colour of the placard shall be orange and the border and UN number shall be black. The symbol “****” denotes the space in which the appropriate UN number for radioactive material, as specified in Table 1, shall be displayed.</p>	<p>FIG. 7. Placard for separate display of UN number. The background colour of the placard shall be orange and the border and UN number shall be black. The symbol “****” denotes the space in which the appropriate UN number for radioactive material, as specified in Table 1, shall be displayed.</p>	
<p><b>Consignor’s certification or declaration</b></p>	<p><b>Consignor’s certification or declaration</b></p>	

<p>545. The <i>consignor</i> shall include in the transport documents a certification or declaration in the following terms:</p> <p>“I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to the applicable international and national governmental regulations.”</p>	<p><del>545</del> <u>547</u>. The <i>consignor</i> shall include in the transport documents a certification or declaration in the following terms:</p> <p>“I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport <del>according to</del> <u>in accordance with</u> the applicable international and national governmental regulations.”</p>	
<p>546. If the intent of the declaration is already a condition of transport within a particular international convention, the <i>consignor</i> need not provide such a declaration for that part of the transport covered by the convention.</p>	<p><del>546</del> <u>548</u>. If the intent of the declaration is already a condition of transport within a particular international convention, the <i>consignor</i> need not provide such a declaration for that part of the transport covered by the convention.</p>	
<p>547. The declaration shall be signed and dated by the <i>consignor</i>. Facsimile signatures are acceptable where applicable laws and regulations recognize the legal validity of facsimile signatures.</p>	<p><del>547</del> <u>549</u>. The declaration shall be signed and dated by the <i>consignor</i>. Facsimile signatures are acceptable where applicable laws and regulations recognize the legal validity of facsimile signatures.</p>	
<p>548. If the dangerous goods documentation is presented to the <i>carrier</i> by means of electronic data processing (EDP) or electronic data interchange (EDI) transmission techniques, the signature(s) may be replaced by the name(s) (in capitals) of the person authorized to sign.</p>	<p><del>548</del> <u>550</u>. If the dangerous goods documentation is presented to the <i>carrier</i> by means of electronic data processing (EDP) or electronic data interchange (EDI) transmission techniques, the signature(s) may be replaced by the name(s) (in capitals) of the person authorized to sign.</p>	
<p>549. When <i>radioactive material</i>, other than when carried in <i>tanks</i>, is packed or loaded into any <i>freight container</i> or <i>vehicle</i> which will be transported by sea, those responsible for packing the container or <i>vehicle</i> shall provide a container/<i>vehicle</i> packing certificate specifying the container/<i>vehicle</i> identification number(s) and certifying that the operation has been carried out in accordance with the applicable conditions of the IMDG Code [8].</p>	<p><del>549</del> <u>551</u>. When <i>radioactive material</i>, other than when carried in <i>tanks</i>, is packed or loaded into any <i>freight container</i> or <i>vehicle</i> <del>which</del> <u>that</u> will be transported by sea, those responsible for packing the container or <i>vehicle</i> shall provide a container/<i>vehicle</i> packing certificate specifying the container/<i>vehicle</i> identification number(s) and certifying that the operation has been carried out in accordance with the applicable conditions of the IMDG Code [8].</p>	

<p>550. The information required in the transport document and the container/<i>vehicle</i> packing certificate may be incorporated into a single document, if not, the documents shall be attached one to the other. If the information is incorporated into a single document, the document shall include a signed declaration such as:</p> <p>“It is declared that the packing of the goods into the container/<i>vehicle</i> has been carried out in accordance with the applicable provisions”.</p> <p>This declaration shall be dated and the person signing it shall be identified on the document. Facsimile signatures are acceptable where applicable laws and regulations recognize the legal validity of facsimile signatures.</p>	<p><del>550</del> <u>552</u>. The information required in the transport documents and the container/<i>vehicle</i> packing certificate may be incorporated into a single document, if not, the documents shall be attached one to the other. If the information is incorporated into a single document, the document shall include a signed declaration such as:</p> <p>“It is declared that the packing of the goods into the container/<i>vehicle</i> has been carried out in accordance with the applicable provisions”.</p> <p>This declaration shall be dated and the person signing it shall be identified on the document. Facsimile signatures are acceptable where applicable laws and regulations recognize the legal validity of facsimile signatures.</p>	
<p>551. The declaration shall be made on the same transport document which contains the particulars of <i>consignment</i> listed in para. 544.</p>	<p><del>551</del> <u>553</u>. The declaration shall be made on the same transport document <del>which</del> <u>that</u> contains the particulars of <i>consignment</i> listed in para. <del>544</del> <u>546</u>.</p>	
<p><b>Information for carriers</b></p>	<p><b>Information for carriers</b></p>	
<p>552. The <i>consignor</i> shall provide in the transport documents a statement regarding actions, if any, that are required to be taken by the <i>carrier</i>. The statement shall be in the languages deemed necessary by the <i>carrier</i> or the authorities concerned, and shall include at least the following points:</p> <p>(a) Supplementary requirements for loading, stowage, carriage, handling and unloading of the <i>package, overpack</i> or <i>freight container</i>, including any special stowage provisions for the safe dissipation of heat (see para. 562), or a statement that no such requirements are necessary;</p> <p>(b) Restrictions on the mode of transport or <i>conveyance</i> and any necessary routeing instructions;</p>	<p><del>552</del> <u>554</u>. The <i>consignor</i> shall provide in the transport documents a statement regarding actions, if any that are required to be taken by the <i>carrier</i>. The statement shall be in the languages deemed necessary by the <i>carrier</i> or the authorities concerned, and shall include at least the following points:</p> <p>(a) Supplementary requirements for loading, stowage, carriage, handling and unloading of the <i>package, overpack</i> or <i>freight container</i>, including any special stowage provisions for the safe dissipation of heat (see para. <del>562</del> <u>565</u>), or a statement that no such requirements are necessary;</p> <p>(b) Restrictions on the mode of transport or <i>conveyance</i> and any necessary routeing instructions;</p> <p>(c) Emergency arrangements appropriate to the <i>consignment</i>.</p>	



(c) Emergency arrangements appropriate to the <i>consignment</i> .		
	<a href="#"><u>555. The consignor shall retain a copy of each of the transport documents containing the information specified in paras 546, 547, 551, 552 and 554, as applicable, for a minimum period of three months. When the documents are kept electronically the consignor shall be able to reproduce them in a printed form.</u></a>	
553. The applicable <i>competent authority</i> certificates need not necessarily accompany the <i>consignment</i> . The <i>consignor</i> shall make them available to the <i>carrier(s)</i> before loading and unloading.	<del>553</del> 556. The applicable <i>competent authority</i> certificates need not necessarily accompany the <i>consignment</i> . The <i>consignor</i> shall make them available to the <i>carrier(s)</i> before loading and unloading.	
<b>Notification of competent authorities</b>	<b>Notification of competent authorities</b>	
554. Before the first <i>shipment</i> of any <i>package</i> requiring <i>competent authority</i> approval, the <i>consignor</i> shall ensure that copies of each applicable <i>competent authority</i> certificate applying to that <i>package design</i> have been submitted to the <i>competent authority</i> of the country of origin of the <i>shipment</i> and to the <i>competent authority</i> of each country <i>through or into</i> which the <i>consignment</i> is to be transported. The <i>consignor</i> is not required to await an acknowledgement from the <i>competent authority</i> , nor is the <i>competent authority</i> required to make such acknowledgement of receipt of the certificate.	<del>554</del> 557. Before the first <i>shipment</i> of any <i>package</i> requiring <i>competent authority</i> approval, the <i>consignor</i> shall ensure that copies of each applicable <i>competent authority</i> certificate applying to that <i>package design</i> have been submitted to the <i>competent authority</i> of the country of origin of the <i>shipment</i> and to the <i>competent authority</i> of each country <i>through or into</i> which the <i>consignment</i> is to be transported. The <i>consignor</i> is not required to await an acknowledgement from the <i>competent authority</i> , nor is the <i>competent authority</i> required to make such acknowledgement of receipt of the certificate.	
555. For each <i>shipment</i> listed in (a), (b), (c) or (d) below, the <i>consignor</i> shall notify the <i>competent authority</i> of the country of origin of the <i>shipment</i> and the <i>competent authority</i> of each country <i>through or into</i> which the <i>consignment</i> is to be transported. This notification shall be in the hands of each <i>competent authority</i> prior to the commencement of the <i>shipment</i> , and preferably at least 7 days in advance.  (a) <i>Type C packages</i> containing <i>radioactive material</i> with an activity greater than 3000A <sub>1</sub> or 3000A <sub>2</sub> , as appropriate, or 1000 TBq, whichever is the lower;	<del>555</del> 558. For each <i>shipment</i> listed in (a), (b), (c) or (d) below, the <i>consignor</i> shall notify the <i>competent authority</i> of the country of origin of the <i>shipment</i> and the <i>competent authority</i> of each country <i>through or into</i> which the <i>consignment</i> is to be transported. This notification shall be in the hands of each <i>competent authority</i> prior to the commencement of the <i>shipment</i> , and preferably at least 7 days in advance.  (a) <i>Type C packages</i> containing <i>radioactive material</i> with an activity greater than 3000A <sub>1</sub> or 3000A <sub>2</sub> , as appropriate, or 1000 TBq,	



<p>(b) <i>Type B(U) packages</i> containing <i>radioactive material</i> with an activity greater than <math>3000A_1</math> or <math>3000A_2</math>, as appropriate, or 1000 TBq, whichever is the lower;</p> <p>(c) <i>Type B(M) packages</i>;</p> <p>(d) <i>Shipments under special arrangement</i>.</p>	<p>whichever is the lower;</p> <p>(b) <i>Type B(U) packages</i> containing <i>radioactive material</i> with an activity greater than <math>3000A_1</math> or <math>3000A_2</math>, as appropriate, or 1000 TBq, whichever is the lower;</p> <p>(c) <i>Type B(M) packages</i>;</p> <p>(d) <i>Shipments under special arrangement</i>.</p>	
<p>556. The <i>consignment</i> notification shall include:</p> <p>(a) Sufficient information to enable the identification of the <i>package</i> or <i>packages</i> including all applicable certificate numbers and identification marks.</p> <p>(b) Information on the date of <i>shipment</i>, the expected date of arrival and proposed routing.</p> <p>(c) The names of the <i>radioactive materials</i> or nuclides.</p> <p>(d) Descriptions of the physical and chemical forms of the <i>radioactive material</i>, or whether it is <i>special form radioactive material</i> or <i>low dispersible radioactive material</i>.</p> <p>(e) The maximum activity of the <i>radioactive contents</i> during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol (see Annex II). For <i>fissile material</i>, the mass of <i>fissile material</i> (or the mass of each fissile nuclide for a mixture, when appropriate) in units of grams (g), or multiples thereof, may be used in place of activity.</p>	<p><del>556</del> 559. The <i>consignment</i> notification shall include:</p> <p>(a) Sufficient information to enable the identification of the <i>package</i> or <i>packages</i> including all applicable certificate numbers and identification marks<del>;</del><sub>1</sub>.</p> <p>(b) Information on the date of <i>shipment</i>, the expected date of arrival and proposed routing<del>;</del><sub>1</sub>.</p> <p>(c) The names of the <i>radioactive materials</i> or nuclides<del>;</del><sub>1</sub>.</p> <p>(d) Descriptions of the physical and chemical forms of the <i>radioactive material</i>, or whether it is <i>special form radioactive material</i> or <i>low dispersible radioactive material</i><del>;</del><sub>1</sub>.</p> <p>(e) The maximum activity of the <i>radioactive contents</i> during transport expressed in units of becquerels (Bq) with the appropriate SI prefix symbol (see Annex II). For <i>fissile material</i>, the mass of <i>fissile material</i> (or the mass of each fissile nuclide for a mixture, when appropriate) in units of grams (g), or multiples thereof, may be used in place of activity.</p>	
<p>557. The <i>consignor</i> is not required to send a separate notification if the required information has been included in the application for <i>shipment</i> approval (see para. 822).</p>	<p><del>557</del> 560. The <i>consignor</i> is not required to send a separate notification if the required information has been included in the application for <a href="#">approval of shipment</a> <del>approval</del> (see para. <del>822</del> 827).</p>	
<p><b>Possession of certificates and instructions</b></p>	<p><b>Possession of certificates and instructions</b></p>	
<p>558. The <i>consignor</i> shall have in his or her possession a copy of each certificate required under Section VIII of these Regulations and a copy</p>	<p><del>558</del> 561. The <i>consignor</i> shall have in his or her possession a copy of</p>	

of the instructions with regard to the proper closing of the <i>package</i> and other preparations for <i>shipment</i> before making any <i>shipment</i> under the terms of the certificates.	each certificate required under Section VIII of these Regulations and a copy of the instructions with regard to the proper closing of the <i>package</i> and other preparations for <i>shipment</i> before making any <i>shipment</i> under the terms of the certificates.	
TRANSPORT AND STORAGE IN TRANSIT	TRANSPORT AND STORAGE IN TRANSIT	
<b>Segregation during transport and storage in transit</b>	<b>Segregation during transport and storage in transit</b>	
<p>559. <i>Packages, overpacks and freight containers containing radioactive material and unpackaged radioactive material shall be segregated during transport and during storage in transit:</i></p> <ul style="list-style-type: none"> <li>(a) From workers in regularly occupied working areas by distances calculated using a dose criterion of 5 mSv in a year and conservative model parameters;</li> <li>(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;</li> <li>(c) From undeveloped photographic film by distances calculated using a radiation exposure criterion for undeveloped photographic film due to the transport of <i>radioactive material</i> of 0.1 mSv per <i>consignment</i> of such film; and</li> <li>(d) From other dangerous goods in accordance with para. 505.</li> </ul>	<p><del>559</del> <u>562</u>. <i>Packages, overpacks and freight containers containing radioactive material and unpackaged radioactive material shall be segregated during transport and during storage in transit:</i></p> <ul style="list-style-type: none"> <li>(a) From workers in regularly occupied working areas by distances calculated using a dose criterion of 5 mSv in a year and conservative model parameters;</li> <li>(b) From members of <del>the critical group of</del> 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;</li> <li>(c) From undeveloped photographic film by distances calculated using a radiation exposure criterion for undeveloped photographic film due to the transport of <i>radioactive material</i> of 0.1 mSv per <i>consignment</i> of such film; <del>and</del></li> <li>(d) From other dangerous goods in accordance with para. <del>505</del> <u>506</u>.</li> </ul>	
560. Category II-YELLOW or III-YELLOW <i>packages or overpacks</i> shall not be carried in compartments occupied by passengers, except those exclusively reserved for couriers specially authorized to accompany such <i>packages or overpacks</i> .	<del>560</del> <u>563</u> . Category II-YELLOW or III-YELLOW <i>packages or overpacks</i> shall not be carried in compartments occupied by passengers, except those exclusively reserved for couriers specially authorized to accompany such <i>packages or overpacks</i> .	
<b>Stowage during transport and storage in transit</b>	<b>Stowage during transport and storage in transit</b>	

561. <i>Consignments</i> shall be securely stowed.	<del>561</del> <u>564</u> . <i>Consignments</i> shall be securely stowed.					
562. Provided that its average surface heat flux does not exceed 15 W/m <sup>2</sup> and that the immediate surrounding cargo is not in sacks or bags, a <i>package</i> or <i>overpack</i> may be carried or stored among packaged general cargo without any special stowage provisions except as may be specifically required by the <i>competent authority</i> in an applicable approval certificate.	<del>562</del> <u>565</u> . Provided that its average surface heat flux does not exceed 15 W/m <sup>2</sup> and that the immediate surrounding cargo is not in sacks or bags, a <i>package</i> or <i>overpack</i> may be carried or stored among packaged general cargo without any special stowage provisions except as may be specifically required by the <i>competent authority</i> in an applicable <del>approval</del> certificate <u>of approval</u> .					
563. Loading of <i>freight containers</i> and accumulation of <i>packages</i> , <i>overpacks</i> and <i>freight containers</i> shall be controlled as follows:  (a) Except under the condition of <i>exclusive use</i> , and for <i>consignments</i> of <i>LSA-I</i> material, the total number of <i>packages</i> , <i>overpacks</i> and <i>freight containers</i> aboard a single <i>conveyance</i> shall be so limited that the sum of the <i>TIs</i> aboard the <i>conveyance</i> does not exceed the values shown in Table 11.  (b) The <i>radiation level</i> under routine conditions of transport shall not exceed 2 mSv/h at any point on, and 0.1 mSv/h at 2 m from, the external surface of the <i>conveyance</i> , except for <i>consignments</i> transported under <i>exclusive use</i> by road or rail, for which the radiation limits around the <i>vehicle</i> are set forth in para. 569(b) and (c).  (c) The sum of the <i>CSIs</i> in a <i>freight container</i> and aboard a <i>conveyance</i> shall not exceed the values shown in Table 12.	<del>563</del> <u>566</u> . Loading of <i>freight containers</i> and accumulation of <i>packages</i> , <i>overpacks</i> and <i>freight containers</i> shall be controlled as follows:  (a) Except under the condition of <i>exclusive use</i> , and for <i>consignments</i> of <i>LSA-I</i> material, the total number of <i>packages</i> , <i>overpacks</i> and <i>freight containers</i> aboard a single <i>conveyance</i> shall be so limited that the sum of the <i>TIs</i> aboard the <i>conveyance</i> does not exceed the values shown in Table <del>11</del> <u>10</u> .  (b) The <i>radiation level</i> under routine conditions of transport shall not exceed 2 mSv/h at any point on, and 0.1 mSv/h at 2 m from, the external surface of the <i>conveyance</i> , except for <i>consignments</i> transported under <i>exclusive use</i> by road or rail, for which the radiation limits around the <i>vehicle</i> are set forth in paras <del>569</del> <u>573</u> (b) and (c).  (c) The sum of the <i>CSIs</i> in a <i>freight container</i> and aboard a <i>conveyance</i> shall not exceed the values shown in Table <del>12</del> <u>11</u> .					
TABLE 11. TRANSPORT INDEX LIMITS FOR FREIGHT CONTAINERS AND CONVEYANCES NOT UNDER EXCLUSIVE USE  <table><tr><td>Type of <i>freight container</i> or <i>conveyance</i></td><td>Limit on sum of <i>TIs</i> in a <i>freight container</i> or aboard a <i>conveyance</i></td></tr></table>	Type of <i>freight container</i> or <i>conveyance</i>	Limit on sum of <i>TIs</i> in a <i>freight container</i> or aboard a <i>conveyance</i>	TABLE <del>11</del> <u>10</u> . TRANSPORT INDEX LIMITS FOR FREIGHT CONTAINERS AND CONVEYANCES NOT UNDER EXCLUSIVE USE  <table><tr><td>Type of <i>freight container</i> or <i>conveyance</i></td><td>Limit on sum of <i>TIs</i> in a <i>freight container</i> or aboard a <i>conveyance</i></td></tr></table>	Type of <i>freight container</i> or <i>conveyance</i>	Limit on sum of <i>TIs</i> in a <i>freight container</i> or aboard a <i>conveyance</i>	
Type of <i>freight container</i> or <i>conveyance</i>	Limit on sum of <i>TIs</i> in a <i>freight container</i> or aboard a <i>conveyance</i>					
Type of <i>freight container</i> or <i>conveyance</i>	Limit on sum of <i>TIs</i> in a <i>freight container</i> or aboard a <i>conveyance</i>					

<p>Freight container — Small 50  Freight container — Large 50  Vehicle 50  Aircraft:  Passenger 50  Cargo 200  Inland waterway craft 50  Seagoing vessel<sup>a</sup>:  (i) Hold, compartment or <i>defined deck area</i>:  Packages, overpacks, small freight containers 50  Large freight containers 200  (ii) Total vessel:  Packages, overpacks, small freight containers 200  Large freight containers No limit</p> <p><sup>a</sup> Packages or overpacks carried in or on a vehicle which are in accordance with the provisions of para. 569 may be transported by vessels provided that they are not removed from the vehicle at any time while on board the vessel.</p>	<p><u>Freight container:</u></p> <p>Small freight container 50  Large freight container 50  Vehicle 50  Aircraft:  Passenger 50  Cargo 200  Inland waterway craft 50  Seagoing vessel<sup>a</sup>:  (i) Hold, compartment or <i>defined deck area</i>:  Packages, overpacks, <u>small</u> freight containers 50  Large freight containers 200  (ii) Total vessel:  Packages, overpacks, <u>small</u> freight containers 200  Large freight containers No limit</p> <p><sup>a</sup> Packages or overpacks carried in or on a vehicle <del>which</del> <u>that</u> are in accordance with the provisions of para. <del>569</del> <u>573</u> may be transported by vessels provided that they are not removed from the vehicle at any time while on board the vessel.</p>	
<p>564. Any package or overpack having a <i>TI</i> greater than 10, or any consignment having a <i>CSI</i> greater than 50, shall be transported only under <i>exclusive use</i>.</p>	<p><del>564</del> <u>567</u>. Any package or overpack having a <i>TI</i> greater than 10, or any consignment having a <i>CSI</i> greater than 50, shall be transported only under <i>exclusive use</i>.</p>	
<p><b>Segregation of packages containing fissile material during transport and storage in transit</b></p>	<p><del>Segregation of packages containing fissile material during transport and storage in transit</del>  <u>Additional requirements relating to transport and storage in transit of fissile material</u></p>	
<p>565. Any group of packages, overpacks and freight containers containing <i>fissile material</i> stored in transit in any one storage area shall be so limited that the total sum of the <i>CSIs</i> in the group does not exceed 50. Each group shall be stored so as to maintain a spacing of at least 6 m from other such groups.</p>	<p><del>565</del> <u>568</u>. Any group of packages, overpacks and freight containers containing <i>fissile material</i> stored in transit in any one storage area shall be so limited that the sum of the <i>CSIs</i> in the group does not exceed 50. Each group shall be stored so as to maintain a spacing of at least 6 m from other such groups.</p>	

TABLE 12. CRITICALITY SAFETY INDEX LIMITS FOR FREIGHT CONTAINERS AND CONVEYANCES CONTAINING FISSILE MATERIAL			TABLE <del>12</del> 11. CRITICALITY SAFETY INDEX LIMITS FOR FREIGHT CONTAINERS AND CONVEYANCES CONTAINING FISSILE MATERIAL		
Type of freight container or conveyance	Limit on sum of CSIs in a freight container or aboard a conveyance		Type of freight container or conveyance	Limit on sum of CSIs in a freight container or aboard a conveyance	
	Not under exclusive use	Under exclusive use		Not under exclusive use	Under exclusive use
Freight container — Small	50	Not applicable	<u>Freight container:</u>	50	Not applicable
Freight container — Large	50	100	<u>Small freight container</u>	50	100
Vehicle	50	100	<del>Small</del>	50	100
Aircraft:			<u>Large freight container</u>		
Passenger	50	Not applicable	<del>Large</del>		
Cargo	50	100	Vehicle	50	100
Inland waterway craft	50	100	Aircraft:	50	Not applicable
Seagoing vessel <sup>a</sup> :			Passenger	50	100
(i) Hold, compartment or defined deck area:			Cargo	50	100
Packages, overpacks, small freight containers	50	100	Inland waterway craft	50	100
Large freight containers	50	100	Seagoing vessel <sup>a</sup> :		
(ii) Total vessel:			(i) Hold, compartment or defined deck area:		
Packages, overpacks, small freight containers	200 <sup>b</sup>	200 <sup>c</sup>	Packages, overpacks, <u>small</u> freight containers	50	100
Large freight containers	No limit <sup>b</sup>	No limit <sup>c</sup>	<u>Large</u> freight containers	50	100
<sup>a</sup> Packages or overpacks carried in or on a vehicle which are in accordance with the provisions of para. 569 may be transported by vessels provided that they are not removed from the vehicle at anytime while on board the vessel. In this case the entries under the heading 'under exclusive use' apply.			(ii) Total vessel:		
<sup>b</sup> The consignment shall be so handled and stowed that the sum of CSIs in any group does not exceed 50, and that each group is			Packages, overpacks, <u>small</u> freight containers	200 <sup>b</sup>	200 <sup>c</sup>
			<u>Large</u> freight containers	No limit <sup>b</sup>	No limit <sup>c</sup>
			<sup>a</sup> Packages or overpacks carried in or on a vehicle <del>which</del> <u>that</u> are in accordance with the provisions of para. <del>569</del> 573 may be transported by vessels provided that they are not removed from the vehicle at anytime while on board the vessel. In this case the entries under the		

<p>handled and stowed so that the groups are separated from each other by at least 6 m.</p> <p><sup>c</sup> The <i>consignment</i> shall be so handled and stowed that the sum of CSIs in any group does not exceed 100, and that each group is handled and stowed so that the groups are separated from each other by at least 6 m. The intervening space between groups may be occupied by other cargo in accordance with para. 505.</p>	<p>heading ‘under <i>exclusive use</i>’ apply.</p> <p><sup>b</sup> The <i>consignment</i> shall be so handled and stowed that the sum of CSIs in any group does not exceed 50, and that each group is handled and stowed so <u>as to maintain a spacing of</u> <del>that the groups are separated from each other by</del> <u>at least 6 m from other groups</u>.</p> <p><sup>c</sup> The <i>consignment</i> shall be so handled and stowed that the sum of CSIs in any group does not exceed 100, and that each group is handled and stowed so <u>so as to maintain a spacing of</u> <del>that the groups are separated from each other by</del> <u>at least 6 m from other groups</u>. The intervening space between groups may be occupied by other cargo in accordance with para. <del>505</del> <u>506</u>.</p>	
<p>566. Where the sum of the CSIs on board a <i>conveyance</i> or in a <i>freight container</i> exceeds 50, as permitted in Table 12, storage shall be such as to maintain a spacing of at least 6 m from other groups of <i>packages</i>, <i>overpacks</i> or <i>freight containers</i> containing <i>fissile material</i> or other <i>conveyances</i> carrying <i>radioactive material</i>.</p>	<p><del>566</del> <u>569</u>. Where the sum of the CSIs on board a <i>conveyance</i> or in a <i>freight container</i> exceeds 50, as permitted in Table <del>12</del> <u>11</u>, storage shall be such as to maintain a spacing of at least 6 m from other groups of <i>packages</i>, <i>overpacks</i> or <i>freight containers</i> containing <i>fissile material</i> or other <i>conveyances</i> carrying <i>radioactive material</i>.</p>	
<p><i>Not in TS-R-1 (2009).</i></p>	<p><u>570. Fissile material meeting one of the provisions (a)–(f) of para. 417 shall meet the following requirements:</u></p> <p>(a) <u>Only one of the provisions (a)–(f) of para. 417 is allowed per <i>consignment</i>.</u></p> <p>(b) <u>Only one approved <i>fissile material</i> in <i>packages</i> classified in accordance with para. 417(f) is allowed per <i>consignment</i> unless multiple materials are authorized in the certificate of approval.</u></p> <p>(c) <u><i>Fissile material</i> in <i>packages</i> classified in accordance with para. 417(c) shall be transported in a <i>consignment</i> with no more than 45 g of <i>fissile nuclides</i>.</u></p> <p>(d) <u><i>Fissile material</i> in <i>packages</i> classified in accordance with para. 417(d) shall be transported in a <i>consignment</i> with no more than 15 g of <i>fissile nuclides</i>.</u></p> <p>(e) <u>Unpackaged or packaged <i>fissile material</i> classified in accordance with para. 417(e) shall be transported under <i>exclusive use</i> on a <i>conveyance</i> with no more than 45 g of <i>fissile nuclides</i>.</u></p>	



<b>Additional requirements relating to transport by rail and by road</b>	<b>Additional requirements relating to transport by rail and by road</b>	
<p>567. Rail and road <i>vehicles</i> carrying <i>packages</i>, <i>overpacks</i> or <i>freight containers</i> labelled with any of the labels shown in Figs 2, 3, 4 or 5, or carrying <i>consignments</i> under <i>exclusive use</i>, shall display the placard shown in Fig. 6 on each of</p> <p>(a) The two external lateral walls in the case of a rail <i>vehicle</i>;</p> <p>(b) The two external lateral walls and the external rear wall in the case of a road <i>vehicle</i>.</p> <p>In the case of a <i>vehicle</i> without sides, the placards may be affixed directly on the cargo carrying unit provided that they are readily visible; in the case of large <i>tanks</i> or <i>freight containers</i>, the placards on the <i>tanks</i> or <i>freight containers</i> shall suffice. In the case of <i>vehicles</i> which have insufficient area to allow the fixing of larger placards, the dimensions of the placard described in Fig. 6 may be reduced to 100 mm. Any placards which do not relate to the contents shall be removed.</p>	<p><del>567</del> 571. Rail and road <i>vehicles</i> carrying <i>packages</i>, <i>overpacks</i> or <i>freight containers</i> labelled with any of the labels shown in Figs <del>2, 3, 4 or</del> 2-5, or carrying <i>consignments</i> under <i>exclusive use</i>, shall display the placard shown in Fig. 6 on each of:</p> <p>(a) The two external lateral walls in the case of a rail <i>vehicle</i>;</p> <p>(b) The two external lateral walls and the external rear wall in the case of a road <i>vehicle</i>.</p> <p>In the case of a <i>vehicle</i> without sides, the placards may be affixed directly on the cargo carrying unit provided that they are readily visible; in the case of large <i>tanks</i> or <i>freight containers</i>, the placards on the <i>tanks</i> or <i>freight containers</i> shall suffice. In the case of <i>vehicles</i> <del>which</del> <u>that</u> have insufficient area to allow the fixing of larger placards, the dimensions of the placard described in Fig. 6 may be reduced to 100 mm. Any placards <del>which</del> <u>that</u> do not relate to the contents shall be removed.</p>	
<p>568. Where the <i>consignment</i> in or on the <i>vehicle</i> is unpackaged <i>LSA-I</i> material or <i>SCO-I</i> or where a <i>consignment</i> is required to be shipped under <i>exclusive use</i> and is packaged <i>radioactive material</i> with a single UN number, the appropriate UN number (see Table 1) shall also be displayed, in black digits not less than 65 mm high, either:</p> <p>(a) In the lower half of the placard shown in Fig. 6, against the white background; or</p> <p>(b) On the placard shown in Fig. 7.</p> <p>When the alternative given in (b) is used, the subsidiary placard shall be affixed immediately adjacent to the main placard, either on the two external lateral walls in the case of a rail <i>vehicle</i> or on the two external lateral walls and the external rear wall in the case of a road <i>vehicle</i>.</p>	<p><del>568</del> 572. Where the <i>consignment</i> in or on the <i>vehicle</i> is unpackaged <i>LSA-I</i> material or <i>SCO-I</i> or where a <i>consignment</i> is required to be shipped under <i>exclusive use</i> and is packaged <i>radioactive material</i> with a single UN number, the appropriate UN number (see Table 1) shall also be displayed, in black digits not less than 65 mm high, either:</p> <p>(a) In the lower half of the placard shown in Fig. 6, against the white background; or</p> <p>(b) On the placard shown in Fig. 7.</p> <p>When the alternative given in (b) is used, the subsidiary placard shall be affixed immediately adjacent to the main placard, either on the two</p>	



	external lateral walls in the case of a rail <i>vehicle</i> or on the two external lateral walls and the external rear wall in the case of a road <i>vehicle</i> .	
<p>569. For <i>consignments</i> under <i>exclusive use</i>, the <i>radiation level</i> shall not exceed:</p> <p>(a) 10 mSv/h at any point on the external surface of any <i>package</i> or <i>overpack</i>, and may only exceed 2 mSv/h provided that:</p> <p>(i) The <i>vehicle</i> is equipped with an enclosure which, during routine conditions of transport, prevents the access of unauthorized persons to the interior of the enclosure;</p> <p>(ii) Provisions are made to secure the <i>package</i> or <i>overpack</i> so that its position within the <i>vehicle</i> enclosure remains fixed during routine conditions of transport; and</p> <p>(iii) There is no loading or unloading during the <i>shipment</i>.</p> <p>(b) 2 mSv/h at any point on the outer surfaces of the <i>vehicle</i>, including the upper and lower surfaces, or, in the case of an open <i>vehicle</i>, at any point on the vertical planes projected from the outer edges of the <i>vehicle</i>, on the upper surface of the load, and on the lower external surface of the <i>vehicle</i>.</p> <p>(c) 0.1 mSv/h at any point 2 m from the vertical planes represented by the outer lateral surfaces of the <i>vehicle</i>, or, if the load is transported in an open <i>vehicle</i>, at any point 2 m from the vertical planes projected from the outer edges of the <i>vehicle</i>.</p>	<p><del>569</del> 573. For <i>consignments</i> under <i>exclusive use</i>, the <i>radiation level</i> shall not exceed:</p> <p>(a) 10 mSv/h at any point on the external surface of any <i>package</i> or <i>overpack</i>, and may only exceed 2 mSv/h provided that:</p> <p>(i) The <i>vehicle</i> is equipped with an enclosure <del>which</del> <u>that</u>, during routine conditions of transport, prevents the access of unauthorized persons to the interior of the enclosure;</p> <p>(ii) Provisions are made to secure the <i>package</i> or <i>overpack</i> so that its position within the <i>vehicle</i> enclosure remains fixed during routine conditions of transport; <del>and</del></p> <p>(iii) There is no loading or unloading during the <i>shipment</i>.</p> <p>(b) 2 mSv/h at any point on the outer surfaces of the <i>vehicle</i>, including the upper and lower surfaces, or, in the case of an open <i>vehicle</i>, at any point on the vertical planes projected from the outer edges of the <i>vehicle</i>, on the upper surface of the load, and on the lower external surface of the <i>vehicl</i>;</p> <p>(c) 0.1 mSv/h at any point 2 m from the vertical planes represented by the outer lateral surfaces of the <i>vehicle</i>, or, if the load is transported in an open <i>vehicle</i>, at any point 2 m from the vertical planes projected from the outer edges of the <i>vehicle</i>.</p>	
<p>570. In the case of road <i>vehicles</i>, no persons other than the driver and assistants shall be permitted in <i>vehicles</i> carrying <i>packages</i>, <i>overpacks</i> or <i>freight containers</i> bearing category II-YELLOW or III-YELLOW labels.</p>	<p><del>570</del> 574. In the case of road <i>vehicles</i>, no persons other than the driver and assistants shall be permitted in <i>vehicles</i> carrying <i>packages</i>, <i>overpacks</i> or <i>freight containers</i> bearing category II-YELLOW or III-YELLOW labels.</p>	

Additional requirements relating to transport by vessels	Additional requirements relating to transport by vessels	
<p>571. Packages or overpacks having a surface radiation level greater than 2 mSv/h, unless being carried in or on a vehicle under exclusive use in accordance with Table 11, footnote (a), shall not be transported by vessel except under special arrangement.</p>	<p><del>571</del> 575. Packages or overpacks having a surface radiation level greater than 2 mSv/h, unless being carried in or on a vehicle under exclusive use in accordance with Table <del>11</del> 10, footnote (a), shall not be transported by vessel except under special arrangement.</p>	
<p>572. The transport of consignments by means of a special use vessel which, by virtue of its design, or by reason of its being chartered, is dedicated to the purpose of carrying radioactive material, shall be excepted from the requirements specified in para. 563 provided that the following conditions are met:</p> <p>(a) A radiation protection programme for the shipment shall be approved by the competent authority of the flag state of the vessel and, when requested, by the competent authority at each port of call.</p> <p>(b) Stowage arrangements shall be predetermined for the whole voyage including any consignments to be loaded at ports of call en route.</p> <p>(c) The loading, carriage and unloading of the consignments shall be supervised by persons qualified in the transport of radioactive material.</p>	<p><del>572</del> 576. The transport of consignments by means of a special use vessel <del>which</del> that, by virtue of its design, or by reason of its being chartered, is dedicated to the purpose of carrying radioactive material, shall be excepted from the requirements specified in para. <del>563</del> 566 provided that the following conditions are met:</p> <p>(a) A radiation protection programme for the shipment shall be approved by the competent authority of the flag state of the vessel and, when requested, by the competent authority at each port of call.</p> <p>(b) Stowage arrangements shall be predetermined for the whole voyage, including any consignments to be loaded at ports of call en route.</p> <p>(c) The loading, carriage and unloading of the consignments shall be supervised by persons qualified in the transport of radioactive material.</p>	
Additional requirements relating to transport by air	Additional requirements relating to transport by air	
<p>573. Type B(M) packages and consignments under exclusive use shall not be transported on passenger aircraft.</p>	<p><del>573</del> 577. Type B(M) packages and consignments under exclusive use shall not be transported on passenger aircraft.</p>	
<p>574. 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.</p>	<p><del>574</del> 578. Vented Type B(M) packages, packages <del>which</del> that 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.</p>	

575. <i>Packages or overpacks</i> having a surface <i>radiation level</i> greater than 2 mSv/h shall not be transported by air except by <i>special arrangement</i> .	<del>575</del> 579. <i>Packages or overpacks</i> having a surface <i>radiation level</i> greater than 2 mSv/h shall not be transported by air except by <i>special arrangement</i> .	
<b>Additional requirements relating to transport by post</b>	<b>Additional requirements relating to transport by post</b>	
576. A <i>consignment</i> that conforms with the requirements of para. 514, and in which the activity of the <i>radioactive contents</i> does not exceed one tenth of the limits prescribed in Table 5, may be accepted for domestic movement by national postal authorities, subject to such additional requirements as those authorities may prescribe.	<del>576</del> 580. A <i>consignment</i> that conforms with <u>to</u> the requirements of para. <del>514</del> 515, <del>and</del> in which the activity of the <i>radioactive contents</i> does not exceed one tenth of the limits prescribed in Table <del>5</del> 4, <u>and that does not contain uranium hexafluoride</u> , may be accepted for domestic movement by national postal authorities, subject to such additional requirements as those authorities may prescribe.	
577. A <i>consignment</i> that conforms with the requirements of para. 514, and in which the activity of the <i>radioactive contents</i> does not exceed one tenth of the limits prescribed in Table 5, may be accepted for international movement by post, subject in particular to the following additional requirements as prescribed by the Acts of the Universal Postal Union:  (a) It shall be deposited with the postal service only by <i>consignors</i> authorized by the national authority.  (b) It shall be dispatched by the quickest route, normally by air.  (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 <i>packaging</i> is returned empty.  (d) It shall carry on the outside the name and address of the <i>consignor</i> with the request that the <i>consignment</i> be returned in the case of non-delivery.	<del>577</del> 581. A <i>consignment</i> that conforms with <u>to</u> the requirements of para. <del>514</del> 515, <del>and</del> in which the activity of the <i>radioactive contents</i> does not exceed one tenth of the limits prescribed in Table <del>5</del> 4, <u>and that does not contain uranium hexafluoride</u> , may be accepted for international movement by post, subject in particular to the following additional requirements as prescribed by the Acts of the Universal Postal Union:  (a) It shall be deposited with the postal service only by <i>consignors</i> authorized by the national authority.  (b) It shall be dispatched by the quickest route, normally by air.  (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 <i>packaging</i> is returned empty.  (d) It shall carry on the outside the name and address of the <i>consignor</i> with the request that the <i>consignment</i> be returned in the case of non-delivery.	

(e) The name and address of the <i>consignor</i> and the contents of the <i>consignment</i> shall be indicated on the internal <i>packaging</i> .	(e) The name and address of the <i>consignor</i> and the contents of the <i>consignment</i> shall be indicated on the internal <i>packaging</i> .	
CUSTOMS OPERATIONS	CUSTOMS OPERATIONS	
578. Customs operations involving the inspection of the <i>radioactive contents</i> of a <i>package</i> shall be carried out only in a place where adequate means of controlling radiation exposure are provided and in the presence of qualified persons. Any <i>package</i> opened on customs instructions shall, before being forwarded to the <i>consignee</i> , be restored to its original condition.	<del>578</del> 582. Customs operations involving the inspection of the <i>radioactive contents</i> of a <i>package</i> shall be carried out only in a place where adequate means of controlling radiation exposure are provided and in the presence of qualified persons. Any <i>package</i> opened on customs instructions shall, before being forwarded to the <i>consignee</i> , be restored to its original condition.	
UNDELIVERABLE CONSIGNMENTS	UNDELIVERABLE CONSIGNMENTS	
579. Where a <i>consignment</i> is undeliverable, it shall be placed in a safe location and the appropriate <i>competent authority</i> shall be informed as soon as possible and a request made for instructions on further action.	<del>579</del> 583. Where a <i>consignment</i> is undeliverable, it shall be placed in a safe location and the appropriate <i>competent authority</i> shall be informed as soon as possible and a request made for instructions on further action.	
	<u>RETENTION AND AVAILABILITY OF TRANSPORT DOCUMENTS BY CARRIERS</u>	
	<u>584. A carrier shall not accept a <i>consignment</i> for transport unless:</u> <u>(a) A copy of the transport document and other documents or information as required by these Regulations are provided; or</u> <u>(b) The information applicable to the <i>consignment</i> is provided in electronic form.</u>	
	<u>585. The information applicable to the <i>consignment</i> shall accompany the <i>consignment</i> to final destination. This information may be on the dangerous goods transport document or may be on another document. This information shall be given to the <i>consignee</i> when the <i>consignment</i> is delivered.</u>	

	<u>586. When the information applicable to the <i>consignment</i> is given to the <i>carrier</i> in electronic form, the information shall be available to the <i>carrier</i> at all times during transport to final destination. The information shall be able to be produced without delay as a paper document.</u>	
	<u>587. The <i>carrier</i> shall retain a copy of the transport document and additional information and documentation as specified in these Regulations, for a minimum period of three months.</u>	
	<u>588. When the documents are kept electronically or in a computer system, the <i>carrier</i> shall be capable of reproducing them in a printed form.</u>	

## Section VI REQUIREMENTS FOR RADIOACTIVE MATERIALS AND FOR PACKAGINGS AND PACKAGES

Section VI	Section VI	
REQUIREMENTS FOR RADIOACTIVE MATERIALS AND FOR PACKAGINGS AND PACKAGES	REQUIREMENTS FOR RADIOACTIVE MATERIALS AND FOR PACKAGINGS AND PACKAGES	
REQUIREMENTS FOR RADIOACTIVE MATERIALS	REQUIREMENTS FOR RADIOACTIVE MATERIALS	
Requirements for LSA-III material	Requirements for LSA-III material	
601. <i>LSA-III</i> material shall be a solid of such a nature that if the entire contents of a <i>package</i> were subjected to the test specified in para. 703, the activity in the water would not exceed $0.1A_2$ .	601. <i>LSA-III</i> material shall be a solid of such a nature that if the entire contents of a <i>package</i> were subjected to the test specified in para. 703, the activity in the water would not exceed $0.1A_2$ .	
Requirements for special form radioactive material	Requirements for special form radioactive material	
602. Special form <i>radioactive material</i> shall have at least one dimension of not less than 5 mm.	602. <i>Special form radioactive material</i> shall have at least one dimension of not less than 5 mm.	
603. Special form <i>radioactive material</i> shall be of such a nature or shall be so designed that if it is subjected to the tests specified in paras 704–711, it shall meet the following requirements:	603. <i>Special form radioactive material</i> shall be of such a nature or shall be so designed that if it is subjected to the tests specified in paras 704–711, it shall meet the following requirements:	
<ul style="list-style-type: none"> <li>(a) It would not break or shatter under the impact, percussion and bending tests in paras 705-707 and 709(a), as applicable;</li> <li>(b) It would not melt or disperse in the heat test in para. 708 or para. 709(b) as applicable; and</li> <li>(c) The activity in the water from the leaching tests specified in paras 710 and 711 would not exceed 2 kBq; or alternatively for sealed sources, the leakage rate for the volumetric leakage assessment test specified in the International Organization for Standardization document ISO 9978: Radiation Protection — Sealed Radioactive Sources — Leakage Test Methods [9], would not exceed the applicable acceptance threshold acceptable to the <i>competent authority</i>.</li> </ul>	<ul style="list-style-type: none"> <li>(a) It would not break or shatter under the impact, percussion and bending tests in paras 705-707 and 709(a), as applicable;</li> <li>(b) It would not melt or disperse in the heat test in para. 708 or para. 709(b), as applicable; and</li> <li>(c) The activity in the water from the leaching tests specified in paras 710 and 711 would not exceed 2 kBq; or alternatively, for sealed sources, the leakage rate for the volumetric leakage assessment test specified in the International Organization for Standardization document ISO 9978: Radiation Protection — Sealed Radioactive Sources — Leakage Test Methods [9], would not exceed the applicable acceptance threshold acceptable to the <i>competent authority</i>.</li> </ul>	

604. When a sealed capsule constitutes part of the <i>special form radioactive material</i> , the capsule shall be so manufactured that it can be opened only by destroying it.	604. When a sealed capsule constitutes part of the <i>special form radioactive material</i> , the capsule shall be so manufactured that it can be opened only by destroying it.	
<b>Requirements for low dispersible radioactive material</b>	<b>Requirements for low dispersible radioactive material</b>	
<p>605. <i>Low dispersible radioactive material</i> shall be such that the total amount of this <i>radioactive material</i> in a <i>package</i> shall meet the following requirements:</p> <p>(a) The <i>radiation level</i> at 3 m from the unshielded <i>radioactive material</i> does not exceed 10 mSv/h.</p> <p>(b) If subjected to the tests specified in paras 736 and 737, the airborne release in gaseous and particulate forms of up to 100 µm aerodynamic equivalent diameter would not exceed 100A<sub>2</sub>. A separate specimen may be used for each test.</p> <p>(c) If subjected to the test specified in para. 703 the activity in the water would not exceed 100A<sub>2</sub>. In the application of this test, the damaging effects of the tests specified in (b) shall be taken into account.</p>	<p>605. <i>Low dispersible radioactive material</i> shall be such that the total amount of this <i>radioactive material</i> in a <i>package</i> shall meet the following requirements:</p> <p>(a) The <i>radiation level</i> at 3 m from the unshielded <i>radioactive material</i> does not exceed 10 mSv/h.</p> <p>(b) If subjected to the tests specified in paras 736 and 737, the airborne release in gaseous and particulate forms of up to 100 µm aerodynamic equivalent diameter would not exceed 100A<sub>2</sub>. A separate specimen may be used for each test.</p> <p>(c) If subjected to the test specified in para. 703 the activity in the water would not exceed 100A<sub>2</sub>. In the application of this test, the damaging effects of the tests specified in (b) shall be taken into account.</p>	
<i>Not in TS-R-1 (2009).</i>	<u>REQUIREMENTS FOR MATERIAL EXCEPTED FROM FISSILE CLASSIFICATION</u>	
<i>Not in TS-R-1 (2009).</i>	<p><u>606. A <i>fissile material</i> excepted from classification as FISSILE under para. 417(f) shall be subcritical without the need for accumulation control under the following conditions:</u></p> <p><u>(a) The conditions of para. 673(a);</u></p> <p><u>(b) The conditions consistent with the assessment provisions stated in paras 684(b) and 685(b) for <i>packages</i>;</u></p> <p><u>(c) The conditions specified in para. 683(a), if transported by air.</u></p>	
GENERAL REQUIREMENTS FOR ALL PACKAGINGS AND PACKAGES	GENERAL REQUIREMENTS FOR ALL PACKAGINGS AND PACKAGES	



606. The <i>package</i> shall be so designed in relation to its mass, volume and shape that it can be easily and safely transported. In addition, the <i>package</i> shall be so designed that it can be properly secured in or on the <i>conveyance</i> during transport.	<del>606</del> 607. The <i>package</i> shall be so designed in relation to its mass, volume and shape that it can be easily and safely transported. In addition, the <i>package</i> shall be so designed that it can be properly secured in or on the <i>conveyance</i> during transport.	
607. The <i>design</i> shall be such that any lifting attachments on the <i>package</i> will not fail when used in the intended manner and that, if failure of the attachments should occur, the ability of the <i>package</i> to meet other requirements of these Regulations would not be impaired. The <i>design</i> shall take account of appropriate safety factors to cover snatch lifting.	<del>607</del> 608. The <i>design</i> shall be such that any lifting attachments on the <i>package</i> will not fail when used in the intended manner and that, if failure of the attachments should occur, the ability of the <i>package</i> to meet other requirements of these Regulations would not be impaired. The <i>design</i> shall take account of appropriate safety factors to cover snatch lifting.	
608. Attachments and any other features on the outer surface of the <i>package</i> which could be used to lift it shall be designed either to support its mass in accordance with the requirements of para. 607, or shall be removable or otherwise rendered incapable of being used during transport.	<del>608</del> 609. Attachments and any other features on the outer surface of the <i>package</i> <del>which</del> <u>that</u> could be used to lift it shall be designed either to support its mass in accordance with the requirements of para. <del>607</del> 608, or shall be removable or otherwise rendered incapable of being used during transport.	
609. As far as practicable, the <i>packaging</i> shall be so designed and finished that the external surfaces are free from protruding features and can be easily decontaminated.	<del>609</del> 610. As far as practicable, the <i>packaging</i> shall be so designed and finished that the external surfaces are free from protruding features and can be easily decontaminated.	
610. As far as practicable, the outer layer of the <i>package</i> shall be so designed as to prevent the collection and the retention of water.	<del>610</del> 611. As far as practicable, the outer layer of the <i>package</i> shall be so designed as to prevent the collection and the retention of water.	
611. Any features added to the <i>package</i> at the time of transport which are not part of the <i>package</i> shall not reduce its safety.	<del>611</del> 612. Any features added to the <i>package</i> at the time of transport <del>which</del> <u>that</u> are not part of the <i>package</i> shall not reduce its safety.	
612. The <i>package</i> shall be capable of withstanding the effects of any acceleration, vibration or vibration resonance which may arise under	<del>612</del> 613. The <i>package</i> shall be capable of withstanding the effects of any	

routine conditions of transport without any deterioration in the effectiveness of the closing devices on the various receptacles or in the integrity of the <i>package</i> as a whole. 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.	acceleration, vibration or vibration resonance <del>which</del> <a href="#">that</a> may arise under routine conditions of transport without any deterioration in the effectiveness of the closing devices on the various receptacles or in the integrity of the <i>package</i> as a whole. 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.	
613. The materials of the <i>packaging</i> and any components or structures shall be physically and chemically compatible with each other and with the radioactive contents. Account shall be taken of their behaviour under irradiation.	<del>613</del> <a href="#">614</a> . The materials of the <i>packaging</i> and any components or structures shall be physically and chemically compatible with each other and with the <a href="#">radioactive contents</a> . Account shall be taken of their behaviour under irradiation.	
614. All valves through which the <i>radioactive contents</i> could escape shall be protected against unauthorized operation.	<del>614</del> <a href="#">615</a> . All valves through which the <i>radioactive contents</i> could escape shall be protected against unauthorized operation.	
615. The <i>design</i> of the <i>package</i> shall take into account ambient temperatures and pressures that are likely to be encountered in routine conditions of transport.	<del>615</del> <a href="#">616</a> . The <i>design</i> of the <i>package</i> shall take into account ambient temperatures and pressures that are likely to be encountered in routine conditions of transport.	
<i>Not in TS-R-1 (2009).</i>	<a href="#">617. A package shall be so designed that it provides sufficient shielding to ensure that, under routine conditions of transport and with the maximum radioactive contents that the package is designed to contain, the radiation level at any point on the external surface of the package would not exceed the values specified in paras 516, 527 and 528, as applicable, with account taken of paras 566(b) and 573.</a>	
616. For <i>radioactive material</i> having other dangerous properties the <i>package design</i> shall take into account those properties (see paras 110 and 506).	<del>616</del> <a href="#">618</a> . For <i>radioactive material</i> having other dangerous properties, the <i>package design</i> shall take into account those properties (see paras 110 and <del>506</del> <a href="#">507</a> ).	

ADDITIONAL REQUIREMENTS FOR PACKAGES TRANSPORTED BY AIR	ADDITIONAL REQUIREMENTS FOR PACKAGES TRANSPORTED BY AIR	
617. For <i>packages</i> to be transported by air, the temperature of the accessible surfaces shall not exceed 50°C at an ambient temperature of 38°C with no account taken for insolation.	<del>617</del> 619. For <i>packages</i> to be transported by air, the temperature of the accessible surfaces shall not exceed 50°C at an ambient temperature of 38°C with no account taken for insolation.	
618. <i>Packages</i> to be transported by air shall be so designed that, if they were exposed to ambient temperatures ranging from –40°C to +55°C, the integrity of containment would not be impaired.	<del>618</del> 620. <i>Packages</i> to be transported by air shall be so designed that, if they were exposed to ambient temperatures ranging from –40°C to +55°C, the integrity of containment would not be impaired.	
619. <i>Packages</i> containing <i>radioactive material</i> to be transported by air shall be capable of withstanding, without leakage, an internal pressure which produces a pressure differential of not less than <i>maximum normal operating pressure</i> plus 95 kPa.	<del>619</del> 621. <i>Packages</i> containing <i>radioactive material</i> to be transported by air shall be capable of withstanding, without <del>leakage</del> <u>loss or dispersal of radioactive contents from the containment system</u> , an internal pressure <del>which that</del> produces a pressure differential of not less than <i>maximum normal operating pressure</i> plus 95 kPa.	
REQUIREMENTS FOR EXCEPTED PACKAGES	REQUIREMENTS FOR EXCEPTED PACKAGES	
620. An <i>excepted package</i> shall be designed to meet the requirements specified in paras 606–616 and, in addition, the requirements of paras 617–619 if carried by air.	<del>620</del> 622. An <i>excepted package</i> shall be designed to meet the requirements specified in paras <del>606–616</del> <u>607–618</u> and, in addition, the requirements of paras <del>617–619</del> <u>619–621</u> if carried by air.	
REQUIREMENTS FOR INDUSTRIAL PACKAGES	REQUIREMENTS FOR INDUSTRIAL PACKAGES	
Requirements for Type IP-1	Requirements for Type IP-1	
621. A <i>Type IP-1 package</i> shall be designed to meet the requirements specified in paras 606–616 and 634, and, in addition, the requirements of paras 617–619 if carried by air.	<del>621</del> 623. A <i>Type IP-1 package</i> shall be designed to meet the requirements specified in paras <del>606–616</del> <u>607–618</u> and <del>634</del> <u>636</u> , and, in addition, the requirements of paras <del>617–619</del> <u>619–621</u> if carried by air.	

Requirements for Type IP-2	Requirements for Type IP-2	
<p>622. A <i>package</i> to be qualified as a <i>Type IP-2</i> shall be designed to meet the requirements for <i>Type IP-1</i> as specified in para. 621 and, in addition, if it were subjected to the tests specified in paras 722 and 723, it would prevent:</p> <ul style="list-style-type: none"> <li>(a) Loss or dispersal of the radioactive contents; and</li> <li>(b) More than a 20% increase in the maximum <i>radiation level</i> at any external surface of the <i>package</i>.</li> </ul>	<p><del>622</del> <a href="#">624</a>. A <i>package</i> to be qualified as a <i>Type IP-2</i> shall be designed to meet the requirements for <i>Type IP-1</i> as specified in para. <del>621</del> <a href="#">623</a> and, in addition, if it were subjected to the tests specified in paras 722 and 723, it would prevent:</p> <ul style="list-style-type: none"> <li>(a) Loss or dispersal of the <a href="#">radioactive contents</a>; <del>and</del></li> <li>(b) More than a 20% increase in the maximum <i>radiation level</i> at any external surface of the <i>package</i>.</li> </ul>	
Requirements for Type IP-3	Requirements for Type IP-3	
<p>623. A <i>package</i> to be qualified as a <i>Type IP-3</i> shall be designed to meet the requirements for <i>Type IP-1</i> as specified in para. 621 and, in addition, the requirements specified in paras 634–647.</p>	<p><del>623</del> <a href="#">625</a>. A <i>package</i> to be qualified as a <i>Type IP-3</i> shall be designed to meet the requirements for <i>Type IP-1</i> as specified in para. <del>621</del> <a href="#">623</a> and, in addition, the requirements specified in paras <del>634–647</del> <a href="#">636–649</a>.</p>	
Alternative requirements for Type IP-2 and Type IP-3	Alternative requirements for Type IP-2 and Type IP-3	
<p>624. <i>Packages</i> may be used as <i>Type IP-2</i> provided that:</p> <ul style="list-style-type: none"> <li>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. 621.</li> <li>(b) They are designed to satisfy the requirements prescribed for UN Packing Group I or II in Chapter 6.1 of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations [10].</li> <li>(c) When subjected to the tests required for UN Packing Group I or II, they would prevent: <ul style="list-style-type: none"> <li>(i) Loss or dispersal of the radioactive contents; and</li> <li>(ii) More than a 20% increase in the maximum <i>radiation level</i> at any external surface of the <i>package</i>.</li> </ul> </li> </ul>	<p><del>624</del> <a href="#">626</a>. <i>Packages</i> may be used as <i>Type IP-2</i>, provided that:</p> <ul style="list-style-type: none"> <li>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. <del>621</del> <a href="#">623</a>.</li> <li>(b) They are designed to satisfy the requirements prescribed for UN Packing Group I or II in Chapter 6.1 of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations [10].</li> <li>(c) When subjected to the tests required for UN Packing Group I or II, they would prevent: <ul style="list-style-type: none"> <li>(i) Loss or dispersal of the <a href="#">radioactive contents</a>; <del>and</del></li> <li>(ii) More than a 20% increase in the maximum <i>radiation level</i> at</li> </ul> </li> </ul>	

	any external surface of the <i>package</i> .	
<p>625. Portable <i>tanks</i> may also be used as <i>Type IP-2</i> or <i>Type IP-3</i>, provided that:</p> <p>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. 621;</p> <p>(b) They are designed to satisfy the requirements prescribed in Chapter 6.7 of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations [10], or other requirements at least equivalent, and are capable of withstanding a test pressure of 265 kPa; and</p> <p>(c) They are designed so that any additional shielding which is provided shall be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of transport and of preventing more than a 20% increase in the maximum <i>radiation level</i> at any external surface of the portable <i>tanks</i>.</p>	<p><del>625</del> 627. Portable <i>tanks</i> may also be used as <i>Type IP-2</i> or <i>Type IP-3</i>, provided that:</p> <p>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. <del>621</del> 623<sup>2</sup>.</p> <p>(b) They are designed to satisfy the requirements prescribed in Chapter 6.7 of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations [10], or other requirements at least equivalent, and are capable of withstanding a test pressure of 265 kPa<sup>2</sup>. <del>and</del></p> <p>(c) They are designed so that any additional shielding <del>which</del> <i>that</i> is provided shall be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of transport and of preventing more than a 20% increase in the maximum <i>radiation level</i> at any external surface of the portable <i>tanks</i>.</p>	Editorial
<p>626. <i>Tanks</i>, other than portable <i>tanks</i>, may also be used as <i>Type IP-2</i> or <i>Type IP-3</i> for transporting <i>LSA-I</i> and <i>LSA-II</i> liquids and gases as prescribed in Table 6, provided that:</p> <p>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. 621;</p> <p>(b) They are designed to satisfy the requirements prescribed in regional or national regulations for the transport of dangerous goods and are capable of withstanding a test pressure of 265 kPa; and</p> <p>(c) They are designed so that any additional shielding which is provided shall be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of transport and of preventing more than a 20% increase in the maximum <i>radiation level</i> at any external surface of the <i>tanks</i>.</p>	<p><del>626</del> 628. <i>Tanks</i>, other than portable <i>tanks</i>, may also be used as <i>Type IP-2</i> or <i>Type IP-3</i> for transporting <i>LSA-I</i> and <i>LSA-II</i> liquids and gases as prescribed in Table <del>6</del> 5, provided that:</p> <p>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. <del>621</del> 623<sup>2</sup>.</p> <p>(b) They are designed to satisfy the requirements prescribed in regional or national regulations for the transport of dangerous goods and are capable of withstanding a test pressure of 265 kPa<sup>2</sup>. <del>and</del></p> <p>(c) They are designed so that any additional shielding <del>which</del> <i>that</i> is provided shall be capable of withstanding the static and dynamic stresses resulting from handling and routine conditions of transport and of preventing more than a 20% increase in the maximum <i>radiation level</i> at any external surface of the <i>tanks</i>.</p>	Editorial
627. <i>Freight containers</i> with the characteristics of a permanent	<del>627</del> 629. <i>Freight containers</i> with the characteristics of a permanent	

<p>enclosure may also be used as <i>Type IP-2</i> or <i>Type IP-3</i>, provided that:</p> <p>(a) The <i>radioactive contents</i> are restricted to solid materials.</p> <p>(b) They satisfy the requirements for <i>Type IP-1</i> specified in para. 621.</p> <p>(c) They are designed to conform to the International Organization for Standardization document ISO 1496/1: Series 1 <i>Freight Containers</i> — Specifications and Testing — Part 1: General Cargo Containers for General Purposes [11] excluding dimensions and ratings. They shall be designed such that if subjected to the tests prescribed in that document and to the accelerations occurring during routine conditions of transport they would prevent:</p> <ul style="list-style-type: none"> <li>(i) Loss or dispersal of the radioactive contents; and</li> <li>(ii) More than a 20% increase in the maximum <i>radiation level</i> at any external surface of the <i>freight containers</i>.</li> </ul>	<p>enclosure may also be used as <i>Type IP-2</i> or <i>Type IP-3</i>, provided that:</p> <p>(a) The <i>radioactive contents</i> are restricted to solid materials.</p> <p>(b) They satisfy the requirements for <i>Type IP-1</i> specified in para. <del>621</del> <u>623</u>.</p> <p>(c) They are designed to conform to the International Organization for Standardization document ISO 1496/1: Series 1 <i>Freight Containers</i> — Specifications and Testing — Part 1: General Cargo Containers for General Purposes [11] excluding dimensions and ratings. They shall be designed such that if subjected to the tests prescribed in that document and to the accelerations occurring during routine conditions of transport they would prevent:</p> <ul style="list-style-type: none"> <li>(i) Loss or dispersal of the <u>radioactive contents</u>; <del>and</del></li> <li>(ii) More than a 20% increase in the maximum <i>radiation level</i> at any external surface of the <i>freight containers</i>.</li> </ul>	
<p>628. Metal <i>intermediate bulk containers</i> may also be used as <i>Type IP-2</i> or <i>Type IP-3</i>, provided that:</p> <p>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. 621;</p> <p>(b) They are designed to satisfy the requirements prescribed for UN Packing Group I or II in Chapter 6.5 of the United Nations Recommendations on the Transport of Dangerous Goods: Model Regulations [10], and if they were subjected to the tests prescribed in that document, but with the drop test conducted in the most damaging orientation, they would prevent:</p> <ul style="list-style-type: none"> <li>(i) Loss or dispersal of the radioactive contents; and</li> <li>(ii) More than a 20% increase in the maximum <i>radiation level</i> at any external surface of the <i>IBC</i>.</li> </ul>	<p><del>628</del> <u>630</u>. Metal <i>IBC</i> may also be used as <i>Type IP-2</i> or <i>Type IP-3</i>, provided that:</p> <p>(a) They satisfy the requirements for <i>Type IP-1</i> specified in para. <del>621</del> <u>623</u>.</p> <p>(b) They are designed to satisfy the requirements prescribed for UN Packing Group I or II in Chapter 6.5 of the United Nations Recommendations on the Transport of Dangerous Goods: Model Regulations [10], and if they were subjected to the tests prescribed in that document, but with the drop test conducted in the most damaging orientation, they would prevent:</p> <ul style="list-style-type: none"> <li>(i) Loss or dispersal of the <u>radioactive contents</u>; <del>and</del></li> <li>(ii) More than a 20% increase in the maximum <i>radiation level</i> at any external surface of the <i>IBC</i>.</li> </ul>	



REQUIREMENTS FOR PACKAGES CONTAINING URANIUM HEXAFLUORIDE	REQUIREMENTS FOR PACKAGES CONTAINING URANIUM HEXAFLUORIDE	
<p>629. <i>Packages</i> designed to contain uranium hexafluoride shall meet the requirements prescribed elsewhere in these Regulations which pertain to the radioactive and fissile properties of the material. Except as allowed in para. 632, uranium hexafluoride in quantities of 0.1 kg or more shall also be packaged and transported in accordance with the provisions of the International Organization for Standardization document ISO 7195: Packaging of Uranium Hexafluoride (UF<sub>6</sub>) for Transport [12], and the requirements of paras 630 and 631.</p>	<p><del>629</del> 631. <i>Packages</i> designed to contain uranium hexafluoride shall meet the requirements <u>that pertain to the radioactive and fissile properties of the material</u> prescribed elsewhere in these Regulations <del>which pertain to the radioactive and fissile properties of the material</del>. Except as allowed in para. <del>632</del> 634, uranium hexafluoride in quantities of 0.1 kg or more shall also be packaged and transported in accordance with the provisions of the International Organization for Standardization document ISO 7195: Packaging of Uranium Hexafluoride (UF<sub>6</sub>) for Transport [12], and the requirements of paras <del>630 and 631</del> <u>632 and 633</u>.</p>	
<p>630. Each <i>package</i> designed to contain 0.1 kg or more of uranium hexafluoride shall be designed so that it will meet the following requirements:</p> <p>(a) Withstand without leakage and without unacceptable stress, as specified in the International Organization for Standardization document ISO 7195 [12], the structural test as specified in para. 718;</p> <p>(b) Withstand, without loss or dispersal of the uranium hexafluoride the free drop test specified in para. 722; and</p> <p>(c) Withstand, without rupture of the <i>containment system</i> the thermal test specified in para. 728.</p>	<p><del>630</del> 632. Each <i>package</i> designed to contain 0.1 kg or more of uranium hexafluoride shall be designed so that it will meet the following requirements:</p> <p>(a) Withstand without leakage and without unacceptable stress, as specified in <del>the International Organization for Standardization document</del> ISO 7195 [12], the structural test as specified in para. 718, <u>except as allowed in para. 634</u>;</p> <p>(b) Withstand, without loss or dispersal of the uranium hexafluoride the free drop test specified in para. 722; <del>and</del></p> <p>(c) Withstand, without rupture of the <i>containment system</i> the thermal test specified in para. 728, <u>except as allowed in para. 634</u>.</p>	
<p>631. <i>Packages</i> designed to contain 0.1 kg or more of uranium hexafluoride shall not be provided with pressure relief devices.</p>	<p><del>631</del> 633. <i>Packages</i> designed to contain 0.1 kg or more of uranium hexafluoride shall not be provided with pressure relief devices.</p>	
<p>632. Subject to the approval of the <i>competent authority</i>, <i>packages</i> designed to contain 0.1 kg or more of uranium hexafluoride may be transported if:</p>	<p><del>632</del> 634. Subject to <del>the</del> <u>multilateral approval</u> <del>of the competent authority</del>, <i>packages</i> designed to contain 0.1 kg or more of uranium hexafluoride may be transported if <u>the packages are designed</u>:</p>	



<p>(a) The <i>packages</i> are designed to international or national standards other than ISO 7195 [12], provided an equivalent level of safety is maintained;</p> <p>(b) The <i>packages</i> are designed to withstand without leakage and without unacceptable stress, a test pressure of less than 2.76 MPa as specified in para. 718; or</p> <p>(c) For <i>packages</i> designed to contain 9000 kg or more of uranium hexafluoride, the <i>packages</i> do not meet the requirement of para. 630(c).</p> <p>In all other respects, the requirements specified in paras 629–631 shall be satisfied.</p>	<p>(a) <del>The packages are designed to</del> To international or national standards other than ISO 7195 [12], provided an equivalent level of safety is maintained; <u>and/or</u></p> <p>(b) <del>The packages are designed to</del> To withstand, without leakage and without unacceptable stress, a test pressure of less than 2.76 MPa as specified in para. 718; <u>and/or</u></p> <p>(c) <del>For packages designed to</del> To contain 9000 kg or more of uranium hexafluoride <u>and</u> the <i>packages</i> do not meet the requirement of para. <del>630</del> <u>632</u>(c).</p> <p>In all other respects, the requirements specified in paras <del>629–631</del> <u>631–633</u> shall be satisfied.</p>	
<p><b>REQUIREMENTS FOR TYPE A PACKAGES</b></p>	<p><b>REQUIREMENTS FOR TYPE A PACKAGES</b></p>	
<p>633. <i>Type A packages</i> shall be designed to meet the requirements specified in paras 606–616 and, in addition, the requirements of paras 617–619 if carried by air, and of paras 634–649.</p>	<p><del>633</del> <u>635</u>. <i>Type A packages</i> shall be designed to meet the requirements specified in paras <del>606–616</del> <u>607–618</u> and, in addition, the requirements of paras <del>617–619</del> <u>619–621</u> if carried by air, and of paras <del>634–649</del> <u>636–651</u>.</p>	
<p>634. The smallest overall external dimension of the <i>package</i> shall not be less than 10 cm.</p>	<p><del>634</del> <u>636</u>. The smallest overall external dimension of the <i>package</i> shall not be less than 10 cm.</p>	
<p>635. The outside of the <i>package</i> shall incorporate a feature such as a seal which is not readily breakable and which, while intact, will be evidence that the <i>package</i> has not been opened.</p>	<p><del>635</del> <u>637</u>. The outside of the <i>package</i> shall incorporate a feature such as a seal <del>which</del> <u>that</u> is not readily breakable and which, while intact, will be evidence that the <i>package</i> has not been opened.</p>	
<p>636. Any tie-down attachments on the <i>package</i> shall be so designed that, under normal and accident conditions of transport, the forces in those attachments shall not impair the ability of the <i>package</i> to meet the requirements of these Regulations.</p>	<p><del>636</del> <u>638</u>. Any tie-down attachments on the <i>package</i> shall be so designed that, under normal and accident conditions of transport, the forces in those attachments shall not impair the ability of the <i>package</i> to meet the requirements of these Regulations.</p>	
<p>637. The <i>design</i> of the <i>package</i> shall take into account temperatures ranging from –40°C to +70°C for the components of the <i>packaging</i>.</p>	<p><del>637</del> <u>639</u>. The <i>design</i> of the <i>package</i> shall take into account temperatures</p>	

Attention shall be given to freezing temperatures for liquids and to the potential degradation of <i>packaging</i> materials within the given temperature range.	ranging from –40°C to +70°C for the components of the <i>packaging</i> . Attention shall be given to freezing temperatures for liquids and to the potential degradation of <i>packaging</i> materials within the given temperature range.	
638. The <i>design</i> and manufacturing techniques shall be in accordance with national or international standards, or other requirements, acceptable to the <i>competent authority</i> .	<del>638</del> <a href="#">640</a> . The <i>design</i> and manufacturing techniques shall be in accordance with national or international standards, or other requirements, acceptable to the <i>competent authority</i> .	
639. The <i>design</i> shall include a <i>containment system</i> securely closed by a positive fastening device which cannot be opened unintentionally or by a pressure which may arise within the <i>package</i> .	<del>639</del> <a href="#">641</a> . The <i>design</i> shall include a <i>containment system</i> securely closed by a positive fastening device <del>which</del> <a href="#">that</a> cannot be opened unintentionally or by a pressure <del>which</del> <a href="#">that</a> may arise within the <i>package</i> .	
640. <i>Special form radioactive material</i> may be considered as a component of the <i>containment system</i> .	<del>640</del> <a href="#">642</a> . <i>Special form radioactive material</i> may be considered as a component of the <i>containment system</i> .	
641. If the <i>containment system</i> forms a separate unit of the <i>package</i> , it shall be capable of being securely closed by a positive fastening device which is independent of any other part of the <i>packaging</i> .	<del>641</del> <a href="#">643</a> . If the <i>containment system</i> forms a separate unit of the <i>package</i> , it shall be capable of being securely closed by a positive fastening device <del>which</del> <a href="#">that</a> is independent of any other part of the <i>packaging</i> .	
642. The <i>design</i> of any component of the <i>containment system</i> shall take into account, where applicable, the radiolytic decomposition of liquids and other vulnerable materials and the generation of gas by chemical reaction and radiolysis.	<del>642</del> <a href="#">644</a> . The <i>design</i> of any component of the <i>containment system</i> shall take into account, where applicable, the radiolytic decomposition of liquids and other vulnerable materials and the generation of gas by chemical reaction and radiolysis.	
643. The <i>containment system</i> shall retain its <i>radioactive contents</i> under a reduction of ambient pressure to 60 kPa.	<del>643</del> <a href="#">645</a> . The <i>containment system</i> shall retain its <i>radioactive contents</i> under a reduction of ambient pressure to 60 kPa.	

644. All valves, other than pressure relief valves, shall be provided with an enclosure to retain any leakage from the valve.	<del>644</del> 646. All valves, other than pressure relief valves, shall be provided with an enclosure to retain any leakage from the valve.	
645. A radiation shield which encloses a component of the <i>package</i> specified as a part of the <i>containment system</i> shall be so designed as to prevent the unintentional release of that component from the shield. Where the radiation shield and such component within it form a separate unit, the radiation shield shall be capable of being securely closed by a positive fastening device which is independent of any other <i>packaging</i> structure.	<del>645</del> 647. A radiation shield <del>which</del> <u>that</u> encloses a component of the <i>package</i> specified as a part of the <i>containment system</i> shall be so designed as to prevent the unintentional release of that component from the shield. Where the radiation shield and such component within it form a separate unit, the radiation shield shall be capable of being securely closed by a positive fastening device <del>which</del> <u>that</u> is independent of any other <i>packaging</i> structure.	
646. A <i>package</i> shall be so designed that, if it were subjected to the tests specified in paras 719–724, it would prevent:  (a) Loss or dispersal of the radioactive contents; and (b) More than a 20% increase in the maximum <i>radiation level</i> at any external surface of the <i>package</i> .	<del>646</del> 648. A <i>package</i> shall be so designed that, if it were subjected to the tests specified in paras 719–724, it would prevent:  (a) Loss or dispersal of the <u>radioactive contents</u> ; <del>and</del> (b) More than a 20% increase in the maximum <i>radiation level</i> at any external surface of the <i>package</i> .	1
647. The <i>design</i> of a <i>package</i> intended for liquid <i>radioactive material</i> shall make provision for ullage to accommodate variations in the temperature of the contents, dynamic effects and filling dynamics.	<del>647</del> 649. The <i>design</i> of a <i>package</i> intended for liquid <i>radioactive material</i> shall make provision for ullage to accommodate variations in the temperature of the contents, dynamic effects and filling dynamics.	
648. A <i>Type A package</i> designed to contain liquid <i>radioactive material</i> shall, in addition:  (a) Be adequate to meet the conditions specified in para. 646(a) if the <i>package</i> is subjected to the tests specified in para. 725.  (b) Either:  (i) Be provided with sufficient absorbent material to absorb twice the volume of the liquid contents. Such absorbent material must be suitably positioned so as to contact the	<del>648</del> 650. A <i>Type A package</i> designed to contain liquid <i>radioactive material</i> shall, in addition:  (a) Be adequate to meet the conditions specified in para. <del>646</del> 648(a) if the <i>package</i> is subjected to the tests specified in para. 725; <u>and</u> (b) Either:  (i) Be provided with sufficient absorbent material to absorb twice the volume of the liquid contents. Such absorbent material must be suitably positioned so as to contact the liquid in the event of leakage; or	

<p>liquid in the event of leakage; or</p> <p>(ii) Be provided with a <i>containment system</i> composed of primary inner and secondary outer containment components designed to enclose the liquid contents, completely and to ensure their retention within the secondary outer containment components, even if the primary inner components leak.</p>	<p>(ii) Be provided with a <i>containment system</i> composed of primary inner and secondary outer containment components designed to enclose the liquid contents completely and to ensure their retention within the secondary outer containment components, even if the primary inner components leak.</p>	
<p>649. A <i>package</i> designed for gases shall prevent loss or dispersal of the <i>radioactive contents</i> if the <i>package</i> were subjected to the tests specified in para. 725. A <i>Type A package</i> designed for tritium gas or for noble gases shall be excepted from this requirement.</p>	<p><del>649</del> <a href="#">651</a>. A <i>package</i> designed for gases shall prevent loss or dispersal of the <i>radioactive contents</i> if the <i>package</i> were subjected to the tests specified in para. 725. A <i>Type A package</i> designed for tritium gas or for noble gases shall be excepted from this requirement.</p>	
<p>REQUIREMENTS FOR TYPE B(U) PACKAGES</p>	<p>REQUIREMENTS FOR TYPE B(U) PACKAGES</p>	
<p>650. <i>Type B(U) packages</i> shall be designed to meet the requirements specified in paras 606–616, the requirements in paras 617–619 if carried by air, and in paras 634–647, except as specified in para. 646(a), and, in addition, the requirements specified in paras 651–664.</p>	<p><del>650</del> <a href="#">652</a>. <i>Type B(U) packages</i> shall be designed to meet the requirements specified in paras <del>606–616</del> <a href="#">607–618</a>, the requirements <a href="#">specified</a> in paras <del>617–619</del> <a href="#">619–621</a> if carried by air, and in paras <del>634–647</del> <a href="#">636–649</a>, except as specified in para. <del>646</del> <a href="#">648</a>(a), and, in addition, the requirements specified in paras <del>651–664</del> <a href="#">653–666</a>.</p>	
<p>651. A <i>package</i> shall be so designed that, under the ambient conditions specified in paras 654 and 655, heat generated within the <i>package</i> by the <i>radioactive contents</i> shall not, under normal conditions of transport, as demonstrated by the tests in paras 719–724, adversely affect the <i>package</i> in such a way that it would fail to meet the applicable requirements for containment and shielding if left unattended for a period of one week. Particular attention shall be paid to the effects of heat, which may:</p> <p>(a) Alter the arrangement, the geometrical form or the physical state of the <i>radioactive contents</i> or, if the <i>radioactive material</i> is enclosed in a can or receptacle (for example, clad fuel elements), cause the can, receptacle or <i>radioactive material</i> to deform or</p>	<p><del>651</del> <a href="#">653</a>. A <i>package</i> shall be so designed that, under the ambient conditions specified in paras <del>654 and 655</del> <a href="#">656 and 657</a>, heat generated within the <i>package</i> by the <i>radioactive contents</i> shall not, under normal conditions of transport, as demonstrated by the tests in paras 719–724, adversely affect the <i>package</i> in such a way that it would fail to meet the applicable requirements for containment and shielding if left unattended for a period of one week. Particular attention shall be paid to the effects of heat, <del>which</del> <a href="#">that</a> may <a href="#">cause one or more of the following</a>:</p> <p>(a) Alter the arrangement, the geometrical form or the physical state of the <i>radioactive contents</i> or, if the <i>radioactive material</i> is enclosed in a can or receptacle (for example, clad fuel elements), cause the can, receptacle or <i>radioactive material</i> to deform or</p>	

<p>melt;</p> <p>(b) Lessen the efficiency of the <i>packaging</i> through differential thermal expansion, or cracking or melting of the radiation shielding material; or</p> <p>(c) In combination with moisture, accelerate corrosion.</p>	<p>melt; <del>or</del></p> <p>(b) Lessen the efficiency of the <i>packaging</i> through differential thermal expansion, or cracking or melting of the radiation shielding material; <del>or</del></p> <p>(c) In combination with moisture, accelerate corrosion.</p>	
<p>652. A <i>package</i> shall be so designed that, under the ambient condition specified in para. 654 and in the absence of insolation, the temperature of the accessible surfaces of a <i>package</i> shall not exceed 50°C, unless the <i>package</i> is transported under <i>exclusive use</i>.</p>	<p><del>652</del> <a href="#">654</a>. A <i>package</i> shall be so designed that, under the ambient condition specified in para. <del>654</del> <a href="#">656</a> and in the absence of insolation, the temperature of the accessible surfaces of a <i>package</i> shall not exceed 50°C, unless the <i>package</i> is transported under <i>exclusive use</i>.</p>	
<p>653. Except as required in para. 617 for a <i>package</i> transported by air, the maximum temperature of any surface readily accessible during transport of a <i>package</i> under <i>exclusive use</i> shall not exceed 85°C in the absence of insolation under the ambient conditions specified in para. 654. Account may be taken of barriers or screens intended to give protection to persons without the need for the barriers or screens being subject to any test.</p>	<p><del>653</del> <a href="#">655</a>. Except as required in para. <del>617</del> <a href="#">619</a> for a <i>package</i> transported by air, the maximum temperature of any surface readily accessible during transport of a <i>package</i> under <i>exclusive use</i> shall not exceed 85°C in the absence of insolation under the ambient conditions specified in para. <del>654</del> <a href="#">656</a>. Account may be taken of barriers or screens intended to give protection to persons without the need for the barriers or screens being subject to any test.</p>	
<p>654. The ambient temperature shall be assumed to be 38°C.</p>	<p><del>654</del> <a href="#">656</a>. The ambient temperature shall be assumed to be 38°C.</p>	
<p>655. The solar insolation conditions shall be assumed to be as specified in Table 13.</p>	<p><del>655</del> <a href="#">657</a>. The solar insolation conditions shall be assumed to be as specified in Table <del>13</del> <a href="#">12</a>.</p>	
<p>656. A <i>package</i> which includes thermal protection for the purpose of satisfying the requirements of the thermal test specified in para. 728 shall be so designed that such protection will remain effective if the <i>package</i> is subjected to the tests specified in paras 719–724 and 727(a) and (b) or 727(b) and (c), as appropriate. Any such protection on the exterior of the <i>package</i> shall not be rendered ineffective by ripping,</p>	<p><del>656</del> <a href="#">658</a>. A <i>package</i> <del>which</del> <a href="#">that</a> includes thermal protection for the purpose of satisfying the requirements of the thermal test specified in para. 728 shall be so designed that such protection will remain effective if the <i>package</i> is subjected to the tests specified in paras 719–724 and 727(a) and (b) or 727(b) and (c), as appropriate. Any such protection on</p>	

cutting, skidding, abrading or rough handling.	the exterior of the <i>package</i> shall not be rendered ineffective by ripping, cutting, skidding, abrading or rough handling.	
TABLE 13. INSULATION DATA	TABLE <del>13</del> 12. INSULATION DATA	
<p>657. A <i>package</i> shall be so designed that, if it were subjected to:</p> <p>(a) The tests specified in paras 719–724, it would restrict the loss of <i>radioactive contents</i> to not more than <math>10^{-6}A_2</math> per hour.</p> <p>(b) The tests specified in paras 726, 727(b), 728 and 729 and the tests in paras:</p> <p>(i) 727(c), when the <i>package</i> has a mass not greater than 500 kg, an overall density not greater than <math>1000 \text{ kg/m}^3</math> based on the external dimensions, and <i>radioactive contents</i> greater than <math>1000A_2</math> not as <i>special form radioactive material</i>, or</p> <p>(ii) 727(a), for all other <i>packages</i>, it would meet the following requirements:</p> <ul style="list-style-type: none"> <li>– Retain sufficient shielding to ensure that the <i>radiation level</i> 1 m from the surface of the <i>package</i> would not exceed 10 mSv/h with the maximum <i>radioactive contents</i> which the <i>package</i> is designed to contain; and</li> <li>– Restrict the accumulated loss of <i>radioactive contents</i> in a period of one week to not more than <math>10A_2</math> for krypton-85 and not more than <math>A_2</math> for all other radionuclides.</li> </ul> <p>Where mixtures of different radionuclides are present, the provisions of paras 405–407 shall apply, except that for krypton-85 an effective <math>A_2(i)</math> value equal to <math>10A_2</math> may be used. For case (a) above, the assessment shall take into account the external <i>contamination</i> limits of para. 507.</p>	<p><del>657</del> 659. A <i>package</i> shall be so designed that, if it were subjected to:</p> <p>(a) The tests specified in paras 719–724, it would restrict the loss of <i>radioactive contents</i> to not more than <math>10^{-6}A_2</math> per hour.</p> <p>(b) The tests specified in paras 726, 727(b), 728 and 729 and <u>either</u> the tests in paras:</p> <ul style="list-style-type: none"> <li>– 727(c), when the <i>package</i> has a mass not greater than 500 kg, an overall density not greater than <math>1000 \text{ kg/m}^3</math> based on the external dimensions, and <i>radioactive contents</i> greater than <math>1000 A_2</math> not as <i>special form radioactive material</i>; or</li> <li>– 727(a), for all other <i>packages</i>, <del>it would meet the following requirements;</del></li> </ul> <p><u>(i) It would</u> retain sufficient shielding to ensure that the <i>radiation level</i> 1 m from the surface of the <i>package</i> would not exceed 10 mSv/h with the maximum <i>radioactive contents</i> <del>which</del> <u>that</u> the <i>package</i> is designed to contain; <del>and</del></p> <p><u>(ii) It would</u> restrict the accumulated loss of <i>radioactive contents</i> in a period of one week to not more than <math>10A_2</math> for krypton-85 and not more than <math>A_2</math> for all other radionuclides.</p> <p>Where mixtures of different radionuclides are present, the provisions of paras 405–407 shall apply, except that for krypton-85 an effective <math>A_2(i)</math> value equal to <math>10A_2</math> may be used. For case (a) <del>above</del>, the assessment shall take into account the external <i>contamination</i> limits of para. <del>507</del> 508.</p>	
658. A <i>package</i> for <i>radioactive contents</i> with activity greater than $10^5A_2$ shall be so designed that, if it were subjected to the enhanced	<del>658</del> 660. A <i>package</i> for <i>radioactive contents</i> with activity greater than	



water immersion test specified in para. 730, there would be no rupture of the <i>containment system</i> .	$10^5 A_2$ shall be so designed that, if it were subjected to the enhanced water immersion test specified in para. 730, there would be no rupture of the <i>containment system</i> .	
659. Compliance with the permitted activity release limits shall depend neither upon filters nor upon a mechanical cooling system.	<del>659</del> 661. Compliance with the permitted activity release limits shall depend neither upon filters nor upon a mechanical cooling system.	
660. A <i>package</i> shall not include a pressure relief system from the <i>containment system</i> which would allow the release of <i>radioactive material</i> to the environment under the conditions of the tests specified in paras 719–724 and 726–729.	<del>660</del> 662. A <i>package</i> shall not include a pressure relief system from the <i>containment system</i> <del>which</del> <i>that</i> would allow the release of <i>radioactive material</i> to the environment under the conditions of the tests specified in paras 719–724 and 726–729.	
661. A <i>package</i> shall be so designed that if it were at the <i>maximum normal operating pressure</i> and it were subjected to the tests specified in paras 719–724 and 726–729, the levels of strains in the <i>containment system</i> would not attain values which would adversely affect the <i>package</i> in such a way that it would fail to meet the applicable requirements.	<del>661</del> 663. A <i>package</i> shall be so designed that if it were at the <i>maximum normal operating pressure</i> and it were subjected to the tests specified in paras 719–724 and 726–729, the levels of strains in the <i>containment system</i> would not attain values <del>which</del> <i>that</i> would adversely affect the <i>package</i> in such a way that it would fail to meet the applicable requirements.	
662. A <i>package</i> shall not have a <i>maximum normal operating pressure</i> in excess of a gauge pressure of 700 kPa.	<del>662</del> 664. A <i>package</i> shall not have a <i>maximum normal operating pressure</i> in excess of a gauge pressure of 700 kPa.	
663. A <i>package</i> containing <i>low dispersible radioactive material</i> shall be so designed that any features added to the <i>low dispersible radioactive material</i> that are not part of it, or any internal components of the <i>packaging</i> , shall not adversely affect the performance of the <i>low dispersible radioactive material</i> .	<del>663</del> 665. A <i>package</i> containing <i>low dispersible radioactive material</i> shall be so designed that any features added to the <i>low dispersible radioactive material</i> that are not part of it, or any internal components of the <i>packaging</i> , shall not adversely affect the performance of the <i>low dispersible radioactive material</i> .	
664. A <i>package</i> shall be designed for an ambient temperature range from -40°C to +38°C.	<del>664</del> 666. A <i>package</i> shall be designed for an ambient temperature range from -40°C to +38°C.	



REQUIREMENTS FOR TYPE B(M) PACKAGES	REQUIREMENTS FOR TYPE B(M) PACKAGES	
<p>665. <i>Type B(M) packages</i> shall meet the requirements for <i>Type B(U) packages</i> specified in para. 650, except that for <i>packages</i> to be transported solely within a specified country or solely between specified countries, conditions other than those given in paras 637, 653–655 and 658–664 may be assumed with the approval of the <i>competent authorities</i> of these countries. Notwithstanding, the requirements for <i>Type B(U) packages</i> specified in paras 653 and 658–664 shall be met as far as practicable.</p>	<p><del>665</del> <u>667</u>. <i>Type B(M) packages</i> shall meet the requirements for <i>Type B(U) packages</i> specified in para. <del>650</del> <u>652</u>, except that for <i>packages</i> to be transported solely within a specified country or solely between specified countries, conditions other than those given in paras <del>637</del> <u>639</u>, <del>653–655</del> <u>655–657</u> and <del>658–664</del> <u>660–666</u> may be assumed with the approval of the <i>competent authorities</i> of these countries. Notwithstanding, the requirements for <i>Type B(U) packages</i> specified in paras <del>653</del> <u>655</u> and <del>658–664</del> <u>660–666</u> shall be met as far as practicable.</p>	
<p>666. Intermittent venting of <i>Type B(M) packages</i> may be permitted during transport, provided that the operational controls for venting are acceptable to the relevant <i>competent authorities</i>.</p>	<p><del>666</del> <u>668</u>. Intermittent venting of <i>Type B(M) packages</i> may be permitted during transport, provided that the operational controls for venting are acceptable to the relevant <i>competent authorities</i>.</p>	
REQUIREMENTS FOR TYPE C PACKAGES	REQUIREMENTS FOR TYPE C PACKAGES	
<p>667. <i>Type C packages</i> shall be designed to meet the requirements specified in paras 606–619 and 634–647, except as specified in para. 646(a), and the requirements specified in paras 651–655, 659–664 and 668–670.</p>	<p><del>667</del> <u>669</u>. <i>Type C packages</i> shall be designed to meet the requirements specified in paras <del>606–619</del> <u>607–621</u> and <del>634–647</del> <u>636–649</u>, except as specified in para. <del>646</del> <u>648</u>(a), and the requirements specified in paras <del>651–655</del> <u>653–657</u>, <del>659–664</del> <u>661–666</u> and <del>668–670</del> <u>670–672</u>.</p>	
<p>668. A <i>package</i> shall be capable of meeting the assessment criteria prescribed for tests in paras 657(b) and 661 after burial in an environment defined by a thermal conductivity of 0.33 W/(m·K) and a temperature of 38°C in the steady state. Initial conditions for the assessment shall assume that any thermal insulation of the <i>package</i> remains intact, the <i>package</i> is at the <i>maximum normal operating pressure</i> and the ambient temperature is 38°C.</p>	<p><del>668</del> <u>670</u>. A <i>package</i> shall be capable of meeting the assessment criteria prescribed for tests in paras <del>657</del> <u>659</u>(b) and <del>661</del> <u>663</u> after burial in an environment defined by a thermal conductivity of 0.33 W/(m·K) and a temperature of 38°C in the steady state. Initial conditions for the assessment shall assume that any thermal insulation of the <i>package</i> remains intact, the <i>package</i> is at the <i>maximum normal operating pressure</i> and the ambient temperature is 38°C.</p>	
<p>669. A <i>package</i> shall be so designed that, if it were at the <i>maximum</i></p>	<p><del>669</del> <u>671</u>. A <i>package</i> shall be so designed that, if it were at the <i>maximum</i></p>	

<p><i>normal operating pressure</i> and subjected to:</p> <p>(a) The tests specified in paras 719–724, it would restrict the loss of <i>radioactive contents</i> to not more than <math>10^{-6}A_2</math> per hour.</p> <p>(b) The test sequences in para. 734, it would meet the following requirements:</p> <p>(i) Retain sufficient shielding to ensure that the <i>radiation level</i> 1 m from the surface of the <i>package</i> would not exceed 10 mSv/h with the maximum <i>radioactive contents</i> which the <i>package</i> is designed to contain; and</p> <p>(ii) Restrict the accumulated loss of <i>radioactive contents</i> in a period of one week to not more than <math>10A_2</math> for krypton-85 and not more than <math>A_2</math> for all other radionuclides.</p> <p>Where mixtures of different radionuclides are present, the provisions of paras 405–407 shall apply, except that for krypton-85 an effective <math>A_2(i)</math> value equal to <math>10A_2</math> may be used. For case (a), the assessment shall take into account the external <i>contamination</i> limits of para. 507.</p>	<p><i>normal operating pressure</i> and subjected to:</p> <p>(a) The tests specified in paras 719–724, it would restrict the loss of <i>radioactive contents</i> to not more than <math>10^{-6}A_2</math> per hour.</p> <p>(b) The test sequences in para. 734, <del>it would meet the following requirements:</del></p> <p>(i) <u>It would</u> retain sufficient shielding to ensure that the <i>radiation level</i> 1 m from the surface of the <i>package</i> would not exceed 10 mSv/h with the maximum <i>radioactive contents</i> <del>which</del> <u>that</u> the <i>package</i> is designed to contain; <del>and</del></p> <p>(ii) <u>It would</u> restrict the accumulated loss of <i>radioactive contents</i> in a period of one week to not more than <math>10A_2</math> for krypton-85 and not more than <math>A_2</math> for all other radionuclides.</p> <p>Where mixtures of different radionuclides are present, the provisions of paras 405–407 shall apply, except that for krypton-85 an effective <math>A_2(i)</math> value equal to <math>10A_2</math> may be used. For case (a), the assessment shall take into account the external <i>contamination</i> limits of para. <del>507</del> <u>508</u>.</p>	
<p>670. A <i>package</i> shall be so designed that there will be no rupture of the <i>containment system</i> following performance of the enhanced water immersion test specified in para. 730.</p>	<p><del>670</del> <u>672</u>. A <i>package</i> shall be so designed that there will be no rupture of the <i>containment system</i> following performance of the enhanced water immersion test specified in para. 730.</p>	
<p><b>REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL</b></p>	<p><b>REQUIREMENTS FOR PACKAGES CONTAINING FISSILE MATERIAL</b></p>	
<p>671. <i>Fissile material</i> shall be transported so as to:</p> <p>(a) Maintain subcriticality during normal and accident conditions of transport; in particular, the following contingencies shall be considered:</p> <p>(i) Leakage of water into or out of <i>packages</i>;</p> <p>(ii) Loss of efficiency of built-in neutron absorbers or</p>	<p><del>671</del> <u>673</u>. <i>Fissile material</i> shall be transported so as to:</p> <p>(a) Maintain subcriticality during <u>routine</u>, normal and accident conditions of transport; in particular, the following contingencies shall be considered:</p> <p>(i) Leakage of water into or out of <i>packages</i>;</p> <p>(ii) Loss of efficiency of built-in neutron absorbers or</p>	

<p>moderators;</p> <p>(iii) Rearrangement of the contents either within the <i>package</i> or as a result of loss from the <i>package</i>;</p> <p>(iv) Reduction of spaces within or between <i>packages</i>;</p> <p>(v) <i>Packages</i> becoming immersed in water or buried in snow; and</p> <p>(vi) Temperature changes.</p> <p>(b) Meet the requirements:</p> <p>(i) Of para. 634 for <i>packages</i> containing <i>fissile material</i>;</p> <p>(ii) Prescribed elsewhere in these Regulations which pertain to the radioactive properties of the material; and</p> <p>(iii) Specified in paras 635 and 673 –683 unless excepted by para. 417.</p>	<p>moderators;</p> <p>(iii) Rearrangement of the contents either within the <i>package</i> or as a result of loss from the <i>package</i>;</p> <p>(iv) Reduction of spaces within or between <i>package</i>;</p> <p>(v) <i>Packages</i> becoming immersed in water or buried in snow; <del>and</del></p> <p>(vi) Temperature changes.</p> <p>(b) Meet the requirements:</p> <p>(i) Of para. <del>634</del> 636 <del>for packages containing fissile material</del> <u>except for unpackaged material when specifically allowed by para. 417(e);</u></p> <p>(ii) Prescribed elsewhere in these Regulations <del>which</del> <u>that</u> pertain to the radioactive properties of the material; <del>and</del></p> <p>(iii) <del>Specified in</del> <u>Of</u> paras. <del>635</del> <u>637</u> <del>and 673 –683</del> unless <u>the material is</u> excepted by para. 417<del>;</del>;</p> <p><u>(iv) Of paras 676–686, unless the material is excepted by paras 417, 674 or 675.</u></p>	
<p>672. <i>Fissile material</i> meeting one of the provisions (a) to (d) of para. 417 is excepted from the requirement to be transported in <i>packages</i> that comply with paras 673 –683 as well as the other requirements of these Regulations that apply to <i>fissile material</i>. Only one type of exception is allowed per <i>consignment</i>.</p>	<p><del>672 674. <i>Fissile material</i> meeting one of the provisions (a) to (d) of para. 417 is excepted from the requirement to be transported in <i>packages</i> that comply with paras 673 –683 as well as the other requirements of these Regulations that apply to <i>fissile material</i>. Only one type of exception is allowed per <i>consignment</i>.</del> <u><i>Packages</i> containing <i>fissile material</i> that meet subpara (d) and one of the provisions of subparagraphs (a)–(c) of this paragraph are excepted from the requirements of paras 676–686.</u></p> <p><u>(a) <i>Packages</i> containing <i>fissile material</i> in any form provided that:</u></p> <p><u>(i) The smallest external dimension of the <i>package</i> is not less than 10 cm.</u></p>	

	<p>(ii) <u>The <i>CSI</i> of the <i>package</i> is calculated using the following formula:</u></p> $CSI = 50 \times 5 \times \{ [\text{mass of U-235 in package (g)}] / Z + [\text{mass of other fissile nuclides}^1 \text{ in package (g)}] / 280 \}$ <p><u>where the values of <i>Z</i> are taken from Table 13.</u></p> <p>(iii) <u>The <i>CSI</i> of any <i>package</i> does not exceed 10.</u></p> <p><u>(b) <i>Packages</i> containing <i>fissile material</i> in any form provided that:</u></p> <p>(i) <u>The smallest external dimension of the <i>package</i> is not less than 30 cm.</u></p> <p>(ii) <u>The <i>package</i>, after being subjected to the tests specified in paras 719–724;</u></p> <ul style="list-style-type: none"> <li><u>— Retains its <i>fissile material</i> contents.</u></li> <li><u>— Preserves the minimum overall outside dimensions of the <i>package</i> to at least 30 cm.</u></li> <li><u>— Prevents the entry of a 10 cm cube.</u></li> </ul> <p>(iii) <u>The <i>CSI</i> of the <i>package</i> is calculated using the following formula:</u></p> $CSI = 50 \times 2 \times \{ [\text{mass of U-235 in package (g)}] / Z + [\text{mass of other fissile nuclides}^1 \text{ in package (g)}] / 280 \}$ <p><u>where the values of <i>Z</i> are taken from Table 13.</u></p> <p>(iv) <u>The <i>CSI</i> of any <i>package</i> does not exceed 10.</u></p> <p><u>(c) <i>Packages</i> containing <i>fissile material</i> in any form provided that:</u></p> <p>(i) <u>The smallest external dimension of the <i>package</i> is not less than 10 cm.</u></p> <p>(ii) <u>The <i>package</i>, after being subjected to the tests specified in paras 719–724;</u></p> <ul style="list-style-type: none"> <li><u>— Retains its <i>fissile material</i> contents;</u></li> <li><u>— Preserves the minimum overall outside dimensions of the <i>package</i> to at least 10 cm;</u></li> <li><u>— Prevents the entry of a 10 cm cube.</u></li> </ul> <p>(iii) <u>The <i>CSI</i> of the <i>package</i> is calculated using the following formula:</u></p> $CSI = 50 \times 2 \times \{ [\text{mass of U-235 in package (g)}] / 450 + [\text{mass of other fissile nuclides}^1 \text{ in package (g)}] / 280 \}$ <p>(iv) <u>The maximum mass of <i>fissile nuclides</i> in any <i>package</i> does</u></p>	
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	<p><u>not exceed 15 g.</u></p> <p>(d) <u>The total mass of beryllium, hydrogenous material enriched in deuterium, graphite and other allotropic forms of carbon in an individual <i>package</i> shall not be greater than the mass of <i>fissile nuclides</i> in the <i>package</i> except where their total concentration does not exceed 1 g in any 1000 g of material. Beryllium incorporated in copper alloys up to 4% in weight of the alloy does not need to be considered.</u></p>													
	<p><sup>1</sup> <u>Plutonium may be of any isotopic composition provided that the amount of Pu-241 is less than that of Pu-240 in the <i>package</i>.</u></p>													
	<p><u>TABLE 13 VALUES OF Z FOR CALCULATION OF CSI IN ACCORDANCE WITH PARA. 674</u></p> <table><tr><th><u>Enrichment<sup>a</sup></u></th><th><u>Z</u></th></tr><tr><td><u>Uranium enriched up to 1.5 %</u></td><td><u>2200</u></td></tr><tr><td><u>Uranium enriched up to 5 %</u></td><td><u>850</u></td></tr><tr><td><u>Uranium enriched up to 10 %</u></td><td><u>660</u></td></tr><tr><td><u>Uranium enriched up to 20 %</u></td><td><u>580</u></td></tr><tr><td><u>Uranium enriched up to 100 %</u></td><td><u>450</u></td></tr></table> <p><sup>a</sup> <u>If a <i>package</i> contains uranium with varying enrichments of U-235, then the value corresponding to the highest enrichment shall be used for Z.</u></p>	<u>Enrichment<sup>a</sup></u>	<u>Z</u>	<u>Uranium enriched up to 1.5 %</u>	<u>2200</u>	<u>Uranium enriched up to 5 %</u>	<u>850</u>	<u>Uranium enriched up to 10 %</u>	<u>660</u>	<u>Uranium enriched up to 20 %</u>	<u>580</u>	<u>Uranium enriched up to 100 %</u>	<u>450</u>	
<u>Enrichment<sup>a</sup></u>	<u>Z</u>													
<u>Uranium enriched up to 1.5 %</u>	<u>2200</u>													
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<u>Uranium enriched up to 10 %</u>	<u>660</u>													
<u>Uranium enriched up to 20 %</u>	<u>580</u>													
<u>Uranium enriched up to 100 %</u>	<u>450</u>													
<p><i>Not in TS-R-1 (2009).</i></p>	<p><u>675. Packages containing not more than 1000 g of plutonium are excepted from the application of paras 676–686 provided that:</u></p> <p>(a) <u>Not more than 20% of the plutonium by mass is <i>fissile nuclides</i>.</u></p>													

	<p>(b) <u>The <i>CSI</i> of the <i>package</i> is calculated using the following formula:</u>  <math display="block">CSI = 50 \times 2 \times [\text{mass of plutonium (g)} / 1000].</math></p> <p>(c) <u>If uranium is present with the plutonium, the mass of uranium shall be no more than 1% of the mass of the plutonium.</u></p>	
<b>Contents specification for assessments of package designs containing fissile material</b>	<b>Contents specification for assessments of package designs containing fissile material</b>	
673. Where the chemical or physical form, isotopic composition, mass or concentration, moderation ratio or density, or geometric configuration is not known, the assessments of paras 677 - 682 shall be performed assuming that each parameter that is not known has the value which gives the maximum neutron multiplication consistent with the known conditions and parameters in these assessments.	<del>673</del> 676. Where the chemical or physical form, isotopic composition, mass or concentration, moderation ratio or density, or geometric configuration is not known, the assessments of paras <del>677-682</del> 680-685 shall be performed assuming that each parameter that is not known has the value <del>which</del> <u>that</u> gives the maximum neutron multiplication consistent with the known conditions and parameters in these assessments.	
674. For irradiated nuclear fuel the assessments of paras 677 - 682 shall be based on an isotopic composition demonstrated to provide:	<del>674</del> 677. For irradiated nuclear fuel the assessments of paras <del>677-682</del> 680-685 shall be based on an isotopic composition demonstrated to provide <u>either</u> :	Editorial
<p>(a) The maximum neutron multiplication during the irradiation history,</p> <p>(b) A conservative estimate of the neutron multiplication for the <i>package</i> assessments. After irradiation but prior to <i>shipment</i>, a measurement shall be performed to confirm the conservatism of the isotopic composition.</p>	<p>(a) The maximum neutron multiplication during the irradiation history; <u>or</u></p> <p>(b) A conservative estimate of the neutron multiplication for the <i>package</i> assessments. After irradiation but prior to <i>shipment</i>, a measurement shall be performed to confirm the conservatism of the isotopic composition.</p>	
<b>Geometry and temperature requirements</b>	<b>Geometry and temperature requirements</b>	
675. The <i>package</i> , after being subjected to the tests specified in paras 719-724, shall:	<del>675</del> 678. The <i>package</i> , after being subjected to the tests specified in paras 719-724, shall:	Editorial
<p>(a) Preserve the minimum overall outside dimensions of the <i>package</i> to at least 10 cm; and</p> <p>(b) Prevent the entry of a 10 cm cube.</p>	<p>(a) Preserve the minimum overall outside dimensions of the <i>package</i> to at least 10 cm; <del>and</del></p> <p>(b) Prevent the entry of a 10 cm cube</p>	

<p>676. The <i>package</i> shall be designed for an ambient temperature range of -40°C to +38°C unless the <i>competent authority</i> specifies otherwise in the certificate of approval for the <i>package design</i>.</p>	<p><del>676</del> 679. The <i>package</i> shall be designed for an ambient temperature range of -40°C to +38°C unless the <i>competent authority</i> specifies otherwise in the certificate of approval for the <i>package design</i>.</p>	
<p><b>Assessment of an individual package in isolation</b></p>	<p><b>Assessment of an individual package in isolation</b></p>	
<p>677. For a <i>package</i> in isolation, it shall be assumed that water can leak into or out of all void spaces of the <i>package</i>, including those within the <i>containment system</i>. However, if the <i>design</i> incorporates special features to prevent such leakage of water into or out of certain void spaces, even as a result of error, absence of leakage may be assumed in respect of those void spaces. Special features shall include the following:</p> <p>(a) Multiple high standard water barriers, not less than two of which would remain watertight if the <i>package</i> were subject to the tests prescribed in para. 682(b), a high degree of quality control in the manufacture, maintenance and repair of <i>packagings</i>, and tests to demonstrate the closure of each <i>package</i> before each <i>shipment</i>; or</p> <p>(b) For <i>packages</i> containing uranium hexafluoride only, with maximum uranium enrichment of 5 mass per cent uranium-235:</p> <p>(i) <i>Packages</i> where, following the tests prescribed in para. 682(b), there is no physical contact between the valve and any other component of the <i>packaging</i> other than at its original point of attachment and where, in addition, following the test prescribed in para. 728 the valves remain leaktight; and</p> <p>(ii) A high degree of quality control in the manufacture, maintenance and repair of <i>packagings</i>, coupled with tests to demonstrate closure of each <i>package</i> before each <i>shipment</i>.</p>	<p><del>677</del> 680. For a <i>package</i> in isolation, it shall be assumed that water can leak into or out of all void spaces of the <i>package</i>, including those within the <i>containment system</i>. However, if the <i>design</i> incorporates special features to prevent such leakage of water into or out of certain void spaces, even as a result of error, absence of leakage may be assumed in respect of those void spaces. Special features shall include <u>either of</u> the following:</p> <p>(a) Multiple high standard water barriers, not less than two of which would remain watertight if the <i>package</i> were subject to the tests prescribed in para. <del>682</del> 685(b), a high degree of quality control in the manufacture, maintenance and repair of <i>packagings</i>, and tests to demonstrate the closure of each <i>package</i> before each <i>shipment</i>; or</p> <p>(b) For <i>packages</i> containing uranium hexafluoride only, with maximum uranium enrichment of 5 mass per cent uranium-235:</p> <p>(i) <i>Packages</i> where, following the tests prescribed in para. <del>682</del> 685(b), there is no physical contact between the valve and any other component of the <i>packaging</i> other than at its original point of attachment and where, in addition, following the test prescribed in para. 728 the valves remain leaktight; <del>and</del></p> <p>(ii) A high degree of quality control in the manufacture, maintenance and repair of <i>packagings</i>, coupled with tests to demonstrate closure of each <i>package</i> before each <i>shipment</i>.</p>	



<p>678. It shall be assumed that the <i>confinement system</i> shall be closely reflected by at least 20 cm of water or such greater reflection as may additionally be provided by the surrounding material of the <i>packaging</i>. However, when it can be demonstrated that the <i>confinement system</i> remains within the <i>packaging</i> following the tests prescribed in para. 682(b), close reflection of the <i>package</i> by at least 20 cm of water may be assumed in para. 679(c).</p>	<p><del>678</del> <a href="#">681</a>. It shall be assumed that the <i>confinement system</i> <del>shall be</del> <a href="#">is</a> closely reflected by at least 20 cm of water or such greater reflection as may additionally be provided by the surrounding material of the <i>packaging</i>. However, when it can be demonstrated that the <i>confinement system</i> remains within the <i>packaging</i> following the tests prescribed in para. <del>682</del> <a href="#">685</a>(b), close reflection of the <i>package</i> by at least 20 cm of water may be assumed in para. <del>679</del> <a href="#">682</a>(c).</p>	
<p>679. The <i>package</i> shall be subcritical under the conditions of paras 677 and 678, with the <i>package</i> conditions that result in the maximum neutron multiplication consistent with:</p> <ul style="list-style-type: none"> <li>(a) Routine conditions of transport (incident free);</li> <li>(b) The tests specified in para. 681(b);</li> <li>(c) The tests specified in para. 682(b).</li> </ul>	<p><del>679</del> <a href="#">682</a>. The <i>package</i> shall be subcritical under the conditions of paras <del>677</del> <a href="#">680</a> and <del>678</del> <a href="#">681</a>, <a href="#">and</a> with the <i>package</i> conditions that result in the maximum neutron multiplication consistent with:</p> <ul style="list-style-type: none"> <li>(a) Routine conditions of transport (incident free);</li> <li>(b) The tests specified in para. <del>681</del> <a href="#">684</a>(b);</li> <li>(c) The tests specified in para. <del>682</del> <a href="#">685</a>(b).</li> </ul>	
<p>680. For <i>packages</i> to be transported by air:</p> <ul style="list-style-type: none"> <li>(a) The <i>package</i> shall be subcritical under conditions consistent with the <i>Type C package</i> tests specified in para. 734 assuming reflection by at least 20 cm of water but no water in-leakage; and</li> <li>(b) In the assessment of para. 679 allowance shall not be made for special features of para. 677 unless, following the <i>Type C package</i> tests specified in para. 734 and, subsequently, the water in-leakage test of para. 733, leakage of water into or out of the void spaces is prevented.</li> </ul>	<p><del>680</del> <a href="#">683</a>. For <i>packages</i> to be transported by air:</p> <ul style="list-style-type: none"> <li>(a) The <i>package</i> shall be subcritical under conditions consistent with the <i>Type C package</i> tests specified in para. 734 assuming reflection by at least 20 cm of water but no water in-leakage; <del>and</del></li> <li>(b) In the assessment of para. <del>679</del> <a href="#">682</a> allowance shall not be made for special features of para. <del>677</del> <a href="#">680</a> unless, following the <i>Type C package</i> tests specified in para. 734 and, subsequently, the water in-leakage test of para. 733, leakage of water into or out of the void spaces is prevented.</li> </ul>	
<p><b>Assessment of package arrays under normal conditions of transport</b></p>	<p><b>Assessment of package arrays under normal conditions of transport</b></p>	
<p>681. A number N shall be derived, such that five times N <i>packages</i> shall be subcritical for the arrangement and <i>package</i> conditions that provide the maximum neutron multiplication consistent with the</p>	<p><del>681</del> <a href="#">684</a>. A number N shall be derived, such that five times N <i>packages</i> shall be subcritical for the arrangement and <i>package</i> conditions that provide the maximum neutron multiplication consistent with the</p>	

<p>following:</p> <p>(a) There shall not be anything between the <i>packages</i>, and the <i>package</i> arrangement shall be reflected on all sides by at least 20 cm of water; and</p> <p>(b) The state of the <i>packages</i> shall be their assessed or demonstrated condition if they had been subjected to the tests specified in paras 719–724.</p>	<p>following:</p> <p>(a) There shall not be anything between the <i>packages</i>, and the <i>package</i> arrangement shall be reflected on all sides by at least 20 cm of water; <del>and</del></p> <p>(b) The state of the <i>packages</i> shall be their assessed or demonstrated condition if they had been subjected to the tests specified in paras 719–724.</p>	Editorial
<p><b>Assessment of package arrays under accident conditions of transport</b></p>	<p><b>Assessment of package arrays under accident conditions of transport</b></p>	
<p>682. A number N shall be derived, such that two times N <i>packages</i> shall be subcritical for the arrangement and <i>package</i> conditions that provide the maximum neutron multiplication consistent with the following:</p> <p>(a) Hydrogenous moderation between the <i>packages</i> and the <i>package</i> arrangement reflected on all sides by at least 20 cm of water; and</p> <p>(b) The tests specified in paras 719–724 followed by whichever of the following is the more limiting:</p> <p>(i) The tests specified in para. 727(b), and either para. 727(c) for <i>packages</i> having a mass not greater than 500 kg and an overall density not greater than 1000 kg/m<sup>3</sup> based on the external dimensions, or para. 727(a) for all other <i>packages</i>; followed by the test specified in para. 728 and completed by the tests specified in paras 731–733; or</p> <p>(ii) The test specified in para. 729; and</p> <p>(c) Where any part of the <i>fissile material</i> escapes from the <i>containment system</i> following the tests specified in para. 682(b), it shall be assumed that <i>fissile material</i> escapes from each <i>package</i> in the array, and all of the <i>fissile material</i> shall be arranged in the configuration and moderation that results in the maximum neutron multiplication with close reflection by at least 20 cm of water.</p>	<p><del>682</del> 685. A number N shall be derived, such that two times N <i>packages</i> shall be subcritical for the arrangement and <i>package</i> conditions that provide the maximum neutron multiplication consistent with the following:</p> <p>(a) Hydrogenous moderation between the <i>packages</i> and the <i>package</i> arrangement reflected on all sides by at least 20 cm of water; <del>and</del></p> <p>(b) The tests specified in paras 719–724 followed by whichever of the following is the more limiting:</p> <p>(i) The tests specified in para. 727(b), and either para. 727(c) for <i>packages</i> having a mass not greater than 500 kg and an overall density not greater than 1000 kg/m<sup>3</sup> based on the external dimensions, or para. 727(a) for all other <i>packages</i>; followed by the test specified in para. 728 and completed by the tests specified in paras 731–733; or</p> <p>(ii) The test specified in para. 729; <del>and</del></p> <p>(c) Where any part of the <i>fissile material</i> escapes from the <i>containment system</i> following the tests specified in para. <del>682</del> 685(b), it shall be assumed that <i>fissile material</i> escapes from each <i>package</i> in the array, and all of the <i>fissile material</i> shall be arranged in the configuration and moderation that results in the maximum neutron multiplication with close reflection by at least</p>	

	20 cm of water.	
<b>Determination of criticality safety index for packages</b>	<b>Determination of criticality safety index for packages</b>	
683. The <i>CSI</i> for <i>packages</i> containing <i>fissile material</i> shall be obtained by dividing the number 50 by the smaller of the two values of <i>N</i> derived in paras 681 and 682 (i.e. $CSI = 50/N$ ). The value of the <i>CSI</i> may be zero, provided that an unlimited number of <i>packages</i> are subcritical (i.e. <i>N</i> is effectively equal to infinity in both cases).	<del>683</del> 686. The <i>CSI</i> for <i>packages</i> containing <i>fissile material</i> shall be obtained by dividing the number 50 by the smaller of the two values of <i>N</i> derived in paras <del>681</del> 684 and <del>682</del> 685 (i.e. $CSI = 50/N$ ). The value of the <i>CSI</i> may be zero, provided that an unlimited number of <i>packages</i> are subcritical (i.e. <i>N</i> is effectively equal to infinity in both cases).	

## Section VII TEST PROCEDURES

2009 EDITION	20xx draft 2.53	Remarks
<b>Section VII</b>	<b>Section VII</b>	
<b>TEST PROCEDURES</b>	<b>TEST PROCEDURES</b>	
<b>DEMONSTRATION OF COMPLIANCE</b>	<b>DEMONSTRATION OF COMPLIANCE</b>	
<p>701. Demonstration of compliance with the performance standards required in Section VI shall be accomplished by any of the following methods or by a combination thereof:</p> <p>(a) ) Performance of tests with specimens representing <i>LSA-III</i> material, or <i>special form radioactive material</i>, or <i>low dispersible radioactive material</i>, or with prototypes or samples of the <i>packaging</i>, where the contents of the specimen or the <i>packaging</i> for the tests shall simulate as closely as practicable the expected range of <i>radioactive contents</i> and the specimen or <i>packaging</i> to be tested shall be prepared as presented for transport.</p> <p>(b) Reference to previous satisfactory demonstrations of a sufficiently similar nature.</p> <p>(c) Performance of tests with models of appropriate scale, incorporating those features which are significant with respect to the item under investigation when engineering experience has shown the results of such tests to be suitable for <i>design</i> purposes. When a scale model is used, the need for adjusting certain test parameters, such as penetrator diameter or compressive load, shall be taken into account.</p> <p>(d) Calculation, or reasoned argument, when the calculation procedures and parameters are generally agreed to be reliable or conservative.</p>	<p>701. Demonstration of compliance with the performance standards required in Section VI shall be accomplished by any of the following methods <a href="#">listed below</a> or by a combination thereof:</p> <p>(a) Performance of tests with specimens representing <i>LSA-III</i> material, or <i>special form radioactive material</i>, or <i>low dispersible radioactive material</i>, or with prototypes or samples of the <i>packaging</i>, where the contents of the specimen or the <i>packaging</i> for the tests shall simulate as closely as practicable the expected range of <i>radioactive contents</i> and the specimen or <i>packaging</i> to be tested shall be prepared as presented for transport.</p> <p>(b) Reference to previous satisfactory demonstrations of a sufficiently similar nature.</p> <p>(c) Performance of tests with models of appropriate scale, incorporating those features <del>which</del> <a href="#">that</a> are significant with respect to the item under investigation when engineering experience has shown the results of such tests to be suitable for <i>design</i> purposes. When a scale model is used, the need for adjusting certain test parameters, such as penetrator diameter or compressive load, shall be taken into account.</p> <p>(d) Calculation, or reasoned argument, when the calculation procedures and parameters are generally agreed to be reliable or conservative.</p>	
702. After the specimen, prototype or sample has been subjected to the tests, appropriate methods of assessment shall be used to ensure that the requirements of this section have been fulfilled in compliance with the performance and acceptance standards prescribed in Section VI.	702. After the specimen, prototype or sample has been subjected to the tests, appropriate methods of assessment shall be used to ensure that the requirements of this section have been fulfilled in compliance with the performance and acceptance standards prescribed in Section VI.	

<b>LEACHING TEST FOR LSA-III MATERIAL AND LOW DISPERSIBLE RADIOACTIVE MATERIAL</b>	<b>LEACHING TEST FOR LSA-III MATERIAL AND LOW DISPERSIBLE RADIOACTIVE MATERIAL</b>	
703. A solid material sample representing the entire contents of the <i>package</i> shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6–8 and a maximum conductivity of 1 mS/m at 20°C. The total activity of the free volume of water shall be measured following the 7 day immersion of the test sample.	703. A solid material sample representing the entire contents of the <i>package</i> shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period, the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6–8 and a maximum conductivity of 1 mS/m at 20°C. The total activity of the free volume of water shall be measured following the 7 day immersion of the test sample.	
<b>TESTS FOR SPECIAL FORM RADIOACTIVE MATERIAL</b>	<b>TESTS FOR SPECIAL FORM RADIOACTIVE MATERIAL</b>	
<b>General</b>	<b>General</b>	
704. Specimens that comprise or simulate <i>special form radioactive material</i> shall be subjected to the impact test, the percussion test, the bending test and the heat test specified in paras 705–708. A different specimen may be used for each of the tests. Following each test, a leaching assessment or volumetric leakage test shall be performed on the specimen by a method no less sensitive than the methods given in para. 710 for indispersible solid material or in para. 711 for encapsulated material.	704. Specimens that comprise or simulate <i>special form radioactive material</i> shall be subjected to the impact test, the percussion test, the bending test and the heat test specified in paras 705–708. A different specimen may be used for each of the tests. Following each test, a leaching assessment or volumetric leakage test shall be performed on the specimen by a method no less sensitive than the methods given in para. 710 for indispersible solid material or in para. 711 for encapsulated material.	
<b>Test methods</b>	<b>Test methods</b>	
705. Impact test: The specimen shall drop onto the target from a height of 9 m. The target shall be as defined in para. 717.	705. Impact test: The specimen shall drop onto the target from a height of 9 m. The target shall be as defined in para. 717.	
706. Percussion test: The specimen shall be placed on a sheet of lead which is supported by a smooth solid surface and struck by the flat face of a mild steel bar so as to cause an impact equivalent to that resulting from a free drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of $3.0 \pm 0.3$ mm. The lead, of hardness number 3.5-4.5 on the Vickers scale and	706. Percussion test: The specimen shall be placed on a sheet of lead <del>which</del> <u>that</u> is supported by a smooth solid surface and struck by the flat face of a mild steel bar so as to cause an impact equivalent to that resulting from a free drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of	

not more than 25 mm thick, shall cover an area greater than that covered by the specimen. A fresh surface of lead shall be used for each impact. The bar shall strike the specimen so as to cause maximum damage.	3.0 ± 0.3 mm. The lead, of hardness number 3.5-4.5 on the Vickers scale and not more than 25 mm thick, shall cover an area greater than that covered by the specimen. A fresh surface of lead shall be used for each impact. The bar shall strike the specimen so as to cause maximum damage.	
707. Bending test: The test shall apply only to long, slender sources with both a minimum length of 10 cm and a length to minimum width ratio of not less than 10. The specimen shall be rigidly clamped in a horizontal position so that one half of its length protrudes from the face of the clamp. The orientation of the specimen shall be such that the specimen will suffer maximum damage when its free end is struck by the flat face of a steel bar. The bar shall strike the specimen so as to cause an impact equivalent to that resulting from a free vertical drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of 3.0 ± 0.3 mm.	707. Bending test: The test shall apply only to long, slender sources with both a minimum length of 10 cm and a length to minimum width ratio of not less than 10. The specimen shall be rigidly clamped in a horizontal position so that one half of its length protrudes from the face of the clamp. The orientation of the specimen shall be such that the specimen will suffer maximum damage when its free end is struck by the flat face of a steel bar. The bar shall strike the specimen so as to cause an impact equivalent to that resulting from a free vertical drop of 1.4 kg through 1 m. The lower part of the bar shall be 25 mm in diameter with the edges rounded off to a radius of 3.0 ± 0.3 mm.	
708. Heat test: The specimen shall be heated in air to a temperature of 800°C and held at that temperature for a period of 10 minutes and shall then be allowed to cool.	708. Heat test: The specimen shall be heated in air to a temperature of 800°C and held at that temperature for a period of 10 minutes and shall then be allowed to cool.	
<p>709. Specimens that comprise or simulate <i>radioactive material</i> enclosed in a sealed capsule may be excepted from:</p> <p>(a) The tests prescribed in paras 705 and 706 provided the mass of the <i>special form radioactive material</i>:</p> <p>(i) Is less than 200 g and the specimens are alternatively subjected to the Class 4 impact test prescribed in the International Organization for Standardization document ISO 2919: Sealed Radioactive Sources — Classification [13]; or</p> <p>(ii) Is less than 500 g and the specimens are alternatively subjected to the Class 5 impact test prescribed in the</p>	<p>709. Specimens that comprise or simulate <i>radioactive material</i> enclosed in a sealed capsule may be excepted from:</p> <p>(a) The tests prescribed in paras 705 and 706 provided <a href="#">that the mass of the <i>special form radioactive material</i> the specimens are alternatively subjected to the impact test prescribed in the International Organization for Standardization document ISO 2919: Sealed Radioactive Sources — Classification [13]:</a></p> <p>(i) <a href="#">The Class 4 impact test if the mass of the <i>special form radioactive material</i> is less than 200 g and the specimens are alternatively subjected to the Class 4 impact test prescribed in the International Organization for Standardization document ISO 2919: Sealed Radioactive</a></p>	

<p>International Organization for Standardization document ISO 2919: Sealed Radioactive Sources — Classification [13].</p> <p>(b) The test prescribed in para. 708 provided the specimens are alternatively subjected to the Class 6 temperature test specified in the International Organization for Standardization document ISO 2919: Sealed Radioactive Sources — Classification [13].</p>	<p><del>Sources — Classification [13]; or</del></p> <p>(ii) <u>The Class 5 impact test if the mass of the special form radioactive material is more than 200 g but is less than 500 g and the specimens are alternatively subjected to the Class 5 impact test prescribed in the International Organization for Standardization document ISO 2919: Sealed Radioactive Sources — Classification [13].</u></p> <p>(b) The test prescribed in para. 708 provided the specimens are alternatively subjected to the Class 6 temperature test specified in <del>the International Organization for Standardization document ISO 2919: Sealed Radioactive Sources — Classification [13].</del></p>	
<p><b>Leaching and volumetric leakage assessment methods</b></p>	<p><b>Leaching and volumetric leakage assessment methods</b></p>	
<p>710. For specimens which comprise or simulate indispersible solid material, a leaching assessment shall be performed as follows:</p> <p>(a) The specimen shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6–8 and a maximum conductivity of 1 mS/m at 20°C.</p> <p>(b) The water with the specimen shall then be heated to a temperature of <math>50 \pm 5</math> °C and maintained at this temperature for 4 hours.</p> <p>(c) The activity of the water shall then be determined.</p> <p>(d) The specimen shall then be kept for at least 7 days in still air at not less than 30°C and with a relative humidity of not less than 90%.</p> <p>(e) The specimen shall then be immersed in water of the same specification as in (a) and the water with the specimen heated to <math>50 \pm 5</math> °C and maintained at this temperature for 4 hours.</p> <p>(f) The activity of the water shall then be determined.</p>	<p>710. For specimens <del>which</del> <u>that</u> comprise or simulate indispersible solid material, a leaching assessment shall be performed as follows:</p> <p>(a) The specimen shall be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test shall be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining shall be at least 10% of the volume of the solid test sample itself. The water shall have an initial pH of 6–8 and a maximum conductivity of 1 mS/m at 20°C.</p> <p>(b) The water with the specimen shall then be heated to a temperature of <math>50 \pm 5</math> °C and maintained at this temperature for 4 <del>hours</del>.</p> <p>(c) The activity of the water shall then be determined.</p> <p>(d) The specimen shall then be kept for at least 7 days in still air at not less than 30°C and with a relative humidity of not less than 90%.</p> <p>(e) The specimen shall then be immersed in water of the same specification as in (a) and the water with the specimen heated to <math>50 \pm 5</math> °C and maintained at this temperature for 4 <del>hours</del>.</p> <p>(f) The activity of the water shall then be determined.</p>	



<p>711. For specimens which comprise or simulate <i>radioactive material</i> enclosed in a sealed capsule, either a leaching assessment or a volumetric leakage assessment shall be performed as follows:</p> <p>(a) The leaching assessment shall consist of the following steps:</p> <ul style="list-style-type: none"> <li>(i) The specimen shall be immersed in water at ambient temperature. The water shall have an initial pH of 6–8 with a maximum conductivity of 1 mS/m at 20°C.</li> <li>(ii) The water and the specimen shall be heated to a temperature of <math>50 \pm 5</math> °C and maintained at this temperature for 4 hours.</li> <li>(iii) The activity of the water shall then be determined.</li> <li>(iv) The specimen shall then be kept for at least 7 days in still air at not less than 30°C and a relative humidity of not less than 90%.</li> <li>(v) The process in (i), (ii) and (iii) shall be repeated.</li> </ul> <p>(b) The alternative volumetric leakage assessment shall comprise any of the tests prescribed in the International Organization for Standardization document ISO 9978: Radiation Protection — Sealed Radioactive Sources — Leakage Test Methods [9] which are acceptable to the <i>competent authority</i>.</p>	<p>711. For specimens <del>which</del> <u>that</u> comprise or simulate <i>radioactive material</i> enclosed in a sealed capsule, either a leaching assessment or a volumetric leakage assessment shall be performed as follows:</p> <p>(a) The leaching assessment shall consist of the following steps:</p> <ul style="list-style-type: none"> <li>(i) The specimen shall be immersed in water at ambient temperature. The water shall have an initial pH of 6–8 with a maximum conductivity of 1 mS/m at 20°C.</li> <li>(ii) The water and the specimen shall be heated to a temperature of <math>50 \pm 5</math> °C and maintained at this temperature for 4 <del>hours</del>.</li> <li>(iii) The activity of the water shall then be determined.</li> <li>(iv) The specimen shall then be kept for at least 7 days in still air at not less than 30°C and with a relative humidity of not less than 90%.</li> <li>(v) The process in (i), (ii) and (iii) shall be repeated.</li> </ul> <p>(b) The alternative volumetric leakage assessment shall comprise any of the tests prescribed in the International Organization for Standardization document ISO 9978: Radiation Protection — Sealed Radioactive Sources — Leakage Test Methods [9] <u>provided that they</u> <del>which</del> are acceptable to the <i>competent authority</i>.</p>	
TESTS FOR LOW DISPERSIBLE RADIOACTIVE MATERIAL	TESTS FOR LOW DISPERSIBLE RADIOACTIVE MATERIAL	
<p>712. A specimen that comprises or simulates <i>low dispersible radioactive material</i> shall be subjected to the enhanced thermal test specified in para. 736 and the impact test specified in para. 737. A different specimen may be used for each of the tests. Following each test, the specimen shall be subjected to the leach test specified in para. 703. After each test it shall be determined if the applicable requirements of para. 605 have been met.</p>	<p>712. A specimen that comprises or simulates <i>low dispersible radioactive material</i> shall be subjected to the enhanced thermal test specified in para. 736 and the impact test specified in para. 737. A different specimen may be used for each of the tests. Following each test, the specimen shall be subjected to the leach test specified in para. 703. After each test it shall be determined if the applicable requirements of para. 605 have been met.</p>	

TESTS FOR PACKAGES	TESTS FOR PACKAGES	
<b>Preparation of a specimen for testing</b>	<b>Preparation of a specimen for testing</b>	
713. All specimens shall be inspected before testing in order to identify and record faults or damage including the following:  (a) Divergence from the <i>design</i> ;  (b) Defects in manufacture;  (c) Corrosion or other deterioration; and (d) Distortion of features.	713. All specimens shall be inspected before testing in order to identify and record faults or damage including the following:  (a) Divergence from the <i>design</i> ;  (b) Defects in manufacture;  (c) Corrosion or other deterioration; <del>and</del> (d) Distortion of features.	Editorial
714. The <i>containment system</i> of the <i>package</i> shall be clearly specified.	714. The <i>containment system</i> of the <i>package</i> shall be clearly specified.	
715. The external features of the specimen shall be clearly identified so that reference may be made simply and clearly to any part of such a specimen.	715. The external features of the specimen shall be clearly identified so that reference may be made simply and clearly to any part of such a specimen.	
<b>Testing the integrity of the containment system and shielding and assessing criticality safety</b>	<b>Testing the integrity of the containment system and shielding and assessing criticality safety</b>	
716. After each of the applicable tests specified in paras 718–737:  (a) Faults and damage shall be identified and recorded.  (b) It shall be determined whether the integrity of the <i>containment system</i> and shielding has been retained to the extent required in Section VI for the <i>package</i> under test.  (c) For <i>packages</i> containing <i>fissile material</i> , it shall be determined whether the assumptions and conditions used in the assessments required by paras 671 –683 for one or more <i>packages</i> are valid.	716. After each of the applicable tests specified in paras 718–737:  (a) Faults and damage shall be identified and recorded. (b) It shall be determined whether the integrity of the <i>containment system</i> and shielding has been retained to the extent required in Section VI for the <i>package</i> under test. (c) For <i>packages</i> containing <i>fissile material</i> , it shall be determined whether the assumptions and conditions used in the assessments required by paras <del>671–683</del> <u>673–686</u> for one or more <i>packages</i> are valid.	
<b>Target for drop tests</b>	<b>Target for drop tests</b>	
717. The target for the drop test specified in paras 705, 722, 725(a), 727 and 735 shall be a flat, horizontal surface of such a character that any increase in its resistance to displacement or deformation upon	717. The target for the drop test specified in paras 705, 722, 725(a), 727 and 735 shall be a flat, horizontal surface of such a character that any increase in its resistance to displacement or deformation upon impact by	

impact by the specimen would not significantly increase damage to the specimen.	the specimen would not significantly increase damage to the specimen.	
<b>Test for packagings designed to contain uranium hexafluoride</b>	<b>Test for packagings designed to contain uranium hexafluoride</b>	
718. Specimens that comprise or simulate <i>packagings</i> designed to contain 0.1 kg or more of uranium hexafluoride shall be tested hydraulically at an internal pressure of at least 1.38 MPa but, when the test pressure is less than 2.76 MPa, the <i>design</i> shall require <i>multilateral approval</i> . For retesting <i>packagings</i> , any other equivalent non-destructive testing may be applied subject to <i>multilateral approval</i> .	718. Specimens that comprise or simulate <i>packagings</i> designed to contain 0.1 kg or more of uranium hexafluoride shall be tested hydraulically at an internal pressure of at least 1.38 MPa, but, when the test pressure is less than 2.76 MPa, the <i>design</i> shall require <i>multilateral approval</i> . For retesting <i>packagings</i> , any other equivalent non-destructive testing may be applied, subject to <i>multilateral approval</i> .	
<b>Tests for demonstrating ability to withstand normal conditions of transport</b>	<b>Tests for demonstrating ability to withstand normal conditions of transport</b>	
719. The tests are: the water spray test, the free drop test, the stacking test and the penetration test. Specimens of the <i>package</i> shall be subjected to the free drop test, the stacking test and the penetration test, preceded in each case by the water spray test. One specimen may be used for all the tests, provided that the requirements of para. 720 are fulfilled.	719. The tests are: the water spray test, the free drop test, the stacking test and the penetration test. Specimens of the <i>package</i> shall be subjected to the free drop test, the stacking test and the penetration test, preceded in each case by the water spray test. One specimen may be used for all the tests, provided that the requirements of para. 720 are fulfilled.	
720. The time interval between the conclusion of the water spray test and the succeeding test shall be such that the water has soaked in to the maximum extent, without appreciable drying of the exterior of the specimen. In the absence of any evidence to the contrary, this interval shall be taken to be two hours if the water spray is applied from four directions simultaneously. No time interval shall elapse, however, if the water spray is applied from each of the four directions consecutively.	720. The time interval between the conclusion of the water spray test and the succeeding test shall be such that the water has soaked in to the maximum extent, without appreciable drying of the exterior of the specimen. In the absence of any evidence to the contrary, this interval shall be taken to be <del>two hours</del> <a href="#">2 h</a> if the water spray is applied from four directions simultaneously. No time interval shall elapse, however, if the water spray is applied from each of the four directions consecutively.	
721. Water spray test: The specimen shall be subjected to a water spray test that simulates exposure to rainfall of approximately 5 cm per hour for at least one hour.	721. Water spray test: The specimen shall be subjected to a water spray test that simulates exposure to rainfall of approximately 5 cm per hour for at least <del>one hour</del> <a href="#">1 h</a> .	
722. Free drop test: The specimen shall drop onto the target so as to suffer maximum damage in respect of the safety features to be tested:	722. Free drop test: The specimen shall drop onto the target so as to suffer maximum damage in respect of the safety features to be tested:	

<p>(a) The height of drop measured from the lowest point of the specimen to the upper surface of the target shall be not less than the distance specified in Table 14 for the applicable mass. The target shall be as defined in para. 717.</p> <p>(b) For rectangular fibreboard or wood <i>packages</i> not exceeding a mass of 50 kg, a separate specimen shall be subjected to a free drop onto each corner from a height of 0.3 m.</p> <p>(c) For cylindrical fibreboard <i>packages</i> not exceeding a mass of 100 kg, a separate specimen shall be subjected to a free drop onto each of the quarters of each rim from a height of 0.3 m.</p>	<p>(a) The height of drop measured from the lowest point of the specimen to the upper surface of the target shall be not less than the distance specified in Table 14 for the applicable mass. The target shall be as defined in para. 717.</p> <p>(b) For rectangular fibreboard or wood <i>packages</i> not exceeding a mass of 50 kg, a separate specimen shall be subjected to a free drop onto each corner from a height of 0.3 m.</p> <p>(c) For cylindrical fibreboard <i>packages</i> not exceeding a mass of 100 kg, a separate specimen shall be subjected to a free drop onto each of the quarters of each rim from a height of 0.3 m.</p>	
<p>723. Stacking test: Unless the shape of the <i>packaging</i> effectively prevents stacking, the specimen shall be subjected, for a period of 24 h, to a compressive load equal to the greater of the following:</p> <p>(a) A total weight equal to 5 times the maximum weight of the <i>package</i>; and</p> <p>(b) The equivalent of 13 kPa multiplied by the vertically projected area of the <i>package</i>.</p> <p>The load shall be applied uniformly to two opposite sides of the specimen, one of which shall be the base on which the <i>package</i> would typically rest.</p>	<p>723. Stacking test: Unless the shape of the <i>packaging</i> effectively prevents stacking, the specimen shall be subjected, for a period of 24 h, to a compressive load equal to the greater of the following:</p> <p>(a) <del>A total weight equal to</del> <u>The equivalent of</u> 5 times the maximum weight of the <i>package</i>; <del>and</del></p> <p>(b) The equivalent of 13 kPa multiplied by the vertically projected area of the <i>package</i>.</p> <p>The load shall be applied uniformly to two opposite sides of the specimen, one of which shall be the base on which the <i>package</i> would typically rest.</p>	
<p>724. Penetration test: The specimen shall be placed on a rigid, flat, horizontal surface which will not move significantly while the test is being carried out:</p> <p>(a) A bar 3.2 cm in diameter with a hemispherical end and a mass of 6 kg shall be dropped and directed to fall, with its longitudinal axis vertical, onto the centre of the weakest part of the specimen, so that, if it penetrates sufficiently far, it will hit the <i>containment system</i>. The bar shall not be significantly deformed by the test performance.</p> <p>(b) The height of drop of the bar measured from its lower end to the</p>	<p>724. Penetration test: The specimen shall be placed on a rigid, flat, horizontal surface <del>which</del> <u>that</u> will not move significantly while the test is being carried out:</p> <p>(a) A bar 3.2 cm in diameter with a hemispherical end and a mass of 6 kg shall be dropped and directed to fall, with its longitudinal axis vertical, onto the centre of the weakest part of the specimen, so that, if it penetrates sufficiently far, it will hit the <i>containment system</i>. The bar shall not be significantly deformed by the test performance.</p> <p>(b) The height of drop of the bar measured from its lower end to the</p>	

intended point of impact on the upper surface of the specimen shall be 1 m.	intended point of impact on the upper surface of the specimen shall be 1 m.	
<b>Additional tests for Type A packages designed for liquids and gases</b>	<b>Additional tests for Type A packages designed for liquids and gases</b>	
<p>725. A specimen or separate specimens shall be subjected to each of the following tests unless it can be demonstrated that one test is more severe for the specimen in question than the other, in which case one specimen shall be subjected to the more severe test:</p> <p>(a) Free drop test: The specimen shall drop onto the target so as to suffer the maximum damage in respect of containment. The height of the drop measured from the lowest part of the specimen to the upper surface of the target shall be 9 m. The target shall be as defined in para. 717.</p> <p>(b) Penetration test: The specimen shall be subjected to the test specified in para. 724 except that the height of the drop shall be increased to 1.7 m from the 1 m specified in para. 724(b).</p>	<p>725. A specimen, or separate specimens, shall be subjected to each of the following tests unless it can be demonstrated that one test is more severe for the specimen in question than the other, in which case one specimen shall be subjected to the more severe test:</p> <p>(a) Free drop test: The specimen shall drop onto the target so as to suffer the maximum damage in respect of containment. The height of the drop measured from the lowest part of the specimen to the upper surface of the target shall be 9 m. The target shall be as defined in para. 717.</p> <p>(b) Penetration test: The specimen shall be subjected to the test specified in para. 724, except that the height of the drop shall be increased to 1.7 m from the 1 m specified in para. 724(b).</p>	
TABLE 14. FREE DROP DISTANCE FOR TESTING PACKAGES TO NORMAL CONDITIONS OF TRANSPORT	TABLE 14. FREE DROP DISTANCE FOR TESTING PACKAGES TO NORMAL CONDITIONS OF TRANSPORT	
<b>Tests for demonstrating ability to withstand accident conditions of transport</b>	<b>Tests for demonstrating ability to withstand accident conditions of transport</b>	
726. The specimen shall be subjected to the cumulative effects of the tests specified in paras 727 and 728, in that order. Following these tests, either this specimen or a separate specimen shall be subjected to the effect(s) of the water immersion test(s) as specified in para. 729 and, if applicable, para. 730.	726. The specimen shall be subjected to the cumulative effects of the tests specified in paras 727 and 728, in that order. Following these tests, either this specimen or a separate specimen shall be subjected to the effect(s) of the water immersion test(s) as specified in para. 729 and, if applicable, para. 730.	
727. Mechanical test: The mechanical test consists of three different drop tests. Each specimen shall be subjected to the applicable drops as specified in para. 657 or para. 682. The order in which the specimen is subjected to the drops shall be such that, on completion of the mechanical test, the specimen shall have suffered such damage as will lead to maximum damage in the thermal test which follows:	727. Mechanical test: The mechanical test consists of three different drop tests. Each specimen shall be subjected to the applicable drops as specified in para. <del>657</del> 659 or para. <del>682</del> 685. The order in which the specimen is subjected to the drops shall be such that, on completion of the mechanical test, the specimen shall have suffered such damage as	

<p>(a) For drop I, the specimen shall drop onto the target so as to suffer maximum damage, and the height of the drop measured from the lowest point of the specimen to the upper surface of the target shall be 9 m. The target shall be as defined in para. 717.</p> <p>(b) For drop II, the specimen shall drop so as to suffer maximum damage onto a bar rigidly mounted perpendicularly on the target. The height of the drop measured from the intended point of impact of the specimen to the upper surface of the bar shall be 1 m. The bar shall be of solid mild steel of circular section, <math>15.0 \pm 0.5</math> cm in diameter and 20 cm long unless a longer bar would cause greater damage, in which case a bar of sufficient length to cause maximum damage shall be used. The upper end of the bar shall be flat and horizontal with its edge rounded off to a radius of not more than 6 mm. The target on which the bar is mounted shall be as described in para. 717.</p> <p>(c) For drop III, the specimen shall be subjected to a dynamic crush test by positioning the specimen on the target so as to suffer maximum damage by the drop of a 500 kg mass from 9 m onto the specimen. The mass shall consist of a solid mild steel plate 1 m by 1 m and shall fall in a horizontal attitude. The height of the drop shall be measured from the underside of the plate to the highest point of the specimen. The target on which the specimen rests shall be as defined in para. 717.</p>	<p>will lead to maximum damage in the thermal test <del>which</del> <u>that</u> follows:</p> <p>(a) For drop I, the specimen shall drop onto the target so as to suffer maximum damage, and the height of the drop measured from the lowest point of the specimen to the upper surface of the target shall be 9 m. The target shall be as defined in para. 717.</p> <p>(b) For drop II, the specimen shall drop <del>so as to suffer maximum damage</del> onto a bar rigidly mounted perpendicularly on the target <u>so as to suffer maximum damage</u>. The height of the drop measured from the intended point of impact of the specimen to the upper surface of the bar shall be 1 m. The bar shall be of solid mild steel of circular section, <math>15.0 \pm 0.5</math> cm in diameter and 20 cm long unless a longer bar would cause greater damage, in which case a bar of sufficient length to cause maximum damage shall be used. The upper end of the bar shall be flat and horizontal with its edge rounded off to a radius of not more than 6 mm. The target on which the bar is mounted shall be as described in para. 717.</p> <p>(c) For drop III, the specimen shall be subjected to a dynamic crush test by positioning the specimen on the target so as to suffer maximum damage by the drop of a 500kg mass from 9 m onto the specimen. The mass shall consist of a solid mild steel plate 1 m by 1 m and shall fall in a horizontal attitude. <u>The lower face of the steel plate shall have its edges and corners rounded off to a radius of not more than 6 mm.</u> The height of the drop shall be measured from the underside of the plate to the highest point of the specimen. The target on which the specimen rests shall be as defined in para. 717.</p>	
<p>728. Thermal test: The specimen shall be in thermal equilibrium under conditions of an ambient temperature of 38°C, subject to the solar insolation conditions specified in Table 13 and subject to the <i>design</i> maximum rate of internal heat generation within the <i>package</i> from the radioactive contents. Alternatively, any of these parameters are allowed to have different values prior to and during the test, provided due account is taken of them in the subsequent assessment of <i>package</i> response. The thermal test shall then consist of: (a) followed by (b).</p>	<p>728. Thermal test: The specimen shall be in thermal equilibrium under conditions of an ambient temperature of 38°C, subject to the solar insolation conditions specified in Table <del>13</del> <u>12</u> and subject to the <i>design</i> maximum rate of internal heat generation within the <i>package</i> from the radioactive contents. Alternatively, any of these parameters are allowed to have different values prior to and during the test, provided due account is taken of them in the subsequent assessment of <i>package</i></p>	



<p>(a) Exposure of a specimen for a period of 30 min to a thermal environment which provides a heat flux at least equivalent to that of a hydrocarbon fuel-air fire in sufficiently quiescent ambient conditions to give a minimum average flame emissivity coefficient of 0.9 and an average temperature of at least 800°C, fully engulfing the specimen, with a surface absorptivity coefficient of 0.8 or that value which the <i>package</i> may be demonstrated to possess if exposed to the fire specified.</p> <p>(b) Exposure of the specimen to an ambient temperature of 38°C, subject to the solar insolation conditions specified in Table 13 and subject to the <i>design</i> maximum rate of internal heat generation within the <i>package</i> by the <i>radioactive contents</i> for a sufficient period to ensure that temperatures in the specimen are everywhere decreasing and/or are approaching initial steady state conditions. Alternatively, any of these parameters are allowed to have different values following cessation of heating, provided due account is taken of them in the subsequent assessment of <i>package</i> response. During and following the test, the specimen shall not be artificially cooled and any combustion of materials of the specimen shall be permitted to proceed naturally.</p>	<p>response. The thermal test shall then consist of (a) followed by (b).</p> <p>(a) Exposure of a specimen for a period of 30 min to a thermal environment <del>which</del> <u>that</u> provides a heat flux at least equivalent to that of a hydrocarbon fuel-air fire in sufficiently quiescent ambient conditions to give a minimum average flame emissivity coefficient of 0.9 and an average temperature of at least 800°C, fully engulfing the specimen, with a surface absorptivity coefficient of 0.8 or that value <del>which</del> <u>that</u> the <i>package</i> may be demonstrated to possess if exposed to the fire specified.</p> <p>(b) Exposure of the specimen to an ambient temperature of 38°C, subject to the solar insolation conditions specified in Table <del>13</del> <u>12</u> and subject to the <i>design</i> maximum rate of internal heat generation within the <i>package</i> by the <i>radioactive contents</i> for a sufficient period to ensure that temperatures in the specimen are everywhere decreasing and/or are approaching initial steady state conditions. Alternatively, any of these parameters are allowed to have different values following cessation of heating, provided due account is taken of them in the subsequent assessment of <i>package</i> response. During and following the test, the specimen shall not be artificially cooled and any combustion of materials of the specimen shall be permitted to proceed naturally.</p>	
<p>729. Water immersion test: The specimen shall be immersed under a head of water of at least 15 m for a period of not less than 8 h in the attitude which will lead to maximum damage. For demonstration purposes, an external gauge pressure of at least 150 kPa shall be considered to meet these conditions.</p>	<p>729. Water immersion test: The specimen shall be immersed under a head of water of at least 15 m for a period of not less than 8 h in the attitude <del>which</del> <u>that</u> will lead to maximum damage. For demonstration purposes, an external gauge pressure of at least 150 kPa shall be considered to meet these conditions.</p>	
<p><b>Enhanced water immersion test for Type B(U) and Type B(M) packages containing more than <math>10^5 A_2</math> and Type C packages</b></p>	<p><b>Enhanced water immersion test for Type B(U) and Type B(M) packages containing more than <math>10^5 A_2</math> and Type C packages</b></p>	
<p>730. Enhanced water immersion test: The specimen shall be immersed under a head of water of at least 200 m for a period of not less than 1 h. For demonstration purposes, an external gauge pressure of at least 2 MPa shall be considered to meet these conditions.</p>	<p>730. Enhanced water immersion test: The specimen shall be immersed under a head of water of at least 200 m for a period of not less than 1 h. For demonstration purposes, an external gauge pressure of at least 2 MPa shall be considered to meet these conditions.</p>	



Water leakage test for packages containing fissile material	Water leakage test for packages containing fissile material	
731. <i>Packages</i> for which water in-leakage or out-leakage to the extent which results in greatest reactivity has been assumed for purposes of assessment under paras 677–682 shall be excepted from the test.	731. <i>Packages</i> for which water in-leakage or out-leakage to the extent <del>which</del> <u>that</u> results in greatest reactivity has been assumed for purposes of assessment under paras <del>677–682</del> <u>680–685</u> shall be excepted from the test.	
732. Before the specimen is subjected to the water leakage test specified below, it shall be subjected to the tests in para. 727(b), and either para. 727(a) or 727(c) as required by para. 682 and the test specified in para. 728.	732. Before the specimen is subjected to the water leakage test specified below, it shall be subjected to the tests in para. 727(b), and either para. 727(a) or 727(c), as required by para. <del>682</del> <u>685</u> and the test specified in para. 728.	
733. The specimen shall be immersed under a head of water of at least 0.9 m for a period of not less than 8 h and in the attitude for which maximum leakage is expected.	733. The specimen shall be immersed under a head of water of at least 0.9 m for a period of not less than 8 h and in the attitude for which maximum leakage is expected.	
Tests for Type C packages	Tests for Type C packages	
734. Specimens shall be subjected to the effects of each of the following test sequences in the orders specified:  (a) The tests specified in paras 727(a), 727(c), 735 and 736; and  (b) The test specified in para. 737.  Separate specimens are allowed to be used for each of the sequences (a) and (b).	734. Specimens shall be subjected to the effects of each of the following test sequences in the orders specified:  (a) The tests specified in paras 727(a), 727(c), 735 and 736; <del>and</del>  (b) The test specified in para. 737.  Separate specimens are allowed to be used for each of the sequences (a) and (b).	
735. Puncture-tearing test: The specimen shall be subjected to the damaging effects of a solid probe made of mild steel. The orientation of the probe to the surface of the specimen shall be such as to cause maximum damage at the conclusion of the test sequence specified in para. 734(a):  (a) The specimen, representing a <i>package</i> having a mass of less than 250 kg, shall be placed on a target and subjected to a probe having a mass of 250 kg falling from a height of 3 m above the intended impact point. For this test the probe shall be a 20 cm diameter cylindrical bar with the striking end forming the frustum of a right circular cone with the following dimensions: 30 cm height and 2.5	735. Puncture-tearing test: The specimen shall be subjected to the damaging effects of a <u>vertical</u> solid probe made of mild steel. The orientation of the <del>probe to the surface of the</del> <u>package</u> specimen <u>and the impact point on the package surface</u> shall be such as to cause maximum damage at the conclusion of the test sequence specified in para. 734(a):  (a) The specimen, representing a <i>package</i> having a mass of less than 250 kg, shall be placed on a target and subjected to a probe having a mass of 250 kg falling from a height of 3 m above the intended impact point. For this test the probe shall be a 20 cm diameter cylindrical bar with the striking end forming the frustum of a right circular cone with the following dimensions: 30 cm height and 2.5	

<p>cm diameter at the top with its edge rounded off to a radius of not more than 6 mm. The target on which the specimen is placed shall be as specified in para. 717.</p> <p>(b) For <i>packages</i> having a mass of 250 kg or more, the base of the probe shall be placed on a target and the specimen dropped onto the probe. The height of the drop, measured from the point of impact with the specimen to the upper surface of the probe, shall be 3 m. For this test the probe shall have the same properties and dimensions as specified in (a), except that the length and mass of the probe shall be such as to cause maximum damage to the specimen. The target on which the base of the probe is placed shall be as specified in para. 717.</p>	<p>cm diameter at the top with its edge rounded off to a radius of not more than 6 mm. The target on which the specimen is placed shall be as specified in para. 717.</p> <p>(b) For <i>packages</i> having a mass of 250 kg or more, the base of the probe shall be placed on a target and the specimen dropped onto the probe. The height of the drop, measured from the point of impact with the specimen to the upper surface of the probe, shall be 3 m. For this test the probe shall have the same properties and dimensions as specified in (a), except that the length and mass of the probe shall be such as to cause maximum damage to the specimen. The target on which the base of the probe is placed shall be as specified in para. 717.</p>	
<p>736. Enhanced thermal test: The conditions for this test shall be as specified in para. 728, except that the exposure to the thermal environment shall be for a period of 60 minutes.</p>	<p>736. Enhanced thermal test: The conditions for this test shall be as specified in para. 728, except that the exposure to the thermal environment shall be for a period of 60 minutes.</p>	
<p>737. Impact test: The specimen shall be subject to an impact on a target at a velocity of not less than 90 m/s, at such an orientation as to suffer maximum damage. The target shall be as defined in para. 717, except that the target surface may be at any orientation as long as the surface is normal to the specimen path.</p>	<p>737. Impact test: The specimen shall be subject to an impact on a target at a velocity of not less than 90 m/s, at such an orientation as to suffer maximum damage. The target shall be as defined in para. 717, except that the target surface may be at any orientation as long as the surface is normal to the specimen path.</p>	

## Section VIII APPROVAL AND ADMINISTRATIVE REQUIREMENTS

2009 EDITION	20xx draft 2.51	Remarks
<b>Section VIII</b>	Section VIII <sup>1</sup>	
<sup>1</sup> Although this publication is identified as a new edition, there are no changes that affect the administrative and approval requirements in Section VIII.	<sup>1</sup> Although this publication is identified as a new edition, there are no changes that affect the administrative and approval requirements in respect of radioactive material and packages approved under the <del>the</del> <a href="#">Section VIII of previous editions, amendments or revisions since the 1996 Edition.</a>	Footnote, bottom of page
<b>APPROVAL AND ADMINISTRATIVE REQUIREMENTS</b>	<b>APPROVAL AND ADMINISTRATIVE REQUIREMENTS</b>	
<b>GENERAL</b>	<b>GENERAL</b>	
801. For <i>package designs</i> where it is not required that a <i>competent authority</i> issue an approval certificate, the <i>consignor</i> shall, on request, make available for inspection by the relevant <i>competent authority</i> , documentary evidence of the compliance of the <i>package design</i> with all the applicable requirements.	801. For <i>package designs</i> where it is not required that a <i>competent authority</i> issue an <del>approval</del> certificate <a href="#">of approval</a> , the <i>consignor</i> shall, on request, make available for inspection by the relevant <i>competent authority</i> , documentary evidence of the compliance of the <i>package design</i> with all the applicable requirements.	
802. <i>Competent authority</i> approval shall be required for the following:  (a) <i>Designs</i> for  (i) <i>Special form radioactive material</i> (see paras 803, 804 and 818);  (ii) <i>Low dispersible radioactive material</i> (see paras 803 and 804);  (iii) <i>Packages</i> containing 0.1 kg or more of uranium hexafluoride (see para. 805);  (iv) All <i>packages</i> containing <i>fissile material</i> unless excepted by para. 417 (see paras 812–814, 816 and 817);  (v) <i>Type B(U) packages</i> and <i>Type B(M) packages</i> (see paras 806–811, 816 and 817);	802. <i>Competent authority</i> approval shall be required for the following:  (a) <i>Designs</i> for:  (i) <i>Special form radioactive material</i> (see paras 803, 804 and <del>818</del> <a href="#">823</a> ) ;  (ii) <i>Low dispersible radioactive material</i> (see paras 803 and 804) ;  <a href="#">(iii) Fissile material excepted under para. 417(f) (see paras 805 and 806);</a>  <del>(iiiiv)</del> <a href="#">(iv)</a> <i>Packages</i> containing 0.1 kg or more of uranium hexafluoride (see para. <del>805</del> <a href="#">807</a> );  <del>(ivv)</del> <del>All</del> <a href="#">(v)</a> <i>Packages</i> containing <i>fissile material</i> unless excepted by para. 417, <a href="#">674 or 675</a> (see paras <del>812–814</del> <a href="#">814–816</a> and <del>816</del>	

<p>(vi) <i>Type C packages</i> (see paras 806–808).</p> <p>(b) <i>Special arrangements</i> (see paras 824–826).</p> <p>(c) <i>Certain shipments</i> (see paras 820–823).</p> <p>(d) <i>Radiation protection programme</i> for special use vessels (see para. 572(a)).</p> <p>(e) Calculation of radionuclide values that are not listed in Table 2 (see para. 403).</p>	<p><a href="#">820 and 817</a>);</p> <p>(<del>vi</del>) <i>Type B(U) packages</i> and <i>Type B(M) packages</i> (see paras <del>806–811</del> <a href="#">808–813</a> and <del>816</del> <a href="#">820 and 817</a>);</p> <p>(<del>vii</del>) <i>Type C packages</i> (see paras <del>806–808</del> <a href="#">808–810</a>).</p> <p>(b) <i>Special arrangements</i> (see paras <del>824–826</del> <a href="#">829–831</a>);</p> <p>(c) <del>Certain shipments</del> (see paras <del>820–823</del> <a href="#">825–828</a>);</p> <p>(d) <i>Radiation protection programme</i> for special use vessels (see para. <del>572</del> <a href="#">576(a)</a>);</p> <p>(e) <a href="#">Calculation of radionuclide values that are not listed in Table 2</a> (see para. 403(a));</p> <p><a href="#">Calculation of alternative activity limits for an exempt consignment of instruments and articles (see para. 403 (b)).</a></p> <p><a href="#">The certificates of approval for the package design and the shipment may be combined into a single certificate.</a></p>	
APPROVAL OF SPECIAL FORM RADIOACTIVE MATERIAL AND LOW DISPERSIBLE RADIOACTIVE MATERIAL	APPROVAL OF SPECIAL FORM RADIOACTIVE MATERIAL AND LOW DISPERSIBLE RADIOACTIVE MATERIAL	
<p>803. The <i>design</i> for <i>special form radioactive material</i> shall require <i>unilateral approval</i>. The <i>design</i> for <i>low dispersible radioactive material</i> shall require <i>multilateral approval</i>. In both cases, an application for approval shall include:</p> <p>(a) A detailed description of the <i>radioactive material</i> or, if a capsule, the contents; particular reference shall be made to both physical and chemical states;</p> <p>(b) A detailed statement of the <i>design</i> of any capsule to be used;</p> <p>(c) A statement of the tests which have been done and their results, or</p>	<p>803. The <i>design</i> for <i>special form radioactive material</i> shall require <i>unilateral approval</i>. The <i>design</i> for <i>low dispersible radioactive material</i> shall require <i>multilateral approval</i>. In both cases, an application for approval shall include:</p> <p>(a) A detailed description of the <i>radioactive material</i> or, if a capsule, the contents; particular reference shall be made to both physical and chemical states;</p> <p>(b) A detailed statement of the <i>design</i> of any capsule to be used;</p> <p>(c) A statement of the tests <del>which</del> <a href="#">that</a> have been done and their results, or evidence based on calculative methods to show that the</p>	Editorial

<p>evidence based on calculative methods to show that the <i>radioactive material</i> is capable of meeting the performance standards, or other evidence that the <i>special form radioactive material</i> or <i>low dispersible radioactive material</i> meets the applicable requirements of these Regulations;</p> <p>(d) A specification of the applicable <i>quality assurance</i> programme as required in para. 306; and</p> <p>(e) Any proposed pre-shipment actions for use in the <i>consignment</i> of <i>special form radioactive material</i> or <i>low dispersible radioactive material</i>.</p>	<p><i>radioactive material</i> is capable of meeting the performance standards, or other evidence that the <i>special form radioactive material</i> or <i>low dispersible radioactive material</i> meets the applicable requirements of these Regulations;</p> <p>(d) A specification of the applicable <del>quality assurance programme</del> <u>management system</u> as required in para. 306; and</p> <p>(e) Any proposed pre-shipment actions for use in the <i>consignment</i> of <i>special form radioactive material</i> or <i>low dispersible radioactive material</i>.</p>	
804. The <i>competent authority</i> shall establish an approval certificate stating that the approved <i>design</i> meets the requirements for <i>special form radioactive material</i> or <i>low dispersible radioactive material</i> and shall attribute to that <i>design</i> an identification mark.	804. The <i>competent authority</i> shall establish an <del>approval</del> certificate <u>of approval</u> stating that the approved <i>design</i> meets the requirements for <i>special form radioactive material</i> or <i>low dispersible radioactive material</i> and shall attribute to that <i>design</i> an identification mark.	
Not in TS-R-1 (2009).	<u>APPROVAL OF MATERIAL EXCEPTED FROM FISSILE CLASSIFICATION</u>	
Not in TS-R-1 (2009).	<p><u>805. The design for a <i>fissile material</i> excepted from <b>FISSILE</b> classification in accordance with Table 1, under para. 417(f) shall require <i>multilateral approval</i>. An application for approval shall include:</u></p> <p><u>(a) A detailed description of the material; particular reference shall be made to both physical and chemical states;</u></p> <p><u>(b) A statement of the tests that have been done and their results, or evidence based on calculation methods to show that the material is capable of meeting the requirements specified in para. 606;</u></p> <p><u>(c) A specification of the applicable <i>management system</i> as required in para. 306;</u></p> <p><u>(d) A statement of specific actions to be taken prior to <i>shipment</i>.</u></p>	
Not in TS-R-1 (2009).	<u>806. The <i>competent authority</i> shall establish a certificate of approval stating that the approved material meets the requirements for <i>fissile material</i> excepted by the <i>competent authority</i> in accordance with para. 606 and shall attribute to that <i>design</i> an identification mark.</u>	

APPROVAL OF PACKAGE DESIGNS	APPROVAL OF PACKAGE DESIGNS	
Approval of package designs to contain uranium hexafluoride	Approval of package designs to contain uranium hexafluoride	
<p>805. The approval of <i>designs</i> for <i>packages</i> containing 0.1 kg or more of uranium hexafluoride requires that:</p> <p>(a) Each <i>design</i> that meets the requirements of para. 632 shall require <i>multilateral approval</i>.</p> <p>(b) Each <i>design</i> that meets the requirements of paras 629–631 shall require <i>unilateral approval</i> by the <i>competent authority</i> of the country of origin of the <i>design</i>, unless <i>multilateral approval</i> is otherwise required by these Regulations.</p> <p>(c) The application for approval shall include all information necessary to satisfy the <i>competent authority</i> that the <i>design</i> meets the requirements of para. 629, and a specification of the applicable <i>quality assurance</i> programme as required in para. 306.</p> <p>(d) The <i>competent authority</i> shall establish an approval certificate stating that the approved <i>design</i> meets the requirements of para. 629 and shall attribute to that <i>design</i> an identification mark.</p>	<p><del>805</del> 807. The approval of <i>designs</i> for <i>packages</i> containing 0.1 kg or more of uranium hexafluoride requires that:</p> <p>(a) Each <i>design</i> that meets the requirements of para. <del>632</del> 634 shall require <i>multilateral approval</i>.</p> <p>(b) Each <i>design</i> that meets the requirements of paras <del>629–631</del> 631–633 shall require <i>unilateral approval</i> by the <i>competent authority</i> of the country of origin of the <i>design</i>, unless <i>multilateral approval</i> is otherwise required by these Regulations.</p> <p>(c) The application for approval shall include all information necessary to satisfy the <i>competent authority</i> that the <i>design</i> meets the requirements of para. <del>629</del> 631, and a specification of the applicable <del>quality assurance programme</del> <i>management system</i> as required in para. 306.</p> <p>(d) The <i>competent authority</i> shall establish <del>an approval</del> certificate <i>of approval</i> stating that the approved <i>design</i> meets the requirements of para. <del>629</del> 631 and shall attribute to that <i>design</i> an identification mark.</p>	
Approval of Type B(U) and Type C package designs	Approval of Type B(U) and Type C package designs	
<p>806. Each <i>Type B(U)</i> and <i>Type C package design</i> shall require <i>unilateral approval</i>, except that:</p> <p>(a) A <i>package design</i> for <i>fissile material</i>, which is also subject to paras 812–814, shall require <i>multilateral approval</i>; and</p> <p>(b) A <i>Type B(U) package design</i> for <i>low dispersible radioactive material</i> shall require <i>multilateral approval</i>.</p>	<p><del>806</del> 808. Each <i>Type B(U)</i> and <i>Type C package design</i> shall require <i>unilateral approval</i>, except that:</p> <p>(a) A <i>package design</i> for <i>fissile material</i>, which is also subject to paras <del>812–814</del> 814–816, shall require <i>multilateral approval</i>; <del>and</del></p> <p>(b) A <i>Type B(U) package design</i> for <i>low dispersible radioactive material</i> shall require <i>multilateral approval</i>.</p>	
<p>807. An application for approval shall include:</p> <p>(a) A detailed description of the proposed <i>radioactive contents</i> with reference to their physical and chemical states and the nature of the radiation emitted;</p>	<p><del>807</del> 809. An application for approval shall include:</p> <p>(a) A detailed description of the proposed <i>radioactive contents</i> with reference to their physical and chemical states and the nature of the radiation emitted;</p>	

<p>(b) A detailed statement of the <i>design</i>, including complete engineering drawings and schedules of materials and methods of manufacture;</p> <p>(c) A statement of the tests which have been carried out and their results, or evidence based on calculative methods or other evidence that the <i>design</i> is adequate to meet the applicable requirements;</p> <p>(d) The proposed operating and maintenance instructions for the use of the <i>packaging</i>;</p> <p>(e) If the <i>package</i> is designed to have a <i>maximum normal operating pressure</i> in excess of 100 kPa gauge, a specification of the materials of manufacture of the <i>containment system</i>, the samples to be taken, and the tests to be made;</p> <p>(f) Where the proposed <i>radioactive contents</i> are irradiated fuel, the applicant shall state and justify any assumption in the safety analysis relating to the characteristics of the fuel and describe any <i>pre-shipment</i> measurement required by para. 674(b);</p> <p>(g) Any special stowage provisions necessary to ensure the safe dissipation of heat from the <i>package</i> considering the various modes of transport to be used and the type of <i>conveyance</i> or <i>freight container</i>;</p> <p>(h) A reproducible illustration, not larger than 21 cm × 30 cm, showing the make-up of the <i>package</i>; and</p> <p>(i) A specification of the applicable <i>quality assurance</i> programme as required in para. 306.</p>	<p>(b) A detailed statement of the <i>design</i>, including complete engineering drawings and schedules of materials and methods of manufacture;</p> <p>(c) A statement of the tests <del>which</del> <u>that</u> have been carried out and their results, or evidence based on calculative methods or other evidence that the <i>design</i> is adequate to meet the applicable requirements;</p> <p>(d) The proposed operating and maintenance instructions for the use of the <i>packaging</i>;</p> <p>(e) If the <i>package</i> is designed to have a <i>maximum normal operating pressure</i> in excess of 100 kPa gauge, a specification of the materials of manufacture of the <i>containment system</i>, the samples to be taken, and the tests to be made;</p> <p>(f) Where the proposed <i>radioactive contents</i> are irradiated <u>nuclear</u> fuel, the applicant shall state and justify any assumption in the safety analysis relating to the characteristics of the fuel and describe any <i>pre-shipment</i> measurement required by para. <del>674</del> <u>677</u>(b) ;</p> <p>(g) Any special stowage provisions necessary to ensure the safe dissipation of heat from the <i>package</i> considering the various modes of transport to be used and the type of <i>conveyance</i> or <i>freight container</i>;</p> <p>(h) A reproducible illustration, not larger than 21 cm × 30 cm, showing the make-up of the <i>package</i>; <del>and</del></p> <p>(i) A specification of the applicable <del>quality assurance programme</del> <u>management system</u> as required in para. 306.</p>	
<p>808. The <i>competent authority</i> shall establish an approval certificate stating that the approved <i>design</i> meets the requirements for <i>Type B(U)</i> or <i>Type C packages</i> and shall attribute to that <i>design</i> an identification mark.</p>	<p><del>808</del> 810. The <i>competent authority</i> shall establish <del>a</del> <u>an approval</u> certificate <u>of approval</u> stating that the approved <i>design</i> meets the requirements for <i>Type B(U)</i> or <i>Type C packages</i> and shall attribute to that <i>design</i> an identification mark.</p>	



<b>Approval of Type B(M) package designs</b>	<b>Approval of Type B(M) package designs</b>	
809. Each <i>Type B(M) package design</i> , including those for <i>fissile material</i> which are also subject to paras 812–814 and those for <i>low dispersible radioactive material</i> , shall require <i>multilateral approval</i> .	<del>809</del> <u>811</u> . Each <i>Type B(M) package design</i> , including those for <i>fissile material</i> which are also subject to paras <del>812–814</del> <u>814–816</u> and those for <i>low dispersible radioactive material</i> , shall require <i>multilateral approval</i> .	
<p>810. An application for approval of a <i>Type B(M) package design</i> shall include, in addition to the information required in para. 807 for <i>Type B(U) packages</i>:</p> <p>(a) A list of the requirements specified in paras 637, 653–655 and 658–664 with which the <i>package</i> does not conform;</p> <p>(b) Any proposed supplementary operational controls to be applied during transport not regularly provided for in these Regulations, but which are necessary to ensure the safety of the <i>package</i> or to compensate for the deficiencies listed in (a);</p> <p>(c) A statement relative to any restrictions on the mode of transport and to any special loading, carriage, unloading or handling procedures; and</p> <p>(d) The range of ambient conditions (temperature, solar radiation) which are expected to be encountered during transport and which have been taken into account in the <i>design</i>.</p>	<p><del>810</del> <u>812</u>. An application for approval of a <i>Type B(M) package design</i> shall include, in addition to the information required in para. <del>807</del> <u>809</u> for <i>Type B(U) packages</i>:</p> <p>(a) A list of the requirements specified in paras <del>637</del> <u>639</u>, <del>653–655</del> <u>655–657</u> and <del>658–664</del> <u>660–666</u> with which the <i>package</i> does not conform;</p> <p>(b) Any proposed supplementary operational controls to be applied during transport not regularly provided for in these Regulations, but which are necessary to ensure the safety of the <i>package</i> or to compensate for the deficiencies listed in (a) ;</p> <p>(c) A statement relative to any restrictions on the mode of transport and to any special loading, carriage, unloading or handling procedures; <del>and</del></p> <p>(d) <u>A statement of t</u><del>The range of ambient conditions (temperature, solar radiation) which</del> <u>that</u> are expected to be encountered during transport and which have been taken into account in the <i>design</i>.</p>	
811. The <i>competent authority</i> shall establish an approval certificate stating that the approved <i>design</i> meets the applicable requirements for <i>Type B(M) packages</i> and shall attribute to that <i>design</i> an identification mark.	<del>811</del> <u>813</u> . The <i>competent authority</i> shall establish <del>a</del> <u>an approval</u> certificate <u>of approval</u> stating that the approved <i>design</i> meets the applicable requirements for <i>Type B(M) packages</i> and shall attribute to that <i>design</i> an identification mark.	
<b>Approval of package designs to contain fissile material</b>	<b>Approval of package designs to contain fissile material</b>	
812. Each <i>package design</i> for <i>fissile material</i> which is not excepted according to para. 417 from the requirements that apply specifically to <i>packages</i> containing <i>fissile material</i> shall require <i>multilateral approval</i> .	<del>812</del> <u>814</u> . Each <i>package design</i> for <i>fissile material</i> , <del>which</del> <u>that</u> is not excepted <u>by any of paras 417 (a)-(f), 674 and 675</u> <del>according to, from the requirements that apply specifically to packages containing fissile material</del> shall require <i>multilateral approval</i> .	

<p>813. An application for approval shall include all information necessary to satisfy the <i>competent authority</i> that the <i>design</i> meets the requirements of para. 671, and a specification of the applicable <i>quality assurance</i> programme as required in para. 306.</p>	<p><del>813</del> 815. An application for approval shall include all information necessary to satisfy the <i>competent authority</i> that the <i>design</i> meets the requirements of para. <del>671</del> 673, and a specification of the applicable <del>quality assurance programme</del> <u>management system</u> as required in para. 306.</p>	
<p>814. The <i>competent authority</i> shall establish an approval certificate stating that the approved <i>design</i> meets the requirements of para. 671 and shall attribute to that <i>design</i> an identification mark.</p>	<p><del>814</del> 816. The <i>competent authority</i> shall establish <del>a</del> <u>an approval</u> certificate of approval stating that the approved <i>design</i> meets the requirements of para. <del>671</del> 673 and shall attribute to that <i>design</i> an identification mark.</p>	
	<p>APPROVAL OF ALTERNATIVE ACTIVITY LIMITS FOR AN EXEMPT CONSIGNMENT OF INSTRUMENTS OR ARTICLES</p>	
	<p><u>817. Alternative activity limits for an exempt consignment of instruments or articles in accordance with para. 403(b) shall require multilateral approval. An application for approval shall include:</u></p> <p><u>(a) An identification and detailed description of the instrument or article, its intended uses and the radionuclide(s) incorporated;</u></p> <p><u>(b) The maximum activity of the radionuclide(s) in the instrument or article;</u></p> <p><u>(c) Maximum external radiation levels arising from the instrument or article;</u></p> <p><u>(d) The chemical and physical forms of the radionuclide(s) contained in the instrument or article;</u></p> <p><u>(e) Details of the construction and design of the instrument or article, particularly as related to the containment and shielding of the radionuclide in routine, normal and accident conditions of transport;</u></p> <p><u>(f) The applicable management system, including the quality testing and verification procedures to be applied to radioactive sources,</u></p>	

	<p><u>components and finished products to ensure that the maximum specified activity of <i>radioactive material</i> or the maximum <i>radiation levels</i> specified for the instrument or article are not exceeded, and that the instruments or articles are constructed according to the <i>design specifications</i>;</u></p> <p><u>(g) The maximum number of instruments or articles expected to be shipped per <i>consignment</i> and annually;</u></p> <p><u>(h) Dose assessments in accordance with the principles and methodologies set out in the BSS [2], including individual doses to transport workers and members of the public and, if appropriate, collective doses arising from routine, normal and accident conditions of transport, based on representative transport scenarios the <i>consignments</i> are subject to.</u></p>	
	<p><u>818. The <i>competent authority</i> shall establish a certificate of approval stating that the approved alternative activity limit for an exempt <i>consignment</i> of instruments or articles meets the requirements of para. 403(b) and shall attribute to that certificate an identification mark.</u></p>	
TRANSITIONAL ARRANGEMENTS	TRANSITIONAL ARRANGEMENTS	
<b>Packages not requiring competent authority approval of design under the 1985 and 1985 (As Amended 1990) Editions of these Regulations</b>	<b>Packages not requiring competent authority approval of design under the 1985 and 1985 (As Amended 1990) Editions of these Regulations</b>	
<p>815. <i>Excepted packages, Type IP-1, Type IP-2, Type IP-3 and Type A packages</i> that did not require approval of <i>design</i> by the <i>competent authority</i> and which meet the requirements of the 1985 or 1985 (As Amended 1990) Editions of these Regulations may continue to be used subject to the mandatory programme of <i>quality assurance</i> in accordance with the requirements of para. 306 and the activity limits and material restrictions of Section IV. Any <i>packaging</i> modified, unless to improve safety, or manufactured after 31 December 2003, shall meet this Edition of these Regulations in full. <i>Packages</i> prepared for transport not later</p>	<p><del>815. <i>Excepted packages, Type IP-1, Type IP-2, Type IP-3 and Type A packages</i> that did not require approval of <i>design</i> by the <i>competent authority</i> and which meet the requirements of the 1985 or 1985 (As Amended 1990) Editions of these Regulations may continue to be used subject to the mandatory programme of <i>quality assurance</i> in accordance with the requirements of para. 306 and the activity limits and material restrictions of Section IV. Any <i>packaging</i> modified, unless to improve safety, or manufactured after 31 December 2003, shall meet this Edition of these Regulations in full. <i>Packages</i> prepared for transport not later</del></p>	

<p>than 31 December 2003 under the 1985 or 1985 (As Amended 1990) Editions of these Regulations may continue in transport. <i>Packages</i> prepared for transport after this date shall meet this Edition of these Regulations in full.</p>	<p><del>than 31 December 2003 under the 1985 or 1985 (As Amended 1990) Editions of these Regulations may continue in transport. <i>Packages</i> prepared for transport after this date shall meet this Edition of these Regulations in full</del></p> <p><u>819. <i>Packages not requiring competent authority approval of design (Excepted packages, Type IP-1, Type IP-2, Type IP-3 and Type A packages)</i> shall meet this Edition of these Regulations in full, except that <i>packages</i> that meet the requirements of the 1985 or 1985 (As Amended 1990) Editions of these Regulations:</u></p> <p>(a) <u>May continue in transport provided that they were prepared for transport prior to 31 December 2003, and subject to the requirements of para. 822, if applicable.</u></p> <p>(b) <u>May continue to be used provided that :</u></p> <p>(i) <u>They were not designed to contain UF<sub>6</sub>.</u></p> <p>(ii) <u>The applicable requirements of para. 306 of this Edition of these Regulations are applied.</u></p> <p>(iii) <u>The activity limits and classification in Section IV of this Edition of these Regulations are applied.</u></p> <p>(iv) <u>The requirements and controls for transport in Section V of this Edition of these Regulations are applied.</u></p> <p>(v) <u>The <i>packaging</i> was not manufactured or modified after 31 December 2003.</u></p>	
<p><b>Packages approved under the 1973, 1973 (As Amended), 1985 and 1985 (As Amended 1990) Editions of these Regulations</b></p>	<p><b>Packages approved under the 1973, 1973 (As Amended), 1985 and 1985 (As Amended 1990) Editions of these Regulations</b></p>	
<p>816. <i>Packagings</i> manufactured to a <i>package design</i> approved by the <i>competent authority</i> under the provisions of the 1973 or 1973 (As Amended) Editions of these Regulations may continue to be used, subject to: <i>multilateral approval of package design</i>, the mandatory programme of <i>quality assurance</i> in accordance with the applicable requirements of para. 306; the activity limits and material restrictions of Section IV; and, for a <i>package</i> containing <i>fissile material</i> and transported by air, the requirement of para. 680. No new manufacture of such <i>packaging</i> shall be permitted to commence. Changes in the <i>design</i> of the <i>packaging</i> or in the nature or quantity of the authorized <i>radioactive contents</i> which, as determined by the <i>competent authority</i>, would significantly affect safety shall require that this Edition of these</p>	<p><del>816. <i>Packagings</i> manufactured to a <i>package design</i> approved by the <i>competent authority</i> under the provisions of the 1973 or 1973 (As Amended) Editions of these Regulations may continue to be used, subject to: <i>multilateral approval of package design</i>, the mandatory programme of <i>quality assurance</i> in accordance with the applicable requirements of para. 306; the activity limits and material restrictions of Section IV; and, for a <i>package</i> containing <i>fissile material</i> and transported by air, the requirement of para. 680. No new manufacture of such <i>packaging</i> shall be permitted to commence. Changes in the <i>design</i> of the <i>packaging</i> or in the nature or quantity of the authorized <i>radioactive contents</i> which, as determined by the <i>competent authority</i>, would significantly affect safety shall require that this Edition of these</del></p>	

<p>Regulations be met in full. A serial number according to the provision of para. 539 shall be assigned to and marked on the outside of each <i>packaging</i>.</p>	<p><del>Regulations be met in full. A serial number according to the provision of para. 539 shall be assigned to and marked on the outside of each <i>packaging</i>.</del></p> <p><u>820. Packages requiring competent authority approval of the design shall meet this Edition of these Regulations in full unless the following conditions are met:</u></p> <ul style="list-style-type: none"> <li><u>(a) The <i>packagings</i> were manufactured to a <i>package design</i> approved by the <i>competent authority</i> under the provisions of the 1973 or 1973 (As Amended) or the 1985 or 1985 (As Amended 1990) Editions of these Regulations.</u></li> <li><u>(b) The <i>package design</i> is subject to <i>multilateral approval</i>.</u></li> <li><u>(c) The applicable requirements of para. 306 of this Edition of these Regulations are applied.</u></li> <li><u>(d) The activity limits and classification in Section IV of this Edition of these Regulations are applied.</u></li> <li><u>(e) The requirements and controls for transport in Section V of this Edition of these Regulations are applied.</u></li> <li><u>(f) For a <i>package</i> containing <i>fissile material</i> and transported by air, the requirement of para. 683 is met.</u></li> <li><u>(g) For <i>packages</i> that meet the requirements of the 1973 or 1973 (As Amended) Editions of these Regulations:</u> <ul style="list-style-type: none"> <li><u>(i) The <i>packages</i> retain sufficient shielding to ensure that the <i>radiation level</i> at 1 m from the surface of the <i>package</i> would not exceed 10 mSv/h in the accident conditions of transport defined in the 1973 Revised or 1973 Revised (As Amended) Editions of these Regulations with the maximum <i>radioactive contents</i> which the <i>package</i> is authorized to contain.</u></li> <li><u>(ii) The <i>packages</i> do not utilize continuous venting.</u></li> <li><u>(iii) A serial number in accordance with the provision of para. 535 is assigned to and marked on the outside of each <i>packaging</i>.</u></li> </ul> </li> </ul>	
	<p><u>821. No new manufacture of <i>packagings</i> to a <i>package design</i> meeting the provisions of the 1973, 1973 (As Amended), 1985, and 1985 (As Amended 1990) Editions of these Regulations shall be permitted to commence.</u></p>	

<p>817. <i>Packagings</i> manufactured to a <i>package design</i> approved by the <i>competent authority</i> under the provisions of the 1985 or 1985 (As Amended 1990) Editions of these Regulations may continue to be used, subject to: <i>multilateral approval of package design</i>, the mandatory programme of <i>quality assurance</i> in accordance with the requirements of para. 306; the activity limits and material restrictions of Section IV; and, for a <i>package</i> containing <i>fissile material</i> and transported by air, the requirement of para. 680. Changes in the <i>design</i> of the <i>packaging</i> or in the nature or quantity of the authorized <i>radioactive contents</i> which, as determined by the <i>competent authority</i>, would significantly affect safety shall require that this Edition of these Regulations be met in full. All <i>packagings</i> for which manufacture begins after 31 December 2006 shall meet this Edition of the Regulations in full.</p>	<p><del>817. <i>Packagings</i> manufactured to a <i>package design</i> approved by the <i>competent authority</i> under the provisions of the 1985 or 1985 (As Amended 1990) Editions of these Regulations may continue to be used, subject to: <i>multilateral approval of package design</i>, the mandatory programme of <i>quality assurance</i> in accordance with the requirements of para. 306; the activity limits and material restrictions of Section IV; and, for a <i>package</i> containing <i>fissile material</i> and transported by air, the requirement of para. 680. Changes in the <i>design</i> of the <i>packaging</i> or in the nature or quantity of the authorized <i>radioactive contents</i> which, as determined by the <i>competent authority</i>, would significantly affect safety shall require that this Edition of these Regulations be met in full. All <i>packagings</i> for which manufacture begins after 31 December 2006 shall meet this Edition of the Regulations in full.</del></p>	
	<p><b><u>Packages excepted from the requirements for fissile materials under the 2009 Edition of these Regulations</u></b></p>	
	<p><u>822. Packages containing fissile material that are excepted from classification as FISSILE according to para. 417(a)(i) or (iii) of the 2009 Edition of these Regulations prepared for transport before 31 December 2014 may continue in transport and may continue to be classified as non-fissile or fissile-excepted except that the <i>consignment</i> limits in Table 4 of the 2009 Edition of these Regulations shall apply to the <i>conveyance</i>. The <i>consignment</i> shall be transported under <i>exclusive use</i>.</u></p>	
<p><b>Special form <i>radioactive material</i> approved under the 1973, 1973 (As Amended), 1985 and 1985 (As Amended 1990) Editions of these Regulations</b></p>	<p><b>Special form radioactive material approved under the 1973, 1973 (As Amended), 1985 and 1985 (As Amended 1990) Editions of these Regulations</b></p>	
<p>818. Special form <i>radioactive material</i> manufactured to a <i>design</i> which had received <i>unilateral approval</i> by the <i>competent authority</i> under the 1973, 1973 (As Amended), 1985 or 1985 (As Amended 1990) Editions of these Regulations may continue to be used when in compliance with the mandatory programme of <i>quality assurance</i> in accordance with the applicable requirements of para. 306. All <i>special form radioactive material</i> manufactured after 31 December 2003 shall meet this Edition of these Regulations in full.</p>	<p><del>818</del> 823. Special form <i>radioactive material</i> manufactured to a <i>design</i> <del>which</del> <u>that</u> had received <i>unilateral approval</i> by the <i>competent authority</i> under the 1973, 1973 (As Amended), 1985 or 1985 (As Amended 1990) Editions of these Regulations may continue to be used when in compliance with the mandatory <del>programme of <i>quality assurance</i></del> <u>management system</u> in accordance with the applicable requirements of para. 306. <del>All special form radioactive material manufactured after 31</del></p>	



	<del>December 2003 shall meet this Edition of these Regulations in full. No</del> <u>new manufacture of such special form radioactive material shall be permitted to commence.</u>	
NOTIFICATION AND REGISTRATION OF SERIAL NUMBERS	NOTIFICATION AND REGISTRATION OF SERIAL NUMBERS	
819. The <i>competent authority</i> shall be informed of the serial number of each <i>packaging</i> manufactured to a <i>design</i> approved under paras 806, 809, 812, 816 and 817.	<del>819</del> <u>824</u> . The <i>competent authority</i> shall be informed of the serial number of each <i>packaging</i> manufactured to a <i>design</i> approved under paras <del>806, 809, 812 and 816 and 817</del> <u>808, 811, 814 and 820</u> .	
APPROVAL OF SHIPMENTS	APPROVAL OF SHIPMENTS	
820. <i>Multilateral approval</i> shall be required for:  (a) The <i>shipment</i> of <i>Type B(M) packages</i> not conforming with the requirements of para. 637 or designed to allow controlled intermittent venting;  (b) The <i>shipment</i> of <i>Type B(M) packages</i> containing <i>radioactive material</i> with an activity greater than 3000A <sub>1</sub> or 3000A <sub>2</sub> , as appropriate, or 1000 TBq, whichever is the lower;  (c) The <i>shipment</i> of <i>packages</i> containing <i>fissile materials</i> if the sum of the <i>CSIs</i> of the <i>packages</i> in a single <i>freight container</i> or in a single <i>conveyance</i> exceeds 50. Excluded from this requirement shall be shipments by seagoing <i>vessels</i> , if the sum of the <i>CSIs</i> does not exceed 50 for any hold, compartment or <i>defined deck area</i> and the distance of 6 m between groups of <i>packages</i> or <i>overpacks</i> as required in Table 12 is met; and  (d) <i>Radiation protection programmes</i> for shipments by special use <i>vessels</i> according to para. 572(a).	<del>820</del> <u>825</u> . <i>Multilateral approval</i> shall be required for:  (a) The <i>shipment</i> of <i>Type B(M) packages</i> not conforming with the requirements of para. <del>637</del> <u>639</u> or designed to allow controlled intermittent venting;  (b) The <i>shipment</i> of <i>Type B(M) packages</i> containing <i>radioactive material</i> with an activity greater than 3000A <sub>1</sub> or 3000A <sub>2</sub> , as appropriate, or 1000 TBq, whichever is the lower;  (c) The <i>shipment</i> of <i>packages</i> containing <i>fissile materials</i> if the sum of the <i>CSIs</i> of the <i>packages</i> in a single <i>freight container</i> or in a single <i>conveyance</i> exceeds 50. Excluded from this requirement shall be <i>shipments</i> by seagoing <i>vessels</i> , if the sum of the <i>CSIs</i> does not exceed 50 for any hold, compartment or <i>defined deck area</i> and the distance of 6 m between groups of <i>packages</i> or <i>overpacks</i> as required in Table <del>12</del> <u>11</u> is met; <del>and</del>  (d) <i>Radiation protection programmes</i> for shipments by special use <i>vessels</i> <del>according to</del> <u>in accordance with</u> para. <del>572</del> <u>576</u> (a).	
821. A <i>competent authority</i> may authorize transport into or through its country without <i>shipment</i> approval, by a specific provision in its <i>design</i> approval (see para. 827).	<del>821</del> <u>826</u> . A <i>competent authority</i> may authorize transport <u>through or into</u> its country without <i>shipment</i> approval, by a specific provision in its <i>design</i> approval <del>(see para. 827)</del> .	



<p>822. An application for <i>shipment</i> approval shall include:</p> <p>(a) The period of time, related to the <i>shipment</i>, for which the approval is sought;</p> <p>(b) The actual radioactive contents, the expected modes of transport, the type of <i>conveyance</i> and the probable or proposed route; and</p> <p>(c) The details of how the precautions and administrative or operational controls, referred to in the <i>package design</i> approval certificates issued under paras 808, 811 and 814, are to be put into effect.</p>	<p><del>822</del> 827. An application for <u>approval of shipment approval</u> shall include:</p> <p>(a) The period of time, related to the <i>shipment</i>, for which the approval is sought;</p> <p>(b) The actual <i>radioactive contents</i>, the expected modes of transport, the type of <i>conveyance</i> and the probable or proposed route; <del>and</del></p> <p>(c) The details of how the precautions and administrative or operational controls, referred to in the <u>certificate of approval for the package design approval certificates, if applicable</u>, issued under paras <del>808, 811 and 814</del> <u>810, 813 and 816</u>, are to be put into effect.</p>	
<p>823. Upon approval of the <i>shipment</i>, the <i>competent authority</i> shall issue an approval certificate.</p>	<p><del>823</del> 828. Upon approval of the <i>shipment</i>, the <i>competent authority</i> shall issue <del>an approval</del> certificate <u>of approval</u>.</p>	
<p>APPROVAL OF SHIPMENTS UNDER SPECIAL ARRANGEMENT</p>	<p>APPROVAL <del>OF</del> <u>FOR</u> SHIPMENTS UNDER SPECIAL ARRANGEMENT</p>	
<p>824. Each <i>consignment</i> transported under <i>special arrangement</i> shall require <i>multilateral approval</i>.</p>	<p><del>824</del> 829. Each <i>consignment</i> transported under <i>special arrangement</i> shall require <i>multilateral approval</i>.</p>	
<p>825. An application for approval of shipments under <i>special arrangement</i> shall include all the information necessary to satisfy the <i>competent authority</i> that the overall level of safety in transport is at least equivalent to that which would be provided if all the applicable requirements of these Regulations had been met. The application shall also include:</p> <p>(a) A statement of the respects in which, and of the reasons why, the shipment cannot be made in full accordance with the applicable requirements; and</p> <p>(b) A statement of any special precautions or special administrative or operational controls which are to be employed during transport to compensate for the failure to meet the applicable requirements.</p>	<p><del>825</del> 830. An application for approval of <i>shipments</i> under <i>special arrangement</i> shall include all the information necessary to satisfy the <i>competent authority</i> that the overall level of safety in transport is at least equivalent to that <del>which</del> <u>that</u> would be provided if all the applicable requirements of these Regulations had been met. The application shall also include:</p> <p>(a) A statement of the respects in which, and of the reasons why, the <i>shipment</i> cannot be made in full accordance with the applicable requirements; <del>and</del></p> <p>(b) A statement of any special precautions or special administrative or operational controls <del>which</del> <u>that</u> are to be employed during transport to compensate for the failure to meet the applicable requirements.</p>	

826. Upon approval of shipments under <i>special arrangement</i> , the competent authority shall issue an approval certificate.	<del>826</del> <u>831</u> . Upon approval of <i>shipments</i> under <i>special arrangement</i> , the competent authority shall issue an approval <u>a</u> certificate <u>of approval</u> .	
COMPETENT AUTHORITY APPROVAL CERTIFICATES	COMPETENT AUTHORITY <del>APPROVAL</del> CERTIFICATES <u>OF APPROVAL</u>	
827. Five types of approval certificates may be issued for: (i) <i>special form radioactive material</i> , (ii) <i>low dispersible radioactive material</i> , (iii) <i>special arrangement</i> , (iv) <i>shipment</i> and (v) <i>package design</i> . The <i>package design</i> and <i>shipment approval</i> certificates may be combined into a single certificate..	<del>827. Five types of approval certificates may be issued for: (i) special form radioactive material, (ii) low dispersible radioactive material, (iii) special arrangement, (iv) shipment and (v) package design. The package design and shipment approval certificates may be combined into a single certificate.</del>	
<b>Competent authority identification marks</b>	<b>Competent authority identification marks</b>	
<p>828. Each approval certificate issued by a <i>competent authority</i> shall be assigned an identification mark. The mark shall be of the following generalized type:</p> <p>VRI/Number/Type Code</p> <p>(a) Except as provided in para. 829(b), VRI represents the international vehicle registration identification code of the country issuing the certificate.</p> <p>(b) The number shall be assigned by the <i>competent authority</i>, and shall be unique and specific with regard to the particular <i>design</i> or <i>shipment</i>. The <i>shipment</i> approval identification mark shall be clearly related to the <i>design</i> approval identification mark.</p> <p>(c) The following type codes shall be used in the order listed to indicate the types of approval certificates issued:</p> <p>AF     <i>Type A package design for fissile material</i></p> <p>B(U)   <i>Type B(U) package design (B(U)F if for fissile material)</i></p>	<p><del>828</del> <u>832</u>. Each <del>approval</del> certificate <u>of approval</u> issued by a <i>competent authority</i> shall be assigned an identification mark. The mark shall be of the following generalized type:</p> <p>VRI/Number/Type Code</p> <p>(a) Except as provided in para. <del>829</del> <u>833</u>(b), VRI represents the international vehicle registration identification code of the country issuing the certificate<del>;</del>.</p> <p>(b) The number shall be assigned by the <i>competent authority</i> and shall be unique and specific with regard to the particular design, shipment <u>or alternative activity limit for exempt consignment</u>. The <del>shipment approval</del> identification mark <u>of the approval of shipment</u> shall be clearly related to the <del>design approval</del> identification mark <u>of the approval of design</u>.</p> <p>(c) The following type codes shall be used in the order listed to indicate the types of <del>approval</del> <u>certificate of approval</u> issued:</p> <p>AF     <i>Type A package design for fissile material</i></p>	

<p>B(M) <i>Type B(M) package design (B(M)F if for fissile material)</i></p> <p>C <i>Type C package design (CF if for fissile material)</i></p> <p>IF <i>Industrial package design for fissile material</i></p> <p>S <i>Special form radioactive material</i></p> <p>LD <i>Low dispersible radioactive material</i></p> <p>T <i>Shipment</i></p> <p>X <i>Special arrangement</i></p> <p>In the case of <i>package designs</i> for non-fissile or fissile excepted uranium hexafluoride, where none of the above codes apply, the following type codes shall be used:</p> <p>H(U) <i>unilateral approval</i></p> <p>H(M) <i>Multilateral approval.</i></p> <p>(d) For <i>package design and special form radioactive material approval certificates</i>, other than those issued under the provisions</p>	<p>B(U) <i>Type B(U) package design (B(U)F if for fissile material)</i></p> <p>B(M) <i>Type B(M) package design (B(M)F if for fissile material )</i></p> <p>C <i>Type C package design (CF if for fissile material)</i></p> <p>IF <i>Industrial package design for fissile material</i></p> <p>S <i>Special form radioactive material</i></p> <p>LD <i>Low dispersible radioactive material</i></p> <p><a href="#">FE</a> <a href="#">Fissile material complying with the requirements of para. 606</a></p> <p>T <i>Shipment</i></p> <p>X <i>Special arrangement</i></p> <p><a href="#">AL</a> <a href="#">Alternative activity limits for an exempt consignment of instruments or articles</a></p> <p>In the case of <i>package designs</i> for non-fissile or fissile excepted uranium hexafluoride, where none of the above codes apply, the following type codes shall be used:</p> <p>H(U) <i>Unilateral approval</i></p> <p>H(M) <i>Multilateral approval.</i></p> <p>(d) For <a href="#">certificates of approval of package design</a> and <i>special form radioactive material approval certificates</i>, other than those issued under the provisions of paras <del>816-818</del> <a href="#">820-823</a>, and for <a href="#">certificates of approval of low dispersible radioactive material approval certificates</a>, the symbol “-96” shall be added to the type code.</p>	
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<p>of paras 816-818, and for <i>low dispersible radioactive material</i> approval certificates, the symbols “-96” shall be added to the type code.</p>		
<p>829. These type codes shall be applied as follows:</p> <p>(a) Each certificate and each <i>package</i> shall bear the appropriate identification mark, comprising the symbols prescribed in paras 828(a)-(d), except that, for <i>packages</i>, only the applicable <i>design</i> type codes including, if applicable, the symbol ‘-96’ shall appear following the second stroke, that is, the “T” or “X” shall not appear in the identification marking on the <i>package</i>. Where the <i>design</i> approval and <i>shipment</i> approval are combined, the applicable type codes do not need to be repeated. For example:</p> <p>A/132/B(M)F-96: A <i>Type B(M) package design</i> approved for <i>fissile material</i>, requiring <i>multilateral approval</i>, for which the <i>competent authority</i> of Austria has assigned the <i>design</i> number 132 (to be marked both on the <i>package</i> and on the <i>package design approval certificate</i>);</p> <p>A/132/B(M)F-96T: The <i>shipment</i> approval issued for a <i>package</i> bearing the identification mark elaborated above (to be marked on the certificate only);</p> <p>A/137/X: A <i>special arrangement</i> approval issued by the <i>competent authority</i> of Austria, to which the number 137 has been assigned (to be marked on the certificate only);</p> <p>A/139/IF-96: An <i>industrial package design</i> for <i>fissile material</i> approved by the <i>competent authority</i> of Austria, to which <i>package design</i> number 139 has been assigned (to be marked both on the <i>package</i> and on the</p>	<p><del>829</del> 833. These <del>type codes</del> <u>identification marks</u> shall be applied as follows:</p> <p>(a) Each certificate and each <i>package</i> shall bear the appropriate identification mark, comprising the symbols prescribed in paras <del>828</del> 832(a)-(d), except that, for <i>packages</i>, only the applicable <i>design</i> type codes including, if applicable, the symbol ‘-96’ shall appear following the second stroke, that is, the “T” or “X” shall not appear in the identification marking on the <i>package</i>. Where the <u>approval of design approval</u> and the <u>approval of shipment approval</u> are combined, the applicable type codes do not need to be repeated. For example:</p> <p>A/132/B(M)F-96: A <i>Type B(M) package design</i> approved for <i>fissile material</i>, requiring <i>multilateral approval</i>, for which the <i>competent authority</i> of Austria has assigned the <i>design</i> number 132 (to be marked both on the <i>package</i> and on the <u>certificate of approval for the package design approval certificate</u>);</p> <p>A/132/B(M)F-96T: The <u>approval of shipment approval</u> issued for a <i>package</i> bearing the identification mark elaborated above (to be marked on the certificate only);</p> <p>A/137/X: An <u>approval of special arrangement approval</u> issued by the <i>competent authority</i> of Austria, to which the number 137 has been assigned (to be marked on the certificate only);</p>	

<p><i>package design</i> approval certificate); and</p> <p>A/145/H(U)-96: A <i>package design</i> for fissile excepted uranium hexafluoride approved by the <i>competent authority</i> of Austria, to which <i>package design</i> number 145 has been assigned (to be marked both on the <i>package</i> and on the <i>package design</i> approval certificate).</p> <p>(b) Where <i>multilateral approval</i> is effected by validation according to para. 834, only the identification mark issued by the country of origin of the <i>design</i> or <i>shipment</i> shall be used. Where <i>multilateral approval</i> is effected by issue of certificates by successive countries, each certificate shall bear the appropriate identification mark, and the <i>package</i> whose <i>design</i> was so approved shall bear all appropriate identification marks.</p> <p>For example:</p> <p>A/132/B(M)F-96</p> <p>CH/28/B(M)F-96</p> <p>would be the identification mark of a <i>package</i> which was originally approved by Austria and was subsequently approved, by separate certificate, by Switzerland. Additional identification marks would be tabulated in a similar manner on the <i>package</i>.</p> <p>(c) The revision of a certificate shall be indicated by a parenthetical expression following the identification mark on the certificate. For example, A/132/B(M)F-96(Rev.2) would indicate revision 2 of the Austrian <i>package design</i> approval certificate; or A/132/B(M)F-96(Rev.0) would indicate the original issuance of the Austrian <i>package design</i> approval certificate. For original issuances, the parenthetical entry is optional and other words such as “original issuance” may also be used in place of “Rev.0”. Certificate revision numbers may only be issued by the country issuing the</p>	<p>A/139/IF-96: An <i>industrial package design</i> for fissile material approved by the <i>competent authority</i> of Austria, to which <i>package design</i> number 139 has been assigned (to be marked both on the <i>package</i> and on the <a href="#">certificate of approval for the package design approval certificate</a>); and</p> <p>A/145/H(U)-96: A <i>package design</i> for fissile excepted uranium hexafluoride approved by the <i>competent authority</i> of Austria, to which <i>package design</i> number 145 has been assigned (to be marked both on the <i>package</i> and on the <a href="#">certificate of approval for the package design approval certificate</a>).</p> <p>(b) Where <i>multilateral approval</i> is effected by validation <del>according to</del> <a href="#">in accordance with</a> para. <del>834</del> <a href="#">840</a>, only the identification mark issued by the country of origin of the <i>design</i> or <i>shipment</i> shall be used. Where <i>multilateral approval</i> is effected by issue of certificates by successive countries, each certificate shall bear the appropriate identification mark, and the <i>package</i> whose <i>design</i> was so approved shall bear all appropriate identification marks.</p> <p>For example:</p> <p>A/132/B(M)F-96</p> <p>CH/28/B(M)F-96</p> <p>would be the identification mark of a <i>package</i> <del>which</del> <a href="#">that</a> was originally approved by Austria and was subsequently approved, by separate certificate, by Switzerland. Additional identification marks would be tabulated in a similar manner on the <i>package</i>.</p> <p>(c) The revision of a certificate shall be indicated by a parenthetical expression following the identification mark on the certificate. For</p>	
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<p>original approval certificate.</p> <p>(d) Additional symbols (as may be necessitated by national requirements) may be added in brackets to the end of the identification mark, for example, A/132/B(M)F-96(SP503).</p> <p>(e) It is not necessary to alter the identification mark on the <i>packaging</i> each time that a revision to the <i>design</i> certificate is made. Such re-marking shall be required only in those cases where the revision to the <i>package design</i> certificate involves a change in the letter type codes for the <i>package design</i> following the second stroke.</p>	<p>example, A/132/B(M)F-96(Rev.2) would indicate revision 2 of the Austrian <del>certificate</del> <u>certificate of approval for the package design approval</u>; or A/132/B(M)F-96(Rev.0) would indicate the original issuance of the Austrian <del>certificate</del> <u>certificate of approval for the package design approval</u>. For original issuances, the parenthetical entry is optional and other words such as “original issuance” may also be used in place of “Rev.0”. Certificate revision numbers may only be issued by the country issuing the original <del>approval</del> <u>certificate of approval</u>.</p> <p>(d) Additional symbols (as may be necessitated by national requirements) may be added in brackets to the end of the identification mark, for example, A/132/B(M)F-96(SP503).</p> <p>(e) It is not necessary to alter the identification mark on the <i>packaging</i> each time that a revision to the <i>design</i> certificate is made. Such re-marking shall be required only in those cases where the revision to the <i>package design</i> certificate involves a change in the letter type codes for the <i>package design</i> following the second stroke.</p>	
<p>CONTENTS OF APPROVAL CERTIFICATES</p>	<p>CONTENTS OF <del>APPROVAL</del> CERTIFICATES <u>OF APPROVAL</u></p>	
<p><b>Special form radioactive material and low dispersible radioactive material approval certificates</b></p>	<p><u>Certificates of approval of special form radioactive material and of low dispersible radioactive material approval certificates</u></p>	
<p>830. Each approval certificate issued by a <i>competent authority</i> for <i>special form radioactive material</i> or <i>low dispersible radioactive material</i> shall include the following information:</p> <p>(a) Type of certificate;</p> <p>(b) The <i>competent authority</i> identification mark;</p> <p>(c) The issue date and an expiry date;</p> <p>(d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the <i>special form radioactive</i></p>	<p><del>830</del> <u>834</u>. Each <del>approval</del> <u>of approval</u> certificate issued by a <i>competent authority</i> for <i>special form radioactive material</i> or <i>low dispersible radioactive material</i> shall include the following information:</p> <p>(a) Type of certificate;</p> <p>(b) The <i>competent authority</i> identification mark;</p> <p>(c) The issue date and an expiry date;</p> <p>(d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the <i>special form radioactive</i></p>	



<p><i>material or low dispersible radioactive material is approved;</i></p> <p>(e) The identification of the <i>special form radioactive material or low dispersible radioactive material</i>;</p> <p>(f) A description of the <i>special form radioactive material or low dispersible radioactive material</i>;</p> <p>(g) <i>Design specifications for the special form radioactive material or low dispersible radioactive material</i>, which may include references to drawings;</p> <p>(h) A specification of the <i>radioactive contents</i> which includes the activities involved and which may include the physical and chemical forms;</p> <p>(i) A specification of the applicable <i>quality assurance</i> programme as required in para. 306;</p> <p>(j) Reference to information provided by the applicant relating to specific actions to be taken prior to <i>shipment</i>;</p> <p>(k) If deemed appropriate by the <i>competent authority</i>, reference to the identity of the applicant;</p> <p>(l) Signature and identification of the certifying official.</p>	<p><i>material or low dispersible radioactive material is approved;</i></p> <p>(e) The identification of the <i>special form radioactive material or low dispersible radioactive material</i>;</p> <p>(f) A description of the <i>special form radioactive material or low dispersible radioactive material</i>;</p> <p>(g) <i>Design specifications for the special form radioactive material or low dispersible radioactive material</i>, which may include references to drawings;</p> <p>(h) A specification of the <i>radioactive contents</i> <del>which</del> <u>that</u> includes the activities involved and which may include the physical and chemical forms;</p> <p>(i) A specification of the applicable <del>quality assurance programme</del> <u>management system</u> as required in para. 306;</p> <p>(j) Reference to information provided by the applicant relating to specific actions to be taken prior to <i>shipment</i>;</p> <p>(k) If deemed appropriate by the <i>competent authority</i>, reference to the identity of the applicant;</p> <p>(l) Signature and identification of the certifying official.</p>	
Not in TS-R-1 (2009).	<u>Certificates of approval for material excepted from fissile classification</u>	
Not in TS-R-1 (2009).	<p><u>835. Each certificate of approval issued by a <i>competent authority</i> for material excepted from classification as FISSILE shall include the following information:</u></p> <p><u>(a) Type of certificate;</u></p> <p><u>(b) The <i>competent authority</i> identification mark;</u></p> <p><u>(c) The issue date and an expiry date;</u></p>	.



	<p>(d) <u>List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the exception is approved;</u></p> <p>(e) <u>A description of the excepted material;</u></p> <p>(f) <u>Limiting specifications for the excepted material;</u></p> <p>(g) <u>A specification of the applicable <i>management system</i> as required in para. 306;</u></p> <p>(h) <u>Reference to information provided by the applicant relating to specific actions to be taken prior to <i>shipment</i>;</u></p> <p>(i) <u>If deemed appropriate by the <i>competent authority</i>, reference to the identity of the applicant;</u></p> <p>(j) <u>Signature and identification of the certifying official;</u></p> <p>(k) <u>Reference to documentation that demonstrates compliance with para. 606.</u></p>	
<b>Special arrangement approval certificates</b>	<b><u>Certificates of approval of special arrangement approval certificates</u></b>	
<p>831. Each approval certificate issued by a <i>competent authority</i> for a <i>special arrangement</i> shall include the following information:</p> <p>(a) Type of certificate.</p> <p>(b) The <i>competent authority</i> identification mark.</p> <p>(c) The issue date and an expiry date.</p> <p>(d) Mode(s) of transport.</p> <p>(e) Any restrictions on the modes of transport, type of <i>conveyance</i>, <i>freight container</i>, and any necessary routeing instructions.</p> <p>(f) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of</p>	<p><del>831</del> 836. Each <del>approval</del> certificate <u>of approval</u> issued by a <i>competent authority</i> for a <i>special arrangement</i> shall include the following information:</p> <p>(a) Type of certificate<del>;</del><u>;</u></p> <p>(b) The <i>competent authority</i> identification mark<del>;</del><u>;</u></p> <p>(c) The issue date and an expiry date<del>;</del><u>;</u></p> <p>(d) Mode(s) of transport<del>;</del><u>;</u></p> <p>(e) Any restrictions on the modes of transport, type of <i>conveyance</i>, <i>freight container</i>, and any necessary routeing instructions<del>;</del><u>;</u></p> <p>(f) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the <i>special arrangement</i> is approved<del>;</del><u>;</u></p> <p>(g) The following statement: “This certificate does not relieve the</p>	

<p>Radioactive Material under which the <i>special arrangement</i> is approved.</p> <p>(g) The following statement: “This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.”</p> <p>(h) References to certificates for alternative radioactive contents, other <i>competent authority</i> validation, or additional technical data or information, as deemed appropriate by the <i>competent authority</i>.</p> <p>(i) Description of the <i>packaging</i> by reference to the drawings or a specification of the <i>design</i>. If deemed appropriate by the <i>competent authority</i>, a reproducible illustration not larger than 21 cm × 30 cm, showing the make-up of the <i>package</i>, should also be provided, accompanied by a brief description of the <i>packaging</i>, including materials of manufacture, gross mass, general external dimensions and appearance.</p> <p>(j) A specification of the authorized radioactive contents, including any restrictions on the <i>radioactive contents</i> which might not be obvious from the nature of the <i>packaging</i>. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), mass in grams (for <i>fissile material</i> or for each <i>fissile nuclide</i> when appropriate) and whether <i>special form radioactive material</i> or <i>low dispersible radioactive material</i>, if applicable.</p> <p>(k) Additionally, for <i>packages</i> containing <i>fissile material</i>:</p> <p>(i) A detailed description of the authorized radioactive contents;</p> <p>(ii) The value of the <i>CSI</i>;</p> <p>(iii) Reference to the documentation that demonstrates the criticality safety of the contents;</p>	<p>consignor from compliance with any requirement of the government of any country through or into which the package will be transported.”</p> <p>(h) References to certificates for alternative <i>radioactive contents</i>, other <i>competent authority</i> validation, or additional technical data or information, as deemed appropriate by the <i>competent authority</i>.</p> <p>(i) Description of the <i>packaging</i> by reference to the drawings or a specification of the <i>design</i>. If deemed appropriate by the <i>competent authority</i>, a reproducible illustration not larger than 21 cm × 30 cm, showing the make-up of the <i>package</i>, should also be provided, accompanied by a brief description of the <i>packaging</i>, including materials of manufacture, gross mass, general external dimensions and appearance.</p> <p>(j) A specification of the authorized <i>radioactive contents</i>, including any restrictions on the <i>radioactive contents</i> <del>which</del> <u>that</u> might not be obvious from the nature of the <i>packaging</i>. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), mass in grams (for <i>fissile material</i> or for each <i>fissile nuclide</i>, when appropriate) and whether <i>special form radioactive material</i>, <del>or</del> <i>low dispersible radioactive material</i> <u>or fissile material excepted under para. 417(f)</u>, if applicable.</p> <p>(k) Additionally, for <i>packages</i> containing <i>fissile material</i>:</p> <p>(i) A detailed description of the authorized <i>radioactive contents</i>;</p> <p>(ii) The value of the <i>CSI</i>;</p> <p>(iii) Reference to the documentation that demonstrates the criticality safety of the content;</p> <p>(iv) Any special features on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment;</p> <p>(v) Any allowance (based on para. <del>674</del> <u>677</u>(b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience; <del>and</del></p> <p>(vi) The ambient temperature range for which the <i>special arrangement</i> has been approved.</p> <p>(l) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling</p>	
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<p>(iv) Any special features on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment;</p> <p>(v) Any allowance (based on para. 674(b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience; and</p> <p>(vi) The ambient temperature range for which the <i>special arrangement</i> has been approved.</p> <p>(l) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the <i>consignment</i>, including any special stowage provisions for the safe dissipation of heat.</p> <p>(m) If deemed appropriate by the <i>competent authority</i>, reasons for the <i>special arrangement</i>.</p> <p>(n) Description of the compensatory measures to be applied as a result of the <i>shipment</i> being under <i>special arrangement</i>.</p> <p>(o) Reference to information provided by the applicant relating to the use of the <i>packaging</i> or specific actions to be taken prior to the <i>shipment</i>.</p> <p>(p) A statement regarding the ambient conditions assumed for purposes of <i>design</i> if these are not in accordance with those specified in paras 654, 655 and 664, as applicable.</p> <p>(q) Any emergency arrangements deemed necessary by the <i>competent authority</i>.</p> <p>(r) A specification of the applicable <i>quality assurance</i> programme as required in para. 306.</p>	<p>of the <i>consignment</i>, including any special stowage provisions for the safe dissipation of heat<sup>1</sup>.</p> <p>(m) If deemed appropriate by the <i>competent authority</i>, reasons for the <i>special arrangement</i><sup>1</sup>.</p> <p>(n) Description of the compensatory measures to be applied as a result of the <i>shipment</i> being under <i>special arrangement</i><sup>1</sup>.</p> <p>(o) Reference to information provided by the applicant relating to the use of the <i>packaging</i> or specific actions to be taken prior to the <i>shipment</i><sup>1</sup>.</p> <p>(p) A statement regarding the ambient conditions assumed for purposes of <i>design</i> if these are not in accordance with those specified in paras <del>654, 655 and 664</del> <a href="#">656, 657 and 666</a>, as applicable<sup>1</sup>.</p> <p>(q) Any emergency arrangements deemed necessary by the <i>competent authority</i><sup>1</sup>.</p> <p>(r) A specification of the applicable <del>quality assurance programme</del> <a href="#">management system</a> as required in para. 306<sup>1</sup>.</p> <p>(s) If deemed appropriate by the <i>competent authority</i>, reference to the identity of the applicant and to the identity of the <i>carrier</i><sup>1</sup>.</p> <p>(t) Signature and identification of the certifying official.</p>	
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<p>(s) If deemed appropriate by the <i>competent authority</i>, reference to the identity of the applicant and to the identity of the <i>carrier</i>.</p> <p>(t) Signature and identification of the certifying official.</p>		
<b>Shipment approval certificates</b>	<b><u>Certificates of shipment approval</u></b>	
<p>832. Each approval certificate for a <i>shipment</i> issued by a <i>competent authority</i> shall include the following information:</p> <p>(a) Type of certificate.</p> <p>(b) The <i>competent authority</i> identification mark(s).</p> <p>(c) The issue date and an expiry date.</p> <p>(d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the <i>shipment</i> is approved.</p> <p>(e) Any restrictions on the modes of transport, type of <i>conveyance</i>, <i>freight container</i>, and any necessary routeing instructions.</p> <p>(f) The following statement: “This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.”</p> <p>(g) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the <i>consignment</i>, including any special stowage provisions for the safe dissipation of heat or maintenance of criticality safety.</p> <p>(h) Reference to information provided by the applicant relating to specific actions to be taken prior to <i>shipment</i>.</p> <p>(i) Reference to the applicable <i>design</i> approval certificate(s).</p> <p>(j) A specification of the actual radioactive contents, including any</p>	<p><del>832</del> 837. Each <del>approval</del> certificate <u>of approval</u> for a <i>shipment</i> issued by a <i>competent authority</i> shall include the following information:</p> <p>(a) Type of certificate<del>;</del>.</p> <p>(b) The <i>competent authority</i> identification mark(s)<del>;</del>.</p> <p>(c) The issue date and an expiry date<del>;</del>.</p> <p>(d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the <i>shipment</i> is approved<del>;</del>.</p> <p>(e) Any restrictions on the modes of transport, type of <i>conveyance</i>, <i>freight container</i>, and any necessary routeing instructions<del>;</del>.</p> <p>(f) The following statement: “This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.”</p> <p>(g) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the <i>consignment</i>, including any special stowage provisions for the safe dissipation of heat or maintenance of criticality safety<del>;</del>.</p> <p>(h) Reference to information provided by the applicant relating to specific actions to be taken prior to <i>shipment</i><del>;</del>.</p> <p>(i) Reference to the applicable <u>certificate(s) of approval of design approval certificate(s)</u><del>;</del>.</p> <p>(j) A specification of the actual <i>radioactive contents</i>, including any restrictions on the <i>radioactive contents</i> <del>which</del> <u>that</u> might not be obvious from the nature of the <i>packaging</i>. This shall include the physical and chemical forms, the total activities involved (including those of the various isotopes, if appropriate), mass in grams (for <i>fissile material</i> or for each <i>fissile nuclide</i>, when appropriate), and whether <i>special form radioactive material</i>, <del>or</del> <u>low dispersible radioactive material or fissile material excepted under</u></p>	

<p>restrictions on the <i>radioactive contents</i> which might not be obvious from the nature of the <i>packaging</i>. This shall include the physical and chemical forms, the total activities involved (including those of the various isotopes, if appropriate), mass in grams (for <i>fissile material</i> or for each <i>fissile nuclide</i> when appropriate), and whether <i>special form radioactive material</i> or <i>low dispersible radioactive material</i>, if applicable.</p> <p>(k) Any emergency arrangements deemed necessary by the <i>competent authority</i>.</p> <p>(l) A specification of the applicable <i>quality assurance</i> programme as required in para. 306.</p> <p>(m) If deemed appropriate by the <i>competent authority</i>, reference to the identity of the applicant.</p> <p>(n) Signature and identification of the certifying official.</p>	<p><a href="#">para. 417(f)</a>, if applicable;</p> <p>(k) Any emergency arrangements deemed necessary by the <i>competent authority</i>;</p> <p>(l) A specification of the applicable <del><i>quality assurance programme</i></del> <a href="#">management system</a> as required in para. 306;</p> <p>(m) If deemed appropriate by the <i>competent authority</i>, reference to the identity of the applicant;</p> <p>(n) Signature and identification of the certifying official.</p>	
<p><b>Package design approval certificates</b></p>	<p><b><del>Certificates of approval of package design approval certificates</del></b></p>	
<p>833. Each approval certificate of the <i>design</i> of a <i>package</i> issued by a <i>competent authority</i> shall include the following information:</p> <p>(a) Type of certificate.</p> <p>(b) The <i>competent authority</i> identification mark.</p> <p>(c) The issue date and an expiry date.</p> <p>(d) Any restriction on the modes of transport, if appropriate.</p> <p>(e) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the <i>design</i> is approved.</p> <p>(f) The following statement: “This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.”</p>	<p><del>833</del> 838. Each <a href="#">certificate of approval</a> <del>certificate</del> of the <i>design</i> of a <i>package</i> issued by a <i>competent authority</i> shall include the following information:</p> <p>(a) Type of certificate;</p> <p>(b) The <i>competent authority</i> identification mark;</p> <p>(c) The issue date and an expiry date;</p> <p>(d) Any restriction on the modes of transport, if appropriate;</p> <p>(e) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the <i>design</i> is approved;</p> <p>(f) The following statement: “This certificate does not relieve the consignor from compliance with any requirement of the government of any country through or into which the package will be transported.”</p> <p>(g) References to certificates for alternative <i>radioactive contents</i>, other <i>competent authority</i> validation, or additional technical data or information, as deemed appropriate by the <i>competent authority</i>;</p>	



<p>(g) References to certificates for alternative radioactive contents, other <i>competent authority</i> validation, or additional technical data or information, as deemed appropriate by the <i>competent authority</i>.</p> <p>(h) A statement authorizing <i>shipment</i> where <i>shipment</i> approval is required under para. 820, if deemed appropriate.</p> <p>(i) Identification of the <i>packaging</i>.</p> <p>(j) Description of the <i>packaging</i> by reference to the drawings or specification of the <i>design</i>. If deemed appropriate by the <i>competent authority</i>, a reproducible illustration not larger than 21 cm × 30 cm, showing the make-up of the <i>package</i>, should also be provided, accompanied by a brief description of the <i>packaging</i>, including materials of manufacture, gross mass, general external dimensions and appearance.</p> <p>(k) Specification of the <i>design</i> by reference to the drawings.</p> <p>(l) A specification of the authorized radioactive contents, including any restrictions on the <i>radioactive contents</i> which might not be obvious from the nature of the <i>packaging</i>. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), mass in grams (for <i>fissile material</i> or for each <i>fissile nuclide</i> when appropriate), and whether <i>special form radioactive material</i> or <i>low dispersible radioactive material</i>, if applicable.</p> <p>(m) A description of the <i>containment system</i>.</p> <p>(n) Additionally, for <i>packages</i> containing <i>fissile material</i>:</p> <p>(i) A detailed description of the authorized radioactive contents;</p> <p>(ii) A description of the <i>confinement system</i>;</p>	<p>(h) A statement authorizing <i>shipment</i> where <u>approval of shipment</u> <del>approval</del> is required under para. <del>820</del> <u>825</u>, if deemed appropriate<del>;</del>.</p> <p>(i) Identification of the <i>packaging</i><del>;</del>.</p> <p>(j) Description of the <i>packaging</i> by reference to the drawings or specification of the <i>design</i>. If deemed appropriate by the <i>competent authority</i>, a reproducible illustration not larger than 21 cm × 30 cm, showing the make-up of the <i>package</i>, should also be provided, accompanied by a brief description of the <i>packaging</i>, including materials of manufacture, gross mass, general external dimensions and appearance<del>;</del>.</p> <p>(k) Specification of the <i>design</i> by reference to the drawings<del>;</del>.</p> <p>(l) A specification of the authorized <i>radioactive contents</i>, including any restrictions on the <i>radioactive contents</i> <del>which</del> <u>that</u> might not be obvious from the nature of the <i>packaging</i>. This shall include the physical and chemical forms, the activities involved (including those of the various isotopes, if appropriate), <u>the</u> mass in grams (for <i>fissile material</i> <u>the total mass of fissile nuclides</u> or <u>the mass</u> for each <i>fissile nuclide</i>, when appropriate)<del>;</del> and whether <i>special form radioactive material</i>, <del>or</del> <u>low dispersible radioactive material or fissile material excepted under para. 417(f)</u>, if applicable<del>;</del>.</p> <p>(m) A description of the <i>containment system</i><del>;</del>.</p> <p>(n) <del>Additionally, for</del> <u>For package designs</u> containing <i>fissile material</i> <u>that require multilateral approval of the package design in accordance with para. 814:</u></p> <p>(i) A detailed description of the authorized <i>radioactive contents</i>;</p> <p>(ii) A description of the <i>confinement system</i>;</p> <p>(iii) The value of the <i>CSI</i>;</p> <p>(iv) Reference to the documentation that demonstrates the criticality safety of the contents;</p> <p>(v) Any special features on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment;</p> <p>(vi) Any allowance (based on para. <del>674</del> <u>677(b)</u>) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience; <del>and</del></p> <p>(vii) The ambient temperature range for which the <i>package design</i> has been approved.</p>	
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<p>(iii) The value of the <i>CSI</i>;</p> <p>(iv) Reference to the documentation that demonstrates the criticality safety of the contents;</p> <p>(v) Any special features on the basis of which the absence of water from certain void spaces has been assumed in the criticality assessment;</p> <p>(vi) Any allowance (based on para. 674(b)) for a change in neutron multiplication assumed in the criticality assessment as a result of actual irradiation experience; and</p> <p>(vii) The ambient temperature range for which the <i>package design</i> has been approved.</p> <p>(o) For <i>Type B(M) packages</i>, a statement specifying those prescriptions of paras 637, 653–655 and 658–664 with which the <i>package</i> does not conform and any amplifying information which may be useful to other <i>competent authorities</i>.</p> <p>(p) For <i>packages</i> containing more than 0.1 kg of uranium hexafluoride, a statement specifying those prescriptions of para. 632 that apply, if any, and any amplifying information which may be useful to other <i>competent authorities</i>.</p> <p>(q) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the <i>consignment</i>, including any special stowage provisions for the safe dissipation of heat.</p> <p>(r) Reference to information provided by the applicant relating to the use of the <i>packaging</i> or to specific actions to be taken prior to <i>shipment</i>.</p> <p>(s) A statement regarding the ambient conditions assumed for purposes of <i>design</i> if these are not in accordance with those</p>	<p>(o) For <i>Type B(M) packages</i>, a statement specifying those prescriptions of paras <del>637, 653–655</del> <a href="#">639, 655–657</a> and <del>658–664</del> <a href="#">660–666</a> with which the <i>package</i> does not conform and any amplifying information <del>which</del> <a href="#">that</a> may be useful to other <i>competent authorities</i>;</p> <p>(p) For <i>packages</i> containing more than 0.1 kg of uranium hexafluoride, a statement specifying those prescriptions of para. <del>632</del> <a href="#">634</a> that apply, if any, and any amplifying information <del>which</del> <a href="#">that</a> may be useful to other <i>competent authorities</i>;</p> <p>(q) A detailed listing of any supplementary operational controls required for preparation, loading, carriage, unloading and handling of the <i>consignment</i>, including any special stowage provisions for the safe dissipation of heat;</p> <p>(r) Reference to information provided by the applicant relating to the use of the <i>packaging</i> or to specific actions to be taken prior to <i>shipment</i>;</p> <p>(s) A statement regarding the ambient conditions assumed for purposes of <i>design</i> if these are not in accordance with those specified in paras <del>654, 655 and 664</del> <a href="#">656, 657 and 666</a>, as applicable;</p> <p>(t) A specification of the applicable <del>quality assurance programme</del> <a href="#">management system</a> as required in para. 306;</p> <p>(u) Any emergency arrangements deemed necessary by the <i>competent authority</i>;</p> <p>(v) If deemed appropriate by the <i>competent authority</i>, reference to the identity of the applicant;</p> <p>(w) Signature and identification of the certifying official.</p>	
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<p>specified in paras 654, 655 and 664, as applicable.</p> <p>(t) A specification of the applicable quality assurance programme as required in para. 306.</p> <p>(u) Any emergency arrangements deemed necessary by the <i>competent authority</i>.</p> <p>(v) If deemed appropriate by the <i>competent authority</i>, reference to the identity of the applicant.</p> <p>(w) Signature and identification of the certifying official.</p>		
	<p><b><u>Certificates for alternative activity limits for an exempt consignment of instruments or articles</u></b></p>	
	<p><u>839. Each certificate issued by a <i>competent authority</i> for alternative activity limits for an exempt <i>consignment</i> of instruments or articles according to para. 818 shall include the following information:</u></p> <p><u>(a) Type of certificate</u></p> <p><u>(b) The <i>competent authority</i> identification mark.</u></p> <p><u>(c) The issue date and an expiry date.</u></p> <p><u>(d) List of applicable national and international regulations, including the edition of the IAEA Regulations for the Safe Transport of Radioactive Material under which the exemption is approved.</u></p> <p><u>(e) The identification of the instrument or article</u></p> <p><u>(f) A description of the instrument or article</u></p> <p><u>(g) <i>Design</i> specifications for the instrument or article</u></p>	

	<p><u>(h) A specification of the radionuclide(s), the approved alternative activity limit(s) for the exempt <i>consignment(s)</i> of the instrument(s) or article(s).</u></p> <p><u>(i) Reference to documentation that demonstrates compliance with para. 403(b).</u></p> <p><u>(j) If deemed appropriate by the <i>competent authority</i>, reference to the identity of the applicant.</u></p> <p><u>(k) Signature and identification of the certifying official.</u></p>	
VALIDATION OF CERTIFICATES	VALIDATION OF CERTIFICATES	
834. <i>Multilateral approval</i> may be by validation of the original certificate issued by the <i>competent authority</i> of the country of origin of the <i>design</i> or <i>shipment</i> . Such validation may take the form of an endorsement on the original certificate or the issuance of a separate endorsement, annex, supplement, etc., by the <i>competent authority</i> of the country <i>through or into</i> which the <i>shipment</i> is made.	<del>834</del> 840. <i>Multilateral approval</i> may be by validation of the original certificate issued by the <i>competent authority</i> of the country of origin of the <i>design</i> or <i>shipment</i> . Such validation may take the form of an endorsement on the original certificate or the issuance of a separate endorsement, annex, supplement, etc., by the <i>competent authority</i> of the country <i>through or into</i> which the <i>shipment</i> is made.	

## REFERENCES

2009 EDITION	20xx draft 2.53	Remarks
REFERENCES	REFERENCES	
References are to editions that are current as of the time of publication of these Regulations. Editions that supersede these may be adopted under national legislation.	References are to editions that are current as of the time of publication of these Regulations. Editions that supersede these may be adopted under national legislation.	All these references should be updated.
<p>[1] EUROPEAN ATOMIC ENERGY COMMUNITY, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, INTERNATIONAL MARITIME ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS ENVIRONMENT PROGRAMME, WORLD HEALTH ORGANIZATION, Fundamental Safety Principles, IAEA Safety Standards Series No. SF-1, IAEA, Vienna (2006).</p> <p>[2] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANISATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, WORLD HEALTH ORGANIZATION, International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No. 115, IAEA, Vienna (1996).</p> <p>[3] INTERNATIONAL ATOMIC ENERGY AGENCY, Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, IAEA Safety Standard Series No. TS-G-1.1 (Rev. 1), IAEA, Vienna (2008).</p> <p>[4] INTERNATIONAL ATOMIC ENERGY AGENCY, Planning and Preparing for Emergency Response to</p>	<p>[1] EUROPEAN ATOMIC ENERGY COMMUNITY, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, INTERNATIONAL MARITIME ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS ENVIRONMENT PROGRAMME, WORLD HEALTH ORGANIZATION, Fundamental Safety Principles, IAEA Safety Standards Series No. SF-1, IAEA, Vienna (2006).</p> <p>[2] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANISATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, WORLD HEALTH ORGANIZATION, International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No. 115, IAEA, Vienna (1996).</p> <p>[3] INTERNATIONAL ATOMIC ENERGY AGENCY, Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.1 (Rev. 1), IAEA, Vienna (2008).</p> <p>[4] INTERNATIONAL ATOMIC ENERGY AGENCY, Planning and Preparing for Emergency Response to</p>	

<p>Transport Accidents Involving Radioactive Material, IAEA Safety Standards Series No. TS-G-1.2 (ST-3), IAEA, Vienna (2002).</p> <p>[5] INTERNATIONAL ATOMIC ENERGY AGENCY, Compliance Assurance for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.5, IAEA, Vienna (2009).</p> <p>[6] INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.4, IAEA, Vienna (2008).</p> <p>[7] INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation Protection Programmes for the Transport of Radioactive Material, IAEA Safety Standards Series No TS-G-1.3, IAEA, Vienna (2007).</p> <p>[8] INTERNATIONAL MARITIME ORGANIZATION, International Maritime Dangerous Goods Code, IMDG-IMO, London (2006)</p> <p>[9] INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, Radiation Protection — Sealed Radioactive Sources — Leakage Test Methods (ISO 9978:1992(E)), ISO, Geneva (1992).</p> <p>[10] UNITED NATIONS, Recommendations on the Transport of Dangerous Goods, Fifteenth Revised Edition (ST/SG/AC.10/1/Rev. 15), UN, New York and Geneva (2007).</p> <p>[11] INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, Series 1 Freight Containers – Specifications and Testing – Part 1: General Cargo Containers for General Purposes, ISO 1496:1990(E), ISO, Geneva (1990); and subsequent Amendments 1:1993, 2:1998, 3:2005, 4:2006 and 5:2006.</p> <p>[12] INTERNATIONAL ORGANIZATION FOR</p>	<p>Transport Accidents Involving Radioactive Material, IAEA Safety Standards Series No. TS-G-1.2 (ST-3), IAEA, Vienna (2002).</p> <p>[5] INTERNATIONAL ATOMIC ENERGY AGENCY, Compliance Assurance for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.5, IAEA, Vienna (2009).</p> <p>[6] INTERNATIONAL ATOMIC ENERGY AGENCY, The Management System for the Safe Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.4, IAEA, Vienna (2008).</p> <p>[7] INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation Protection Programmes for the Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.3, IAEA, Vienna (2007).</p> <p>[8] INTERNATIONAL MARITIME ORGANIZATION, International Maritime Dangerous Goods Code, IMDG-IMO, London (2006).</p> <p>[9] INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, Radiation Protection — Sealed Radioactive Sources — Leakage Test Methods (ISO 9978:1992(E)), ISO, Geneva (1992).</p> <p>[10] UNITED NATIONS, Recommendations on the Transport of Dangerous Goods, Fifteenth Revised Edition (ST/SG/AC.10/1/Rev.15), UN, New York and Geneva (2007).</p> <p>[11] INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, Series 1 Freight Containers – Specifications and Testing – Part 1: General Cargo Containers for General Purposes, ISO 1496:1990(E), ISO, Geneva (1990); and subsequent Amendments 1:1993, 2:1998, 3:2005, 4:2006 and 5:2006.</p> <p>[12] INTERNATIONAL ORGANIZATION FOR</p>	
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<p>STANDARDIZATION, Nuclear Energy - Packaging of Uranium Hexafluoride (UF<sub>6</sub>) for Transport, ISO 7195: 2005 (E), ISO, Geneva (2005).</p> <p>[13] INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, Radiation Protection — Sealed Radioactive Sources — General Requirements and Classification, ISO 2919: 1999 (E), ISO, Geneva (1999).</p>	<p>STANDARDIZATION, Nuclear Energy — Packaging of Uranium Hexafluoride (UF<sub>6</sub>) for Transport, ISO 7195:2005(E), ISO, Geneva (2005).</p> <p>[13] INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, Radiation Protection — Sealed Radioactive Sources — General Requirements and Classification, ISO 2919:1999(E), ISO, Geneva (1999).</p>	

## Annexes

2009 EDITION	20xx draft 2.53	Remarks
<b>Annex I</b>		
<b>SUMMARY OF APPROVAL AND PRIOR NOTIFICATION REQUIREMENTS</b>		
<p>This summary reflects the contents of the Regulations for the Safe Transport of Radioactive Material (<del>2009</del> 2012 Edition). The user's attention is called to the fact that there may be deviations (exceptions, additions, etc.) relative to:</p> <p>(a) National regulations relating to safety;</p> <p>(b) <i>Carrier</i> restrictions; and</p> <p>(c) National regulations relating to security, physical protection, liability, insurance, pre-notification and/or routeing and import/export/transit licensing.<sup>1</sup></p> <p><sup>1</sup> In particular, additional measures are taken to provide appropriate physical protection in the transport of nuclear material and to prevent acts without lawful authority which constitute the receipt, possession, use, transfer, alteration, disposal or dispersal of nuclear material and which cause or are likely to cause death or serious injury to any person or substantial damage to property (see Refs I-1 to I-6).</p>		

<b>ANNEX I: SUMMARY OF APPROVAL AND PRIOR NOTIFICATION REQUIREMENTS (Part 1)</b>				
Key paragraphs in the Regulations	Class of <i>package</i> or material	Competent authority approval required		Consignor required to notify country of origin and countries en route <sup>a</sup> of each <i>shipment</i>
		Country of origin	Countries en route <sup>a</sup>	
	<del>Excepted package<sup>b</sup> by domestic post</del>	<del>No</del>	<del>Not applicable</del>	<del>No</del>
	<del>Excepted package<sup>b</sup> by international post</del>	<del>Yes, of consignor</del>	<del>No</del>	<del>No</del>
	<del>Package design</del>	<del>No</del>	<del>No</del>	<del>No</del>
	<del>Shipment</del>	<del>No</del>	<del>No</del>	<del>No</del>

<del>577</del> <del>Consignor</del>	<del>Yes</del>	<del>Not applicable</del>	<del>No</del>
<del>Excepted package</del> <sup>b, d, e</sup> <del>other than by post</del>	No	No	No
<del>LSA material</del> <sup>b, c, e</sup> and SCO <del>c, e</del>  – Type IP-1,  – Type IP-2 or  – Type IP-3	No	No	No
Type A <sup>b, c, e</sup>	No	No	No
<p><sup>a</sup> Countries <i>through or into</i> which (but not over which) the <i>consignment</i> is transported (see para. 204 of the Regulations).</p> <p><sup>b</sup> If the <i>radioactive contents</i> are uranium hexafluoride in quantities of 0.1 kg or more, the approval requirements for <i>packages</i> containing it shall additionally apply (see paras 802 and 807 of the Regulations).</p> <p><sup>c</sup> If the <i>radioactive contents</i> are <i>fissile material</i> <del>which</del> <u>that</u> is not excepted from the requirements for <i>packages</i> containing <i>fissile material</i>, then the approval requirements in paras <del>812</del> 814 and <del>820</del> <u>825</u> of the Regulations shall additionally apply.</p> <p><sup>d</sup> <u>For international transport by post the <i>consignment</i> shall be deposited with the postal service only by consignors authorized by the national authority.</u></p> <p><sup>e</sup> <u>If the <i>radioactive contents</i> are <i>fissile material</i> excepted under para. 417(f) of the Regulations, <i>multilateral approval</i> shall be required (see para. 805 of the Regulations).</u></p>			
ANNEX I: SUMMARY OF APPROVAL AND PRIOR NOTIFICATION REQUIREMENTS (Part 2)			
Key paragraphs in the Regulations	Class of <i>package</i> or material	Competent authority approval required  Country of origin	Consignor required to notify country of origin and countries en route <sup>a</sup> of each <i>shipment</i>
<del>806, 820</del> <u>808</u>	Type B(U) <sup>b, c, e</sup> – Package design		



<del>554, 555</del> <a href="#">557, 558, 825</a>	– Shipment	Yes	No <sup>d</sup>	
		No	No	(see Note 1 and 2)
<del>809, 820</del> <a href="#">811</a>	Type B(M) <sup>b, c, e</sup> – Package design			
<del>554, 555</del> <a href="#">557, 558, 825</a>	– Shipment	Yes	Yes	Yes
		(see Note 3)	(see Note 3)	(see Note 1)
<del>809, 820</del> <a href="#">808</a>	Type C <sup>b, c, e</sup> – Package design			
<del>554, 555</del> <a href="#">557, 558, 825</a>	– Shipment	Yes	Yes	
		No	No	(see Note 1 and 2)
<p><sup>a</sup> Countries <i>through or into</i> which (but not over which) the <i>consignment</i> is transported (see para. 204 of the Regulations).</p> <p><sup>b</sup> If the <i>radioactive contents</i> are <i>fissile material</i> <del>which</del> <a href="#">that</a> is not excepted from the requirements for <i>packages</i> containing <i>fissile material</i>, then the approval requirements in paras <del>812 and 820</del> <a href="#">814 and 825</a> of the Regulations shall additionally apply.</p> <p><sup>c</sup> If the <i>radioactive contents</i> are uranium hexafluoride in quantities of 0.1 kg or more, the approval requirements for <i>packages</i> containing it shall additionally apply (see paras 802 and <del>805</del> <a href="#">807</a> of the Regulations).</p> <p><sup>d</sup> If the <i>radioactive contents</i> are <i>low dispersible radioactive material</i> and the <i>package</i> is to be shipped by air, <i>multilateral approval</i> of the <i>package design</i> is required (see para. <del>806</del> <a href="#">808</a>(b) of the Regulations).</p> <p><sup>e</sup> <a href="#">If the radioactive contents are fissile material excepted under para. 417(f) of the Regulations, multilateral approval shall be required (see para. 805 of the Regulations).</a></p> <p><b>Note 1:</b> Before the first <i>shipment</i> of any <i>package</i> requiring <i>competent authority</i> approval of the <i>design</i>, the <i>consignor</i> shall ensure that a copy of the <del>approval</del> certificate <a href="#">of approval</a> for that <i>design</i> has been submitted to the <i>competent authority</i> of each country (see para. <del>554</del> <a href="#">557</a> of the Regulations).</p> <p><b>Note 2:</b> Notification required if the <i>radioactive contents</i> exceed 3000A<sub>1</sub>, or 3000A<sub>2</sub>, or 1000 TBq, whichever is the lower (see para. <del>555</del> <a href="#">558</a> of the Regulations).</p> <p><b>Note 3:</b> <i>Multilateral approval</i> of <i>shipment</i> required if the <i>radioactive contents</i> exceed <del>3 × 10<sup>3</sup></del> <a href="#">3000</a>A<sub>1</sub>, or <del>3 × 10<sup>3</sup></del> <a href="#">3000</a>A<sub>2</sub>, or 1000 TBq, whichever is the lower, or if controlled intermittent venting is allowed (see para. <del>820</del> <a href="#">825</a> of the Regulations).</p>				
<b>ANNEX I: SUMMARY OF APPROVAL AND PRIOR NOTIFICATION REQUIREMENTS (Part 3)</b>				
Key paragraphs in the Regulations	Class of <i>package</i> or material	<i>Competent authority</i> approval required	<i>Consignor</i> required to notify country of origin and countries en route <sup>a</sup> of each	

		Country of origin	Countries en route <sup>a</sup>	shipment
<del>812</del> <a href="#">814</a> <del>820</del> <a href="#">825</a>	<i>Packages for fissile material</i>			
	– <i>Package design</i>	Yes <sup>b</sup>	Yes <sup>b</sup>	
	– <i>Shipment</i>			
	$\Sigma CSI \leq 50$ $\Sigma CSI > 50$	No <sup>c</sup>	No <sup>c</sup>	(see Note 1 and 2)
		Yes	Yes	(see Note 1 and 2)
<del>805</del> <a href="#">807</a> <del>820</del> <a href="#">825</a>	<i>Packages containing 0.1 kg or more of Uranium hexafluoride<sup>d</sup></i>			
	– <i>Package design</i>	No <sup>d</sup> <a href="#">Yes</a>	No <sup>d</sup> <a href="#">Yes for H(M)/ No for H(U)</a>	
	– <i>Shipment</i>			
		No <sup>c</sup>	No <sup>c</sup>	(see Note 1 and 2)
<p><sup>a</sup> Countries <i>through or into</i> which (but not over which) the <i>con ignment</i> is transported (see para. 204 of the Regulations).</p> <p><sup>b</sup> <i>Designs</i> of packages containing <i>fissile material</i> may also require approval in respect of one of the other items in Annex I.</p> <p><sup>c</sup> <i>Shipments</i> may, however, require approval in respect of one of the other items in Annex I.</p> <p><sup>d</sup> <del>Except that, after 31 December 2000, designs that only meet the requirement of para. 632 require multilateral approval, and after 31 December 2003, designs that meet the requirements of paras 629–631 require unilateral approval by the competent authority of the country of origin of the design (para. 805).</del></p> <p><sup>d</sup> <a href="#">If the radioactive contents are fissile material excepted under para. 417(f) of the Regulations, multilateral approval shall be required (see para. 805 of the Regulations).</a></p> <p><b>Note 1:</b> The <i>multilateral approval</i> requirement for fissile packages and some uranium hexafluoride packages automatically satisfies the requirement of para. <del>554</del> <a href="#">557</a> of the Regulations.</p> <p><b>Note 2:</b> Notification required if the <i>radioactive contents</i> exceed <del><math>3 \times 10^3</math></del> <a href="#">3000</a>A<sub>1</sub>, or <del><math>3 \times 10^3</math></del> <a href="#">3000</a>A<sub>2</sub>, or 1000 TBq, whichever is the lower (see para. <del>555</del> <a href="#">558</a> of the Regulations).</p>				

ANNEX I: SUMMARY OF APPROVAL AND PRIOR NOTIFICATION REQUIREMENTS (Part 4)				
Key paragraphs in the Regulations	Class of <i>package</i> or material	Competent authority approval required		Consignor required to notify country of origin and countries en route <sup>a</sup> of each <i>shipment</i>
		Country of origin	Countries en route <sup>a</sup>	
803 <del>820</del> <a href="#">825</a>	<i>Special form radioactive material</i> – <i>Design</i> – <i>Shipment</i>	Yes  (see Note 1)	No  (see Note 1)	No  (see Note 1)
803 <del>820</del> <a href="#">825</a>	<i>Low dispersible radioactive material</i> – <i>Design</i> – <i>Shipment</i>	Yes  (see Note 1)	<del>No</del> <a href="#">Yes</a>  (see Note 1)	No  (see Note 1)
<del>555</del> <a href="#">558</a> , 802, <del>824</del> <a href="#">829</a>	<i>Special arrangement</i> – <i>Shipment</i>	Yes	Yes	Yes
<del>812</del> <a href="#">820</a> <del>820</del> <a href="#">820</a>	<i>Type B (U) packages</i> for which <i>design</i> is approved under 1973 Regulations 1985 Regulations	Yes  (see Note 3)	Yes  <del>Not until 31</del>	(see Note 2)  (see Note 2)

<del>December 2003</del> <del>Yes thereafter</del>					
<a href="#">805</a>	<a href="#">Fissile material</a> <a href="#">excepted from FISSILE classification, in accordance with para. 606</a>	<a href="#">Yes</a>	<a href="#">Yes</a>	<a href="#">No</a>	
<a href="#">817</a>	<a href="#">Exempt consignment of instruments or articles</a>	<a href="#">Yes</a>	<a href="#">Yes</a>	<a href="#">No</a>	
<p><sup>a</sup> Countries <i>through or into</i> which (but not over which) the <i>consignment</i> is transported (see para. 204 of the Regulations).</p> <p><b>Note 1:</b> See approval and prior notification requirements for applicable <i>package</i>.</p> <p><b>Note 2:</b> Before the first <i>shipment</i> of any <i>package</i> requiring <i>competent authority</i> approval of the <i>design</i>, the <i>consignor</i> shall ensure that a copy of the <del>approval</del> certificate <a href="#">of approval</a> for that <i>design</i> has been submitted to the <i>competent authority</i> of each country (see para. <del>554</del> <a href="#">557</a> of the Regulations).</p>					
REFERENCES TO ANNEX I			REFERENCES TO ANNEX I		
<p>[I-1] INTERNATIONAL ATOMIC ENERGY AGENCY, The Convention on the Physical Protection of Nuclear Material, INFCIRC/274/Rev.1, IAEA, Vienna (1980).</p> <p>[I-2] INTERNATIONAL ATOMIC ENERGY AGENCY, The Physical Protection of Nuclear Material and Nuclear Facilities, INFCIRC/225/Rev.4(Corrected), IAEA, Vienna (1999).</p> <p>[I-3] INTERNATIONAL ATOMIC ENERGY AGENCY, Guidance and Considerations for the Implementation of INFCIRC/225/Rev.4, The Physical Protection of Nuclear Material and Nuclear Facilities, IAEA-TECDOC-967(Rev.1), IAEA, Vienna (2000).</p> <p>[I-4] INTERNATIONAL ATOMIC ENERGY AGENCY, Security</p>			<p>[I-1] INTERNATIONAL ATOMIC ENERGY AGENCY, The Convention on the Physical Protection of Nuclear Material, INFCIRC/274/Rev.1, IAEA, Vienna (1980).</p> <p>[I-2] INTERNATIONAL ATOMIC ENERGY AGENCY, The Physical Protection of Nuclear Material and Nuclear Facilities, <del>INFCIRC/225/Rev.4(Corrected)</del>, IAEA, Vienna (1999). <a href="#">Recommendations on the Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5)</a>, IAEA Nuclear Security Series No.13, IAEA, Vienna (2011).</p> <p>[I-3] INTERNATIONAL ATOMIC ENERGY AGENCY, Guidance and Considerations for the Implementation of INFCIRC/225/Rev.4, The Physical Protection of Nuclear Material and Nuclear Facilities, IAEA-TECDOC-967(Rev.1),</p>		

<p>in the Transport of Radioactive Material, IAEA Nuclear Security Series No. 9, IAEA, Vienna (2008).</p> <p>[I-5] INTERNATIONAL ATOMIC ENERGY AGENCY, Code of Conduct on the Safety and Security of Radioactive Sources, IAEA, Vienna (2004).</p> <p>[I-6] INTERNATIONAL ATOMIC ENERGY AGENCY, Guidance on the Import and Export of Radioactive Sources, IAEA, Vienna (2005).</p>	<p>IAEA, Vienna (2000).</p> <p>[I-4] INTERNATIONAL ATOMIC ENERGY AGENCY, Security in the Transport of Radioactive Material, IAEA Nuclear Security Series No. 9, IAEA, Vienna (2008).</p> <p>[I-5] INTERNATIONAL ATOMIC ENERGY AGENCY, Code of Conduct on the Safety and Security of Radioactive Sources, IAEA, Vienna (2004).</p> <p>[I-6] INTERNATIONAL ATOMIC ENERGY AGENCY, Guidance on the Import and Export of Radioactive Sources, IAEA, Vienna (2005).</p>	
<p><i>Not in TS-R-1 (2009).</i></p>	<p><b>Annex III</b></p>	
<p><i>Not in TS-R-1 (2009).</i></p>	<p><b><u>SUMMARY OF CONSIGNMENTS REQUIRING EXCLUSIVE USE</u></b></p>	
<p><i>Not in TS-R-1 (2009).</i></p>	<p><u>The following consignments are required to be shipped under exclusive use:</u></p> <p>(a) <u>Unpackaged LSA-I material and SCO-I (see para. 520);</u></p> <p>(b) <u>Liquid LSA-I material in a Type IP-1 package (see para. 521 and Table 5);</u></p> <p>(c) <u>Gaseous and/or liquid LSA-II material in a Type IP-2 package (see para. 521 and Table 5);</u></p> <p>(d) <u>LSA-III material in Type a IP-2 package (see para. 521 and Table 5);</u></p> <p>(e) <u>Packages or overpacks having an individual TI greater than 10 or a consignment CSI greater than 50 (see paras 526 and 567);</u></p> <p>(f) <u>Packages or overpacks having the maximum radiation level at any point on the external surfaces that exceed 2 mSv/h (see para. 527);</u></p>	

	<p>(g) <u>Loaded conveyances or large freight containers with a total sum of <i>TI</i> exceeding the values given in Table 10 (see para. 566(a));</u></p> <p>(h) <u>Loaded conveyances or large freight containers with a total sum of <i>CSI</i> exceeding the values given in Table 11 for “not under <i>exclusive use</i>” (see para. 569);</u></p> <p>(i) <u>Type B(U), Type B(M) or Type C package whose temperature of accessible surfaces exceeds 50°C when subject to an ambient temperature of 38°C in the absence of insolation (see para. 654).</u></p> <p>(j) <u>Up to 45 g of <i>fissile nuclides</i> on a conveyance, either packaged or unpackaged, in accordance with the provisions of paras 417(e) and 520 (d);</u></p> <p>(k) <u>Packages containing <i>fissile material</i> classified as non-fissile or fissile excepted under para. 417(a)(i) or (iii) of the 2009 Edition of these Regulations (see para. 822).</u></p>	