

Executive Order No. 993 of 05/12/2001
Ministry of Health, Danish Health Authority

Executive Order on Transport of Radioactive Material¹

Pursuant to sections 2 and 5 of Act No. 94 of 31 March 1953 on Use, etc. of Radioactive Material and by authority in accordance with Section 4 (2) of Executive Order No. 574 of 20 November 1975 on Safety Measures for the Use Etc. of Radioactive Material, the following shall apply:

Chapter 1

Definitions

§ 1. In this Executive Order, the following definitions shall apply:

- 1) Exclusive use:
A single consignor's use of an entire vehicle, an entire railway wagon, an entire aircraft or ship, a fully delimited cargo space or deck area of a ship, or a large freight container of a minimum length of 6 m, the loading and unloading of which are carried out in accordance with the consignor's or the consignee's instructions.
- 2) Special form radioactive material:
A radioactive substance in indispersible solid form or in a sealed capsule that complies with the strength and impermeability requirements of the transport regulations.
- 3) Low dispersible radioactive material:
A radioactive substance in solid form or in a sealed capsule that has limited dispersibility and is not in powder form.
- 4) Special arrangement:
A shipment that does not comply with all the applicable, ordinary transport regulations, but where other precautions have been taken and approved in writing by the competent authority so that the level of safety is not impaired.
- 5) Transport:
Relocation and any operation involving loading, unloading, in-transit storage and handling on Danish territory. Transport therefore includes shipments to and from Danish consignees and consignors, and shipments transiting Danish territory.
- 6) Type B package:
A package containing radioactive material of such concentration that particularly durable packaging

is required. A distinction is made between Type B(U) packages requiring approval by the authorities of the country of origin (unilateral approval) and Type B(M) packages requiring approval by the authorities of all countries concerned (multilateral approval).

- 7) Type C package:
Packages for carriage by air containing radioactive material of such a nature and such a concentration that particularly durable packaging is required.

Chapter 2

General regulations

§ 2. The regulations for the transport of radioactive material are drawn up on the basis of the International Atomic Energy Agency's (IAEA) Regulations for the Safe Transport of Radioactive Material (1996 edition); cf. Annex 1.

(2) The Danish Health Authority, Radiation Protection acts as the Danish competent authority for the transport of radioactive material in accordance with the regulations referred to in (1) and Section 3 and the specific regulations issued pursuant thereto for each mode of transport; cf. Appendix 2.

§ 3. In addition to the provisions of this Executive Order, the following shall apply:

- 1) For carriage by rail of radioactive material, the regulations laid down by the Ministry of Transport and Housing, the Danish Transport, Construction and Housing Authority and the Danish Road Safety Agency.
- 2) For carriage by air of radioactive material, the regulations laid down by the Ministry of Transport and Housing and the Danish Transport, Construction and Housing Authority.
- 3) For carriage by sea of radioactive material, the regulations laid down by the Ministry of Industry, Business and Financial Affairs and the Danish Maritime Authority.
- 4) For carriage by road of radioactive material, the regulations laid down by the Ministry of Justice and the Danish Road Safety Agency.

(2) See the summary in Annex 2.

¹ This Executive Order contains provisions implementing Council Directive 96/29, Official Journal of the European Communities L. 159, p. 1.

§ 4. Shipping of radioactive material by mail to or from Denmark is prohibited. Transport by post within Denmark is permitted only to the extent and under the conditions stipulated by the Ministry of Transport and Housing following negotiation with the Danish Health Authority.

Chapter 3

Special approvals and notifications

§ 5. Preparation of shipments containing radioactive material and their shipment from a Danish consignor is conditional on the consignor already holding licence for the use, etc. of radioactive material in accordance with Act No. 94 of 31 March 1953 and the consignor's organisation having an approved radiation protection officer.

§ 6. Danish consignors commencing use of a transport packaging for which there is a certificate of approval for the package design from a competent authority must, before the first shipment, forward a copy of the certificate for this to the Danish Health Authority with information on the packaging's serial number. Any revised certificate of approval shall likewise be submitted to the Danish Health Authority.

§ 7. Carriers (common or contract), etc. who transport radioactive material or store it in transit shall notify this to the Danish Health Authority. However, undertakings that have already been licenced by the Danish Health Authority for use of radioactive material in accordance with Act No. 94 of 31 March 1953, are exempted from notification.

(2) The Danish Health Authority may lay down requirements for the approval of a radiation protection officer, for the design of temporary storage, for safety training of personnel and radiological monitoring of personnel, etc.

(3) Special temporary storage shall generally be shielded so that no one outside that storage could incur exposure to radiation exceeding the dose limits for members of the public in the Danish Health Authority's Executive Order No. 823 of 31 October 1997 on Dose Limits for Ionising Radiation. The dose rate must not exceed 7.5 µSv/h on the exterior of the temporary storage. The dose rate at workplaces near the temporary storage shall be kept as low as reasonably achievable and must not exceed 2.5 µSv/h. The temporary storage shall be equipped with a warning sign bearing the symbol for ionising radiation and the legend: 'RADIOACTIVE'.

§ 8. Carriers (common or contract) who carry out shipments of radioactive material which, in accordance with the provisions referred to in Sections 2 and 3, require prior notification of each shipment to the

competent authorities, or who carry consignments under exclusive use, must be approved to do so by the Danish Health Authority. The Danish Health Authority may lay down conditions for such approval.

Chapter 4

Approvals and prior notification in accordance with the specific regulations for each mode of transport

§ 9. If the specific regulations; cf. Annex 2, require a certificate of approval from the Danish competent authority for the design of special form radioactive material or of low dispersible radioactive material, this will be issued by the Danish Health Authority regardless of the mode of transport.

(2) The application submitted to the Danish Health Authority shall contain:

- 1) A description of the radioactive material with reference to its physical and chemical states.
- 2) A statement of the design of any sealed capsule to be used.
- 3) A statement of the tests that have been carried out and their results, or calculative or other evidence to show that the special form radioactive material meets the quality requirements.
- 4) Documentation of a quality assurance programme for the design, manufacture and testing of the special form radioactive material.
- 5) Any proposed pre-shipment actions for special form radioactive material or low dispersible radioactive material.

§ 10. Where the specific regulations, cf. Annex 2, require a certificate of approval from the Danish competent authority for the design of a transport package, this will be issued by the Danish Health Authority regardless of the mode of transport.

(2) For a Type B(U) package design and a Type C package design, the application submitted to the Danish Health Authority shall contain:

- 1) A description of the proposed radioactive content with respect to its physical and chemical states and to the nature of the radiation emitted.
- 2) A statement regarding the design, including complete engineering drawings and descriptions of the materials and manufacturing methods employed.
- 3) A statement of the tests that have been carried out and their results, or calculative or other evidence to show that the design meets all applicable requirements.
- 4) Proposed operating and maintenance instructions for the use of the packaging.
- 5) If the package is designed to withstand a maximum normal operating pressure of more than 100 kPa gauge (1.0 bar), the application shall specify the

samples to be taken and tests to be made regarding the design of the containment system, and procedural descriptions shall likewise be enclosed.

- 6) Where the planned radioactive contents are spent reactor fuel, a statement of justification of any assumption in the safety analysis regarding the characteristics of that fuel.
- 7) Information on all special stowage provisions necessary to ensure the safe dissipation of heat from the package considering the various modes of carriage to be used and the type of vehicle or container.
- 8) A reproducible illustration, no larger than 21 cm by 30 cm, which shows the mark-up of the package.
- 9) Documentation of a quality assurance programme for the design, manufacture, testing, use and maintenance of the packaging.

(3) For a Type B(M) package design, the application submitted to the Danish Health Authority shall, in addition to (2), contain:

- 1) A list of the specific requirements for Type B(U) packages with which the Type B(M) package does not conform.
- 2) Information on operational controls during transport which are necessary to guarantee the safety of the package due to the non-conformities specified in No. 1. These may consist of interventions for temperature or pressure measurements, intermittent venting, etc., including taking into account the possibility of unexpected delay.
- 3) Detailed information on all restrictions on the mode of transport and on all special loading, stowage, transport and unloading procedures.
- 4) The impact of ambient conditions (temperature, insolation) that are expected to be encountered during carriage and which have been taken into account in the design.

(4) In addition, for a package design for fissile material, all the necessary information shall be provided to demonstrate that the design meets the applicable technical requirements.

(5) Packages with an internal design pressure exceeding 10 kPa (0.1 bar) shall also be approved by the Danish Working Environment Authority in accordance with applicable regulations for transportable pressure vessels.

§ 11. Where the specific regulations: cf. Annex 2, require a certificate of approval from a Danish competent authority for shipment approval, this will be issued by the Danish Health Authority for carriage by rail and road; by the Danish Transport, Construction and Housing Authority for carriage by air; and by the Danish Maritime Authority for carriage by sea.

(2) In all instances, the application shall be submitted to the Danish Health Authority, which following technical processing of an application for carriage by air or sea, forwards it to the Danish Transport, Construction and Housing Authority or the Danish Maritime Authority.

(3) The application shall contain:

- 1) Information on the period for which approval is sought.
- 2) Information on the radioactive content to be shipped, the expected modes of transport, the nature of the vessels and vehicles and the proposed transport route.
- 3) Detailed information on how the special precautions and special administrative or operational controls referred to in the certificate of approval for the package design will be implemented.

§ 12. Approval of shipments of radioactive material under special arrangement in accordance with the specific regulations, cf. Annex 2, is granted for carriage by rail and by road by the Danish Health Authority; for carriage by air by the Danish Transport, Construction and Housing Authority; and for carriage by sea by the Danish Maritime Authority.

(2) In all instances, the application shall be submitted to the Danish Health Authority, which following technical processing of an application for carriage by air or sea, forwards it to the Danish Transport, Construction and Housing Authority or the Danish Maritime Authority.

(3) The application shall contain:

- 1) A statement of the points where the consignment does not fully comply with the applicable normal requirements and there reasons why.
- 2) A statement of any special precautions, including special administrative or operational measures, that are to be employed during transport to compensate for the failure to comply with the applicable requirements.

§ 13. Prior to the first shipment in Denmark of a package for which a certificate of approval is required for the design from a foreign competent authority, the foreign consignor, in accordance with the specific regulations in Annex 2, shall submit a copy of the applicable certificate of approval for the package to the Danish Health Authority.

§ 14. Where the specific regulations; cf. Annex 2, require prior notification to the Danish competent authority of each shipment, the prior notification shall be submitted to the Danish Health Authority.

(2) The prior notification, which must reach the Danish Health Authority as far as possible at least 5

working days before commencement of transport, shall contain:

- 1) Sufficient information to permit identification of the package, including all relevant certificate numbers and identification marks.
- 2) Information on the date of shipment, and on the expected routing and date of arrival.
- 3) The name and description of the radioactive material.
- 4) A description of the physical and chemical form of the radioactive material, and whether it is in special form.
- 5) Information on the maximum activity of the radioactive content during transport. Alternatively, for fissile material, the total mass may be stated.

§ 15. Where the specific regulations; cf. Annex 2, from the Danish competent authority require approval that is not covered by Sections 9-14, an application for this shall be submitted to the Danish Health Authority.

Chapter 5

Requirements for the shipment of radioactive material

§ 16. The supervisor of the use, etc. of radioactive material, cf. Section 5, shall ensure that all the applicable provisions of this Executive Order and of the specific regulations mentioned in Section 3 for each mode of transport have been complied with at the time of shipment of radioactive material, including that all required approvals have been obtained from the competent authorities and that any required prior notifications have been submitted.

(2) The supervisor shall ensure that the personnel responsible for the readying, packaging and marking of consignments of radioactive material due to be transported and who prepare transport documents etc. are qualified to do so and have been informed of all the applicable transport regulations and of the existence of the necessary approvals. The personnel shall have access to relevant manuals and the like and shall be carefully instructed in how to comply with the transport regulations for each shipment. Personnel shall also be carefully instructed on the work and the hazard it poses and on the safety measures to be put in place to prevent any such hazard.

(3) The supervisor shall ensure that the necessary equipment, including measuring instruments, is available during preparation of shipments and that it is kept in good condition and used as stipulated. In addition, the supervisor shall ensure that the equipment is inspected regularly. For accidents, lost shipments and the like, see Chapter 7.

(4) The supervisor shall ensure that a quality assurance programme, commensurate with the nature and scale of the shipments, is established and

implemented to ensure and document compliance with the applicable provisions of the transport regulations.

Chapter 6

Requirements for carriers, etc.

§ 17. Carriers (common or contract), etc. shall ensure that personnel involved in the transport of radioactive material have been instructed in all applicable transport regulations with regard to matters such as loading, in-transit storage, segregation from workplaces, from areas accessible to the public, from other dangerous goods and from undeveloped photographic film, and are familiar with all applicable information provided by the consignor. In addition, personnel shall be instructed in precautions in the event of accidents. The personnel shall also be carefully instructed on achieving compliance with the requirements for each transport. For information on transport and in-transit storage of radioactive material, see Section 7.

(2) Carriers (common or contract), etc. shall ensure that a quality assurance programme, commensurate with the nature and scale of the transport operations, is established and implemented to ensure and document compliance with the applicable provisions of the transport regulations.

(3) Carriers (common or contract), etc. shall ensure that radioactive consignments are transported, stored in transit and transferred to the consignee in such a way that they are protected against theft, fire and other harm, as well as against unauthorised persons coming into contact with them. Concerning accidents, lost shipments and the like, see Chapter 7.

Chapter 7

Accidents, lost shipments and the like

§ 18. If a hazard situation occurs, the personnel of the consignor, carrier (common or contract), consignee and others shall take immediate measures to prevent and control the hazard. If there is certainty or a presumption that a radioactive shipment has been damaged or does not comply with the stipulations of the specific regulations regarding permissible exposure from the shipment, the personnel, emergency workers and others shall immediately ensure:

- 1) that unauthorised persons are evacuated from the area;
- 2) that the area is closed off and kept under constant surveillance;
- 3) that the Danish Health Authority, Radiation Protection (tel. +45 44 94 37 73, 24-hour hotline) and other authorities concerned are notified as soon as possible.

Concerning emergency response to transport accidents involving radioactive material, see also the

guidance: "Handling of Accidents Involving Radioactive Material", Danish Health Authority, Radiation Protection, July 2001. This guidance is available on request from the Danish Health Authority, Radiation Protection, or to download from the authority's website (www.sis.dk).

(2) If a radioactive shipment is discovered or presumed to be damaged or defective, the decision regarding the shipment's onward transport or its disposal as waste, and regarding any clear-up operation, may only be made by experts from an institution or undertaking with approval to do so from the Danish Health Authority.

(3) If a radioactive shipment is discovered to have leaked, the conveyances employed, other freight and other items that came into contact with the defective shipment, as well as personnel, etc., shall undergo testing and decontamination to the extent necessary. This work may only be performed by experts from an institution or undertaking with approval to do so from the Danish Health Authority.

§ 19. If a shipment has been lost or stolen, the Danish Health Authority, Radiation Protection (tel. +45 44 94 37 73, 24-hour hotline) and other authorities concerned shall be notified immediately.

§ 20. Shipments containing radioactive material may only be opened for customs inspection or the like by experts from an institution or undertaking with approval to do so from the Danish Health Authority.

§ 21. In the event that neither the consignor nor the consignee of a shipment can be identified, specific precautionary measures shall be requested from the Danish Health Authority.

Chapter 8

Inspection

§ 22. Radioactive shipments and their accompanying transport documents, the conveyances employed and

transit storage facilities, and undertakings that develop, manufacture and maintain source capsules and transport packaging are subject to inspection by the Danish Health Authority. The Danish Health Authority shall at all times have access to such shipments, locations and undertakings.

§ 23. Requirements for transport packaging, for transport documents and for inspection and maintenance of transport packaging, etc., which the Danish Health Authority may impose at the time of inspection, shall be complied with before expiry of the time limit set by the Danish Health Authority. If necessary, the Danish Health Authority may require a shipment to be stopped until the identified non-compliance has been rectified.

Chapter 9

Contributions

§ 24. The Danish Health Authority will collect the fee referred to in Section 1 (1), second sentence of Executive Order No. 734 of 21 September 1999 on the collection of fees for inspection of safety measures in the field of radioactivity, as amended in Executive Order No. 820 of 18 September 2001.

Chapter 10

Appeals, penalties and entry into force

§ 25. The Danish Health Authority's orders, conditions and other decisions pursuant to this Executive Order may be appealed to the Ministry of Health within four weeks.

§ 26. Any contravention of the provisions of this Executive Order is punishable by fine.

§ 27. This Executive Order enters into force on 1 January 2002.

(2) Executive Order No. 731 of 27 November 1989 on the Transport of Radioactive Material is hereby repealed.

Danish Health Authority, 5 December 2001

JENS KRISTIAN GØTRIK

/Kaare Ulbak

Annex 1

Summary of IAEA guidelines

1. IAEA publications

The International Atomic Energy Agency's (IAEA) guidelines for the safe transport of radioactive material are published in the IAEA's Safety Standard Series. The latest edition is IAEA, Regulations for the Safe Transport of Radioactive Material, 1996 Edition, Revised, Safety Standards Series No. TS-R-1 (ST-1, Revised).

Additional information on the content and use of the IAEA guidelines is provided in the following four publications:

- Advisory Material for the Regulations for the Safe Transport of Radioactive Material (2001), Safety Standards Series No. TS-G-1.1.
- Emergency Response Planning and Preparedness for Transport Accidents Involving Radioactive Material (2001), Safety Standards Series No. TS-G-1.2.
- Compliance Assurance for the Safe Transport of Radioactive Material, Safety Series No. 112.
- Quality Assurance for the Safe Transport of Radioactive Material, Safety Standards Series No. 113.

All of these publications are available to order from IAEA distributors or directly from the International Atomic Energy Agency, Vienna International Centre, PO Box 100, A-1400 Vienna, Austria, www.iaea.org.

Below is a brief descriptive review of the objective and content of the IAEA guidelines. For the precise meaning of the terms used, please refer to the definitions in the IAEA guidelines or in the specific regulations for each mode of transport; cf. Annex 2.

2. The objective of the transport regulations

The objective of the IAEA's recommended "Regulations for the Safe Transport of Radioactive Material" is to protect the general public, transport workers and property from harmful effects of radiation during transport.

This protection is achieved by requiring:

- 1) Containment of the radioactive contents;
- 2) Control of external exposure levels;
- 3) Prevention of criticality;
- 4) Prevention of damage caused by heat.

These requirements are met firstly by applying a graded system to limit the radioactive content of packages and conveyances and to performance standards applied to package designs, depending upon

the hazard of the radioactive contents. Secondly, by specifying requirements for the design and use of packages and for the maintenance of packaging. Finally, by requiring administrative controls, including, in certain cases, approval by competent authorities.

The IAEA guidelines apply to the transport of radioactive material on land, water or in the air.

The term transport comprises all operations and conditions associated with and involved in the movement of radioactive material including the design, manufacture, maintenance and repair of transport packaging, as well as the preparation, consigning, carriage, in-transit storage, unloading and receipt of consignments with radioactive contents.

A graded approach is applied in specifying the performance standards in the guidelines, which are characterised in terms of three general severity levels:

- 1) Routine conditions of transport (incident free)
- 2) Normal conditions of transport (minor mishaps)
- 3) Accident conditions of transport.

3. Package types

The IAEA guidelines refer to five main types of packages (packaging + content), depending on the activity concentration and the nature of the radioactive contents. The five main types are:

- Excepted package
- Industrial package
- Type A package
- Type B package
- Type C package

Excepted package

Excepted packages are permitted to contain only small quantities of radioactive material and are therefore excepted (hence the name) from a number of packaging and marking requirements, provided that they meet a number of general requirements (routine conditions) with regard to packaging, external radiation and contamination. Examples of such packages may be shipments with negligible activity, e.g. timepieces, smoke detectors and radioactive sources for instrument control. The packaging is typically rigid cardboard or the like.

Industrial package

Material with low specific activity (LSA) or surface contaminated objects (SCO) is permitted to be transported in industrial packages. Although the specific activity is very low, the aggregate activity of a consignment may be substantial if there is a high volume of material. The materials include radioactive ores and low level waste (LLW). For industrial packages, the receptacles employed are typically cabinets, steel drums and tanks.

The guidelines define three variants of industrial packages: Type 1 (IP-1), Type 2 (IP-2) and Type 3 (IP-3), where IP stands for Industrial Package. The type to be employed depends on the radioactive material concerned. All industrial packages must meet the general packaging requirements (routine conditions). In addition, Type 2 and Type 3 shall be able to withstand normal conditions of transport without escape of the contents or loss of radiation shielding.

Type A package

In a Type A package, the permitted activity concentration of the radioactive material is limited in such a way that the consequences of a scenario of a 'standard accident' (normal condition), which destroys the packaging, will not result in radiation doses to emergency workers or others above a level corresponding to the applicable international dose limits. The limits on the activity concentration for individual radioactive substances are referred to as the A1 and A2 values and are tabulated in the regulations for each mode of transport.

For a Type A package, it must be documentable by means of testing that the package is capable of withstanding normal conditions of transport without the contents escaping or loss of radiation shielding.

Type A packages range from wooden and cardboard designs with inner receptacles of glass, plastic or metal to metal drums or lead-filled steel containers.

Type B package

Radioactive materials in quantities exceeding those permitted in a Type A package must be transported in a

Type B package. Type B packages must be designed so that they can withstand both the normal effects of transport and the effects of an emergency situation (accident conditions).

In order to document this, for a Type B package design, a series of free drop and impact tests as well as a fire test must be carried out to simulate the circumstances in an emergency, and the package design shall be approved by the authority of the country in which it was designed and manufactured and in some cases also by the authorities of each country through which such a package is transported.

Type B packages range in size from steel receptacles weighing a few kilograms to large containers for transport of irradiated reactor fuel, weighing up to 100 tonnes.

Two variants of Type B packages are specified: Type B(U) and Type B(M). Special requirements are made for the transport of B(M) packages; cf. the IAEA guidelines. U stands for unilateral, M for multilateral, and this means that for B(U) packages, approval must be obtained only in the country of origin, while for B(M) packages, approval must be obtained in all countries in which the package is intended to be used.

Type C package

For the carriage by air of radioactive material, in certain cases, the use of Type C packages is required. For this type of package there are even stricter design and testing requirements than for Type B packages. Type C packages, like Type B packages, must be approved by the authority of the country in which they were designed and manufactured. Type C packages, like Type B packages, are very variable in size and weight, depending on the specific contents.

4. Consignment types and UN numbers

Each of the above-mentioned five main types of packages are further classified into several sub-categories depending on the nature and activity of the radioactive material transported. A distinction is thus made between 14 different types of consignments. Each of these consignment types is assigned a number.

Table 1. Summary of consignment types, UN numbers and proper shipping names

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Consignment type no.	UN number	PROPER SHIPPING NAME and description
1	2910	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - LIMITED QUANTITY
2	2911	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - INSTRUMENTS OR ARTICLES
3	2909	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - ARTICLES MANUFACTURED FROM NATURAL URANIUM OR DEPLETED URANIUM or NATURAL THORIUM
4	2908	RADIOACTIVE MATERIAL, EXCEPTED PACKAGE - EMPTY PACKAGING
5	2912	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-I) non-fissile or fissile-excepted
6	3321	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II) non-fissile or fissile-excepted
7	3322	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III) non-fissile or fissile-excepted
8	2913	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I or SCO-II) non-fissile or fissile-excepted
9	2915	RADIOACTIVE MATERIAL, TYPE A PACKAGE non-special form, non-fissile or fissile-excepted
9	3332	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM non-fissile or fissile-excepted
10	2916	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE non-fissile or fissile-excepted
11	2917	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE non-fissile or fissile-excepted
12	3323	RADIOACTIVE MATERIAL, TYPE C PACKAGE non-fissile or fissile-excepted
13+6	3324	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-II), FISSILE
13+7	3325	RADIOACTIVE MATERIAL, LOW SPECIFIC ACTIVITY (LSA-III), FISSILE
13+8	3326	RADIOACTIVE MATERIAL, SURFACE CONTAMINATED OBJECTS (SCO-I OR SCO-II), FISSILE
13+9	3327	RADIOACTIVE MATERIAL, TYPE A PACKAGE, FISSILE non-special form
13+9	3333	RADIOACTIVE MATERIAL, TYPE A PACKAGE, SPECIAL FORM, FISSILE
13+10	3328	RADIOACTIVE MATERIAL, TYPE B(U) PACKAGE, FISSILE
13+11	3329	RADIOACTIVE MATERIAL, TYPE B(M) PACKAGE, FISSILE
13+12	3330	RADIOACTIVE MATERIAL, TYPE C PACKAGE, FISSILE
14	2919	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT non-fissile or fissile-excepted
14+13	3331	RADIOACTIVE MATERIAL, TRANSPORTED UNDER SPECIAL ARRANGEMENT, FISSILE
a)	2978 ^{b)}	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE non-fissile or fissile-excepted
a)+13	2977 ^{b)}	RADIOACTIVE MATERIAL, URANIUM HEXAFLUORIDE, FISSILE

a) UN numbers 2977 and 2978 represent special cases, with no unambiguous relationship to the consignment type numbers.

b) In addition to being radioactive, uranium hexafluoride is also corrosive.

For use in describing a package with radioactive content in transport documents, etc., the UN numbers recommended by the United Nations are also used together with the proper shipping name (correct technical designation) and a description of the contents and, if applicable, of the packaging type. A complete list of consignment types and UN numbers is provided in Table 1, together with the corresponding proper shipping names and descriptions. The UN number and associated proper shipping name shall be stated on the transport documents and be placed on the exterior of packages.

5. Package categories

All packages of the types from 5 to 14 shall be assigned to a specific category, either 'I-WHITE', 'II-YELLOW' or 'III-YELLOW', in accordance with the IAEA guidelines and the regulations specific to the

mode of transport, based on measurement of the radiation level on the package surface and at a distance of 1 metre from the surface. The package category is determined in accordance with Table 2. Special arrangements and packages transported under exclusive use are subject to special rules. The transport index (TI) is an abstract number indicating the maximum dose rate at a distance of 1 metre from the surface of the package in units of millisieverts per hour (mSv/h) multiplied by 100. The corresponding hazard labels to be applied to the package are shown in Figure 1.

In addition, packages containing fissile materials exceeding a certain quantity shall also be provided with a special fissile materials hazard label indicating the criticality safety index (CSI). This index indicates, with a large margin of safety, how many packages may be stowed together without criticality, i.e. an uncontrolled nuclear fission chain reaction.

Table 2. Package category

Conditions		Category
Transport index	Max. dose rate on package surface (mSv/h)	
0	Not more than 0.005	I-WHITE
More than 0 but not more than 1	More than 0.05 but not more than 0.5	II-YELLOW
More than 1 but not more than 10	More than 0.5 but not more than 2	III-YELLOW

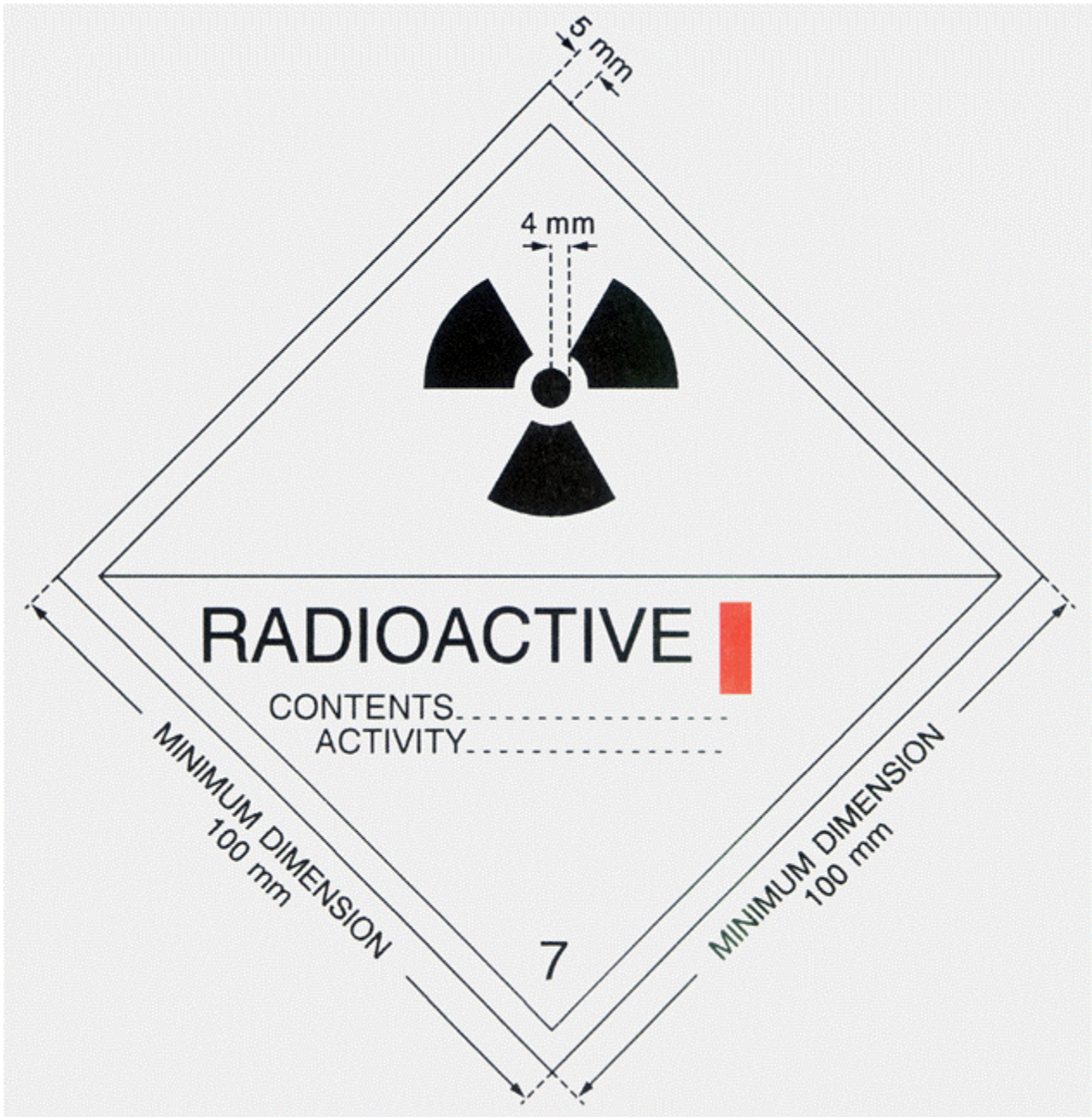
6. Approval of packages and consignments

In a number of cases, the IAEA guidelines include requirements for approval of transport packaging

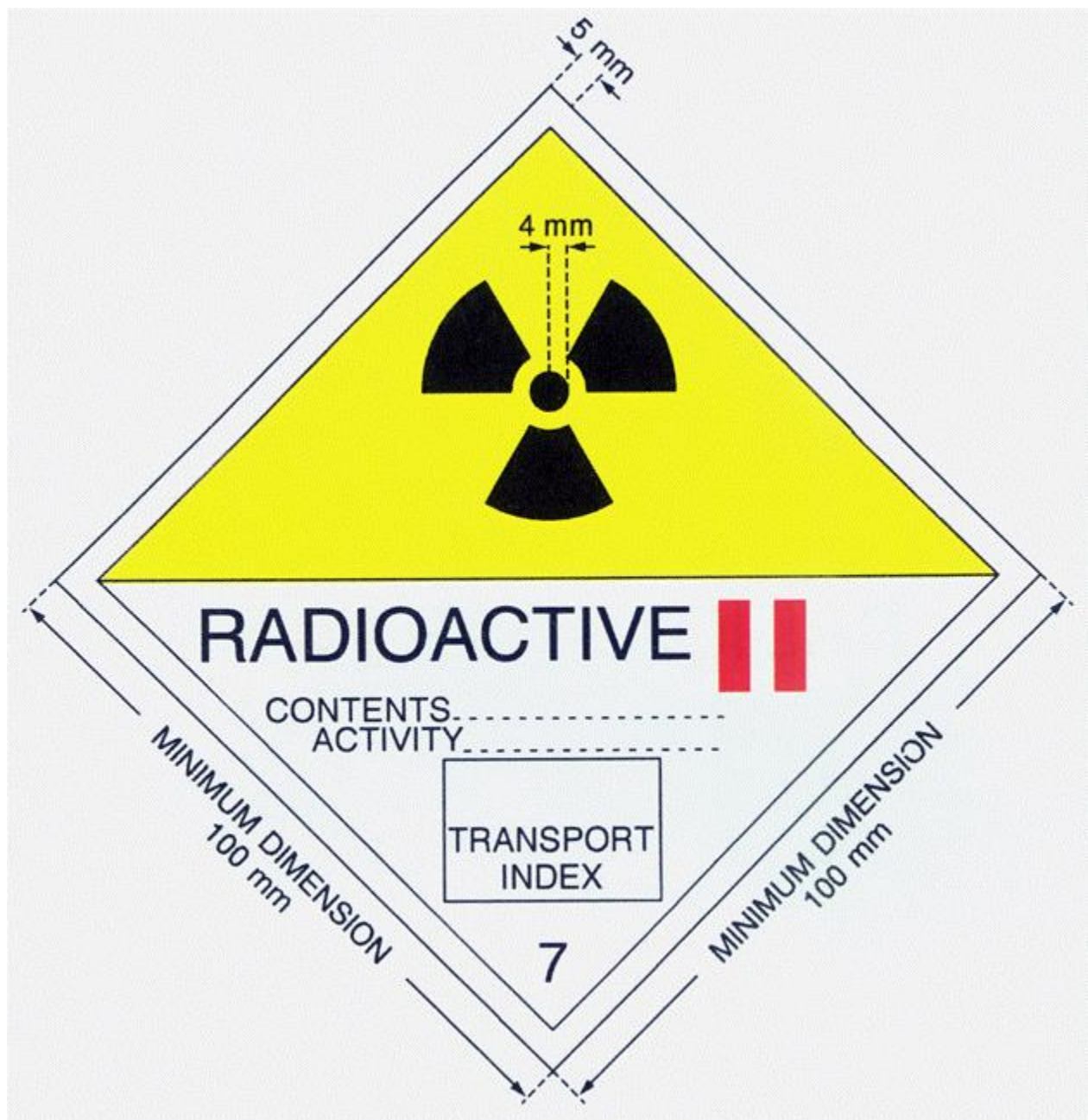
(packages), approval of individual shipments and requirements for prior notification to the authorities for certain shipments. A summary of these requirements is presented in Table 3.

Figure 1. Hazard labels for the transport of radioactive material

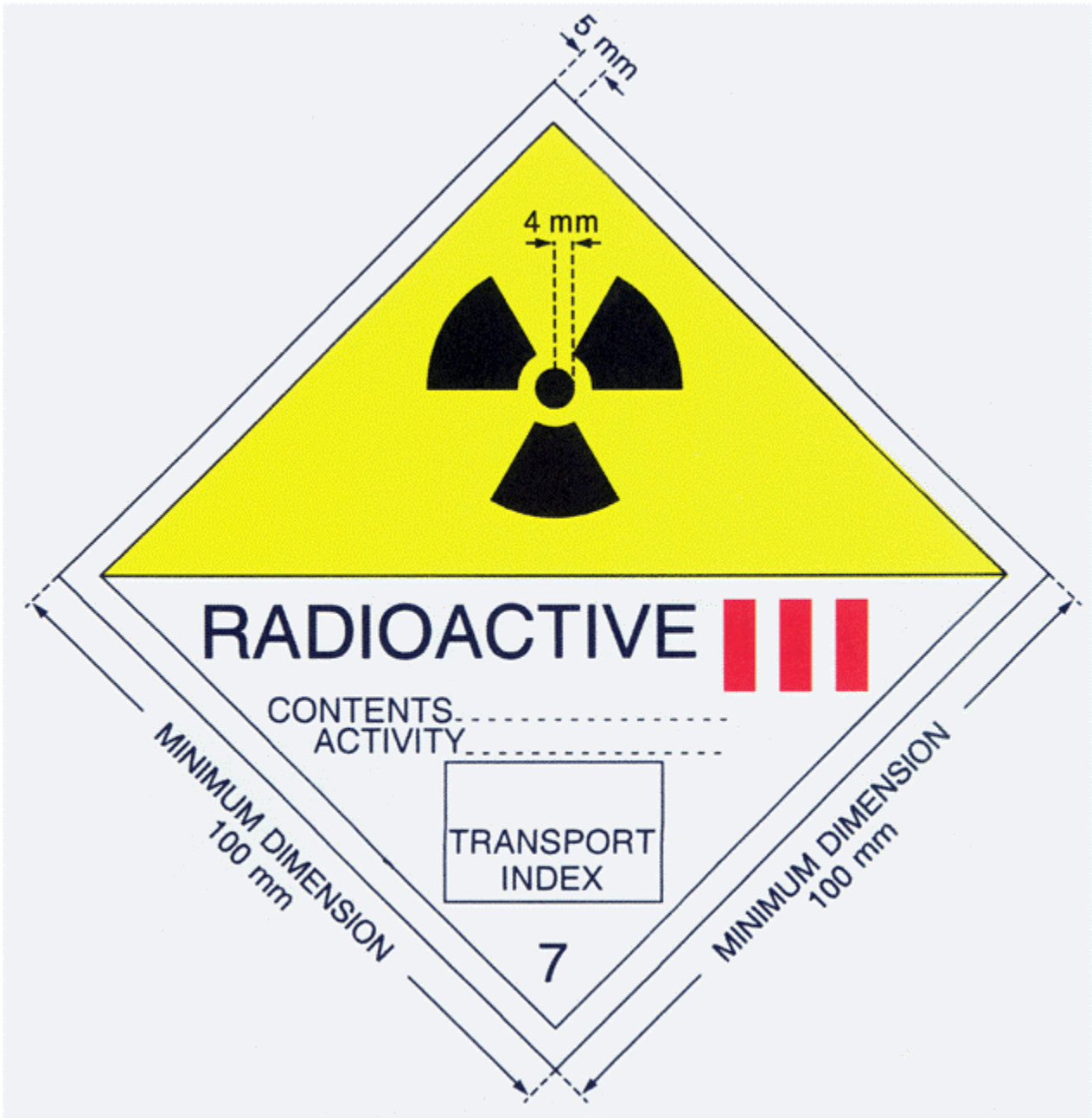
Category I-WHITE



Category II-YELLOW



Category III-YELLOW



Criticality safety index

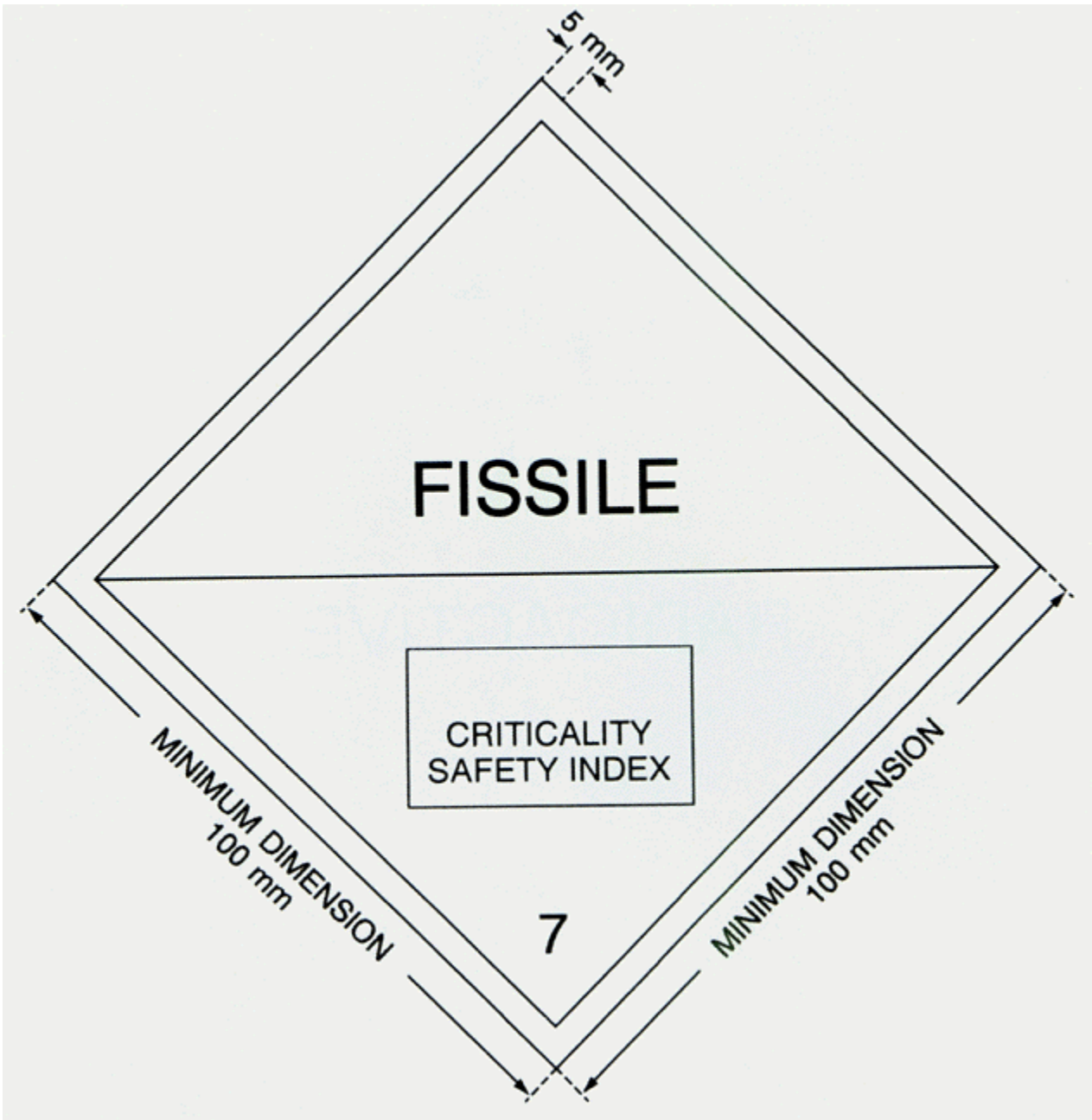


Table 3. Summary of approval and prior notification requirements for safe transport of radioactive material^{a)}

Class of package or material	Competent authority approval required		Consignor required to notify all countries concerned ^{b)} of each shipment
	In country of origin	In all countries concerned ^{b)}	
Excepted packages ^{c)}			
- package design	No	No	-
- shipment	No	No	No
Industrial package ^{c,d)} (LSA material and SCO)			
- package design	No	No	-
- shipment	No	No	No
Type A package ^{c,d)}			
- package design	No	No	-
- shipment	No	No	No
Type B(U) package ^{c,d)}			
- package design	Yes	No ^{e)}	-
- shipment	No	No	f,g)
Type B(M) package ^{c,d)}			
- package design	Yes	Yes	-
- shipment	h)	h)	Yes ^{f)}
Type C package ^{c,d)}			
- package design	Yes	No	-
- shipment	No	No	f,g)
Packages for fissile material			
- package design	Yes ⁱ⁾	Yes ⁱ⁾	-
- shipment			
Σ CSI \leq 50	No ^{j)}	No ^{j)}	g)

Σ CSI > 50	Yes	Yes	g)
Packages containing uranium hexafluoride (> 0.1 kg)			
- package design	No ^{k)}	No ^{k)}	-
- shipment	No ^{j)}	No ^{j)}	g)
Special form radioactive material			
- design	Yes	No	-
- shipment	l)	l)	l)
Low dispersible radioactive material			
- design	Yes	Yes	-
- shipment	l)	l)	l)
Special arrangement			
- shipment	Yes	Yes	Yes

- a) However, certain exceptions apply to carriage by air; see the regulations referred to in Annex 2.
- b) Countries from which, through or into which the consignment will be transported.
- c) If the radioactive content is uranium hexafluoride, which is subject to the requirements for packages containing uranium hexafluoride, these requirements shall also be met.
- d) If the radioactive content is fissile material, which is subject to the requirements for packages containing fissile material, these requirements shall also be met.
- e) If the radioactive content is low dispersible radioactive material and the package is to be carried by air, approval is required in all countries concerned.
- f) Prior to the first shipment of a package requiring the approval of a competent authority, the consignor shall submit a copy of the current certificate of approval to the competent authorities of all the countries concerned.
- g) Prior notification is required if the activity content exceeds 3000 A1, 3000 A2 or 1000 TBq.
- h) Multilateral approval is required if the radioactive contents exceed 3000 A1, 3000 A2 or 1000 TBq or if controlled intermittent venting is allowed.
- i) Designs of packages for fissile materials may also require approval in respect of other items in the summary.
- j) Shipments may, however, require approval in respect of one of the other items in the summary.
- k) Special transitional rules apply.
- l) See approval and prior notification requirements for the relevant package classes.

Annex 2

Summary of other Danish regulatory provisions for the transport of radioactive material

1. General regulations

General regulations on the carriage of dangerous goods, including radioactive material, are, for each mode of transport, laid down in or pursuant to the following acts and ministerial executive orders (the list of links to the individual statutes and orders is also available at www.sis.dk):

Carriage by rail

Act No. 336 of 1 May 1996 on Railway Safety, etc., incorporating amendments to Act No. 1120 of 29 December 1999.

Act No. 289 of 18 May 1998 on Rail Undertakings, etc.

The Ministry of Transport and Housing's Executive Order No. 920 of 16 December 1998 on Rail Undertakings.

The Danish Road Safety Agency's Executive Order No. 665 of 18 August 1999 on Safety Advisors for Transport of Dangerous Goods incorporating Amendments to Executive Order No. 1168 of 29 December 1999.

Carriage by air

Consolidation Act No. 769 of 16 August 2000 on Aviation.

The Ministry of Transport and Housing's Executive Order No. 737 of 17 November 1989 on the Carriage of Dangerous Goods by Air.

Carriage by sea

Consolidation Act No. 554 of 21 June 2000 on Safety at Sea.

Consolidation Act No. 529 of 4 August, 1989, the Pilot Act.

The Danish Maritime Authority's Executive Order No. 710 of 27 July 1994 on the Consignor's Duties in the Carriage by Sea of Dangerous Goods, etc.

The Danish Ministry of Climate, Energy and Utilities' Executive Order No. 258 of 30 June 1999 on Notification of Information on Dangerous or Polluting Freight On Board Ships.

The Ministry of Transport and Housing's Executive Order No. 355 of 12 May 1997 on Standard Rules for Maintaining Order in Danish Ports, incorporating amendments to Executive Order No. 1014 of 15 December 1999.

Notices to seafarers No 1208 of 22 September 1989 on pilotage for merchant ships carrying radioactive cargoes.

The Danish Maritime Authority's Technical Regulation No. 1 of 7 February 1991 on the Transport of Radioactive Material in Vehicles on Ro/Ro ships in Danish Domestic Shipping.

The Danish Maritime Authority's Technical Regulation No. 1 of 1 February 1999 (Executive Order No. 9746) on Transport of Dangerous Goods in accordance with the "Memorandum of Understanding for the Transport of Packaged Dangerous Goods on Ro-Ro Ships in the Baltic Sea" incorporating amendments to Technical Regulation No. 8 of 16 June 2000 (Executive Order No. 11373).

Notices from the Danish Maritime Authority B, Technical Regulations for Shipbuilding and Equipment, etc., Provisional Regulations, 11 December 2000 (Executive Order No. 11776).

Notices from the Danish Maritime Authority B, Technical Regulations for Shipbuilding and Equipment, etc. Part B VII, Transport of Dangerous Goods, 1 January 2001, (Executive Order No. 11771).

Baltic Sea Agreement. Memorandum of Understanding for the Transport of Packaged Dangerous Goods on Ro-Ro Ships in the Baltic Sea in accordance with the regulations in the IMDG Code, RID and ADR, Danish Maritime Authority, 9th edition, 1998.

The Danish Maritime Authority's Technical Regulation No. 14 of 14 November 2000 (Executive Order No. 11665) on Transport of Dangerous Goods in Ships (Amendment of the IMDG Code).

Act No 15 of 13 January 1997 on the Crew of Ships, amending Act No. 902 of 16 December 1998 and Act No. 1261 of 20 December 2000.

Carriage by road

Consolidation Act No. 712 of 2 August 2001 on Transport.

The Danish Road Safety Agency's Order No. 729 of 15 August 2001 on Carriage by Road of Dangerous Goods.

The Danish Road Safety Agency's Executive Order No. 665 of 18 August 1999 on Safety Advisors for Transport of Dangerous Goods incorporating Amendments to Executive Order No. 1168 of 29 December 1999.

2. Specific regulations

A summary of the transport-specific regulations applicable to national and international transport in accordance with the above-mentioned legislation, all of which are based on the IAEA guidelines; cf. Section 2 and Annex 1, is provided below.

Specific regulations for the transport of radioactive material

Mode of transport	Specific regulations
Carriage by rail	RID
Carriage by air	ICAO- TI
Carriage by sea	IMDG
Carriage by road	ADR

RID: Règlement concernant le transport international ferroviaire des marchandises dangereuses. Annex to the Convention concerning International Carriage by Rail (COTIF). RID is available to purchase from the Danish Transport, Construction and Housing Authority.

ICAO-TI: International Civil Aviation Organization - Technical Instructions for the Safe Transport of Dangerous Goods by Air, issued pursuant to Annex 18 to the Convention on International Civil Aviation. ICAO-TI is available to purchase from the Danish Transport, Construction and Housing Authority.

IMDG: International Maritime Dangerous Goods Code, issued by IMO, International Maritime Organization. IMDG is available to purchase from Iver C. Weilbach & Co. A/S, Copenhagen.

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road (L'Accord européen relatif au transport international des marchandises dangereuses par route). Inquiries regarding the purchase of ADR may be made with the Danish Road Safety Agency or the Danish Emergency Management Agency.