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## **Regulatory Guide**

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# **Transportation Safety Guide (FANR-RG-006)**

**Version 0**

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## Basic Principle of Regulatory Guides

Regulatory Guides are issued to describe methods and/or criteria acceptable to the Authority for meeting and implementing specific requirements in the Authority regulations. Regulatory Guides are not substitutes for regulations, and compliance with them is not required. Methods of complying with the requirements in regulations different from the guidance set forth by the regulatory guide can be acceptable if the alternatives provide assurance that the requirements are met.

### Definitions

#### Article (1)

For purposes of this regulatory guide, the following terms shall have the meanings set forth below.

<b>A1</b>	The activity value of special form radioactive material which is listed in Table 2 or derived in Section IV of TS-R-1 and is used to determine the activity limits for the requirements of this regulation.
<b>A2</b>	The activity value of radioactive material, other than special form radioactive material, which is listed in Table 2 or derived in Section IV of TS-R-1 and is used to determine the activity limits for the requirements of this regulation.
<b>Carrier</b>	A person, organization or government that undertakes the carriage of radioactive material by any means of transport.
<b>Consignee</b>	Defined in TS-R-1 as any person, organization or government which is entitled to take delivery of a consignment. The same as a Receiver in this guidance.
<b>Consignment</b>	Consignment shall mean any package or packages, or load of radioactive material, presented by a consignor for transport.
<b>Consignor</b>	Defined in TS-R-1 a person or organization that prepares a consignment for transport. The same as a Shipper in this guidance.
<b>Receiver</b>	A person, organization or government which is entitled to take delivery of a consignment. In TS-R-1 a Receiver is called a Consignee.
<b>Shipper</b>	A person, organization or government that prepares a consignment for transport. In TS-R-1 a Shipper is called a Consignor.
<b>Transport Index</b>	A number assigned to a package, overpack or freight container, or to unpackaged LSA-I or SCO-I, which is used to provide control over radiation exposure.

## Purpose

### Article (2)

1. This is a safety guide for the Authority licensees who plan to ship, carry or receive radioactive materials. It is intended to help licensees make the decisions and take the actions needed to transport radioactive materials safely and efficiently. This document provides guidance for:
  - a. **Shippers** including radioactive material classification; package classifications and requirements; hazard indices; shipping information requirements and notifications; and worker training
  - b. **Carriers** including licence requirements and transportation requirements such as package surveys; loading and stowage; emergency preparedness; and worker training
  - c. **Receivers** including licensing, package acceptance; notification of the Authority; and worker training
2. This document provides guidance for implementing the requirements of FANR-REG-13, Regulation for the Safe Transport of Radioactive Materials, which is posted on the Authority's web site, located at <http://fanr.gov.ae/en> FANR-REG-13 incorporates most of the requirements in IAEA document TS-R-1, Regulations for the Safe Transport of Radioactive Material, 2009 Edition, by reference. TS-R-1 may be found at the IAEA website and a copy has been posted on the Authority's website. The paragraph numbers mentioned in this guide refer to the paragraphs in TS-R-1.
3. This guide is limited to transportation safety. The Authority has additional regulations concerning security of radioactive material, FANR-REG-08, Regulation for the Physical Protection for Nuclear Materials and Nuclear Facilities and FANR-REG-23, Security of Radioactive Sources. These regulations may impose additional requirements for security purposes. For example, the transport of some radioactive materials may require a transportation security plan in addition to the measures described here.
4. Transport by air is governed by both Civil Aviation Regulations and the applicable requirements in FANR-REG-13. Shippers and Carriers planning to transport radioactive materials by air are strongly advised to consult both sets of requirements carefully.

## Guidance for Shippers

### Article (3)

#### 1. Licensing

- a. You will need to decide how the shipment will be licensed. You may use a licensed Carrier or you may use your own licence if it authorises you to transport radioactive material. If you use a licensed Carrier, you only need to meet the requirements for a Shipper. If you use your own licence to transport, you must meet both the requirements for a Shipper and the requirements for a Carrier.
- b. In addition, before shipping a package containing radioactive material, you must assure that the Receiver is authorised to receive and possess it. Finally, if you ship radioactive material outside the State, you will be required to comply with applicable regulations of the receiving country and any countries that the shipment may transit.

#### 2. Worker Training

You are required to train the workers who are involved in shipping radioactive material. This includes persons who classify radioactive material; pack radioactive material; mark and label radioactive material packages; and prepare transport documents. Your training program should reflect job analyses and include procedures, instructions, practical demonstrations, and testing. The Authority strongly recommends that you ensure that your workers are formally trained and qualified before moving on to the next steps. Please see paragraphs 311-315<sup>1</sup>.

#### 3. Shipment Information

- a. You will need to know the name, activity and form of the radioactive material being shipped. You will also need to know how dispersible it may be and the amount of radiation it emits. This information is necessary to classify the material so that a shipping package can be selected; to set the material's hazard indices that are described below; and to meet shipping information and labelling requirements. Most of this information should already be available from your documents that describe the material.
- b. Authority regulations separate radioactive materials into nine classifications that depend on the amount of radioactive material present, how dispersible it may be and the amount of radiation it gives off. Details of these classes are given in Table 1. You should compare the characteristics of your material to these classes and determine which class it is in.

*Hint:* Most sealed sources will be classified as Special Form Radioactive Material.

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<sup>1</sup> The paragraph numbers in this guide refer to the paragraphs in IAEA document TS-R-1, *Regulations for the Safe Transport of Radioactive Material*, 2009 Edition, which FANR-REG-13 incorporates by reference.

**Table 1 – Transportation Classification of Radioactive Material**

Name of Classification	Description
<b>Low Specific Activity (LSA) I</b>	<p>Uranium and thorium ores and concentrates of such ores; natural uranium, depleted uranium, natural thorium or their compounds or mixtures in solid or liquid form; radioactive material for which the <math>A_2^2</math> value is unlimited; and other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times its exempt concentrations.</p> <p>Please see paragraphs 408 and 409 for a description of this material, and paragraph 411 for restrictions on the radiation level of packages containing it.</p>
<b>LSA II</b>	<p>Water with a tritium concentration of up to 0.8 TBq/L (That is <math>2 \times 10^{-2} A_2/g</math>); or,</p> <p>Other material in which the activity is distributed throughout and the estimated average specific activity 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>Please see paragraphs 408 and 409 for a description of this material, paragraph 410 for restrictions on the total activity that a package of it may contain if transported by air, and paragraph 411 for restrictions on the radiation level of packages containing it.</p>
<b>LSA III</b>	<p>Radioactive material that is distributed throughout a solid or a collection of solid objects, and is relatively insoluble, so that the loss of radioactive material per package by leaching when placed in water for seven days would not exceed <math>0.1 A_2</math>; and</p> <p>The estimated average specific activity of the solid, excluding any shielding material, does not exceed <math>2 \times 10^{-3} A_2/g</math>.</p> <p>Please see paragraphs 408 and 409 for a description of this material, paragraph 410 for restrictions on the total activity that a package of it may contain if transported by air, and paragraph 411 for restrictions on the radiation level of packages containing it.</p>

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<sup>2</sup> This guide often refers to  $A_1$  and  $A_2$  values. These values are given in Table 2 of IAEA document TS-R-1, which begins on page 25 of that document. The  $A_1$  values apply to special form radioactive material, and the  $A_2$  values apply to all other radioactive material. Please see Paragraphs 427-429 of TS-R-1.

<b>Name of Classification</b>	<b>Description</b>
<b>Surface Contaminated Object (SCO) I</b>	<p>A solid object which is not itself radioactive but which has radioactive material distributed on its surface, such as a contaminated tool. Limits are specified for the amounts of fixed surface contamination, non-fixed surface contamination and their sum. Limits are also set for the external radiation level for the unshielded objects and for the total activity in a single hold or compartment.</p> <p>Please see paragraphs 412 and 413.</p>
<b>SCO II</b>	<p>An object like an SCO I object, whose limits for fixed surface contamination are 20 times as high and whose limits for non-fixed contamination levels are 100 times as high as for an SCO I object. The limits for the external radiation level for the unshielded objects and for the total activity in a single hold or compartment are the same as for SCO I.</p> <p>Please see paragraphs 412-414.</p>
<b>Special form radioactive material</b>	<p>Radioactive material in an accident-tested, non-dispersible form. It has at least one dimension of not less than 5 mm, and passes a prescribed set of impact, percussion, bending, heat and leach tests. Its design must be approved by a competent authority (such as the regulatory agency in the nation where it was made), and must have an approval certificate. It may be a sealed capsule.</p> <p>When a sealed capsule constitutes part of the special form radioactive material, the capsule must be manufactured so that it can be opened only by destroying it.</p> <p>Please see paragraphs 415, 602-604 and 704-711.</p>
<b>Low dispersible radioactive material</b>	<p>Low dispersible material must pass a leach test, meet a radiation level requirement and meet airborne release limits following thermal and impact tests (see paragraphs 605, 736 &amp; 737). Its design must be approved by a competent authority, and it must have an approval certificate.</p> <p>Please see paragraphs 416, 605, 736, and 737.</p>
<b>Fissile material</b>	<p>Material containing uranium-233, uranium-235, plutonium-239 or plutonium-241, excluding unirradiated natural uranium or depleted uranium. Fissile material packages and consignments are subject to restrictions on mass, enrichment, and other materials present.</p> <p>Please see paragraphs 417, 418 and 671-683.</p>
<b>Uranium hexafluoride</b>	<p>Uranium hexafluoride in solid form and at an internal pressure no greater than atmospheric pressure when presented for transport.</p> <p>Please see paragraphs 419 and 420.</p>

#### 4. Package Selection

When you have determined the characteristics of the radioactive material you plan to ship, you will need to identify an appropriate shipping package. The Authority has established eight types of packages and the properties of the radioactive materials they may contain. A graded approach is used, so that package types that are permitted to contain more hazardous radioactive materials must meet more stringent performance standards. Table 2 contains a description of these eight packages and the limitations on the materials they may contain. By comparing the characteristics of the material you plan to ship with the shipping package requirements, you will be able to identify the types of packages that you will be allowed to use. For combinations of radioactive materials, please see paragraph 429.

*Hint:* Based on the limits in Table 2 and typical activity values for sources, well logging sources and fixed and portable gauges are likely to require Type A packages. Industrial radiography, radiotherapy and irradiator sources are likely to require Type B(U) packages.



**Table 2 – Classification of Transportation Packages**

Package name	Description	Limitations <sup>3,5</sup>	Requirements Paragraphs <sup>4,5</sup>
<b>Excepted Package</b>	Excepted packages are packages in which the allowed radioactive content is restricted to such low levels that the potential hazards are insignificant and therefore no testing is required with regard to containment or shielding integrity.	Excepted packages may be: <ul style="list-style-type: none"> <li>a) Empty packages that have contained radioactive material;</li> <li>b) Packages containing instruments or articles in limited quantities as specified in Table 5 on page 52 of IAEA TS-R-1;</li> <li>c) Packages containing articles manufactured of natural uranium, depleted uranium or natural thorium;</li> <li>d) Packages containing radioactive material in limited quantities as specified in Table 5 on page 52 of IAEA TS-R-1. (Paragraph<sup>5</sup> 422)</li> </ul> The radiation level at any point on the external surface of an excepted package may not exceed 5 µSv/h. (Paragraph 515)	230, 421–426, 514, 515, 541, 620, 815, 828, 829

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<sup>3</sup> the Authority strongly recommends that shippers also review the requirements paragraphs in this table to be sure their packages fully comply with Regulation 13.

<sup>4</sup> The paragraph numbers in this guide refer to the paragraphs in IAEA document TS-R-1, *Regulations for the Safe Transport of Radioactive Material, 2009 Edition*, which the Authority Regulation 13 incorporates by reference.

<sup>5</sup> Note that for all transportation packages, paragraphs 617-619 in TS-R-1 are not requirements, as clarified in REG-13, Article (3) (3).

Package name	Description	Limitations	Requirements Paragraphs <sup>5</sup>
<b>Industrial package Type IP-1</b>	Type IP-1 packages simply contain their radioactive contents under routine transport conditions.	<p>Only LSA-I and SCO-I material may be shipped in these packages. Further, LSA-I liquids in these packages must be shipped under exclusive use of a conveyance or container. That is, no one else may use the vehicle or freight container that carries your package. See Table 6 on page 62 of IAEA TS-R-1. (Paragraph 519)</p> <p>The quantity of material must be restricted so that the external radiation level from the unshielded material at 3 m does not exceed 10 mSv/h. (Paragraph 516)</p>	230, 516, 519, 520, 532, 606 – 616, 621, 634, 815
<b>IP-2</b>	Type IP-2 packages protect against loss or dispersal of their contents and loss of shielding under normal conditions of transport, which include minor mishaps (see paragraph 106).	<p>These packages may be used for LSA-I, LSA-II, LSA-III, SCO-I and SCO-II material. However, LSA-II liquids and gases and LSA-III material must be shipped under exclusive use of a conveyance or container. See Table 6 on page 62 of IAEA TS-R-1. (Paragraph 422).</p> <p>The quantity of material must be restricted so that the external radiation level from the unshielded material at 3 m does not exceed 10 mSv/h. (Paragraph 516)</p>	230, 516, 520, 532, 606-616, 622, 624-628, 634, 717, 722, 723, 815
<b>IP-3</b>	Type IP-3 packages protect against loss or dispersal of their contents and loss of shielding under normal conditions of transport, which include minor mishaps, (see paragraph 106), and provide the same package integrity as a Type A package intended to carry solids.	<p>These packages may be used for LSA-I, LSA-II, LSA-III, SCO-I and SCO-II material, and exclusive use of a conveyance or container is not required. See Table 6 on page 62 of IAEA TS-R-1. (Paragraph 422)</p> <p>The quantity of material must be restricted that so the external radiation level from the unshielded material at 3 m does not exceed 10 mSv/h. (Paragraph 516)</p>	230, 516, 520, 532, 606-616, 623, 624-628, 634-647, 815

Package name	Description	Limitations	Requirements Paragraphs <sup>5</sup>
<b>Type A</b>	<p>Type A packages are intended to provide economical transport for large numbers of low activity consignments, while at the same time achieving a high level of safety. They are designed to survive normal transport conditions (minor mishaps and rough handling). Type A packages are limited to non-life-endangering amounts of radioactive material.</p> <p>Design approval by a competent authority is not required, except for packages containing fissile material.</p>	<p>Type A packages may not contain activities greater than the <math>A_1</math> and <math>A_2</math> amounts shown in Table 2, Basic Radionuclide Values, which begins on page 25 of IAEA document TS-R-1.</p> <p>Please see paragraphs 427-429.</p>	230, 427–429, 532, 633–649, 680, 725, 815, 828
<b>Type B(U)</b>	<p>A Type B(U) package is capable of withstanding most of the severe accident conditions in transport without loss of containment or increase in external radiation level to an extent which would endanger the general public or those involved in rescue or cleanup operations.</p> <p>The designation “(U)” refers to unilateral (U) approval of the Type B package design. That is, the package design is approved by the country of origin.</p>	<p>The limits of the contents of a Type B(U) package depend on its design. It may not contain:</p> <ul style="list-style-type: none"> <li>a) Activities greater than those authorised for the package design;</li> <li>b) Radionuclides different from those authorised for the package design; or</li> <li>c) Contents in a form or a physical or chemical state different from those authorised for the package design.</li> </ul> <p>Please see paragraph 431.</p> <p>Paragraph 433 sets upper limits on the activities that may be contained in a Type B(U) package that is transported by air.</p>	230, 430, 431, 433, 501, 502, 533, 534, 555, 650–664, 680, 730, 802, 806, 808, 828

Package name	Description	Limitations	Requirements Paragraphs <sup>5</sup>
<b>Type B(M)</b>	<p>A Type B(M) package, like a Type B(U) package is capable of withstanding most of the severe accident conditions in transport without loss of containment or increase in external radiation level to an extent which would endanger the general public or those involved in rescue or cleanup operations.</p> <p>The designation “(M)” refers to multilateral (M) approval of the Type B package design. That is, the package design is approved by each country through or into which the package is to be transported.</p>	<p>The limits of the contents of a Type B(M) package depend on its design. It may not contain:</p> <ul style="list-style-type: none"> <li>a) Activities greater than those authorised for the package design;</li> <li>b) Radionuclides different from those authorised for the package design; or</li> <li>c) Contents in a form or a physical or chemical state different from those authorised for the package design.</li> </ul> <p>Please see paragraph 432.</p> <p>Paragraph 433 sets upper limits on the activities that may be contained in a Type B(M) package that is transported by air.</p>	<p>230, 430, 432, 433, 501, 502, 533, 534, 555, 665, 666, 680, 730, 802, 809–811, 820, 828, 829, 833</p>
<b>Type C</b>	<p>A Type C package is capable of withstanding severe accident conditions in air transport without loss of containment or increase in external radiation level to an extent that would endanger the general public or those involved in rescue or cleanup operations.</p>	<p>The limits of the contents of a Type C package depend on its design. It may not contain:</p> <ul style="list-style-type: none"> <li>a) Activities greater than those authorised for the package design;</li> <li>b) Radionuclides different from those authorised for the package design; or</li> <li>c) Contents in a form or a physical or chemical state different from those authorised for the package design.</li> </ul> <p>Please see paragraph 434.</p>	<p>230, 430, 434, 501, 502, 533, 534, 555, 667–670, 680, 730, 734–737, 802, 806, 808, 828</p>

## 5. Hazard Indices

You will need to establish a Transport Index and a Category for your package and, if you are shipping fissile material, a Criticality Safety Index. The Transport Index is used to set radiation protection measures and is used along with surface radiation levels to assign packages to Categories that reflect their hazards. The Category is used to set requirements for marking and labeling packages and to determine your documentation and notification responsibilities. The Criticality Safety Index is used to set criticality safety measures and to control the amount of fissile material in a collection of packages in a consignment.

### a. Transport Index

- You can establish the Transport Index of your package by measuring its maximum radiation level in millisieverts/hour at 1 m from its external surface. The Transport Index is this radiation level multiplied by 100. If you need to determine the Transport Index for a freight container or conveyance, please see paragraphs 521 and 522.
- If the Transport Index of your package or overpack exceeds 10 you must ship it as an exclusive use consignment. That is, no one else may use the vehicle or freight container that carries your package and all initial, intermediate and final loading and unloading must be carried out in accordance with the your directions or the Receiver's directions. Please see paragraphs 521 and 524.
- You should know that there is a limit to the sum of the Transportation Indices in a freight container or conveyance, including vehicles, inland waterway craft, seagoing vessels and aircraft. Please see paragraph 563 for further information.

### b. Category

- You must assign your package to one of three categories depending on its Transport Index and the maximum radiation on its surface. These three categories, in order of increasing hazard, are I-WHITE, II-YELLOW and III-YELLOW. These categories are assigned in accordance with Table 3 below. If the Transport Index and the surface radiation level of a package lie in different categories, you must use the higher category. Please see paragraph 527.

**Table 3 – Categories of Packages**

TI	Maximum radiation level 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 Transported under exclusive use or special arrangement.

<sup>a</sup> If the measured TI is not greater than 0.05, the value quoted may be zero.

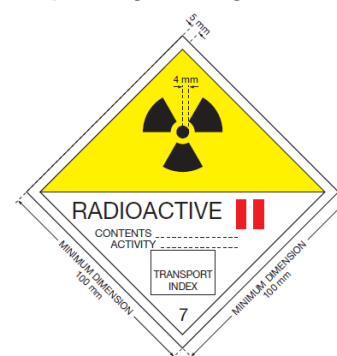
c. Criticality Safety Index

- If your package contains fissile material, you must determine its Criticality Safety Index (CSI). The CSI is a number assigned to a package or other container containing fissile material, and is used to control the amount of fissile material in the collection of these items in a consignment. The CSI is calculated from the maximum number of packages that will remain subcritical under normal transportation and under accident conditions. Please see paragraphs 523, 524 and 681-683 for further information.
- You should know that there is a limit to the sum of the Criticality Safety Indices in a freight container or conveyance, including vehicles, inland waterway craft, seagoing vessels and aircraft. Please see paragraph 563 for further information.

6. Package Marking and Labelling

a. You must mark and label your packages. You must mark them legibly and durably on the outside with either your identification or the Receiver's identification (both are preferred) and the UN (United Nations) number. The UN number will depend on the kind of radioactive material being transported and the kind of package being used. Please see paragraphs 529-535 on marking and paragraph 401 and Table 1 on page 22 of IAEA document TS-R-1 for UN numbers.

b. Your package must also have a label like the example on the right. Three labels are used, I-White, II-Yellow, or III-Yellow. The label must correspond to the Category of your package as discussed in section 5.b above. The label must show the contents, that is the name(s) of the radionuclide(s) in the package, the activity in Becquerels,



and the Transport Index. If a package contains fissile material it requires an additional label. Please see paragraphs 536-540 for details.

## 7. Information Requirements

In addition to marking and labelling, you must meet four kinds of information requirements, which are discussed below. These are the particulars of the consignment, the Consignor's (Shipper's) certification, information for Carriers, and notification of the Authority and others.

- a. The particulars of consignment are the transportation documents that you must give the Carrier. They include information about the Shipper, the Receiver, the name, activity and form of the material being shipped, the UN number, the Category and the Transport Index. Please see paragraph 544 for a complete list of these information requirements.
- b. The Consignor's (Shipper's) certification is a statement that you must sign that is included in the transportation documents. It certifies that the contents of the package are in proper condition for transport and are fully and accurately described. Please see paragraphs 545-551 for the text of this statement and its requirements.
- c. The information for Carriers is a statement that you must provide to the Carrier regarding any actions that the Carrier must take, including requirements for handling, loading, carrying, and unloading, any transportation restrictions and any emergency arrangements. Please see paragraphs 552-553 for more information.
- d. You must notify the Authority and others about shipments as required by FANR-REG-13 and your licence conditions.
  - Your licence contains a condition that requires you to notify the Authority at least 24 hours in advance (during working days) each time you transport a radioactive source outside your facility<sup>6</sup>. FANR-REG-23 contains additional notification and approval requirements for some sources,
  - FANR-REG-13 requires you to notify the Authority and the competent authority of each country through or into which the package will be transported prior to shipping (and preferably at least 7 days in advance) any Type B(M) package or shipping Type B(U) or Type (C) packages containing more than specified amounts of activity. Please see paragraph 555.
  - FANR-REG-13 also requires you to provide a package design certificate to the Authority and to the competent authority of each country through or into which the

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<sup>6</sup> A notification form may be obtained from the Authority by emailing [FANR.Licensing@fanr.gov.ae](mailto:FANR.Licensing@fanr.gov.ae) . The Authority will review notifications promptly and contact you if the Authority has questions. If the Authority does not contact you, the source may be transported as scheduled.

package will be transported, at least seven (7) days before the first shipment of any package that requires the Authority approval. Please see paragraph 554.

## 8. Recordkeeping

Although FANR-REG-13 does not establish requirements for how long records are to be kept, the Authority recommends that Shippers keep records of all shipments for at least one year after their transport has been completed.

## **Guidance for Carriers**

### **Article (4)**

#### 1. Licence Requirements

- a. You must be licensed by the Authority to transport radioactive materials. If you do not have a licence that authorises you to transport these materials, you must apply to the Authority for this authorization. If you are not otherwise licensed by the Authority and want to become licensed for transportation, please consider applying for a licence that includes possession and storage of the materials that you plan to transport, because transportation is likely to involve these activities as well.
- b. You should also know that a licence from the Authority does not exempt you from any other transportation requirements that other agencies may apply. For example, all United Arab Emirate's and all individual Emirates' requirements for commercial vehicles and all Civil Defence requirements for the transport of hazardous materials will apply. If you transport radioactive material outside the State, you will be required to comply with applicable regulations of the receiving country and any countries that the shipment may transit. If you plan to ship a package by air, you must comply with the Civil Air Regulations that govern transport by air in addition to the requirements in FANR-REG-13, particularly including the requirements in FANR-REG-13 that apply specifically to air transport.

#### 2. Worker Training

You are required to train the workers who are involved in transporting radioactive material. This includes persons who accept radioactive material for transport; carry or handle radioactive material in transport; mark, placard, load or unload packages of radioactive material; and persons who may be involved in emergency response. Your training program should reflect job analyses and include procedures, instructions, practical demonstrations, and testing. The Authority strongly recommends that you ensure that your workers are formally trained and qualified before moving on to the next steps. Please see paragraphs 311-315.



### 3. Vehicle Requirements

- a. You will need to transport radioactive material in a vehicle that complies with United Arab Emirates requirements for commercial vehicles and any additional requirements of agencies such as Civil Defence and the Department of Transport for the transport of hazardous materials. The Authority has set no additional requirements for the capabilities of these vehicles.
- b. The Authority does require that shipments of packages or overpacks with a Transport Index that is greater than 10 or a Criticality Safety Index greater than 50 are shipped as exclusive use consignments. That is, no one else may use the vehicle or freight container that carries such a package and all initial, intermediate and final loading and unloading must be carried out in accordance with the Shipper's or Receiver's directions. Please see paragraphs 521 and 524.
- c. The Authority has established limits on sum of the Transportation Indices and the sum of the Criticality Safety Indices in a freight containers or conveyances, including vehicles, watercraft, seagoing vessels and aircraft. These are provided in Table 11 and Table 12 of TS-R-1, respectively.

### 4. Package Acceptance

- a. Before you accept a package from a Shipper, you should first confirm that all of the required shipping documents are present, that they contain the required information, and that they are consistent with the package(s) you are being asked to carry. These required documents are the particulars of the consignment, the Consignor's (Shipper's) certification and the information for Carriers. In more detail:
  - The particulars of consignment include information about the Shipper, the Receiver, the name, activity and form of the material being shipped, the UN number, the Category and the Transport Index. Please see paragraph 544 for a complete list of these information requirements.
  - The Consignor's (Shipper's) certification is a statement that the contents of the package are in proper condition for transport and are fully and accurately described. Please see paragraphs 545-551 for the text of this statement and its requirements.
  - The information for Carriers gives direction for any actions that you as the Carrier must take, including requirements for handling, loading, carrying, and unloading; any transportation restrictions; and any emergency arrangements. Please see paragraphs 552-553 for more information.
- b. After you confirm that the documents are in order and that they are consistent with the packages to be shipped, you should be sure you understand the directions in the information for Carriers and that you are capable of carrying them out if needed.

- c. Next, you should use a radiation survey meter to confirm the Transport Index. The Transport Index is the maximum radiation level in millisieverts/hour at 1 m from the surface of the package, multiplied by 100.

If

- The documents are not in order;
- Your instructions from the Shipper are not clear or if you cannot carry them out;
- The measured Transport Index is significantly greater than the Transport Index on the label;
- It is evident that the package is damaged or leaking; or
- You suspect that the package may have leaked or been damaged;

Then

- Do not accept the package.

#### 5. Loading, Stowage and Storage in Transit

- a. You must segregate and stow packages during transport and in-transit storage to protect the public, to provide criticality safety and to avoid other dangerous materials.
- b. You must segregate packages and containers from regularly occupied working areas; from areas where the public has regular access; from undeveloped photographic film; and from other dangerous goods such as explosive, flammable and corrosive materials. Please see specific criteria in paragraph 559.
- c. You must load and stow packages securely under restrictions that reflect their Transport Index; the radiation levels at and near the surfaces of your vehicle; any heat the packages may give off; and their Criticality Safety Index if applicable. Further, packages with a Transport Index greater than 10, and consignments with a Criticality Safety Index greater than 50 may only be transported under exclusive use. Please see specific criteria in paragraphs 561-564.
- d. If you carry packages under exclusive use, the radiation level at any point on the outer surfaces of the vehicle may not exceed 2 mSv/h. The radiation level at any point on the outer surfaces of the packages themselves may not exceed 10 mSv/h, and may exceed 2 mSv/h only if the packages are secured so they cannot move during transport, the vehicle is enclosed to prevent access, and there is no loading or unloading during shipment. Please see specific criteria in paragraph 572.
- e. You may not carry Category II-YELLOW or III-YELLOW packages or overpacks in compartments occupied by passengers other than authorised couriers. If they are carried by road vehicles, only the driver and assistants are permitted in the vehicles.

## 6. Placarding

If your vehicle carries a package with a I-White, II-Yellow, or III-Yellow label like the one shown in Figure A, your vehicle must display a placard like the one in Figure B on the two outside side walls and the outside rear wall of your vehicle. If your vehicle has no sides, the placards may be affixed directly on the cargo carrying unit provided that they are readily visible on all sides. Please see paragraphs 541-543 and 567 for details.

Figure A

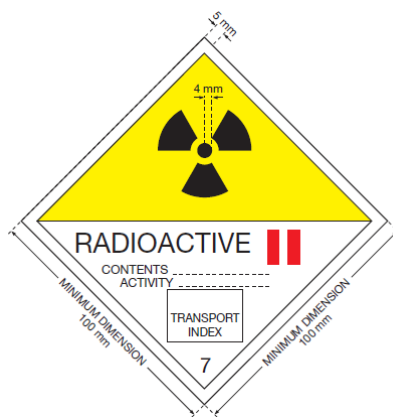


Figure B



## 7. Emergency Preparedness

In case of an emergency, follow the emergency instructions that you were given in the Shipper's information for Carriers. If you cannot follow the emergency instructions for any reason, or if you have any reason to believe the emergency may cause you or the public to be exposed to contamination or excessive radiation, notify the Authority immediately by calling 050-641-6533.

## 8. Undeliverable Packages

As the licensed Carrier, the package is your responsibility until it is accepted by the Receiver or returned to the Shipper. If you find that a package is undeliverable, place it in a safe location that is under your control, notify the Shipper and the Authority as soon as possible and ask for instructions. (Paragraph 579)

## 9. Recordkeeping

Although FANR-REG-13 does not establish requirements for how long records are to be kept, the Authority recommends that Carriers keep records of all shipments for at least one year after transportation has been completed.

## Guidance for Receivers

### Article (5)

#### 1. Licensing

You must be licensed by the Authority to possess, handle, or store radioactive material. Your licence will set limits on the types of radioactive material and the radionuclides, and total activities that you may possess. Before you accept any shipment of radioactive material, you must confirm that the total amount of material you will possess will still be within these limits.

#### 2. Worker Training

You are required to train the workers who are involved in receiving radioactive material. Workers who must be trained include persons who confirm receipt of shipments, perform radiation and contamination surveys of materials upon receipt and unload and open packages. Your training program should reflect job analyses and include procedures, instructions, practical demonstrations, and testing. The Authority strongly recommends that you ensure that your workers are formally trained and qualified before moving on to the next steps. Please see paragraphs 311-315.

#### 3. Package Acceptance

a. Before you accept a package from a Carrier, you should first confirm that the appropriate shipping documents are present, that they contain the required information, and that they are consistent with the package(s) you are being asked to receive. These documents are the particulars of the consignment and the information for Carriers. In more detail:

- The particulars of consignment include information about the Shipper, the Receiver, the name, activity and form of the material being shipped, the UN number, the Category and the Transport Index. Please see paragraph 544 for a complete list of these information requirements.
- The information for Carriers gives direction for any actions that you as the Receiver must take, including requirements for unloading and any emergency arrangements.

b. After you confirm that the documents are in order, you should be sure that you understand any unloading directions and that you can carry them out.

c. Next, you should use a radiation survey meter to confirm the Transport Index. The Transport Index is the maximum radiation level in millisieverts/hour at 1 m from surface of the package, multiplied by 100.

If

- The documents are not in order;

- Your unloading instructions from the Shipper are not clear or if you cannot carry them out;
- The measured Transport Index is significantly greater than the Transport Index on the label;
- It is evident that the package is damaged or leaking; **or**
- You suspect that the package may have leaked or been damaged,

Then

Do not unload or otherwise touch or move the package. Contact the Shipper for further directions. If you have any reason to believe that the package may cause you or the public to be exposed to contamination or excessive radiation, notify the Authority immediately at 02-651-6666 between 9:00 AM and 4:00 PM, Sunday through Thursday, or 050-641-6533 outside these hours.

#### 4. Notification of the Authority of receipt

When you receive a source you need to add it to your inventory and notify the Authority so it can add the source to its record of your inventory. The information that you should provide to the Authority is shown in Appendix I. If you receive a device to be used with a radioactive source, such as an industrial radiography projector or camera, that information should also be provided. You should provide this information in time for the Authority to receive it no more than ten (10) business days after your receipt of the source.

#### 5. Recordkeeping

Although FANR-REG-13 does not establish requirements for how long records are to be kept, the Authority recommends that Receivers keep records of all shipments for at least one year after their receipt.

## Appendix I – Source Receipt Information Required by the Authority

### Article (6)

<b>Source Information</b>
Radionuclide
Activity
Date activity was measured
IAEA Category
Type of source/how it is used
Source Manufacturer
Model number of source
Serial number of source
Source status
Contact person
Telephone number of contact person
Date notification was prepared
<b>Device Information</b>
Type of device
Manufacturer
Model number of device
Serial number of device
<b>User Information</b>
Name of business holding licence
the Authority licence number
Address where source is located
Transfer Information
Type of transfer (import, transfer from another licensee)
Date of receipt
Comments

## References

### Article (7)

1. Regulation for the Physical Protection for Nuclear Materials and Nuclear Facilities, FANR Regulation 08, April 2010
2. Regulation for the Safe Transport of Radioactive Materials, FANR Regulation 13, April 2010
3. Security of Radioactive Sources, FANR Regulation 23, May 2011
4. Regulations for the Safe Transport of Radioactive Material, IAEA Safety Requirements No. TS-R-1, 2009
5. Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material, IAEA Safety Guide No. TS-G-1.1 (ST-2), 2002