

IAEA Approved Changes to TS-R-1

This paper summarises the changes that were approved by the IAEA Transport Safety Standards Committee (TRANSSC) for incorporation into the 2005 edition of the IAEA Transport Regulations compared with the equivalent paragraphs from the Australian Transport Code (RPS-2, 2001).

The approved changes are presented in the following table, in paragraph order. The text from RPS-2 and the text from the 2005 Edition are presented side by side in order to easily identify what change has been approved. Where the change involves a deletion of text from the Transport Code, the part to be deleted is marked in **bold** in the current text. Where the approved change involves new or revised text the new or revised part is marked in **bold** in the new text.

It is important to note that the 2005 edition of the IAEA Transport Regulations has already been adopted for international air and sea transport of radioactive material as of 1 January 2007. In assessing the impact of adopting the 2005 edition of the IAEA Transport Regulations into a revised Transport Code, the cost to international importers and exporters of radioactive material resulting from any inconsistency between the current version and the proposed version needs to be considered

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
<p>Clause 2.4 of the Transport Code states:</p> <p>In addition to the exemptions specified in paragraphs 107 (a)-(e) of the International Regulations, this Code does not apply to:</p> <p>natural material and ores containing naturally occurring radionuclides 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 paras 401-406.</p> <p>107. The Regulations do not apply to:</p> <p>...</p> <p>(e) natural material and ores containing naturally occurring radionuclides, which have been processed, where the physical or chemical processing was not for the purpose of extracting radionuclides, provided the activity concentration of the material does not exceed 10 times the values specified in paras 401-406.</p>	<p>107. The Regulations do not apply to:</p> <p>...</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 paras 401(b), or calculated in accordance with paras 402-406;</p> <p>...</p> <p>...</p>	<p>401. The following basic values for individual radionuclides are given in Table I:</p> <p>(b) activity concentration for exempt material in Bq/g;</p>	<p>This change was an adoption by the IAEA of the exemption already listed in clause 2.4 of the Australian 2001 Transport Code. As such, it is a “machinery” change and the impact in Australia is negligible.</p>

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
New	107. The Regulations do not apply to: ... (f) non-radioactive solid objects with radioactive substances present on any surfaces in quantities not in excess of the levels defined in para. 214.	214. Contamination shall mean the presence of a radioactive substance on a surface in quantities in excess of 0.4 Bq/cm ² for beta and gamma emitters and low toxicity alpha emitters, or 0.04 Bq/cm ² for all other alpha emitters.	This only adds another situation where the Regulations/Code do not apply. The impact is therefore negligible.
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.	108. These Regulations do not specify controls such as routeing 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.	[The same correction applies in paras. 555, 559, 831, and 832]	Spelling change. Negligible or no impact.
223. <i>Freight container</i> shall mean an article of transport equipment designed to facilitate the transport of goods, either packaged or unpackaged, by one or more modes of transport without intermediate reloading. It shall be of a permanent enclosed character, rigid and strong enough for repeated use, and must be fitted with devices facilitating its handling, particularly in transfer between conveyances and from one mode of transport to another. A small <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 ³ . Any other <i>freight container</i> is considered to be a <i>large freight container</i> .	223. <i>Freight container</i> shall mean an article of transport equipment 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 <i>conveyances</i> 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 ³ . Any other <i>freight container</i> is considered to be a <i>large freight container</i> .		Grammatical change. Negligible or no impact.
226(a)(ii) Solid unirradiated natural uranium or depleted uranium or natural thorium or their solid or liquid compounds or mixtures;	226(a)(ii) Natural uranium, depleted uranium, natural thorium or their compounds or mixtures, providing they are unirradiated and in solid or liquid form;		Clarification change. Negligible or no impact.

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
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 or volume of the material in which the radionuclides are essentially uniformly distributed.	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.		This is a change to a definition for clarification purposes. The impact is expected to be negligible.
246. <i>Natural uranium</i> shall mean chemically separated uranium containing the naturally occurring distribution of uranium isotopes (approximately 99.28% uranium-238, and 0.72% uranium-235 by mass). <i>Depleted uranium</i> shall mean uranium containing a lesser mass percentage of uranium-235 than in <i>natural uranium</i> . <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.	246. <i>Natural uranium</i> shall mean uranium (which may be chemically separated) containing the naturally occurring distribution of uranium isotopes (approximately 99.28% uranium-238, and 0.72% uranium-235 by mass). <i>Depleted uranium</i> shall mean <i>uranium</i> containing a lesser mass percentage of uranium-235 than in <i>natural uranium</i> . <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.		Clarification change. Negligible or no impact.
<p>Identification of Industrial Packages throughout the text: These packages are generally referred to as, Industrial Packages Type 2 and 3 (Type IP 2 and Type IP 3)</p> <p>The affected paragraphs in the Transport Code are as follows: 230, 411, 521, 537, 621 to 628, 815, 828 and 829</p>	Just refer to Type IP 2 and Type IP 3. The complete wording could be used only in the definition of these package types. This would make the regulations more consistent as they would refer to Type A, Type B, Type C, and Type IP packages.		A text flow change. Negligible or no impact.

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
302. In transport, 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, and doses to persons shall be below the relevant dose limits. 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 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.		As this is simply a rewrite and reordering of an existing paragraph, the change would have negligible or no impact.
303. Workers shall receive appropriate training concerning the radiation hazards involved and the precautions to be observed in order to ensure restriction of their exposure and that 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.		As this is simply a rewrite and reordering of an existing paragraph, the change would have negligible or no impact.
305. For occupational exposures arising from transport activities, where it is assessed that the effective dose: (a) is most unlikely to exceed 1 mSv in a year, neither special work patterns nor detailed monitoring nor dose assessment programmes nor individual record keeping shall be required;	(a) deleted.		As this removes a clause that simply indicated what need not be done in low dose circumstances, the impact would be negligible.

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
<p>306. Radioactive material shall be segregated sufficiently from workers and from members of the public. The following values for dose shall be used for the purpose of calculating segregation distances or radiation levels:</p> <ul style="list-style-type: none"> (a) for workers in regularly occupied working areas a dose of 5 mSv in a year; (b) for members of the public, in areas where the public has regular access, a dose of 1 mSv in a year to the critical group. 	<p>563. Packages, overpacks and freight containers containing radioactive material and unpackaged radioactive material shall be segregated during transport and during storage in transit:</p> <ul style="list-style-type: none"> (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; (b) from members of the critical group of the public, in areas where the public has regular access, by distances calculated using a dose criterion of 1 mSv in a year and conservative model parameters; (c) from undeveloped photographic film by distances calculated using a radiation exposure criterion for undeveloped photographic film due to the transport of radioactive material of 0.1 mSv per consignment of such film; and (d) from other dangerous goods in accordance with para. 506. 	<p>506. Consignments shall be segregated from other dangerous goods during transport in compliance with the relevant transport regulations for dangerous goods of each of the countries through or into which the materials will be transported, and, where applicable, with the regulations of the cognizant transport organizations, as well as these Regulations.</p>	<p>This was a consolidation of paragraphs that already existed under Section 3. The impact would therefore be negligible.</p>

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New	<p>NON-COMPLIANCE</p> <p>309. In the event of non-compliance with any limit in these Regulations applicable to radiation level or contamination:</p> <ul style="list-style-type: none"> (a) the consignor shall be informed of the non-compliance by: <ul style="list-style-type: none"> (i) the carrier if the non-compliance is identified during transport; or (ii) the consignee if the non-compliance is identified at receipt; (b) the carrier, consignor or consignee, as appropriate, shall: <ul style="list-style-type: none"> (i) take immediate steps to mitigate the consequences of the non-compliance; (ii) investigate the non-compliance and its causes, circumstances and consequences; (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 (iv) communicate to the relevant competent authority(ies) on the causes of the non-compliance and on corrective or preventive actions taken or to be taken; and (c) the communication of the non-compliance to the consignor and relevant competent authority(ies), respectively, shall be made as soon as practicable and it shall be immediate whenever an emergency exposure situation has developed or is developing. 		<p>This new Section clarifies what needs to be done in the event of non-compliance. As non-compliance is relatively rare and this is a clarification clause, the impacts of this change would be negligible.</p>

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
<p>303. Workers shall receive appropriate training concerning the radiation hazards involved and the precautions to be observed in order to ensure restriction of their exposure and that of other persons who might be affected by their actions.</p>	<p>TRAINING</p> <p>312. Persons engaged in the transport of radioactive material shall receive training in the contents of these Regulations commensurate with their responsibilities.</p> <p>313. Individuals such as those who classify radioactive material; pack radioactive material; mark and label radioactive material; prepare transport documents for radioactive material; offer or accept radioactive material for transport; carry or handle radioactive material in transport; mark or placard or load or unload packages of radioactive material into or from transport vehicles, bulk packagings or freight containers; or are otherwise directly involved in the transport of radioactive material as determined by the competent authority; 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 radioactive material; labelling, marking, placarding and packaging and segregation requirements; a description of the purpose and content of the radioactive material transport document; and a description of available emergency response documents;</p> <p>(b) Function specific training: Each person shall receive detailed training concerning specific radioactive material transport requirements which are applicable to the function that person performs;</p>		<p>While this is a new clause, 312 is essentially a rewrite of 303. Training was already required under the existing Transport Code. This change clarifies who needs what type of training and therefore the impact of this change would be negligible.</p>

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
	<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"> (i) Methods and procedures for accident avoidance, such as proper use of package handling equipment and appropriate methods of stowage of radioactive material; (ii) Available emergency response information and how to use it; (iii) General dangers presented by the various categories of radioactive material and how to prevent exposure to those hazards, including if appropriate the use of personal protective clothing and equipment; and (iv) Immediate procedures to be followed in the event of an unintentional release of radioactive material, including any emergency response procedures for which the person is responsible and personal protection procedures to be followed. <p>314. The training required in para. 313 shall be provided or verified upon employment in a position involving radioactive material transport and shall be periodically supplemented with retraining as deemed appropriate by the competent authority.</p>		

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
TABLE I of Section IV Cf-252 5×10^{-2} 3×10^{-3} 1×10^1 1×10^4	TABLE I of Section IV Cf-252 5×10^{-1} 3×10^{-3} 1×10^1 1×10^4		This change brings the Transport Code in line with the IAEA Basic Safety Standards exemption limits, already adopted in the National Directory, and therefore the impact would be negligible.
TABLE I of Section IV Te-121m 5×10^0 3×10^0 1×10^2 1×10^5	TABLE I of Section IV Te-121m 5×10^0 3×10^0 1×10^2 1×10^6		This change brings the Transport Code in line with the IAEA Basic Safety Standards exemption limits, already adopted in the National Directory, and therefore the impact would be negligible.
Table VI. MULTIPLICATION FACTORS FOR LARGE DIMENSIONS LOADS	Table 6 . MULTIPLICATION FACTORS FOR TANKS, FREIGHT CONTAINERS AND UNPACKAGED LSA-I AND SCO-I		This is a clarification change and the impact of the impact is therefore negligible.
502(f) For each special form radioactive material, it shall be ensured that all the requirements specified in the special form approval certificate and the relevant provisions of these Regulations have been satisfied.	502(f) For each special form radioactive material, it shall be ensured that all the requirements specified in the approval certificate and the relevant provisions of these Regulations have been satisfied.		This is a clarification change and the impact of the impact is therefore negligible.

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
509. Except as provided in para. 514, the level of non-fixed contamination on the external and internal surfaces of overpacks, freight containers, tanks and intermediate bulk containers shall not exceed the limits specified in para. 508.	509. Except as provided in para. 514, the level of non-fixed contamination on the external and internal surfaces of overpacks, freight containers, tanks, intermediate bulk containers and conveyances shall not exceed the limits specified in para. 508.		This is a clarification change and the impact of the impact is therefore negligible.
517(b) Each instrument or article (except radioluminescent time-pieces or devices) bears the marking "RADIOACTIVE"; and	517(b) Each instrument or article bears the marking "RADIOACTIVE" except: (i) radioluminescent timepieces or devices, (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 consignment in Table 1 (column 5), provided such products are transported in a package that bears the marking "RADIOACTIVE" on an internal surface in such a manner that warning of the presence of radioactive material is visible on opening the package, and		As this clause <i>excludes</i> devices that incorporate small amounts of radioactive material that would have previously been included, the impact of this change would be negligible.
522. <i>LSA material</i> and <i>SCO</i> which is or contains <i>fissile material</i> shall meet the applicable requirements of paras 568, 569 and 671.	522. For <i>LSA material</i> and <i>SCO</i> which is or contains <i>fissile material</i> the applicable requirements of paras 568, 569 and 671 shall be met.		Grammatical change. Negligible or no impact.
529. The <i>criticality safety index</i> for each consignment shall be determined as the sum of the <i>CSIs</i> of all the <i>packages</i> contained in that consignment.	529. The <i>criticality safety index</i> for each overpack or freight container 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 CSIs in a consignment or aboard a conveyance.		Clarification change. Negligible or no impact.
532. The maximum <i>radiation level</i> at any point on any external surface of a <i>package</i> under <i>exclusive use</i> shall not exceed 10 mSv/h.	532. The maximum <i>radiation level</i> at any point on any external surface of a <i>package</i> or <i>overpack</i> under <i>exclusive use</i> shall not exceed 10 mSv/h.		Clarification change. Negligible or no impact.

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New	533.(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. 534.	534. For each <i>package</i> or <i>overpack</i> the UN number and proper shipping name shall be determined (see Table 8). In all cases of international transport of <i>packages</i> requiring <i>competent authority design</i> or shipment approval, for which different approval types apply in the different countries concerned by the shipment, 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> .	Very few transports are carried out under special arrangement and the cost of placing a category III-YELLOW label on an overpack is small (<\$10). The impact of this change is therefore negligible.
543. (a) (b) Activity: The maximum activity of the <i>radioactive contents</i> during transport expressed in units of becquerels (Bq) with the appropriate SI prefix (see Annex II). For <i>fissile material</i> , the mass of <i>fissile material</i> in units of grams (g), or multiples thereof, may be used in place of activity.	543. (a) (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> in units of grams (g), or multiples thereof, may be used in place of activity.	[Same correction applies to paras. 549(f) and 559(e)]	Grammatical change. Negligible or no impact.

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
549(k) For consignments of packages in an overpack or freight container, a detailed statement of the contents of each package within the overpack or freight container and, where appropriate, of each overpack or freight container in the consignment (shall be included). If packages are to be removed from the overpack or freight container at a point of intermediate unloading, appropriate transport documents shall be made available;	550(k) For <i>consignments</i> of more than one package, the information contained in paras 550(a)-(j) shall be given for each package. For <i>packages</i> in an <i>overpack, freight container or conveyance</i> , a detailed statement of the contents of each <i>package</i> within the <i>overpack, freight container or conveyance</i> and, where appropriate, of each <i>overpack, freight container or conveyance</i> shall be included. If <i>packages</i> are to be removed from the <i>overpack, freight container or conveyance</i> at a point of intermediate unloading, appropriate transport documents shall be made available;		The first part of this amendment clarifies what information is required for consignments containing more than one package. The second part includes conveyances in the documentation requirements. The impact of this change is negligible.
ANNEX II SI PREFIXES	ANNEX II SI PREFIXES AND SYMBOLS The decimal multiples and submultiples of a unit may be formed by prefixes or symbols, having the following meanings, placed before the name or symbol of the unit.		Grammatical change. Negligible or no impact.
514. An <i>overpack, freight container, tank, intermediate bulk container or conveyance</i> dedicated to the transport of <i>radioactive material</i> under <i>exclusive use</i> shall be excepted from the requirements of paras 509 and 513 solely with regard to its internal surfaces and only for as long as it remains under that specific <i>exclusive use</i> .	514. 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 509 and 513 solely with regard to its internal surfaces and only for as long as it remains under that specific <i>exclusive use</i> .		Clarification change. Negligible or no impact.

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
<p>546. 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 with 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, as shown in Fig. 2, Fig. 3, Fig. 4 and Fig. 5 where appropriate, with dimensions of the minimum size shown in Fig. 6.</p>	<p>546. 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, as shown in Fig. 2, Fig. 3, Fig. 4 and Fig. 5 where appropriate, with dimensions of the minimum size shown in Fig. 6.</p>		<p>Grammatical change. Negligible or no impact.</p>

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<p>566(c) 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>.</p>	<p>567.(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 consignments transported under exclusive use by road or rail, for which the radiation limits around the vehicle are set forth in paras 573(b) and (c).</p>	<p>573. For consignments under exclusive use, the radiation level shall not exceed: (b) 2 mSv/h at any point on the outer surfaces of the vehicle, including the upper and lower surfaces, or, in the case of an open vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load, and on the lower external surface of the vehicle; and (c) 0.1 mSv/h at any point 2 m from the vertical planes represented by the outer lateral surfaces of the vehicle, or, if the load is transported in an open vehicle, at any point 2 m from the vertical planes projected from the outer edges of the vehicle.</p>	<p>Clarification change describing where the radiation levels need to be measured for consignments transported under exclusive use. Negligible or no impact.</p>
<p>568. The number of <i>packages, overpacks</i> and <i>freight containers</i> containing <i>fissile material</i> stored in transit in any one storage area shall be so limited that the total sum of the <i>criticality safety indexes</i> in any group of such packages, overpacks or freight containers does not exceed 50. Groups of such <i>packages, overpacks</i> and <i>freight containers</i> shall be stored so as to maintain a spacing of at least 6 m from other groups of such packages, overpacks or freight containers.</p>	<p>569. Any group of <i>packages, overpacks</i> and <i>freight containers</i> containing <i>fissile material</i> stored in transit in any one storage area shall be so limited that the total sum of the <i>criticality safety indexes</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>Grammatical change. Negligible or no impact.</p>

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
<p>619 Packages containing radioactive material transported by air shall have a containment system able to withstand without leakage a reduction in ambient pressure to 5 kPa.</p>	<p>619. Packages containing radioactive material to be transported by air shall be capable of withstanding, without leakage, an internal pressure which produces a pressure differential of not less than maximum normal operating pressure plus 95 kPa.</p>		<p>This change has already been adopted into ICAO Technical Instructions and would therefore already be a requirement for any package that would need to be transported by air.</p>
<p>629. Except as allowed in para. 632, uranium hexafluoride shall be packaged and transported in accordance with the provisions of the International Organization for Standardization document ISO 7195: “Packaging of Uranium Hexafluoride (UF₆) for Transport” [10], and the requirements of paras 630–631. The <i>package</i> shall also meet the requirements prescribed elsewhere in these Regulations which pertain to the radioactive and fissile properties of the material.</p>	<p>629. Packages 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 ISO 7195: 1993 “Packaging of Uranium Hexafluoride (UF₆) for Transport”, and the requirements of paras 630-631).</p>		<p>Clarification change. The change also allows an amount below which nothing needs to be done, thereby reducing costs for small amounts. Negligible or no impact.</p>

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
<p>630. Each <i>package</i> designed to contain 0.1 kg or more of uranium hexafluoride shall be designed so that it would 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 [10], the structural test as specified in para. 718;</p> <p>(b) withstand without loss or dispersal of the uranium hexafluoride the test specified in para. 722; and</p> <p>(c) withstand without rupture of the <i>containment system</i> the test specified in para. 728.</p>	<p>630. Each package designed to contain 0.1 kg or more of uranium hexafluoride shall be designed so that it would meet the following requirements:</p> <p>(a) withstand without leakage and without unacceptable stress, as specified in ISO 7195:1993, 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 containment system the thermal test specified in para. 728.</p>		<p>Clarification change. Negligible or no impact.</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>(a) the <i>packages</i> are designed to requirements other than those given in ISO 7195 [10] and paras 630–631 but, notwithstanding, the requirements of paras 630–631 are met as far as practicable;</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>(a) the <i>packages</i> are designed to international or national standards other than ISO 7195 [10], provided an equivalent level of safety is maintained;</p> <p>In all other respects the requirements specified in paras 629-631 shall be satisfied.</p>		<p>Clarification change. Negligible or no impact.</p>
<p>648. A <i>Type A package</i> designed to contain liquids shall, in addition:</p> <p>(a)</p>	<p>648. A <i>Type A package</i> designed to contain liquid radioactive material shall, in addition:</p> <p>(a)</p>		<p>Clarification change. Negligible or no impact.</p>

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)																																
648(a) Be adequate to meet the conditions specified in para. 646 above if the <i>package</i> is subjected to the tests specified in para. 725; and	648(a) Be adequate to meet the conditions specified in para.646(a) above if the <i>package</i> is subjected to the tests specified in para. 725; and		Clarification change. Negligible or no impact.																																
<p>TABLE XI. INSOLATION DATA</p> <table border="1"> <thead> <tr> <th>Form and location of surface</th> <th>Insolation for 12 hours per day (W/m²)</th> </tr> </thead> <tbody> <tr> <td colspan="2">Flat surfaces transported horizontally:</td> </tr> <tr> <td>— base</td> <td>none</td> </tr> <tr> <td>— other surfaces</td> <td>800</td> </tr> <tr> <td colspan="2">Flat surfaces not transported horizontally:</td> </tr> <tr> <td>— each surface</td> <td>200^a</td> </tr> <tr> <td>Curved surfaces</td> <td>400^a</td> </tr> </tbody> </table> <p>^a Alternatively, a sine function may be used, with an absorption coefficient adopted and the effects of possible reflection from neighbouring objects neglected.</p>	Form and location of surface	Insolation for 12 hours per day (W/m ²)	Flat surfaces transported horizontally:		— base	none	— other surfaces	800	Flat surfaces not transported horizontally:		— each surface	200 ^a	Curved surfaces	400 ^a	<p>TABLE II. INSOLATION DATA</p> <table border="1"> <thead> <tr> <th>Case</th> <th>Form and location of surface</th> <th>Insolation for 12 hours per day (W/m²)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Flat surfaces transported horizontally — downward facing</td> <td>0</td> </tr> <tr> <td>2</td> <td>Flat surfaces transported horizontally — upward facing</td> <td>800</td> </tr> <tr> <td>3</td> <td>Surfaces transported vertically</td> <td>200^a</td> </tr> <tr> <td>4</td> <td>Other downward facing (not horizontal) surfaces</td> <td>200^a</td> </tr> <tr> <td>5</td> <td>All other surfaces</td> <td>400^a</td> </tr> </tbody> </table> <p>^a Alternatively, a sine function may be used, with an absorption coefficient adopted and the effects of possible reflection from neighbouring objects neglected.</p>	Case	Form and location of surface	Insolation for 12 hours per day (W/m ²)	1	Flat surfaces transported horizontally — downward facing	0	2	Flat surfaces transported horizontally — upward facing	800	3	Surfaces transported vertically	200 ^a	4	Other downward facing (not horizontal) surfaces	200 ^a	5	All other surfaces	400 ^a		Style change. Negligible or no impact.
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671(b) meet the requirements: (i) of para. 634 for <i>fissile material</i> contained in <i>packages</i> ;	671(b) meet the requirements: (i) of para. 634 for <i>packages</i> containing <i>fissile material</i> ;		Grammatical change. Negligible or no impact.																																
672. (a)..... (i)..... (ii)..... (iii) there is not more than 5 g of <i>fissile material</i> in any 10 litre volume of material.	672. (a)..... (i)..... (ii)..... (iii) there are not more than 5 g of fissile material in any 10 litre volume of material.		Grammatical change. Negligible or no impact.																																
672(a) Last sentence: Neither beryllium nor deuterium shall be present in quantities exceeding 0.1% of the <i>fissile material</i> mass.	672(a) Last sentence: Neither beryllium nor deuterium shall be present in quantities exceeding 1% of the applicable consignment mass limits provided in Table 12, except for deuterium in natural concentration in hydrogen.		Clarification change. Negligible or no impact.																																

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
675. The <i>packaging</i> , after being subjected to the tests specified in paras 719–724, must prevent the entry of a 10 cm cube.	675. The <i>package</i> , after being subjected to the tests specified in paras 719–724, must prevent the entry of a 10 cm cube.		Grammatical change. Negligible or no impact.
680. For <i>packages</i> to be transported by air: (a) the <i>package</i> shall be subcritical under conditions consistent with the tests prescribed in para. 734 assuming reflection by at least 20 cm of water but no water inleakage; and (b) allowance shall not be made for special features of para. 677 unless, following the tests specified in para. 734 and, subsequently, para. 733, leakage of water into or out of the void spaces is prevented.	680. For <i>packages</i> to be transported by air: (a) the <i>package</i> shall be subcritical under conditions consistent with the Type C package tests specified in para. 734 assuming reflection by at least 20 cm of water but no water in-leakage; and (b) in the assessment of para. 679 allowance shall not be made for special features of para. 677 unless, following the Type C package 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.		As this change has already been adopted into ICAO Technical Instructions, it would therefore already be a requirement for any Type C package that would need to be transported by air. The changes serve only to make the existing provision more specific and clearer in intent.

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
<p>727(b) For drop II, the specimen shall drop so as to suffer the 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, (15.0 ± 0.5) 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 edges 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>727(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, (15.0 ± 0.5) 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>Grammatical change. Negligible or no impact.</p>
<p>735 (a) The specimen, representing a <i>package</i> having a mass 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 a frustum of a right circular cone with the following dimensions: 30 cm height and 2.5 cm diameter at the top. The target on which the specimen is placed shall be as specified in para. 717.</p>	<p>735(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 a frustum of a right circular cone with the following dimensions: 30 cm height and 2.5 cm diameter at the top with its edge rounded off to a radius of not more than 6 mm. The target on which the specimen is placed shall be as specified in para. 717.</p>		<p>Clarification change. Negligible or no impact.</p>

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
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.	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.		Clarification change. Negligible or no impact.
825. (a) A statement of the respects in which, and of the reasons why, the <i>consignment</i> cannot be made in full accordance with the applicable requirements; and (b)	825. (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; and (b)		Grammatical change. Negligible or no impact.

Existing Para. Or Sub-Para of TS-R-1 (1996 Edition (Revised)) and the Transport Code	New Para. Or Sub-Para of TS-R-1 (2005 Edition)	Paragraphs referred to within clause	Potential Ramifications (estimation only)
<p>COMMON PROVISIONS FOR SCHEDULES 5-14 B.3. MAXIMUM RADIATION LEVELS</p> <p>(a) <i>Radiation level limits</i> for packages or overpacks are:</p> <ul style="list-style-type: none"> (i) 0.1 mSv/h at 1 m from the external surfaces of the package or overpack, except when transported under <i>exclusive use</i>, and (ii) 2 mSv/h on any external surface of the package or overpack, except when transported under <i>exclusive use</i> by rail or by road, or under <i>exclusive use</i> and <i>special arrangement</i> by vessel or by air, and (iii) 10 mSv/h on any external surface of a package transported under <i>exclusive use</i>. 	<p>COMMON PROVISIONS FOR SCHEDULES 5-14 B.3. MAXIMUM RADIATION LEVELS</p> <p>(a) <i>Radiation level</i> for packages or overpacks shall be limited such that:</p> <ul style="list-style-type: none"> (i) Except for consignments under exclusive use, the transport index of any package or overpack shall not exceed 10, and (ii) Except for packages or overpacks transported under exclusive use by rail or by road, or under exclusive use and special arrangement by vessel or by air, the maximum radiation level at any point on any external surface of a package or overpack shall not exceed 2 mSv/h, and (iii) The maximum radiation level at any point on any external surface of a package or overpack under exclusive use shall not exceed 10 mSv/h. 		<p>Grammatical change. Negligible or no impact.</p>
<p>[In the Index] Criticality Safety Index: 218,528-530, 544, 545, 549, 566-569, 820, 831, 833, 835</p>	<p>[In the Index] Criticality Safety Index: 218,528-530, 544, 545, 549, 566-569, 820, 831, 833</p>		<p>Grammatical change. Negligible or no impact.</p>