

Class 7 Box

Document to support the proposals CH/01-08, CH/12, CH/22-24, CH/26

Content

1.	Current regulations and guidance	2
1.1	SSR-6: para. 581, para. 515, para. 516 and table 4	2
1.2	UN Model Regulations: 1.1.1.6 (b)	3
1.3	ICAO Technical Instructions: 2.3.2 (c)	3
1.4	UPU Convention: Article 19-006	3
1.5	Considerations and conclusions	4
2.	Basic concept of the Class 7 Box	5
2.1	Training	5
2.2	Content	5
2.3	Dose and contamination control	6
2.4	Marking and labelling	6
2.5	Packing	6
2.6	Accumulation control	8
2.7	Transport by post	9
2.8	Design	9
3.	Proposals for SSR-6	10
	Appendix A: Comparison table for package requirements	14

1. Current regulations and guidance

For the transport of excepted packages by mail and courier services, the IAEA has introduced specific requirements in SSR-6, which have been considered and implemented in the UN Model Regulations, the ICAO Technical Instructions and in the UPU Convention. These regulations will be recalled hereafter in sections 1.1 to 1.4. Section 1.5 reflects the current application of these regulations and motivates the concept of the Class 7 Box presented in section 2.

1.1 SSR-6: para. 581, para. 515, para. 516 and table 4

581. A *consignment* that conforms to the requirements of para. 515, in which the activity of the *radioactive contents* does not exceed one tenth of the limits prescribed in Table 4, and that does not contain uranium hexafluoride, 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) The *consignment* shall be deposited with the postal service only by *consignors* authorized by the national authority.
- (b) The *consignment* shall be dispatched by the quickest route, normally by air.
- (c) The *consignment* shall be plainly and durably marked on the outside with the words "RADIOACTIVE MATERIAL — QUANTITIES PERMITTED FOR MOVEMENT BY POST". These words shall be crossed out if the *packaging* is returned empty.
- (d) The *consignment* shall carry on the outside the name and address of the *consignor* with the request that the *consignment* be returned in the case of non-delivery.
- (e) The name and address of the *consignor* and the contents of the *consignment* shall be indicated on the internal *packaging*.

515. *Excepted packages* shall be subject only to the following provisions in Sections V and VI:

- (a) The requirements specified in paras 503–505; 507–513; 516; 530–533; 545; 546 introductory sentence; 546(a); 546(j), (i) and (ii); 546(k); 546(m); 550–553; 555; 556; 561; 564; 570; 582 and 583;
 - (b) The requirements for *excepted packages* specified in para. 622;
 - (c) The requirements specified in paras 580 and 581, if transported by post.
- All relevant provisions of the other sections shall apply to *excepted packages*.

516. The *dose rate* at any point on the external surface of an *excepted package* shall not exceed 5 $\mu\text{Sv/h}$.

TABLE 4. ACTIVITY LIMITS FOR EXCEPTED PACKAGES

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

^a For mixtures of radionuclides, see paras 405–407.

1.2 UN Model Regulations: 1.1.1.6 (b)

Radioactive material in an excepted package conforming to the requirements of 1.5.1.5, the activity of which does not exceed one tenth of that listed in Table 2.7.2.4.1.2 and that does not meet the definitions and criteria of classes, other than Class 7, or divisions, as defined in Part 2.

The requirements of 1.5.1.5 correspond to para. 515 of SSR-6 and the table 2.7.2.4.1.2 correspond to table 4 of SSR-6.

1.3 ICAO Technical Instructions: 2.3.2 (c)

2.3 TRANSPORT OF DANGEROUS GOODS BY POST

2.3.2 The following dangerous goods may be acceptable in mail for air carriage subject to the provisions of the appropriate national authorities concerned and these Instructions:

- c) radioactive material in an excepted package, UN Nos. 2910 and 2911 only, the activity of which does not exceed one-tenth of that listed in Part 2, Chapter 7, Table 2-14, and that does not meet the definitions and criteria of classes, other than Class 7, or divisions, as defined in Part 2. The package must be marked with the name of the shipper and the consignee, the package must be marked "radioactive material — quantities permitted for movement by post" and must bear the radioactive material, excepted package label (Figure 5-33);*

Note 1.— Designated postal operators may accept the dangerous goods identified in 2.3.2 a), b) and c) without receiving specific approval from the civil aviation authority.

Part 2, Chapter 7, Table 2-14 correspond to table 4 of SSR-6.

1.4 UPU Convention: Article 19-006

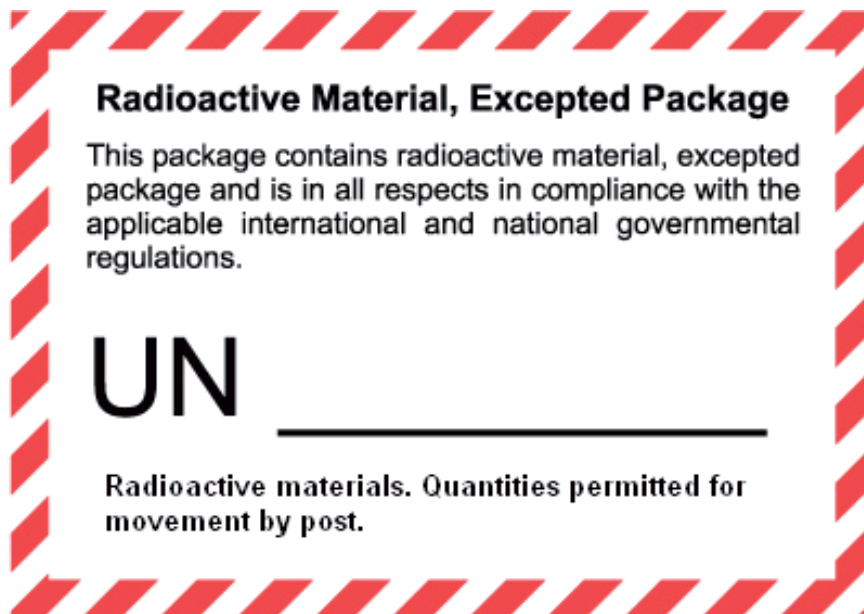
1 Items containing radioactive materials, whose contents and make-up comply with the regulations of the International Atomic Energy Agency shall be admitted for conveyance by post subject to prior consent from the competent authorities of the country of origin provided the activity does not exceed one tenth of that permitted in Table 3 – Activity Limits for Excepted Packages as listed in the current edition of the IAEA TS-R-1 and does not contain uranium hexafluoride.

2 The outside packaging of items containing radioactive materials shall be marked by the sender with the label shown below indicating the applicable UN-number. It shall also bear, in addition to the name and address of the sender, a request in bold letters for the return of the items in the event of non-delivery.

3 The sender shall give his name and address and the contents of the item on the inner wrapping.

4 The label shown above shall be clearly crossed out, should the empty package be returned to the place of origin.

The label mentioned in 4 is shown hereafter. This label allows the distinction of excepted packages respecting regular activity limits and those respecting the reduced activity limits permitted for transport by post:



Concerning safety aspects, the following comment has been added to the article 19-006:

■ **Commentary**

1 As understood here, the conveyance by post of radioactive materials is restricted to consignments exempted from special conveyance prescriptions, within the meaning of the IAEA Regs for the safe transport of radioactive materials, because of the very low activity of their contents.

1.5 Considerations and conclusions

The above-mentioned regulations implement a concept for transporting excepted packages with reduced activities and specific labelling by post. The concept addresses specific safety concerns of mail and courier services by reducing the activity of an excepted package by one tenth in comparison with the activity level usually allowed by the IAEA Transport Regulations. The regulations of the different UN organisations are not fully harmonised and streamlined, for instance with respect to labelling requirements.

Due to the feedback from consignors, the acceptance of the existing concept by mail and courier services is quite poor. Due to the feedback of mail and courier services, reasons are:

- non-acceptance by other stakeholders in the transport chain (road and air carriers, handling agents, courier services)
- difficulties to assign class 7 packages to existing logistic channels due to a special concept in comparison with other dangerous goods classes
- difficulties to train and instruct the staff as well as the lack of appropriate emergency instructions
- variety of excepted packages in size, which provide difficulties to use automated lines

To address the feedback of users, the existing concept should be reinforced adding some more restrictions on package design and permitted contents. This package concept, called Class 7 Box, will be elaborated hereafter including the proposed amendments to SSR-6.

The Class 7 Box is an offer for mail and courier services and will improve acceptance and facilitate the transport of a vast number of radioactive materials.

2. Basic concept of the Class 7 Box

The class 7 box is a standardized transport solution for radioactive material in excepted quantities. Therefore, they address the EQ concept in chapter 3.5 of the UN Model Regulations. The activity permitted is one tenth of the activity limit of an excepted package. Therefore, the class 7 box is in line with activity limits for transport by post required by paras 515(c), 580 and 581.

The class 7 box consists of an outer packaging and one or more inner packagings. The inner packaging is capable of withstanding, without loss or dispersal of radioactive contents from the containment system, an internal pressure that produces a pressure differential of not less than maximum normal operating pressure plus 95 kPa. Therefore, air transport design requirements are addressed. The outer packaging is of UN packing group I or II for solid content and of UN packing group I for liquid content. Consequently, standard UN packages can be used as class 7 box. IP-I and IP-II package requirements of SSR-6 are fulfilled.

2.1 Training

Persons involved in packing and shipping of class 7 boxes do not need the full scope of training required in paras 311-315. So, a separate requirement is introduced to address specific training requirements for packing and shipping of class 7 boxes. General basic training concerning radiation protection, handling and emergencies is recommended and it should be supported by IAEA online training.

With respect to emergency response, it would be reasonable to provide standardized written instructions. A concept for standardized written instructions is not implemented yet in SSR-6 and the UN Model Regulations. Consequently, it is not provided here.

2.2 Content

The activity is below the limits for class 7 boxes as specified in an additional column of Table 4. The activity limits for class 7 boxes are one tenth lower than the activity limits for materials in excepted packages.

TABLE 4. ACTIVITY LIMITS FOR EXCEPTED PACKAGES AND CLASS 7 BOXES

Physical state of contents	Instrument or article		Materials	Class 7 Box
	Item limits ^a	Package limits ^a	Package limits ^a	Package limits ^a
Solids				
<i>Special form</i>	$10^{-2} A_1$	A_1	$10^{-3} A_1$	$10^{-4} A_1$
<i>Other forms</i>	$10^{-2} A_2$	A_2	$10^{-3} A_2$	$10^{-4} A_2$
Liquids	$10^{-3} A_2$	$10^{-1} A_2$	$10^{-4} A_2$	$10^{-5} A_2^b$
Gases				
<i>Tritium</i>	$2 \times 10^{-2} A_2$	$2 \times 10^{-1} A_2$	$2 \times 10^{-2} A_2$	$2 \times 10^{-3} A_2$
<i>Special form</i>	$10^{-3} A_1$	$10^{-2} A_1$	$10^{-3} A_1$	$10^{-4} A_1$
<i>Other forms</i>	$10^{-3} A_2$	$10^{-2} A_2$	$10^{-3} A_2$	$10^{-4} A_2$

^a For mixtures of radionuclides, see paras 405–407.

^b Max. net quantity 1000 ml, see para 621A.

2.3 Dose and contamination control

The dose rate at any point on the external surface of the outer package of the class 7 box shall not exceed 0.5 $\mu\text{Sv/h}$. On the external surface of the inner package the dose rate shall below 5 $\mu\text{Sv/h}$. The reduction of the dose rate on the external surface of the outer package (on tenth compared to excepted packages) takes into account the public exposure limit of 1 mSv per year, which is applicable for staff working at courier or post companies.

The non-fixed contamination on the external surfaces of class 7 box shall be kept as low as practicable and, under routine conditions of transport, shall not exceed 0.4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters and 0.04 Bq/cm² for all other alpha emitters. These limits are applicable when averaged over any area of 300 cm² of any part of the surface. So, the non-fixed contamination on the external surfaces of a class 7 box corresponds to para. 214, which defines basically the level of contamination considered by the regulations or not.

2.4 Marking and labelling

Marking and labelling follows the concept for excepted quantities in the UN Model Regulations. Consequently, the excepted quantities mark is introduced in SSR-6. No classification marking (UN number, proper shipping name) is required due to UN regulations.

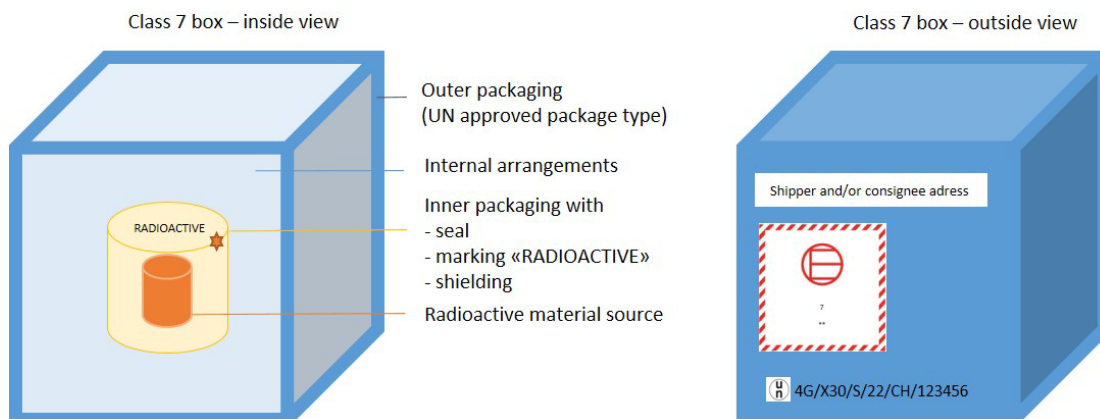
2.5 Packing

The class 7 box consists of one or more inner and one outer packaging. The inner packaging shall be fixed and centred within the outer packaging. The inner packaging shall be closed in such a way, that the closing is not readily breakable and provide evidence that the box has not been opened.

If the *class 7 box* contains liquids, the maximum net quantity shall be 1000 ml. In addition, absorbent material to absorb the double content of authorized liquid quantity is required.

To highlight packing aspects, the following packing instructions are provided according to the UN scheme:

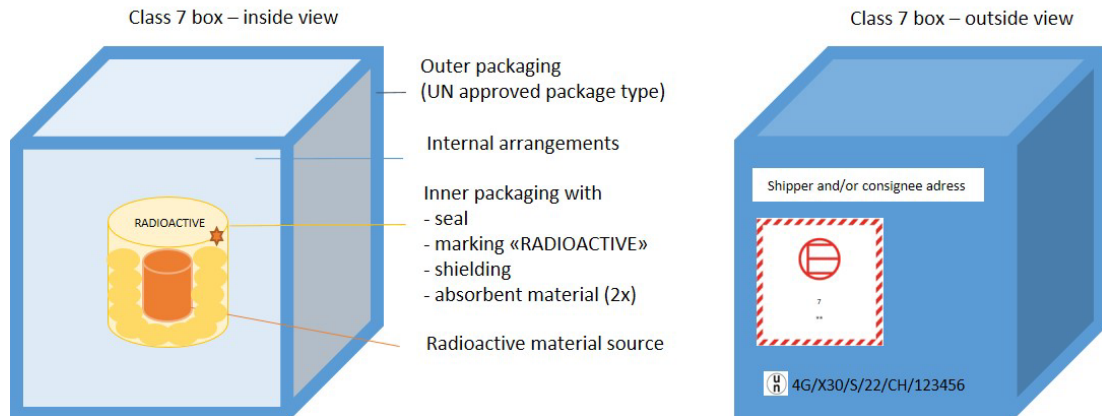
Class 7 Box for solid materials



PACKING INSTRUCTION		
Combination Packagings		
Inner packagings (examples)	Outer packagings	Remarks
Steel Plastic drum Tin can	Package type X or Y examples: Fibreboard (4G) ...	for solid content (not powder) Dim. min. 150 x 150 x 150 mm Dim. max. 1000 x 600 x 600 mm* Gross weight max. 30 kg*
Triple-layer packaging, consisting of: - Outer packaging, packing group min. II / package type X or Y - Internal arrangements to fix and center the inner package - Inner packagings, designed only for single usage, shall be closed as a tight packaging. Inside protection material to cover the content is recommended. It shall incorporate a feature such as a seal that is not readily breakable and which, while intact, will be evidence that the package has not been opened.		
Single packagings		
Not accepted		

*based on guidelines for shipping with Swiss Post for standard package sizes and permissible gross weight of the packages

Class 7 Box for liquid materials



PACKING INSTRUCTION		
Combination Packagings		
<i>Inner packagings (examples)</i>	<i>Outer packagings</i>	<i>Remarks</i>
Steel Plastic drum Tin can max. net quantity 30 ml [E1]	Package type X examples Fibreboard (4G)	for liquid content max. net quantity 1000 ml [E1] Dim. min. 150 x 150 x 150 mm Dim. max. 1000 x 600 x 600 mm* Gross weight max. 30 kg*
Triple-layer packaging, consisting of: - Outer packaging, packing group I / package type X - Internal arrangements to fix and center the inner package - Inner packagings, designed only for single usage, shall be closed as a tight packaging. Inside protection material to cover the content (for example: ampule) is recommended. For liquid content absorbent material to absorb the double content of authorized liquid quantity is required. It shall incorporate a feature such as a seal that is not readily breakable and which, while intact, will be evidence that the package has not been opened.		
Single packagings		
Not accepted		

*based on guidelines for shipping with Swiss Post for standard package sizes and permissible gross weight of the packages

2.6 Accumulation control

The UN Model Regulations allow 1000 EQ packages in a cargo transport unit. The activity of excepted quantities in a class 7 box shall not exceed the activity limits for class 7 box specified in Table 4 of SSR-6. For example, for solid radioactive materials, Table 4 allows $10^{-4} A_2$ as package limit. If we assume 1000 packages, the overall activity will be $10^{-1} A_2$. The package design requirements of a class 7 box (inner plus outer packaging) will be near to Type A requirements. So, there will be enough safety even if all the 1000 packages are damaged.

2.7 Transport by post

For the transport by post, specific requirements are proposed for class 7 box shipments. These requirements are based on the existing para 581. Para 580 is not considered, because the class 7 box is mainly foreseen for international shipments.

2.8 Design

A *class 7 box* shall be designed to meet the general design requirements specified in paras 607-618 as well as the requirements of paras 619-621 for air transport. In addition, the inner packaging shall be capable of withstanding, without loss or dispersal of radioactive contents from the containment system, an internal pressure that produces a pressure differential of not less than maximum normal operating pressure plus 95 kPa. The outer packaging is of UN packing group I or II for solid content and of UN packing group I for liquid content, which provides more safety than required for EQ packages. The inner packaging shall be designed for single use only.

Appropriate UN packages are available on the market. Also, the inner packaging is standardized and easily available. The inner as well as the outer packaging is able to provide containment function.

The class 7 box is designed for postal operators and courier services. So, the dimensions and the gross weight is restricted:

- The minimum dimension of the *class 7 box* shall be 150 mm x 150 mm x 150 mm.
- The maximum dimension of the *class 7 box* shall be 1000 mm x 600 mm x 600 mm.
- The maximum gross weight of the *class 7 box* shall be 30 kg.

The minimum dimension ensures, that there is enough area to place the labels. The EQ label needs 100 mm x 100 mm. The maximum dimension and the maximum gross weight have been defined in accordance with usual requirements of postal operators and courier services.

Due to the standardization of the dimensions, the class 7 box should be suitable to be used e. g. in automated lines and is applicable to modern logistic processes. Even, standardized detection devices for dose rates can be developed and applied to implement additional safety controls, if needed.

Appendix A provides an approach for comparison of design requirements and their applicability to class 7 boxes for

- Excepted packages class 7 according to SSR-6 (Rev. 1), edition 2018,
- Packages for excepted quantities according to UN Model Regulations Rev. 22,
- UN packing group II, UN package type Y according to UN Model Regulations Rev. 22 and
- UN packing group I, UN package type X according to UN Model Regulations Rev. 22.

3. Proposals for SSR-6

To be included under TRAINING after para 315:

315A. Persons involved in packing and shipping *class 7 boxes* shall receive appropriate training concerning radiation protection, handling and emergencies.

To be included under CLASSIFICATION OF MATERIAL after para 420:

Radioactive material in excepted quantities

420A. *Radioactive material* may be classified as *radioactive material* in excepted quantities only if it meets the requirements of paras 421A, 421B and 514A.

To be included under CLASSIFICATION OF PACKAGES after para 421:

Classification as class 7 box

421A. A package may be classified as *class 7 box* if it meets one the following conditions:

- (a) It contains instruments or articles or materials not exceeding the activity limits specified in Table 4;
- (b) It is not to use for an empty package having contained radioactive material;
- (c) It neither contains uranium hexafluoride nor fissile material.

421B. *Radioactive material* that is enclosed by a *class 7 box* may be classified as *radioactive material* in excepted quantities provided that

- (a) The *dose rate* at any point on the external surface of the *class 7 box* is not greater than 0.5 $\mu\text{Sv/h}$;
- (b) The *dose rate* at any point on the external surface of the inner package within the *class 7 box* is not greater than 5 $\mu\text{Sv/h}$;
- (c) The *class 7 box* retains its radioactive contents under routine conditions of transport;
- (d) The *class 7 box* bears the mark "RADIOACTIVE" on the outside surface of the inner package in such a manner that a warning of the presence of radioactive material is visible;

Additional column for activity limits of class 7 boxes to be introduced in Table 4

TABLE 4. ACTIVITY LIMITS FOR EXCEPTED PACKAGES AND CLASS 7 BOXES

Physical state of contents	Instrument or article		Materials	Class 7 Box
	Item limits ^a	Package limits ^a	Package limits ^a	Package limits ^a
Solids				
<i>Special form</i>	$10^{-2} A_1$	A_1	$10^{-3} A_1$	$10^{-4} A_1$
<i>Other forms</i>	$10^{-2} A_2$	A_2	$10^{-3} A_2$	$10^{-4} A_2$
Liquids	$10^{-3} A_2$	$10^{-1} A_2$	$10^{-4} A_2$	$10^{-5} A_2^b$
Gases				
<i>Tritium</i>	$2 \times 10^{-2} A_2$	$2 \times 10^{-1} A_2$	$2 \times 10^{-2} A_2$	$2 \times 10^{-3} A_2$
<i>Special form</i>	$10^{-3} A_1$	$10^{-2} A_1$	$10^{-3} A_1$	$10^{-4} A_1$
<i>Other forms</i>	$10^{-3} A_2$	$10^{-2} A_2$	$10^{-3} A_2$	$10^{-4} A_2$

^a For mixtures of radionuclides, see paras 405–407.

^b Max. net quantity 1000 ml, see para 621A.

To be included under REQUIREMENTS AND CONTROLS FOR TRANSPORT OF THE CLASS 7 BOX after para 514:

514A. *Class 7 boxes* shall be subject only to the following provisions in Sections V and VI:

- (a) The requirements specified in paras 504; 507; 510-513; 514B; 514C; 537A; 545; 546A; 550; 564; 567A; 580-583.
- (b) The requirements for excepted packages specified in para. 621A;
- (c) The requirements specified in paras 580 and 581A, if transported by post.
- (d) All relevant provisions of the other sections shall apply to class 7 boxes.

514B. The *non-fixed contamination* on the external surfaces of a *class 7 box* shall be kept as low as practicable and, under routine conditions of transport, shall not exceed the following limits:

- (a) 0.4 Bq/cm² for beta and gamma emitters and low toxicity alpha emitters;
- (b) 0.04 Bq/cm² for all other alpha emitters.

These limits are applicable when averaged over any area of 300 cm² of any part of the surface.

514C. The *dose rate* at any point on the external surface of the outer package of a *class 7 box* shall not exceed 0.5 µSv/h. On the external surface of the inner package of a *class 7 box*, the *dose rate* shall not exceed 5 µSv/h.

To be included under MARKING, LABELLING AND PLACARDING after para 537:

537A. Each *class 7 box* shall be durably and legibly marked with the mark shown in Fig. 1A. The number 7 shall be shown in the mark. Where the name of the consignor or consignee is not shown elsewhere on the package this information shall be included within the mark.

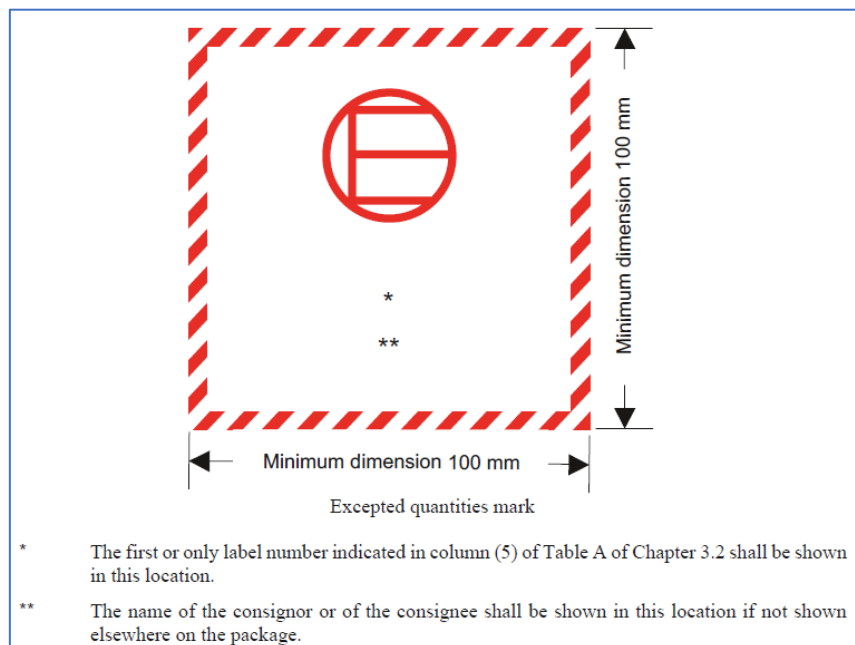


Fig. 1A: Excepted quantities mark. The mark shall be in the form of a square. The hatching and symbol shall be of the same colour, black or red, on white or suitable contrasting background. The minimum dimensions shall be 100 mm x 100 mm. Where dimensions are not specified, all features shall be in approximate proportion to those shown.

To be included under CONSIGNOR'S RESPONSIBILITIES after para 546:

546A. If a document (such as a bill of lading, air waybill) accompanies a *class 7 box* containing *radioactive material* in excepted quantities, it shall include the statement "Dangerous Goods in Excepted Quantities" and indicate the number of packages.

To be included under TRANSPORT AND STORAGE IN TRANSIT after para 567:

567A. The number of *class 7 boxes* in any cargo transport unit shall not exceed 1000.

To be included under TRANSPORT AND STORAGE IN TRANSIT after para 581:

581A. A consignment that conforms to the requirements of para. 514A, in which the activity of the radioactive contents does not exceed one tenth of the limits prescribed in Table 4, and that does not contain uranium hexafluoride, 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) The consignment shall be deposited with the postal service only by consignors authorized by the national authority.
- (b) The consignment shall be dispatched by the quickest route, normally by air.
- (c) The consignment shall be plainly and durably marked on the outside with the mark for excepted quantities specified in para. 537A. In this case, the marking on the outside "RADIOACTIVE MATERIAL — QUANTITIES PERMITTED FOR MOVEMENT BY POST" is not required.
- (d) The consignment shall carry on the outside the name and address of the consignor with the request that the consignment be returned in the case of non-delivery.
- (e) The name and address of the consignor and the contents of the consignment shall be indicated on the internal packaging.

To be included under REQUIREMENTS FOR CLASS 7 BOXES after para 621:

621A. A *class 7 box* shall be designed to meet the requirements specified in paras 607-618 and the requirements of paras 619-621 if carried by air. The following requirements for *class 7 boxes* apply in addition:

- (a) They consist of outer and one or more inner packaging.
- (b) The inner packaging shall be capable of withstanding, without loss or dispersal of radioactive contents from the containment system, an internal pressure that produces a pressure differential of not less than maximum normal operating pressure plus 95 kPa.
- (c) The outer packaging is of UN packing group I or II for solid content and of UN packing group I for liquid content.
- (d) The inner packaging shall be fixed and centred within the outer packaging.
- (e) The inner packaging shall be designed for single use only.
- (f) The inner packaging shall be closed in such a way, that the closing is not readily breakable and provide evidence that the box has not been opened.
- (g) The minimum dimension of the *class 7 box* shall be 150 mm x 150 mm x 150 mm.
- (h) The maximum dimension of the *class 7 box* shall be 1000 mm x 600 mm x 600 mm.
- (i) The maximum gross weight of the *class 7 box* shall be 30 kg.
- (j) If the *class 7 box* contains liquids, the maximum net quantity shall be 1000 ml.
- (k) If the *class 7 box* contains liquids, absorbent material to absorb the double content of authorized liquid quantity is required.

Appendix A: Comparison table for package requirements

	EXCEPTED PACKAGES class 7 IAEA Transport Regulations SSR-6 (Rev. 1) Edition 2018	EXCEPTED QUANTITIES 3.5 UN Model Regulations Rev. 22	UN packing group II UN package type Y UN Model Regulations Rev. 22	UN packing group I UN package type X UN Model Regulations Rev. 22
General packaging provisions	622. An excepted package shall be designed to meet the requirements specified in paras 607–618 and, in addition, the requirements of para. 636 if it contains fissile material allowed by one of the provisions of subparagraphs (a)–(f) of para. 417, and the requirements of paras 619–621 if carried by air.	3.5.2 Packagings	6.1.1. General 6.1.4 Requirements for packagings	6.1.1. General 6.1.4 Requirements for packagings
Mass & volume	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.	3.5.2 e) Each package shall be of such a size that there is adequate space to apply all necessary marks;	6.1.4 Requirements for packagings see requirements of specific packagings	6.1.4 Requirements for packagings see requirements of specific packagings
Design	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	Not applicable	6.1.4 Requirements for packagings see requirements of specific packagings	6.1.4 Requirements for packagings see requirements of specific packagings

	EXCEPTED PACKAGES class 7 IAEA Transport Regulations SSR-6 (Rev. 1) Edition 2018	EXCEPTED QUANTITIES 3.5 UN Model Regulations Rev. 22	UN packing group II UN package type Y UN Model Regulations Rev. 22	UN packing group I UN package type X UN Model Regulations Rev. 22
	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.			
Attachments	609. Attachments and any other features on the outer surface of the <i>package</i> that could be used to lift it shall be designed either to support its mass in accordance with the requirements of para. 608 or shall be removable or otherwise rendered incapable of being used during transport.	Not applicable	6.1.4 Requirements for packagings see requirements of specific packagings	6.1.4 Requirements for packagings see requirements of specific packagings
Free from protruding features and easy to decontaminate	610. As far as practicable, the <i>packaging</i> shall be so designed that the external surfaces are free from protruding features and can be easily decontaminated.	Not applicable	Not applicable	Not applicable
Prevent the collection and the retention of water	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.	Not applicable	6.1.4 Requirements for packagings see requirements of specific packagings	6.1.4 Requirements for packagings see requirements of specific packagings
Features added to the package	612. Any features added to the <i>package</i> at the time of transport that are not part of the <i>package</i> shall not reduce	Not applicable	6.1.4 Requirements for packagings see requirements of specific	6.1.4 Requirements for packagings see requirements of specific

	EXCEPTED PACKAGES class 7 IAEA Transport Regulations SSR-6 (Rev. 1) Edition 2018	EXCEPTED QUANTITIES 3.5 UN Model Regulations Rev. 22	UN packing group II UN package type Y UN Model Regulations Rev. 22	UN packing group I UN package type X UN Model Regulations Rev. 22
	its safety.		packagings	packagings
Routine conditions of transport	613. The package shall be capable of withstanding the effects of any acceleration, vibration or vibration resonance that 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 package 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.	3.5.2 b) Each inner packaging shall be securely packed in an intermediate packaging with cushioning material in such a way that, under normal conditions of carriage, they cannot break, be punctured or leak their contents. For liquid dangerous goods, the intermediate or outer packaging shall contain sufficient absorbent material to absorb the entire contents of the inner packaging. When placed in the intermediate packaging, the absorbent material may be cushioning material. Regardless of its orientation, the package shall completely contain the contents in case of breakage or leakage.	6.1.4.0 General requirements Any permeation of the substance contained in the packaging shall not constitute a danger under normal conditions of carriage.	6.1.4.0 General requirements Any permeation of the substance contained in the packaging shall not constitute a danger under normal conditions of carriage.
Ageing mechanisms	613A. The <i>design</i> of the <i>package</i> shall take into account ageing mechanisms.	Not applicable, because single use of inner package. Packaging is not foreseen to use for storage.	Not applicable, because single use of inner package. Packaging is not foreseen to use for storage.	Not applicable, because single use of inner package. Packaging is not foreseen to use for storage.
Material of the packaging	614. The materials of the <i>packaging</i> and any	3.5.2 a) There shall be an inner	6.1.4 Requirements for packagings	6.1.4 Requirements for packagings

	EXCEPTED PACKAGES class 7 IAEA Transport Regulations SSR-6 (Rev. 1) Edition 2018	EXCEPTED QUANTITIES 3.5 UN Model Regulations Rev. 22	UN packing group II UN package type Y UN Model Regulations Rev. 22	UN packing group I UN package type X UN Model Regulations Rev. 22
	components or structures shall be physically and chemically compatible with each other and with the <i>radioactive contents</i> . Account shall be taken of their behaviour under irradiation.	packaging and each inner packaging shall be constructed of plastic, or of glass, porcelain, stoneware, earthenware or metal and the closure of each inner packaging shall be held securely in place with wire, tape or other positive means; any receptacle having a neck with moulded screw threads shall have a leak proof threaded type ap. The closure shall be resistant to the contents.	see requirements of specific packagings	see requirements of specific packagings
valves	615. All valves through which the <i>radioactive contents</i> could escape shall be protected against unauthorized operation.	See 3.5.2 a)	6.1.4 Requirements for packagings see requirements of specific packagings	6.1.4 Requirements for packagings see requirements of specific packagings
Temperature and pressure	616. The design of the package shall take into account ambient temperatures and pressures that are likely to be encountered in routine conditions of transport.	See 3.5.2 b)	6.1.4 Requirements for packagings see requirements of specific packagings	6.1.4 Requirements for packagings see requirements of specific packagings
shielding	617. A <i>package</i> shall be so designed that it provides sufficient shielding to ensure that, under routine conditions	Not applicable	Not applicable	Not applicable

	EXCEPTED PACKAGES class 7 IAEA Transport Regulations SSR-6 (Rev. 1) Edition 2018	EXCEPTED QUANTITIES 3.5 UN Model Regulations Rev. 22	UN packing group II UN package type Y UN Model Regulations Rev. 22	UN packing group I UN package type X UN Model Regulations Rev. 22
	of transport and with the maximum <i>radioactive contents</i> that the <i>package</i> is designed to contain, the <i>dose rate</i> at any point on the external surface of the <i>package</i> would not exceed the values specified in paras 516, 527 and 528, as applicable, with account taken of paras 566(b) and 573			
Other dangerous properties	618. For <i>radioactive material</i> having other dangerous properties, the <i>package design</i> shall take into account those properties (see paras 110 and 507).	See 3.5.2 a)	6.1.4 Requirements for packagings see requirements of specific packagings	6.1.4 Requirements for packagings see requirements of specific packagings
Airfreight Temperature of the surfaces	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.	not required	not required	not required
Airfreight Packages designed for temperatures (-40 °C – 55 °C)	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.	not required	not required	not required

	EXCEPTED PACKAGES class 7 IAEA Transport Regulations SSR-6 (Rev. 1) Edition 2018	EXCEPTED QUANTITIES 3.5 UN Model Regulations Rev. 22	UN packing group II UN package type Y UN Model Regulations Rev. 22	UN packing group I UN package type X UN Model Regulations Rev. 22
Airfreight Normal operation pressure plus 95 kPa	621. <i>Packages</i> containing <i>radioactive material</i> to be transported by air shall be capable of withstanding, without loss or dispersal of <i>radioactive contents</i> from the <i>containment system</i> , an internal pressure that produces a pressure differential of not less than <i>maximum normal operating pressure</i> plus 95 kPa.	not required	6.1.5.5 Internal pressure (hydraulic) test All packing groups min. test pressure 100 kPa	6.1.5.5 Internal pressure (hydraulic) test Packing group I Liquids: test period 5 min. or 30 min. 250 kPa (gauge)
Alternative requirements	Alternative requirements for Type IP-2 and Type IP-3 626. Packages may be used as Type IP-2, provided that: (a) They satisfy the requirements for Type IP-1 specified in para. 623. (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 [17]. (c) When subjected to the tests required for UN Packing			

	EXCEPTED PACKAGES class 7 IAEA Transport Regulations SSR-6 (Rev. 1) Edition 2018	EXCEPTED QUANTITIES 3.5 UN Model Regulations Rev. 22	UN packing group II UN package type Y UN Model Regulations Rev. 22	UN packing group I UN package type X UN Model Regulations Rev. 22
	Group I or II, they would prevent: (i) Loss or dispersal of the radioactive contents; (ii) More than a 20% increase in the maximum dose rate at any external surface of the package.			
Tests	719. Tests for demonstrating ability to withstand normal conditions of transport: 720 - 724	3.5.3	6.1.5 Test requirements for packagings	6.1.5 Test requirements for packagings
Test: water spray test	721. Water spray test: rainfall of app. 5cm/h for 1h	not required	not required	not required
Test: free drop test	722. free drop test (a), (b) and (c) not applicable: free drop height: 1.2 m	3.5.3 (a) drop test: Free drop height 1.8 m	6.1.5.3 Drop test Packing group II Free drop height 1.2 m	6.1.5.3 Drop test Packing group I Free drop height 1.8 m
Test: stacking test	723. stacking test (a) 5 x 30 kg = 150 kg	Similar stacking test 24h, up to 3 m height 60 cm x 5 = 300 cm	6.1.5.6 Stacking test min. height of the stack incl. test sample: 3 m 60 cm x 5 = 300 cm	6.1.5.6 Stacking test min. height of the stack incl. test sample: 3 m 60 cm x 5 = 300 cm
Test: penetration test	724. penetration test a bar Ø 3.2cm, 6 kg drop in 1m height to the package	not required	not required	not required
Test: Leakproofness test	not required	not required	6.1.5.4 Leakproofness test Packing group II Not less than 20 kPa (0.2 bar)	6.1.5.4 Leakproofness test Packing group I Not less than 30 kPa (0.3 bar)
Test: Internal pressure	not required	not required	6.1.5.5 Internal pressure (hydraulic) test All packing groups	6.1.5.5 Internal pressure (hydraulic) test Packing group I

	EXCEPTED PACKAGES class 7 IAEA Transport Regulations SSR-6 (Rev. 1) Edition 2018	EXCEPTED QUANTITIES 3.5 UN Model Regulations Rev. 22	UN packing group II UN package type Y UN Model Regulations Rev. 22	UN packing group I UN package type X UN Model Regulations Rev. 22
			min. test pressure 100 kPa	Liquids: test period 5 min. or 30 min. 250 kPa (gauge)
Test: permeability test	not required	not required	Only for plastic drums and jerricans	Only for plastic drums and jerricans