Republic of Latvia

Cabinet
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Regulations Regarding Protection against Ionising Radiation when Transporting Radioactive Materials

Issued pursuant to
Section 3, Paragraph three of the Law on Radiation Safety and Nuclear Safety

1. General Provisions

1. This Regulation prescribes the basic principles of radiation safety and nuclear safety when transporting materials which contain radioactive substances and in which the total and specific radioactivity is higher than that laid down in Annex 1 to this Regulation (hereinafter – the radioactive material).

2. In order to ensure the fulfilment of the requirements of this Regulation, the Radiation Safety Centre (hereinafter – the Centre) shall, in addition to the special permit (licence) or permit for activities with sources of ionising radiation, issue a document which certifies that the relevant technical design or transport complies with the requirements of the laws and regulations governing the transport of the radioactive material (hereinafter – the certificate of approval).

3. If the radioactive material is transported:

3.1. only within the territory of Latvia, the Centre shall issue a unilateral certificate of approval which certifies that the technical design of the packaging of the radioactive material or packaging intended for transport (together with its radioactive content) (hereinafter – the package) complies with the requirements of this Regulation;

3.2. in the territory of several countries, a multilateral certificate of approval is necessary which is issued by the Centre or the authority of a foreign country having competence in the field of radiation safety and nuclear safety (hereinafter – the competent authority) and which attests that the technical design or transport complies with the laws and regulations of the country in which the technical design has been created or transport has been commenced, and with the laws and regulations of the country through which or to which the consignment is being transported, or a unilateral certificate of approval is necessary which is issued by the competent authority and which certifies that the technical design complies with the laws and regulations of the country in which it has been created.

4. Transport includes all activities and circumstances which are related to movement of the radioactive material and affect this process, for example, designing, manufacturing, servicing and repair of the packaging, and also preparation, loading, dispatch and carriage of the relevant consignment (storage, unloading and acceptance at the final destination point of transport).

5. This Regulation shall apply to the radioactive materials, except for:

5.1. the radioactive material that is an integral part of a vehicle;

5.2. the movement of radioactive material within objects where such material is produced, used or stored, unless public roads or public railway transport is used;

5.3. the radioactive materials implanted or incorporated into a person or animal for diagnosis or treatment;

5.4. the radioactive material in consumer products;

5.5. the natural material or ore containing naturally occurring radionuclides which are not intended to be processed for further use if the specific radioactivity of the natural material or ore does not exceed the limits laid down in Annex 1 to this Regulation by more than 10 times.

6. Protection of persons, property and environment against ionising radiation during transport of the radioactive material shall be ensured by:

6.1. using tightly closed casing (packaging) which includes the radioactive content and prevents release of radioactive substances into the environment in case of radiation emergency or radiation accident;

6.2. using such set of packaging components which is designed and created to hold the radioactive content in the packaging during transport (hereinafter – the containment system);

6.3. controlling the dose rate of ionising radiation and ensuring that the limits laid down in this Regulation for the dose rate of ionising radiation are not exceeded;

6.4. implementing measures to prevent creation of such conditions in which self-sustaining nuclear reaction may occur in fissile material (hereinafter – the nuclear criticality) if the ratio of the number of produced neutrons to the number of neutrons which is being absorbed or escapes from the fissile material at the same time (hereinafter – the coefficient of increase in the number of neutrons) is 1. The referred to condition shall not apply to such sources of neutrons in which neutrons are not produced through the fission process;

6.5. preventing damages to the radioactive material an packaging due to exposure to heat;

6.6. ensuring that pressure in the package does not exceed the maximum permissible pressure which may arise in the containment system within one year under such temperature and sun radiation conditions which are appropriate for transport if the packaging does not have ventilation, external cooling with auxiliary systems or there is no intervention of other type (hereinafter – the maximum operating pressure).

7. In order to protect persons and environment, when transporting radioactive material, the radioactive contamination – the radioactive material which is located on a surface of a solid material and the amount of which exceeds 0.4 Bq/cm^2 for beta and gamma emitters and low toxicity alpha emitters or 0.04 Bq/cm^2 for other alpha emitters – shall be controlled. There are the following types of radioactive contamination:

7.1. the non-fixed radioactive contamination – the radioactive contamination which may be removed from the surface during routine conditions of transport and which may pollute environment or radioactive substances may enter into a human body;

7.2. the fixed radioactive contamination – the radioactive contamination which cannot be removed from the surface during routine conditions of transport. Such contamination does not cause environmental contamination, but may increase the dose rate of ionising radiation.

8. In order to protect persons and environment, when transporting nuclear materials, such conditions are needed to be provided in which self-sustaining nuclear reaction may not occur in the fissile material (hereinafter – the sub-criticality), i.e. the coefficient of increase in the number of neutrons must be less than 1.

9. Any other measures and considerations related to the transport of the radioactive material and its control (for example, the consignor may use casing to join two or several packages for

easier processing, storage and transportation (hereinafter – the overpack)) may not reduce the safety requirements provided for in this Regulation.

2. General Safety Requirements for the Transport of the Radioactive Materials

10. In order to meet the general safety requirements during transport of the radioactive material, it is necessary to comply with:

10.1. the restrictions on the type of radioactive material and total radioactivity in the respective packaging;

10.2. the requirements laid down for each type of package;

10.3. the requirements for the provision of marking, label, poster and consignment documentation;

10.4. the requirements for the use of the package and stacking during transport and storage.

11. Depending on the safety level, the transport may be:

11.1. transport without incidents (hereinafter – routine conditions of transport);

11.2. transport with minor incidents (hereinafter – normal conditions of transport);

11.3. accident conditions of transport.

12. In order to achieve a high level of safety during transport, the best combination of the type of the radioactive material, packaging and vehicle shall be chosen, and also other factors affecting transport safety, for example, use of the vehicle or large freight container only for the needs of one consignor (hereinafter – the exclusive use), shall be taken into account.

13. The following packages shall be used for the transport of the radioactive material:

13.1. the type A package – a tank, barrel or similar container, freight container or box with limited total radioactivity for safe and economic transport of materials. Total radioactivity limits A_1 and A_2 are laid down in Annex 1 to this Regulation;

13.2. the type B package – a tank, barrel or similar container, freight container or box the total radioactivity of the radioactive material present therein exceeds limits A_1 and A_2:

13.2.1. the type B(U) package – a unilateral certificate of approval is required for the transport;

13.2.2. the type B(M) package – a multilateral certificate of approval is required for the transport;

13.3. the type C package – a tank or freight container in which the radioactive material is located for transport by air;

13.4. the excepted package – a package containing the radioactive material with low ionising radiation danger the total radioactivity limits for which are laid down in Annex 1 to this Regulation;

13.5. the industrial package – a tank, barrel or similar container, freight container or box in which the material with low specific activity (hereinafter – the LSA) or the surface contaminated object (hereinafter – the SCO) is located. Industrial packages have the following types (hereinafter – the IP): IP-1, IP-2 and IP-3.

14. The following withstands the transport without damages:

14.1. excepted packages, industrial packages of type IP-1, IP-2 and IP-3, type A packages, type B packages and type C packages when they are transported under routine conditions;

14.2. industrial packages of type IP-2 and IP-3, type A packages, type B packages and type C packages when they are transported under normal conditions;

14.3. type B packages and type C packages when they are transported under accident conditions.

15. In order to inspect the conformity of the package for the transport under normal conditions, the tests for normal conditions shall be used. To inspect the package for the transport under accident conditions the tests for accident conditions and tests for severe accident conditions shall be used. The sequence and amount of tests shall be determined in conformity with Chapter 8 of this Regulation.

16. Tests for accident conditions and severe accident conditions are the transport of the radioactive material under such conditions in which:

16.1. the radiation emergency or radiation accident may damage property and cause threats to human life and health, as due to the damage caused by the radiation emergency or radiation accident the radioactive material move outside the containment system;

16.2. the release of the radioactive content into the environment may occur or the dose rate of ionising radiation may increase;

16.3. exposure of transport workers, vehicle drivers and members of the public is possible without exceeding the laid down limits for the dose of ionising radiation – under accident conditions, or by exceeding the laid down limits for the dose of ionising radiation – under severe accident conditions.

17. The carrier and consignor shall ensure that during transport the dose rate of ionising radiation, the number of persons exposed to ionising radiation and likelihood of exposure is as low as it is actually possible under the relevant economic and social circumstances:

17.1. the consignor shall ensure the packaging of the radioactive material;

17.2. the carrier shall provide measures for protection against ionising radiation by complying with the basic principles of radiation safety and nuclear safety (hereinafter – the protection measures) during freight transport;

17.3. the carrier shall provide training for transport workers and vehicle drivers in conformity with their work specifics by taking into account the requirements of the laws and regulations.

18. The consignor and carrier shall determine the nature and amount of the protection measures based on the amount of the committed effective dose and possibility of exposure:

18.1. if the committed effective dose does not exceed 1 mSv per year, a special work regime and detailed dosimetric control, programme for the assessment of doses of ionising radiation and individual accounting of exposure doses is not necessary;

18.2. if the committed effective dose is from 1 mSv up to 6 mSv per year, radioactive contamination shall be controlled and effective doses shall be assessed at workplaces, or the individual dosimetric control shall be carried out. The relevant transport workers shall be included in category B in conformity with the laws and regulations regarding the protection against ionising radiation;

18.3. if the committed effective dose is from 6 mSv to 20 mSv per year, individual exposure doses shall be controlled and medical supervision shall be provided. The relevant transport workers shall be included in category A in conformity with the laws and regulations regarding the protection against ionising radiation;

19. The carrier shall ensure that the packages of radioactive materials are located in such distance from transport workers and members of the public which is sufficient for the amount of the committed effective dose not to exceed:

19.1. for category A transport workers – 10 mSv per year;

19.2. for category B transport workers – 5 mSv per year;

19.3. for members of the public (critical group of members of the public) – 1 mSv per year.

20. The carrier shall place the radioactive materials in such distance from non-developed photographic films and other sensitive photo materials that the dose of ionising radiation would not exceed 0.1 mSv during the entire time of their storage and transport.

21. The consignor, carrier and producer of the radioactive material and packaging shall ensure the implementation of quality assurance programme in designing, production, testing, use, transport, storage and inspection of the radioactive material, package and overpack. The quality assurance programme shall include requirements and their compliance inspections in relation to:

21.1. the drawing up, approval, registration, recording and archiving of documents, and also changes therein;

21.2. the preparation, inspection and approval of the technical design plan, inspection of entry data, and also norms, software, specifications of specific construction elements;

21.3. the preparation of the technical project, as well as the development of the instructions for use and repair, and also inspections of the technical project;

21.4. the control of order and procurement, also assessment and selection of suppliers, requirements of the laws and regulations for procurements, requirements for the documentation of the order and procurement and documents attesting the quality, and also for the procurement reviews;

21.5. the material control, also identification, inspection, marking and storage;

21.6. the process control in transporting, storing and processing the material and construction elements, and also product inspections;

21.7. the measuring instruments to be used in testing;

21.8. the testing devices, their calibration, adjustment and repair;

21.9. the marking of the material and products to be tested;

21.10. the notes of inspections and testing;

21.11. the non-conformities with quality requirements, their finding and documentation;

21.12. the marking of non-conforming construction elements, their removal from the system and replacement with other construction elements or repair;

21.13. the elimination of non-conformities, also detection and research of those processes which cause non-conformities, modification of the relevant process modifications; replacement of the material or construction, work with a supplier, and also with competent authorities for joint measures;

21.14. the recording and registration, entry identification, compilation, indexation, document storage, information update and correction;

21.15. the training of workers, also establishment of training programmes and qualification examinations of workers;

21.16. the service organisation supervision;

21.17. regular inspections independent from production and exploitation by including experts from own authority or an independent institution.

22. The producer of the radioactive material or packaging, consignor or user of the package shall provide a possibility for the representatives of the Centre to conduct unhindered inspection of designing, production and use of the package.

23. The producer of the radioactive material or packaging, consignor or user of the package shall, in conformity with the quality assurance programme, inspect whether production methods and materials comply with the approved technical project, and also periodically

inspect the packaging and, if necessary, repair of the packaging so that it would comply with the relevant requirements of Chapter 7 of this Regulation even after several uses of the packaging.

24. For carriages within the territory of Latvia, the consignor or consignee shall ensure that all inscriptions on the package and its marking, and also the documents accompanying consignment are in the official language. Translation into the official language is not necessary for international carriages.

3. Types of the Radioactive Material to be Transported

25. In order to establish the exact conditions and requirements for packaging and transport, the types of the radioactive materials shall be divided into groups. The consignor and carrier shall comply with the requirements laid down in this Regulation for the packaging and transport of the relevant material.

26. The special form radioactive material is a non-dispersible solid radioactive material or fused ampoule containing the radioactive material (hereinafter – the sealed source of radiation).

27. The LSA material is such radioactive material the low specific radioactivity of which is determined by its nature, or such material the radioactivity of which does not exceed the specific radioactivity values laid down in Annex 1 to this Regulation:

27.1. LSA-I material is any of the following materials:

27.1.1. ore containing unirradiated natural uranium or unirradiated natural thorium and concentrate of such ores;

27.1.2. ore which contains radionuclides which can be found in the nature, except for uranium and thorium, and is intended for processing to use such radionuclides;

27.1.3. solid unirradiated natural uranium, and also uranium in which the amount of uranium 235 is less than 0.72 percentage by weight (hereinafter – the depleted uranium), and solid or liquid compound or mixture of a solid unirradiated natural uranium and the depleted uranium;

27.1.4. solid unirradiated natural thorium, solid or liquid compound or mixture thereof;

27.1.5. the radioactive material the A_2 value of which is not limited and which is not a fissile material;

27.1.6. other radioactive material in which radionuclides are distributed in the entire volume and the average specific radioactivity does not exceed the value which is laid down in Annex 1 to this Regulation for more than 30 times;

27.2. LSA-II material is any of the following materials:

27.2.1. water in which the concentration of tritium exceeds 0.8 TBq/l;

27.2.2. the material in which radionuclides, except for tritium, are distributed in the entire volume and the average specific radioactivity does not exceed 10^{-4} A_2/g for a solid matter and gas and $10^{-5}A_2$/g – for a liquid;

27.3. LSA-III material is a solid material (except for powder) in which:

27.3.1. the radioactive material is distributed in the entire volume of the material or group of solid objects, or is evenly distributed in a solid, dense binding agent;

27.3.2. the radioactive material which is relatively insoluble or located in an insoluble matrix. If packaging is damaged, the loss of radioactive content, whilst this packaging is in water for seven days, does not exceed 0.1 A_2;

27.3.3. the average specific radioactivity, without taking into account the protective materials used for packaging, does not exceed $2 \times 10^{-3} A_2/g$.

28. Low dispersible radioactive material is a solid radioactive material in the form of chemically and mechanically stable monolith which has limited spreading capacity, is not powder and may be additionally locked in a metallic ampoule.

29. Unirradiated natural thorium is such thorium (chemically separated thorium contains practically 100 percentage by weight of thorium 232) one gram of thorium 232 of which contains less than 10^{-7} grams of uranium 233.

30. Unirradiated natural uranium is such uranium (chemically separated uranium contains approximately 99.28 percentage by weight of uranium 238 and 0.72 percentage by weight of uranium 235) one gram of uranium 235 of which contains not more than 2×10^3 of Bq plutonium. 9×10^6 of Bq uranium fission products and 5×10^{-3} grams of uranium 236.

31. The SCO object is a solid object which itself is not radioactive, but on the surface of which is the radioactive material:

31.1. SCO-I object is a solid object:

31.1.1. the non-fixed radioactive contamination per 300 cm^2 of the available surface (or the entire surface if it is smaller than 300 cm^2) of which does not exceed 4 Bq/cm^2 for a beta, gamma and low toxicity alpha radiation source or 0.4 Bq/cm^2 for another alpha radiation source;

31.1.2. the fixed radioactive contamination per 300 cm^2 of the available surface (or the entire surface if it is smaller than 300 cm^2) of which does not exceed 4×10^4 Bq/cm^2 for a beta, gamma and low toxicity alpha radiation source or does not exceed 4×10^3 Bq/cm^2 for another alpha radiation source;

31.1.3. the non-fixed radioactive contamination together with fixed radioactive contamination per 300 cm^2 of the available surface (or the entire surface if it is smaller than 300 cm^2) of which does not exceed 4×10^4 Bq/cm^2 for a beta, gamma and low toxicity alpha radiation source or does not exceed 4×10^3 Bq/cm^2 for another alpha radiation source;

31.2. SCO-II object is a solid object:

31.2.1. the non-fixed radioactive contamination per 300 cm^2 of the available surface (or the entire surface if it is smaller than 300 cm^2) of which within the range from 4 to 400 Bq/cm^2 for a beta, gamma and low toxicity alpha radiation source or from 0.4 to 40 Bq/cm^2 for another alpha radiation source;

31.2.2. the fixed radioactive contamination per 300 cm^2 of the available surface (or the entire surface if it is smaller than 300 cm^2) of which is within the range from 4×10^4 to 8×10^5 Bq/cm^2 for a beta, gamma and low toxicity alpha radiation source or from 4×10^3 to 8×10^4 Bq/cm^2 for another alpha radiation source;

31.2.3. the non-fixed radioactive contamination together with fixed radioactive contamination per 300 cm^2 of the unavailable surface (or the entire surface if it is smaller than 300 cm^2) of which is within the range from 4×10^4 to 8×10^5 Bq/cm^2 for a beta, gamma and low toxicity alpha radiation source or from 4×10^3 to 8×10^4 Bq/cm^2 for another alpha radiation source.

32. The fissile material is such radioactive material which contains uranium 233, uranium 235, plutonium 239, plutonium 241 or any combination of these radionuclides, except for the uranium containing naturally occurring mixture of isotopes (unirradiated natural uranium) or the depleted uranium, and also natural uranium or depleted uranium

which has been irradiated in reactors with thermal-neutrons, i.e. electron energy is less than 0.3 eV.

33. Low toxicity alpha radiation source is unirradiated natural uranium, depleted uranium, unirradiated natural thorium, uranium 235 or uranium 238, and also thorium 232, thorium 228 and thorium 230, if it is present in ore content or physical or chemical concentrate, and also alpha radiation source the half-life of which is less than 10 days.

4. Restriction on Radioactivity and Amount of the Radioactive Material

4.1. Definition of the Radionuclide Values

34. The main values of radionuclides are as follows:

34.1. A_1 – the maximum permissible total radioactivity of the special form radioactive material in a type A package;

34.2. A_2 – the maximum permissible total radioactivity of the radioactive material (except for the special form radioactive material) in a type A package;

34.3. the specific radioactivity of the material;

34.4. the total radioactivity of the consignment.

35. The restriction on the total and specific radioactivity of radionuclides in the package shall be calculated by using limits A_1 and A_2 laid down for radionuclides in Annex 1 of this Regulation by taking into account the specific radioactivity and total radioactivity limits for the packages that are not subject to control, and also the requirements for the technical design of the package.

36. If the total and specific radioactivity limit of any of the radionuclides has not been laid down in Annex 1 to this Regulation, the respective value laid down in Annex 2 to this Regulation shall be used.

37. When defining limit A_1 and A_2 for a radionuclide for which it has not been laid down in Annex 1 to this Regulation, the following shall be taken into account:

37.1. a radionuclide with one radioactive decay chain where the radionuclides are in naturally occurring proportions and no daughter radionuclides with half-life of more than 10 days or exceeding the half-life of the mother radionuclide are present shall be regarded as a separate radionuclide and the total and specific radioactivity and limits A_1 and A_2 of the mother radionuclide of this decay chain shall be taken into account;

37.2. a radionuclide with radioactive decay chains where the half-life of any daughter radionuclide is longer than 10 days or exceeds the half-life of the mother radionuclide, the mother radionuclide together with such daughter radionuclide shall be regarded as a mixture of different radionuclides.

38. If each radionuclide is known, but the specific radioactivity of some radionuclides is not known, the radionuclides may be joined in groups. Groups may be formed based on their total alpha radioactivity, total beta or gamma radioactivity. If such radioactivities are known, the smallest value which corresponds to alpha emitters, beta or gamma emitters shall be used. If the necessary data are not available for certain radionuclides or mixtures thereof, the values laid down in Annex 2 to this Regulation shall be used.

4.2. Restriction on Radioactive Content in the Package

39. The total radioactivity for an excepted package with the radioactive material (except for the items manufactured of unirradiated natural uranium, depleted uranium or unirradiated natural thorium) may not be higher than the total radioactivity limit laid down in Annex 3 to this Regulation:

39.1. for each separate unit and each package if the radioactive material is the sealed source of radiation or a part of an industrially manufactured item;

39.2. for the package if the radioactive material is not the sealed source of radiation.

40. If the item is manufactured of unirradiated natural uranium, depleted uranium or unirradiated natural thorium, the excepted package may contain any amount of such material, if the external surface of uranium or thorium is closed in non-radioactive casing which is made of metal or other dense material.

41. If the excepted package is sent by post, the total radioactivity of the radioactive material may not exceed one tenth of the relevant limits which are laid down in Annex 3 to this Regulation.

42. The total radioactivity in a separate industrial package in which the LSA material or SCO object is located may not exceed:

42.1. the limits of total radioactivity laid down in Annex 4 to this Regulation for a vehicle;

42.2. the value which, in the distance of 3 m from the unshielded radioactive material, produces the dose rate of ionising radiation – 10 mSv/h.

43. In a separate industrial package with non-combustible solid LSA-II material or LSA-III material if it is intended to be transported by air, the total radioactivity may not exceed 3000 A_2.

44. In a type A package, the total radioactivity may not exceed A_1 – for the special form radioactive material – or A_2 – for another radioactive material.

45. If a type A contains a radionuclide mixture and its content and the total or specific radioactivity is known, the following condition shall be used:

$$\sum_i \frac{B(i)}{A_1(i)} + \sum_j \frac{C(j)}{A_2(j)} \leq 1, \text{ where}$$

B(i) – total or specific radioactivity of the radionuclide i of the special form radioactive material;
$A_1(i)$ – limit A_1 of the radionuclide i;
C(j) – total or specific radioactivity of the radionuclide i of the radioactive material which is not the special form radioactive material;
$A_2(i)$ – limit A_2 of the radionuclide i.

46. In accordance with that indicated in the certificate of approval, a type B package may not contain:

46.1. the radionuclide the total radioactivity of which is higher than that permitted in the technical design of the package;

46.2. the radionuclide which is not permitted in the technical design of the package;

46.3. the radioactive material the form or physical condition or chemical composition of which differs from that provided for in the technical design of the package.

47. A type B package which is intended to be transported by air in addition to the requirements laid down in Paragraph 46 of this Regulation may not contain:

47.1. low dispersible radioactive material the total radioactivity of which is higher than the value indicated in the certificate of approval;

47.2. the special form radioactive material the total radioactivity of which is higher than 3000 A_1 or 100 000 A_2 (the lowest value shall be chosen);

47.3. other radioactive material the total radioactivity of which is higher than 3000 A_2.

48. In accordance with that indicated in the certificate of approval a type C package may not contain:

48.1. the radionuclide the total radioactivity of which is higher than that permitted in the technical design of the package;

48.2. the radionuclide which is not allowed in the technical design of the package;

48.3. the radioactive material the form or physical condition or chemical composition of which differs from that provided for in the technical design of the package.

49. In accordance with that indicated in the certificate of approval a package containing a fissile material may not contain:

49.1. amount of the fissile material that exceed that permitted in the technical design of the package;

49.2. any radionuclide or fissile material which is not allowed in the technical design of the package;

49.3. the radioactive material the physical condition, chemical composition or spatial layout of which differs from that provided for in the technical design of the package.

50. A uranium hexafluoride package may not take more than 95 % of space of the total volume in the package (at least 5 % is the free volume). The total volume shall be calculated by using the weight by volume of liquid uranium hexafluoride for which, at the temperature of 121 °C, it is 3257 kg/m^3. It must be ensured that uranium hexafluoride is in solid form, its chemical purity is at least 99.5 % and, when submitting the package for transport, the internal pressure of the package is lower than the atmospheric pressure.

5. Requirements for the Preparation for Transport

5.1. General Requirements for the Preparation of the Package Before its Transport

51. Before the first transport of any package, the consignor shall ensure that the following requirements are met:

51.1. if the designed pressure exceeds 35 kPa in the containment system, the ability of the containment system of the package to withstand the relevant pressure shall be inspected;

51.2. for packages of type B and type C, and packages containing a fissile material the efficiency of the protection against ionising radiation and containment systems and, where necessary, the conformity of thermal conductivity attributes with the requirements of the approved technical design shall be inspected;

51.3. for a package containing fissile material where neutron poisons are intended to be used in the form of package elements in order to maintain sub-criticality under normal and accident conditions the presence of neutron poisons and conformity of their distribution with that provided for in the technical design of the package shall be inspected.

52. Before each transport of package of any type the consignor shall ensure that:

52.1. the package meets the requirements of this Regulation;

52.2. only the relevant radioactive material, and also the items and documents necessary for the use of the radioactive material are present in the package;

52.3. lifting attachment which disables safe lifting and moving of a full package is removed or rendered inoperable.

53. Before each transport of a type B and type C package the consignor shall:

53.1. store the package until reaching the equilibrium position which is sufficiently close to the necessary temperature and pressure if such requirement has not been revoked in the unilateral certificate of approval;

53.2. examine the containment system and ascertain that closures and valves through which the radioactive content may leak are duly closed and (where necessary) sealed, and the leakage of the radioactive content does not exceed:

53.2.1. for a radioactive substance (except for a gaseous substance) – 10^{-6} A_2/h. The external non-fixed radioactive contamination shall also be taken into account for a radionuclide mixture;

53.2.2. for krypton 85 - 10 A_2 within one week. The value A_2 of krypton 85 may be assumed to be 10 A_2 for a mixture of radionuclides;

53.2.3. for radioactive gas (except krypton 85) – A_2 within one week;

53.2.4. 10 mSv/h in the distance of 1 m from the package surface if the package contains the maximum quantity of the radioactive content;

53.3. ensure the compliance with the requirements laid down in the certificates of conformity.

54. Before each transport of a package containing a fissile material the consignor shall:

54.1. ensure that the requirements laid down in the certificates of conformity are met;

54.2. assume the biggest possible harm and likelihood of an accident (hereinafter – the conservative model) by using the method for the assessment of the for the identification of maximum risk, assess the coefficient of increase in the number of neutrons and take measurements before transport in order to determine the isotopic content of the fissile material to be transported;

54.3. inspect whether the package is closed and whether it has special parts which prevent the ingress of water in free volumes of the package or discharge of water therefrom (also due to a mistake of workers).

55. Before each transport of a package containing a special form radioactive material or low dispersible radioactive material, a consignor shall ensure that the package meets the requirements of the certificate of approval and this Regulation.

56. The consignor and carrier shall ensure that the level of the non-fixed radioactive contamination on the external surface of any package is maintained as low as it is possible under routine conditions of transport by reasonable means, and the radioactive contamination on the external surface of the package does not exceed:

56.1. for beta and gamma emitters and low toxicity alpha emitters per 300 cm^2 of available surface – 4 Bq/cm^2;

56.2. for other alpha emitters per 300 cm^2 of available surface – 0.4 Bq/cm^2.

5.2. Definition of Transport Index and Nuclear Criticality Index

57. The transport index is the number assigned to the package, overpack, freight container, unpackaged LSA-I material or SCO-I object and used for controlling the dose rate of ionising

radiation, and also for the imposition of restrictions on radioactive content for the particular package, overpack or freight container in order to assess whether the transport should be done with exclusive use transport and to determine the permissible number of packages in the freight container or vehicle.

58. The transport index shall be determined as follows:

58.1. the maximum dose rate of ionising radiation shall be measured in the distance of 1 m from the external surface of the package, overpack, freight container, unpackaged LSA-I material or SCO-I object in mSv/h, and this value shall be multiplied by 100, the calculated figure shall be rounded up to the first tenth, except for 0.05 and less which is assumed to be zero;

58.2. for large-scaled consignment if their cross-sectional area exceeds 1 m^2, the maximum dose rate of ionising radiation shall be measured in the distance of 1 m from the external surface of the tank, freight container, unpackaged LSA-I material or SCO-I object in mSv/h, this value shall be multiplied by 100 and additionally multiplied by the appropriate coefficient (Annex 5), the calculated figure shall be rounded up to the first tenth, except for 0.05 and less which is assumed to be zero.

59. If only uranium or thorium ore and their concentrate is transported, the transport index for the package, overpack, tank and freight container shall be determined by using the following assessment of the dose rate of ionising radiation in the distance of 1 m from any point of the external surface of the consignment:

59.1. for a physical concentrate of ore, uranium and thorium – 0.4 mSv/h;

59.2. for a chemical concentrate of thorium – 0.3 mSv/h;

59.3. for a chemical concentrate of uranium (except uranium hexafluoride) – 0.02 mSv/h.

60. The transport index for each overpack, freight container or the entire vehicle may be defined as the sum of transport indices of all packages or directly – by measuring the dose rate of ionising radiation, except for a soft overpack for which the transport index shall be defined only as the sum of transport indices.

61. Nuclear criticality index is the number laid down for the package containing a fissile material, overpack or freight container and used to control the total number of the packages containing a fissile material, overpacks or freight containers.

62. Nuclear criticality index is acquired by dividing the number 50 with the lowest of the N (number of the packages) values which has been acquired by assessing the nuclear criticality for the package containing a fissile material which is transported under normal and accident conditions. The number of packages shall be calculated so that:

62.1. the 5N package would be under sub-critical condition if the maximum increase in the number of neutrons occurs which is caused by the following circumstances:

62.1.1. there are not delimiting barriers or any other materials between the packages containing a fissile material and packages are embraced by at least 20 cm thick water layer from all sides;

62.1.2. the package is exposed to the tests laid down in Sub-chapter 8.8 of this Regulation under normal conditions for the package containing a fissile material;

62.2. the 2N package would be under sub-critical condition if the maximum increase in the number of neutrons occurs which is caused by the following circumstances:

62.2.1. a material containing hydrogen is between the packages containing a fissile material, and at least 20 cm thick water layer shall be around the packages as neutron retarder and reflector;

62.2.2. if, upon carrying out the I test sequence for accident conditions or II water immersion test for accident conditions laid down in Sub-chapter 8.8 of this Regulation, part of the fissile material escapes from the containment system, it shall be assumed that the same part of the fissile material escapes also from all other packages and the fissile material arranges itself so that the number of neutrons maximally increase, and 20 cm thick water layer is around the packages as neutron retarder and reflector;

62.3. the nuclear criticality index may be zero if unlimited number of packages are at a sub-critical condition (N value is infinite).

63. The nuclear criticality index for each consignment is the sum of the nuclear criticality indices of all packages.

64. The transport index for any package or overpack may not exceed 10, but the nuclear criticality index – 50, except for the consignment under exclusive use conditions.

65. The transport index sum for LSA-I material consignment is not limited.

5.3. Determination of the Category of the Package and Overpack and their Marking

66. Depending on the transport index and maximum dose rate of ionising radiation on the surface of the package and overpack, the packages and overpack shall have the following categories (Annex 6):

66.1. I-WHITE;

66.2. II-YELLOW;

66.3. III-YELLOW.

67. If the transport index corresponds to one category, but the dose rate of ionising radiation – to another category, the package or overpack shall be included in the higher category. I-WHITE shall be the lowest category.

68. The consignor shall ensure that legible and durable appropriate marking is on the external surface of the packaging of each package.

69. The following shall be provided on the marking of the package:

69.1. information on the consignor and (or) carrier;

69.2. the identification number (Annex 7) of the United Nations Organisation (hereinafter – UN) which has the letters "UN" in front of it, and the package title (except for the excepted packages and international postal packages);

69.3. permissible gross weight if the gross weight of the package exceeds 50 kg;

69.4. the type of package:

69.4.1. for an industrial package – "type IP-1", "type IP-2" or "type IP-3" (choose as appropriate);

69.4.2. for packages of type A, type B and type C – the type designation: "type A", "type B(U)", "type B(M)" or "type C" (choose as appropriate);

69.5. international vehicle registration code which has been assigned by the country in which the technical design of the type IP-2, type IP-3 or type A package has been developed, and also the name of the producer or the packaging identification approved by the competent authority.

70. If the multilateral certificate of approval is required, the marking of type B packages, type C packages, packages containing the fissile material and uranium hexafluoride, shall also indicate the following:

70.1. the identification sign assigned by the competent authority for the relevant technical design;

70.2. the individual designation – serial number – of the technical design of the packaging.

71. Type B and type C packages shall be additionally marked with the radiation symbol laid down in Annex 8, Figure 1 of this Regulation which is pressed on, stamped or placed otherwise on the surface. This marking shall be fireproof and water resistant.

5.4. Requirements for the Label and Poster

72. In addition to the marking, the consignor shall use a label and poster to provide the necessary information regarding the content of the consignment to the persons involved in the transport and supervisory authorities.

73. The consignor shall, in conformity with the content of the consignment, provide a label (Figure 2, 3 and 4 of Annex 8) on each package, overpack and freight container that corresponds to the category, except for large freight containers and tanks for which a poster may be used instead of the label (Figure 6 of Annex 8).

74. The consignor shall provide a label (Figure 5 of Annex 8 to this Regulation) on each package containing a fissile material, overpack and freight container.

75. If the radioactive material has other harmful properties, an appropriate additional label shall be used and the normative documents for the transport of such consignment shall be complied with.

76. The labels indicated in Figures 2, 3 and 4 of Annex 8 to this Regulation shall be attached outside the package or overpack on two opposite surfaces or outside the freight container and tank on four sides. The label indicated in Figure 5 of Annex 8 to this Regulation shall be attached in addition to other labels (Figures 2, 3 and 4 of Annex 8).

77. The label may not cover marking of the package.

78. The following information shall be included in the labels indicated in the Figures 2, 3 and 4 of Annex 8 to this Regulation:

78.1. the radioactive content:

78.1.1. the symbol or name of the radionuclide, the most significant symbols or names of radionuclides shall be indicated for the mixture of radionuclides;

78.1.2. the designation “LSA-II”, “LSA-III”, “SCO-I” or “SCO-II” which is indicated after the symbol or name of the radionuclide;

78.1.3. for an LSA-I material, only the designation “LSA-I” shall be indicated (the symbol or name of radionuclide is not necessary);

78.2. the maximum total radioactivity in the SI system with the appropriate prefix. For a fissile material, the total radioactivity shall not be indicated, but the total mass in grams shall be indicated;

78.3. in the information of the overpack and freight container regarding the radioactive content and total radioactivity, the information regarding the whole content of the overpack or freight container (if the overpack or freight container contains consignment of mixed

packages with different radionuclides, the following inscription may be used: “See transport documents”);

78.4. the transport index shall not be indicated on the label I-WHITE.

79. On the label indicated in Figure 5 of Annex 8 to this Regulation, the consignor shall indicate the nuclear criticality index which is laid down in the certificate of approval for the technical design of the package or in the certificate of approval for the transport under special arrangement.

80. On the label of an overpack or freight container indicated in Figure 5 of Annex 8 to this Regulation the nuclear criticality index which is acquired by compiling the information regarding the total amount of fissile material shall be indicated.

81. On a large freight container (except for an excepted package) and tank, the consignor shall provide four posters (Figure 6 of Annex 8) which shall be vertically attached to large surfaces of the freight container or tank.

82. Where necessary, the label and poster may be proportionally enlarged.

83. The consignor shall ensure that all labels and posters which do not apply to the content of the consignment are removed.

84. On a railway and road vehicle which carries the package containing a radioactive material, overpack, tank or small freight container, the consignor shall, in addition to the labels laid down in the Figures 2, 3, 4 or 5 of Annex 8 to this Regulation, provide posters (Figure 6 of Annex 8) which are placed on:

84.1. the two external side surfaces of the railway vehicle;

84.2. the two external side surfaces and the back surface of the road vehicle;

84.3. the freight bearing unit (so that the posters are easily visible) if the vehicle has no boards;

84.4. the tank or freight container (if the curve of the surface of the tank or freight container hinders the placement of the poster, the length of the poster edge may be decreased to 100 mm).

5.5. Consignment Transport Documents

85. The consignor shall provide the following information in the consignment transport documents in conformity with the requirements laid down in the laws and regulation for the relevant type of transport:

85.1. the package name in accordance with Annex 7 to this Regulation;

85.2. the UN dangerous goods class designation 7;

85.3. the UN number in accordance with Annex 7 to this Regulation (the indication shall be started with the letters “UN”);

85.4. the symbol or name of each radionuclide (all or only the most significant radionuclides shall be accounted for a mixture of radionuclides);

85.5. the description of the physical condition or chemical composition of the radioactive material or an indication that it is the special form radioactive material or low dispersible radioactive material. The description of the chemical composition may be general;

85.6. the maximum total radioactivity according to the SI system with the appropriate prefix, the total radioactivity shall not be indicated for the fissile material, but the total mass in grams shall be indicated;

85.7. the category of the package – (I-WHITE, II-YELLOW, III-YELLOW);

85.8. the transport index (shall be indicated only for the category II-YELLOW and III-YELLOW);

85.9. the nuclear criticality index (shall be indicated only for consignments containing a fissile material);

85.10. the identification signs assigned by the competent authorities – the issuers of the certificates of conformity;

85.11. the detailed description of the content of the packages present in the overpack or freight container and, where necessary, the detailed description of the content of each overpack or freight container present in the consignment;

85.12. for the consignments of LSA-II material, LSA-III material, SCO-I object and SCO-II object – the ratio of the total radioactivity to A_2 (for example, $5A_2$, $0.5\ A_2$).

86. If during the transport packages are taken out of the overpack or freight container, the consignor shall include the necessary additional information in the consignment transport documents.

87. The consignor shall append a signed and dated declaration to the consignment transport documents with the text of the following content:

"I, ..., hereby notify that the content of this consignment is complete and precisely described by using appropriate name of the shipment, and is also classified, packed,

(given name, surname)

labelled, provided with labels and prepared so that it is suitable for transport

with ..... in conformity with relevant Latvian and international laws and regulations."

(transport type (types))

88. If during the transport the carrier needs to take additional actions, the consignor shall include the following information in the transport documents:

88.1. additional requirements for the use, loading, placement, transport, servicing and unloading of the package, overpack or freight container, and also any special instructions for the placement in order to ensure safe discharge of heat, or notification that additional requirements are not necessary;

88.2. special requirements for the placement to ensure heat dissipation by not exceeding 15 W/m^2, or the notification that such requirements are not necessary;

88.3. restrictions on the transport or choice of a vehicle, instructions for the route (where necessary);

88.4. measures for the protection of the relevant consignment (Annex 9) by taking into account the possibility for the formation of dangerous substance in chemical reactions between the content of the consignment and the environment if due to a radiation emergency or radiation accident the containment system is damaged;

88.5. other information regarding additional activities during transport.

89. Before loading the consignor shall present the certificate of approval issued by the competent authority for the radioactive material and package. A copy of the certificate of approval does not need to be sent together with the consignment.

90. Before the first international transport of each package, if the package needs a certificate of approval issued by the Centre, the consignor shall send the copies of the certificate of approval of the technical design of the package to the competent authority of that foreign country (of those foreign countries) through which and to which the consignment is

transported. The competent authority need not to notify the consignor of the receipt of the copy of the certificate of approval.

91. The consignor shall send a notification to the competent authority of that foreign country (of those foreign countries) through which or to which the consignment is transported at least seven days before the transport of such freight:

91.1. the type C package which contains the radioactive material the total radioactivity of which is higher than 3000 A_1, 3000 A_2 or 1000 TBq (the lowest value shall be selected);

91.2. the type B(U) package which contains the radioactive material the total radioactivity of which is higher than 3000 A_1, 3000 A_2 or 1000 TBq (the lowest value shall be selected);

91.3. the type B(M) package.

92. The consignor shall indicated in the notification:

92.1. the information necessary for the identification of the package, also the numbers and identification signs of all certificates of conformity;

92.2. the start date and the expected end date of the transport, and also the planned route;

92.3. the name of the radioactive material or the symbol or name of radionuclide;

92.4. the description of the physical condition and chemical composition of the radioactive material or an indication that it is the special form radioactive material or low dispersible radioactive material.

92.5. the maximum total radioactivity in the package according to the SI system with an appropriate prefix. For a fissile material, the total radioactivity shall not be indicated, but the total mass in grams shall be indicated.

93. The consignor may refrain from sending a notification to the competent authority if the information to be indicated in the notification is included in the request for obtaining the certificate of approval in the relevant country.

94. Before each transport the consignor shall transfer the copies of the certificate of approval laid down in Chapter 9 of this Regulation, and also the copies of the instructions related to the containment system of the packaging and other preparatory activities associated with the transport to the carrier.

6. Requirements for Transport and Control Thereof

6.1. Transport of the Radioactive Materials Together with Other Goods

95. The LSA material or SCO object may be transported together with other goods only when there is no interaction between them and packaging or package content which may reduce safety of the package.

96. A tank which is used for the transport of the radioactive material may not be used for the storage and transport of other goods, except when it has been decontaminated and no radioactive contamination has been left.

97. The consignor shall ensure separation of the package containing the radioactive material from other dangerous goods during the transport and storage in conformity with this Regulation and other laws and regulations of the Republic of Latvia governing transport of dangerous materials, and also laws and regulations of foreign countries through or to which the consignment is being transported.

98. Other characteristics of the content of dangerous package (explosiveness, inflammation, self-inflammation, chemical toxicity, corrosion) shall be taken into account at packaging stage by choosing and attaching labels and posters, and also by storing and transporting the package in conformity with this Regulation and other regulations for the transport of dangerous goods.

99. If the average heat flow from the package or overpack does not exceed 15 W/m^2 and consignments in direct vicinity are not placed in sacks or bags, the package may be transported together with other packaged goods without special conditions for placement, except when requested by the certificate of approval of the consignment.

6.2. Control of Radioactive Contamination and Damaged Package

100. The non-fixed radioactive contamination of the internal and external surface of the overpack, freight container or tank may not exceed the following values:

100.1. for beta and gamma emitters and low toxicity alpha emitters per 300 cm^2 of available surface – 4 Bq/cm^2;

100.2. for other alpha emitters per 300 cm^2 of available surface – 0.4 Bq/cm^2.

101. If the carrier finds that the package is damaged or it has leakage, or there are suspicions of the leakage or damage of the package, the carrier shall:

101.1. restrict access to such package;

101.2. immediately ensure that a qualified specialist assesses the level of the radioactive contamination and dose rate of ionising radiation;

101.3. ensure inspection of the vehicle and nearby loading and unloading areas and, where necessary, inspection of other material transported in the same vehicle;

101.4. implement other protection measures in order to protect members of the public, property and environment.

102. If the radioactive content has leaked and permissible limits have been exceeded, the carrier shall:

102.1. immediately ensure elimination of the leakage of the radioactive content;

102.2. where necessary, invite representatives of the Centre for the provision of recommendations on the elimination of the radioactive contamination or additional packaging of the package.

103. The carrier shall control the vehicle and auxiliary equipment which is regularly used for the transport of the radioactive material at least once a quarter to ascertain that the level of radioactive contamination does not exceed the relevant limits.

104. If a vehicle, its equipment or any part thereof has become radioactive, the consignor, carrier or consignee shall, in conformity with laws and regulations, immediately ensure decontamination of the relevant vehicle and prevent its use until one of the following conditions is fulfilled:

104.1. the non-fixed radioactive contamination is reduced to the following values:

104.1.1. for beta and gamma emitters and low toxicity alpha emitters per 300 cm^2 of available surface – 4 Bq/cm^2;

104.1.2. for other alpha emitters per 300 cm^2 of available surface – 0.4 Bq/cm^2;

104.2. the dose rate of ionising radiation generated by the fixed radioactive contamination is reduced to at least 5 µSv/h on the vehicle surface.

6.3. General Requirements for Transport and Storage

105. During transport and storage, a package, overpack or freight container containing the radioactive material shall be delimited:

105.1. from the places where people are located, and also from non-developed photographic films intended for control and other sensitive photo materials;

105.2. from other dangerous consignments.

106. The carrier shall prevent unauthorised activities with the consignment of the radioactive material during its storage and transport.

107. In accordance with laws and regulations, when carrying out the technical inspection of the vehicle which transports the radioactive material, the conformity of the vehicle with the instructions for use of the manufacturer and the requirements of laws and regulations shall be established.

108. The carrier shall delimit the LSA material or SCO object in a separate package of type IP-1, type IP-2, or type IP-3, item or item group so that the dose rate of ionising radiation in the distance of three meters from a non-shielded package or overpack would not exceed 10 mSv/h.

109. In internal waters on board a vessel or other vehicle other than vessel with which the unpackaged or packaged LSA material or SCO object in the industrial package is transported in a ship compartment or separate freight room the total radioactivity may not exceed the total radioactivity values laid down in Annex 4 to this Regulation for the transport of the LSA material and SCO object.

110. The SCO-I object may be transported unpackaged under routine conditions if the non-fixed radioactive contamination does not exceed the following values:

110.1. for beta and gamma emitters and low toxicity alpha emitters per 300 cm^2 of available surface – 4 Bq/cm^2;

110.2. for other alpha emitters per 300 cm^2 of available surface – 0.4 Bq/cm^2.

111. The LSA material or SCO object, except for the transport under exclusive use conditions, shall be packed in conformity with the requirements laid down in Annex 10 to this Regulation.

112. When placing containers and freight containers, as well as when accumulating the packages, overpacks and freight containers in warehouses, freight areas or vehicles, the carrier shall control that:

112.1. the total number of the packages, overpacks and freight containers in one vehicle (except for the LSA-I material consignments and consignments transported under exclusive use conditions) would be restricted so that the sum of transport indices would not exceed the values laid down in Annex 11 to this Regulation;

112.2. the total sum of nuclear criticality indices in the freight container and vehicle does not exceed the values laid down in Annex 11 to this Regulation;

112.3. in the routine conditions of transport the ionising radiation dose rate does not exceed 2 mSv/h at any point of the external surface of the vehicle and 0.1 mSv/h in the distance of two meters from the external surface of the vehicle.

113. The carrier of the packages, overpacks and freight containers containing a fissile material shall:

113.1. restrict the number of the packages, overpacks and freight containers at one storage place and in a separate vehicle so that the sum of nuclear criticality indices for any group of the packages, overpacks or freight containers does not exceed 50;

113.2. the groups of the packages, overpacks and freight containers shall be stored in the distance of at least 6 m from other groups of packages, overpacks or freight containers.

114. If the total sum of nuclear criticality indices in one separate vehicle or freight container exceeds 50 which is allowed in accordance with Annex 11 to this Regulation, the carrier shall provide a space of at least 6 m between the relevant vehicle and other packages, overpacks and freight containers containing the fissile material or other vehicles.

115. The category II-YELLOW or III-YELLOW package or overpack may not be transported by rail in passenger compartments occupied by passengers, except for the compartments exclusively reserved for couriers who are authorised to accompany the relevant packages or overpacks.

116. Only the manager or his or her assistants may be present in the vehicle which transports the category II-YELLOW or III-YELLOW package, overpack or freight container.

117. The vented type B(M) packages, the packages that require external cooling by an ancillary cooling system, the packages requiring operational controls during transport, and the packages which contain a liquid pyrophoric material are prohibited to be transported by air.

118. Customs operations for the inspection of the radioactive content of the consignment may be carried out only by the officials of the State Revenue Service who have received a permit to work with sources of ionising radiation if the control of the dose rate of ionising radiation is ensured. The referred to activities may be performed only at the places which are specified in the permit issued by the Centre for the activities with sources of ionising radiation.

119. Before sending further a package that has been opened, the official of the State Revenue Service shall renew its initial condition:

119.1. the packages shall be safely closed, and the official ascertains that closures and valves through which radioactive content may escape are duly closed;

119.2. the relevant seals shall be affixed;

119.3. the official ascertains that the non-fixed radioactive contamination on the external and internal surface of the package does not exceed the following values:

119.3.1. for beta and gamma emitters and low toxicity alpha emitters per 300 cm^2 of available surface – 4 Bq/cm^2;

119.3.2. for other alpha emitters per 300 cm^2 of the available surface – 0.4 Bq/cm^2;

119.4. the official ascertains that the dose rates of ionising radiation do not exceed the value permissible for the relevant package which is indicated in the documents accompanying the consignment.

120. If due to some reasons the consignment of the radioactive material cannot be transported, the carrier shall:

120.1. ensure the placement of the packages of the radioactive material in a safe place for storage;

120.2. immediately inform the consignee or consignor to receive instructions for further actions;

120.3. if the consignment contains the packages containing a fissile material, immediately inform the Security Police.

6.4. Requirements for the Transport of the Radioactive Material under Exclusive Use Conditions

121. All operations with the consignment under exclusive use conditions shall be carried out only in accordance with the instructions of the consignor or consignee.

122. Other items may be transported together with the consignment under exclusive use conditions if the transport is controlled only by the consignor and transport is not prohibited by other laws and regulations.

123. The overpack, freight container, tank or vehicle under exclusive use conditions may be used if on their internal surfaces:

123.1. the non-fixed radioactive contamination exceeds:

123.1.1. for beta and gamma emitters and low toxicity alpha emitters per 300 cm^2 of the available surface – 4 Bq/cm^2;

123.1.2. for other alpha emitters per 300 cm^2 of available surface – 0.4 Bq/cm^2;

123.2. the dose rate of ionising radiation which is emitted by the fixed radioactive contamination exceeds 5 μSv/h on the surface.

124. Unpackaged LSA-I material and SCO-I object may be transported under routine conditions if:

124.1. non-metallic material which contains only natural radionuclides is transported and damages to its radiation shield and losses of the radioactive content from the vehicle have not been found;

124.2. each vehicle is under exclusive use conditions, except for the case laid down in Paragraph 110 of this Regulation;

124.3. the protection measures shall be implemented for SCO-I object so as to prevent the contamination of the vehicle by the radioactive material if there are substantiated suspicions that the non-fixed radioactive contamination on non-reachable surfaces exceeds the following values:

124.3.1. for beta and gamma emitters and low toxicity alpha emitters per 300 cm^2 of the available surface – 4 Bq/cm^2;

124.3.2. for other alpha emitters per 300 cm^2 of the available surface – 0.4 Bq/cm^2.

125. When preparing a consignment for transport under the exclusive use conditions, the consignor shall ensure the fulfilment of the following requirements:

125.1. he or she shall indicate in the transport documents that the transport takes place under exclusive use conditions;

125.2. if the LSA-I material or SCO-I object is transported in a container or it is enclosed in a non-radioactive casing, a legible and durable marking “RADIOACTIVE LSA-I” or “RADIOACTIVE SCO-I” shall be placed on the container or enclosing material;

125.3. for the type B package which is transported by air under exclusive use conditions if the temperature of the accessible surfaces of the package exceeds 50 °C and the ambient temperature is 38 °C, the surface temperature shall not exceed 85 °C by ignoring the solar heat;

125.4. if the unpackaged LSA-I material or SCO-I object is present in the freight container or tank or the packaged radioactive material is in the freight container and such consignment has one separate UN number, the UN number shall be indicated on the bottom part of the poster indicated in Figure 6 of Annex 8 to this Regulation on white background with black numbers of at least 65 mm (the indication shall be started with letters “UN”) or

indicate on the poster laid down in Figure 7 of Annex 8 to this Regulation which shall be placed beside the main poster on four surfaces of the freight container or tank, on two side surfaces of the rail transport or two side surfaces and back surface of the road transport.

126. For the consignment which is transported under exclusive use conditions, the sum of transport indices for one vehicle shall not be restricted.

127. The package or overpack the transport index of which is higher than 10 or the nuclear criticality index of which is higher than 50 may be transported only under the exclusive use conditions.

128. The consignment which is transported by rail or road under exclusive use conditions shall be provided with posters (Annex 8, Figure 6) which are placed on:

128.1. two external side surfaces of the rail transport;

128.2. two external side surfaces and on the back surface of the road transport;

128.3. freight bearing units (so that the posters can be easily visible) if the vehicle has no boards;

128.4. tank or freight container (if the curve of the tank or freight container hinders the placement of the poster, the length of the poster edge may be reduced to 100 mm).

129. For the consignment which is transported by rail or road under exclusive use conditions, the dose rate of ionising radiation may not exceed the following values:

129.1. 10 mSv/h at any point of the external surface of the package or overpack. If the dose rate exceeds 2 mSv/h at any point of the external surface, the following provisions shall be complied with:

129.1.1.the vehicle shall be supplied with fence in order to prevent access by unauthorised persons to the package or overpack;

129.1.2. the package or overpack shall be secured in a fixed position in the vehicle;

129.1.3. additional loading and unloading shall not take place during the transport;

129.2. 2 mSv/h at any point of the external surface of the vehicle, but for an open vehicle – at any point on a conditional vertical plane which runs through the external edges of the vehicle;

129.3. 0.1 mSv/h at any point in the distance of two metres from the external side surfaces of the vehicle, but for an open vehicle – at any point in the distance of two metres from the conditional vertical plane which runs through the external edges of the vehicle.

130. During transport the package or overpack may not be reloaded to another vehicle if the dose rate of ionising radiation dose exceeds 2 mSv/h on the surface, and the package or overpack is transported by water under exclusive use conditions.

131. Under exclusive use conditions, the type B(M) package and consignment may not be transported in passenger aircrafts.

6.5. Requirements for the Transport of Excepted Package

132. The consignor of the excepted package shall ensure the fulfilment of the following requirements:

132.1. the conformity of the package to the general requirements (when packing the relevant label, poster and marking shall be selected, when storing and transporting not only

the radioactive properties and ability to divide of the radioactive content, but also other harmful properties shall be taken into account);

132.2. the outer non-fixed radioactive contamination of the package shall not exceed the following values:

132.1.2. for beta and gamma emitters and low toxicity alpha emitters per 300 cm^2 of available surface – 4 Bq/cm^2;

132.2.2. for other alpha emitters per 300 cm^2 of available surface – 0.4 Bq/cm^2;

132.3. if the radioactive content has leaked:

132.3.1. the leakage shall be immediately eliminated;

132.3.2. where necessary, representatives of the Centre shall be invited for the provision of recommendations for the elimination of the radioactive contamination or additional packaging of the package.

132.4. the dose rate of ionising radiation at any point on the external surface of the excepted package may not exceed 5 mSv/h;

132.5. the package shall be marked in conformity with the UN number, the package name shall not be indicated;

132.6. permissible gross weight shall be indicated on the package marking if the gross weight of the package exceeds 50 kg;

132.7. when transporting an empty packaging as excepted package, the previously affixed labels or (and) posters may not be visible;

132.8. if the package contains a fissile material, one of the cases referred to in Paragraph 200 of this Regulation shall apply to it; the size of the shortest edge shall be at least 10 cm;

132.9. the requirements laid down in Paragraphs 133 and 134 of this Regulation shall be complied with in respect of the consignments by post.

133. The consignment which corresponds to the requirements for the transport of excepted package, if its total radioactivity does not exceed one tenth of the values indicated in Annex 3 to this Regulation, may be sent by post within the territory of the Republic of Latvia.

134. The consignment which corresponds to the requirements for the transport of excepted package, if its total radioactivity does not exceed one tenth of the values indicated in Annex 3 to this Regulation, may be sent by post outside the borders of the Republic of Latvia by additionally complying with the provisions of the Universal Postal Union:

134.1. consignments may be transferred to the post only by authorised consignors of the Centre;

134.2. the consignment shall be sent by the shortest route, usually with an aircraft;

134.3. on the exterior of the consignment clearly visible and safely affixed labels shall be present with following text “Radioactive material – quantities permitted for movement by post”. When sending back an empty packaging, this text shall be crossed out;

134.4. on the exterior of the consignment the name of the consignor and address of the consignor with a note on the return of the consignment shall be indicated if the consignment has not been delivered to the addressee;

134.5. the name and address of the consignor, as well as the content of the consignment shall be indicated on the internal packaging.

135. Non-profit organisation the State joint stock company “Latvijas pasts” and companies (undertakings) which have received licences issued by the Ministry of Transport for the provision of postal services shall be responsible for the safety and conformity of postal items with this Regulation.

136. If the radioactive material is a part of a tool or other industrially manufactured item, it may be transported in the excepted package if:

136.1. total radioactivity does not exceed the values laid down in Annex 3 to this Regulation for a separate unit and package;

136.2. the dose rate of ionising radiation in the distance of 10 cm from any point of the external surface of an unpackaged tool or item does not exceed 0.1 mSv/h;

136.3. the item or tool has marking "Radioactive";

136.4. the active material is completely enclosed in inactive element.

137. If the radioactive material is not a part of a tool or other industrially manufactured item, or is not in the form of a sealed source of radiation, it may be transported in the excepted package if:

137.1. total radioactivity does not exceed the values laid down in Annex 3 to this Regulation;

137.2. the package retains its radioactive content when it is transported under any routine conditions;

137.3. the marking "Radioactive" is placed on the internal surface of the packaging so that it could be easily seen, when opening the package.

138. An industrially manufactured item which contains only unirradiated natural uranium, depleted uranium or inrradiated natural thorium, may be transported as excepted package if the external surface of uranium or thorium is enclosed in a non-radioactive casing of metal or other dense material.

139. Empty packaging which has contained the radioactive material may be transported as excepted package if:

139.1. the packaging is in a good condition and safely closed;

139.2. the external surface of unirradiated natural uranium or unirradiated natural thorium present in the structure of each packaging is enclosed in a non-radioactive casing of metal or other durable material;

139.3. the non-fixed radioactive contamination on internal surfaces does not exceed the following values:

139.3.1. for beta and gamma emitters and low toxicity alpha emitters per 300 cm^2 of available surface – 400 Bq/cm^2;

139.3.2. for other alpha emitters per 300 cm^2 of available surface – 40 Bq/cm^2.

6.6. Requirements for Transport Under Special Arrangement

140. The consignment which due to technical reasons may not be prepared so as to completely comply with all requirements of this Regulation may be transported only under special arrangement in conformity with Sub-chapter 6.6 of this Regulation if the level of safety in transport is equivalent to that which would be provided if all the requirements of these Regulations would be met. In such cases the consignment may be transported only in a specially adapted vehicles and the consignor must co-ordinate the special transport arrangement with the following authorities:

140.1. for transport by road – the route selected by the carrier shall be co-ordinated with the Licensing and Permit System Division of the State Police;

140.2. for transport by rail – with the Railway Technical Inspectorate;

140.3. for transport by sea – with the Latvian Maritime Administration;

140.4. for transport by air – with the Civil Aviation Administration.

141. When preparing the consignment for transport under special arrangement, the consignor shall ensure the fulfilment of the following requirements:

141.1. the package and overpack which are transported under special arrangement shall be included in the category III-YELLOW;

141.2. the nuclear criticality index laid down in the certificate of approval for the transport under special arrangement shall be indicated on the label provided for in Figure 5 of Annex 8 to this Regulation;

141.3. at least seven days before the consignment is transported a notification shall be sent to the competent authority of the foreign country (foreign countries) through which or to which the consignment is transported.

142. The package or overpack the dose rate of ionising radiation on the surface of which exceeds 2 mSv/h may be transported by water only under exclusive use conditions or special arrangement.

143. Consignments may be transported by a vessel which is specially assigned for the transport of the radioactive material if the conditions referred to in Annex 1 to this Regulation, and also the following requirements are met:

143.1. the radiation safety and nuclear safety programme is approved with the competent authority of the country the flag of which is present on the ship, and competent authorities of those countries in the ports of which the vessel calls;

143.2. the procedures for the placement of consignments is determined in advance for the entire transport route by taking into account also those consignments which are intended to be loaded in the ports included in the route;

143.3. loading, movement, placement and unloading of consignments shall be controlled by the person assigned by the carrier who ensures compliance with this Regulation or regulations of the International Atomic Energy Agency for the safe transport of radioactive materials (SS-6 or ST-1) at the places of loading and unloading and during carriage if the transport takes place in the territory of several countries.

144. The package or overpack the dose rate of ionising radiation on the surface of which exceeds 2 mSv/h may be transported by air only under special arrangement.

7. Requirements for the Radioactive Material, Packaging and Package

7.1. Specific Requirements for the Radioactive Material

145. The carrier shall ensure that a solid LSA-III material has such properties so that after the leakage test I for accident conditions laid down in Sub-chapter 8.3 of this Regulation the total radioactivity in water does not exceed 0.1 A_2 in respect to all radioactive content of the package.

146. The consignor shall ensure that the length of at least one external edge of an unpackaged special form radioactive material exceeds 5 mm and this material has such properties that upon performance of the test for accident conditions laid down in Sub-chapter 8.3 of this Regulation for the special form radioactive material:

146.1. the special form radioactive material does not break or rupture after the free drop test for accident conditions, bending test for accident conditions and percussion test for accident conditions;

146.2. the special form radioactive material does not melt or crumble away after the heat test for accident conditions;

146.3. the total radioactivity of water after the II leakage test for accident conditions laid down in Sub-chapter 8.3 of this Regulation does not exceed 2 kBq.

147. If the special form radioactive material is in a sealed capsule, the capsule must be manufactured so that it can be opened only by destroying it.

148. The consignor shall ensure the conformity of the total amount of the low dispersible radioactive material present in the package with the following requirements:

148.1. the dose rate of ionising radiation in the distance of 3 m from the low dispersible material without radiation shield does not exceed10 mSv/h;

148.2. the total radioactivity in the form of exhaust gas or fine dispersive dust (i.e. in the form of such dust the aerodynamic diameter equivalent of which is less than 100 μm) does not exceed 100 A_2 if material is subjected to the tests for accident conditions for the low dispersible radioactive material laid down in Sub-chapter 8.3 of this Regulation. Different samples may be used for each test;

148.3. the total radioactivity of water after the I leakage test for accident conditions laid down in Sub-chapter 8.3 of this Regulation does not exceed 100 A_2.

7.2. General Requirements for the Packaging and Package

149. The packaging is a set of components for the complete containment of the radioactive content. One or several tanks, absorbing material, distancing structures, barriers for the protection against ionising radiation, as well as filling up and draining equipment, ventilation, pressure relief, cooling, mechanical shock amortisation, servicing, fastening and thermal insulation devices and other service appliances may be in the composition of the packaging. The packaging may be a box, case, barrel or container of other type, also freight container or tank.

150. A freight container is a compact transport unit which is intended for the transport of packaged or unpackaged radioactive material with one or several types of transport without reloading of the radioactive content. The freight container may not arbitrary open. It must be strong and durable enough so that it could be used repeatedly. The freight container shall be equipped with devices which facilitate work, especially when reloading from one vehicle to another. There are the following freight containers:

150.1. large freight container – the container the internal volume of which is 3.0 m^3 or bigger, or the length of the shortest external edge of which is 1.5 m or longer;

150.2. small freight container – the container the internal volume of which is less than 3.0 m^3, or the shortest external edge of which is shorter than 1.5 m.

151. When designing the package, the mass, volume and shape thereof shall be taken into account and meeting of the following requirements shall be ensured:

151.1. the package can be safely secured in a vehicle or on it;

151.2. the package can be easily and safely serviced during the transport;

151.3. the lifting attachments are not damaged if they are used correctly;

151.4. the package is not damaged if the lifting attachment is damaged;

151.5. the conformity assessment of the lifting attachment takes into account the possible snatch lifting of the package.

152. Attachments and other devices on the outer surface of the package which may be used to lift the package shall be designed either to support the mass of the package or shall be removable or otherwise renderable incapable of being used during transport by the carrier.

153. In order to facilitate decontamination, the packaging shall be designed so that the external surfaces are free from protruding features.

154. The package shall be designed so as to prevent the collection and retention of water on its outer surface.

155. Any features added to the package during transport which are not a part of the package may not reduce its safety.

156. Acceleration, vibration and vibration resonance which may arise under routine conditions of transport may not reduce the efficiency of the closing devices of the package and safety of the entire package.

157. Nuts, bolts and other safety devices shall be designed so as to prevent them from becoming loose or being released unintentionally, even after repeated use.

158. The materials of the packaging and all parts thereof or that of the technical design shall be physically and chemically compatible with each other and with the radioactive content of the package. When selecting these materials the possible changes caused by ionising radiation during the entire period of use provided for in the technical design of the package shall be taken into account.

159. The technical design shall provide for such securities which ensure that the valves through which the loss of radioactive content may occur are protected against unauthorised operation.

160. When developing the technical design of the package, the changes in the ambient temperature and pressure shall be taken into account if transport takes place under routine conditions.

161. the technical design of the package which is intended for the transport of such radioactive material which also has other dangerous properties such properties shall be taken into account.

162. If the package is transported by air:

162.1. the temperature on the available surface may not exceed 50 °C if the ambient temperature is 38 °C by ignoring the solar heat;

162.2. if the ambient temperature is from -40 °C to 55 °C, the containment system is not being damaged;

162.3. the containment system of the package may not allow the leakage of the radioactive content if the external pressure decreases to 5 kPa.

7.3. Specific Requirements for the Industrial Package

163. The consignor shall ensure that the length of the shortest edge of the type IP-1 package is at least 10 cm.

164. The type IP-2 package shall be designed by complying with the requirements for the type IP-1 package and additionally ensuring that if the package is subjected to the tests for normal conditions laid down in Sub-chapter 8.4 of this Regulation for the type IP-2 package the technical design of the package shall not allow:

164.1. loss or dispersal of the radioactive content;

164.2. damages to the radiation shield due to which the dose rate of ionising radiation on the external surface of the package may increase by 20 %.

165. The type IP-3 package shall be designed by complying with the requirements for the type IP-1 package and the following additional requirements:

165.1. on the external surface of the package there is a device (for example, seal) which is difficult to damage and based on the appearance of which it can be easily established whether the package has been opened;

165.2. any attachments of the package are designed so that the load generated under normal and accident conditions of transport does not reduce the conformity of the package with the requirements of this Regulation;

165.3. the technical design of the package provides that the range of the temperature is from -40 °C to 70 °C for the packaging elements, special attention should be paid to the freezing point of the liquid content and possible degradation of the packaging materials within the given temperature range;

165.4. the technical design and manufacturing techniques shall comply with the requirements of this Regulation or that of International Atomic Energy Agency (SS-6 or ST-1) for the safe transport of radioactive materials if the transport takes place in the territory of several countries;

165.5. the technical design shall include a containment system securely closed by a positive fastening device that cannot be opened unintentionally or by a pressure that may arise within the package (the special form radioactive material may be considered as the element of the containment system);

165.6. if the containment system is a separate part of the package system, it shall be securely closed by a positive fastening device which is independent from other parts of the packaging;

165.7. when designing the components of the containment system, radiolytic decomposition of liquids and other vulnerable materials and the generation of gas by chemical reaction and radiolysis shall be taken into account;

165.8. the containment system shall retain the radioactive content of the package without leakages if the external pressure decreases to 95 kPa;

165.9. all valves, except for pressure relief valves, shall be closed in order to prevent leakage of the radioactive content;

165.10. the ionising radiation shield of the package which encloses a component of the package and is a part of the containment system shall be designed as to prevent the unintentional release of that component from the shield. If the ionising radiation shield and component of the package forms a separate unit therein, the radiation shield shall be independent of any other packaging structure and securely closable;

165.11. if the package is subjected to the tests for normal conditions laid down in Sub-chapter 8.4 of this Regulation for the type IP-3 package the technical design of the package shall not allow:

165.11.1. loss or dispersal of the radioactive content;

165.11.2. damages to the radiation shield due to which the dose rate of ionising radiation on the external surface of the package may increase by 20 %.

166. If the type IP-3 package is used for the transport of liquid radioactive content, free volume shall be additionally intended in the technical design of the package in order to compensate changes in the content volume due to temperature fluctuations, and also dynamic effects during filling up and transport.

7.4. Specific Requirements for the Package Containing Uranium Hexafluoride

167. Each package which is intended for the carriage of 0.1 kg and larger amount of uranium hexafluoride shall be designed so as to prevent leakage of uranium hexafluoride and damages of the containment system if it is subjected to the I test sequence for accident and normal conditions laid down in Sub-chapter 8.9 of this Regulation.

168. The package in which 0.1 kg and larger amount of uranium hexafluoride is intended to be transported may not contain pressure-relief devices (drain valves).

169. The maximum operating conditions of the containment system are as follows:

169.1. external pressure – 0.172 MPa;

169.2. internal pressure – 1.38 MPa;

169.3. working temperature – from -40 °C to 121 °C.

170. The specific details of the package containing uranium hexafluoride which prevent the entry and escape of water from the empty premises are devices which prevent physical contact between valves and any other package component if the package is exposed to II test sequence for accident conditions laid down in Sub-chapter 8.9 of this Regulation, and the valves ensure hermetically sealed condition also after the thermal test for accident conditions.

171. It is allowed to transport 0.1 kg and larger amount of uranium hexafluoride in the package if the package is designed so that it may withstand the pressure test for accident conditions without leakage of uranium hexafluoride and containment system damages if the pressure exceeds 1.38 MPa and is less than 2.76 MPa. The thermal test for accident conditions needs not be carried out for the package which is designed for the transport of 9000 kg and more of uranium hexafluoride.

7.5. Specific Requirements for the Type A Package

172. The type A package shall be designed by complying with the requirements for the type IP-3 package.

173. The type A package which is intended for the transport of liquid radioactive content shall correspond to the following requirements:

173.1. when subjecting the package to the tests for accident and normal conditions laid down in Sub-chapter 8.5 of this Regulation, the technical design of the package may not allow:

173.1.1. loss or dispersal of the radioactive content;

173.1.2. damages to the radiation shield due to which the dose rate of ionising radiation on the external surface of the package may increase for more than 20 %;

173.2. the package shall be provided with liquid absorbing material which after leakage of the liquid radioactive content comes into contact with liquid and is capable of absorbing twice of the amount of the liquid content, or the package shall be provided with two containment systems (internal and external) in order for all liquid content from the internal containment system to be completely perceived by the external containment system in the case of leakage of the radioactive content.

174. The type A package which is intended for the transport of the gaseous radioactive content shall be designed so that when the package is subjected to the tests for accident and normal conditions laid down in Sub-chapter 8.5 of this Regulation (except for the packaging

which is designed for the transport of tritium and inert radioactive gases) the technical design of the package may not allow the loss or dispersal of the radioactive content.

7.6. Specific Requirements for the Type B Package

175. The type B(U) package shall be designed by complying with the requirements for the type IP-3 package.

176. The type B(U) package shall be designed so that at the ambient temperature of 38 °C and under the conditions laid down in Annex 12 to this Regulation the heat emitted by the radioactive content during normal conditions of transport would not adversely affect the package, containment system and protection against ionising radiation if the package is left without supervision for one week.

177. When performing the tests for normal conditions laid down in Sub-chapter 8.6 of this Regulation, the heat effect shall be especially examined which may:

177.1. change the layout, geometric form or physical condition of the radioactive content;

177.2. cause deformation or melting of the casing, tank or radioactive content if the radioactive content is enclosed in the casing or tank;

177.3. reduce the protection efficiency of the package against ionising radiation;

177.4. accelerate corrosion due to humidity.

178. If the type B(U) package is subjected to the tests for normal conditions laid down in Sub-chapter 8.6 of this Regulation, the technical design shall not allow:

178.1. loss of the radioactive content from the package which exceeds $10^{-6}A_2$ per hour. The external non-fixed radioactive contamination shall be additionally taken into account for a radionuclide mixture;

178.2. damages to the radiation shield due to which the dose rate of ionising radiation on the external surface of the package may increase by 20 %.

179. The type B(U) package with thermal protection shall be designed so that the thermal protection could withstand the thermal test for the accident conditions also after the performance of the tests for accident conditions for the type B package with thermal protection laid down in Sub-chapter 8.6 of this Regulation.

180. The thermal protection of the type B(U) package shall retain its efficiency under all conditions which the package may face during servicing and transport or during an accident of the vehicle (breakage, felling, sliding, rubbing, inefficient handling).

181. The type B(U) package shall be designed so that when it is subjected to the I test sequence for accident conditions laid down in Sub-chapter 8.6 of this Regulation:

181.1. the dose rate of ionising radiation in the distance of 1 m from the package surface would not exceed 10 mSv/h, if the package contains the maximum designed amount of the radioactive materials;

181.2. the total losses of the radioactive content within one week would not exceed 10 A_2 for krypton 85 and A_2 – for all other radionuclides. Value A_2 for krypton 85 of the radionuclide mixture shall be 10_2.

182. The type B(U) package in which the total radioactivity of the radioactive content is higher than 10^5A_2 shall be designed so that the containment system would not be damaged if it is subjected to the water immersion test for sever accident conditions.

183. The type B(U) package shall be designed so that complying with the permissible total radioactivity leakage limits would not depend on filters or mechanical cooling systems.

184. The type B(U) package shall be designed so that it would not have pressure-relief systems that allow for the leakage of the radioactive content into the environment and, when subjecting the package to the II test sequence for accident conditions laid down in Sub-chapter 8.6 of this Regulation, the containment system could withstand the maximum operating pressure without damages.

185. The maximum operating pressure in the type B(U) package may not exceed 700 kPa.

186. If the ambient temperature is 38 °C, the temperature on the external surface of the type B(U) package may not exceed 50 °C except for transport under exclusive use conditions. If the package is transported by air, the referred to condition shall apply also to exclusive use conditions.

187. If the ambient temperature is 38 °C, ignoring the heating up due to exposure to sunlight, the maximum temperature of the external surface may not exceed 85 °C for the type B(U) package under exclusive use conditions.

188. Barriers and shields may be provided for the protection of workers against the heat emitted from the type B(U) package.

189. A package containing low dispersible radioactive material shall be designed so that any elements which are attached to the low dispersible radioactive material and which are not included in its composition, or any internal elements of the packaging would not adversely affect technical specifications of the low dispersible radioactive material.

190. The type B(U) package shall be designed for use at ambient temperature from -40 °C to 38 °C.

191. The type B(M) package shall be designed by complying with the requirements for the type B(U) package.

192. If the type B(M) package is transported only within one country or only within certain countries, and the competent authorities of these countries allow it, the ambient temperature may exceed 70 °C and the heating up due to exposure to sunlight may differ from the parameters laid down in Annex 12 to this Regulation.

193. Ventilation of the type B(M) package in each particular case of transport is allowed only when a permit has been received from the competent authority.

7.7. Specific Requirements for the Type C Package

194. The type C package shall be designed by complying with the requirements for the type B(U) package.

195. When subjecting the type C package for the burying test under severe accident conditions:

195.1. the exposition does rate in the distance of 1 m from the package surface may not exceed 10 mSv/h if the package contains the maximum designed amount of the radioactive material;

195.2. the total losses of the radioactive content within one week may not exceed 10 A_2 for krypton 85 and A_2 – for all other radionuclides. Value A_2 for krypton 85 of the radionuclide mixture shall be 10 A_2;

195.3. the containment system withstands the maximum operating pressure without damages.

196. The type C package shall be designed so that, when subjecting the package to the tests for normal conditions laid down in Sub-chapter 8.7 of this Regulation, the containment system could withstand the maximum operating pressure without damages and leakage of the radioactive content does not exceed $10^{-6}A_2$ per hour. External non-fixed radioactive contamination limits shall also be taken into account for a radionuclide mixture.

197. The type C package shall be designed so that, when subjecting the package to the tests for accident conditions laid down in Sub-chapter 8.7 of this Regulation, the containment system could withstand the maximum operating pressure without damages and comply with the following requirements:

197.1. retain sufficient protection by ensuring a dose rate of ionising radiation that does not exceed 10 mSv/h in the distance of one metre from the package surface if the package contains the maximum designed amount of the radioactive material;

197.2. the total losses of the radioactive content within one week do not exceed 10 A_2 for krypton 85 and A_2 – for all other radionuclides. Value A_2 for krypton 85 of the radionuclide mixture shall be 10 A_2.

198. Type C package shall be designed so that it could withstand the water immersion test for severe accident conditions without damages to the containment system.

7.8. Specific Requirements for the Package Containing a Fissile Material

199. The package containing a fissile material shall be designed so as to ensure sub-criticality during the transport under normal and accident conditions by taking into account:

199.1. entry of water in the package or escape from it;

199.2. reduction in efficiency of the built-in neutron absorbers and retarders;

199.3. re-structuring of the radioactive content in the package;

199.4. reduction of the spaces between the packages or between the fissile material present in the package;

199.5. the package becoming immersed in water or buried in snow;

199.6. possible change in temperature.

200. The requirements laid down for the package containing a fissile material shall not be applied if at least one of the following provision apply to the fissile material:

200.1. each individual package contains less than 15 g of the fissile material, and the freight mass limit is less than 1. The freight mass limit shall be calculated as follows:

200.1.1. if the fissile material is mixed with such material the average concentration of hydrogen atoms of which is the same as for water or less, the following condition shall be used:

$$\frac{A(i)}{400} + \frac{B(j)}{250} < 1$$, where

A(i) – uranium 235 mass (g);
B(j) – mass of other fissile material (g);

200.1.2. if the fissile material is mixed with such material the average concentration of hydrogen atoms of which is greater than for water, the following condition shall be used:

$$\frac{A(i)}{290} + \frac{B(j)}{180} < 1$$, where

A(i) – uranium 235 mass (g);
B(j) – mass of other fissile material (g);

200.2. the fissile material is placed in homogeneous water liquids or mixtures in which the total mass ratio of isotopes subject to nuclear reactions to the total mass of hydrogen atoms is less than 5 % and freight mass limit is less than 1.

200.3. each 10 litres of the package volume contain less than 5 g of the fissile material, and the freight mass limit is less than 1;

200.4. the amount of beryllium and deuterium in the package does not exceed 0.1 % of the mass of the fissile material, and the freight mass limit is less than 1;

200.5. the package contains only 0.72–1 percentage by weight of uranium enriched with uranium 235 if the total amount of plutonium and uranium 233 is less than 1 percentage by weight to uranium 235 by ensuring that the fissile material is homogeneously distributed in the entire transported material. If uranium 235 is in metal, oxide or carbide form, it may not form a grid structure in the package;

200.6. the package contains uranyl nitrate liquid which is enriched with uranium 235 from 0.72 to two percentages by weight if the total amount of plutonium and uranium 233 is less than 0.002 percentages by weight of uranium, and the ratio of the number of nitrogen and uranium atoms (N/U) is at least 2;

200.7. the package contains less than 1 kg plutonium, and plutonium 239, plutonium 241 or any combination of these radionuclides therein is not more than 20 percentages by weight.

201. If the physical condition, chemical content, isotopic composition, mass, concentration, retardation coefficient, density or geometric configuration of the fissile material is unknown, it shall be assumed in the assessments of a particular package that each unknown parameter causes maximum increase in the number of neutrons in relation to known parameters.

202. When assessing the sub-criticality of the package which contains irradiated nuclear fuel, the isotopic content of the fissile material shall be used and, by assuming that previous exposure of the nuclear fuel causes maximum increase in the number of neutrons, one of the following activities shall be carried out:

202.1. conservative models shall be used to calculate the coefficient of increase in the number of neutrons in the package;

202.2. after exposure of nuclear fuel, but before its transport, measurements shall be carried to check whether the assessment of isotopic content of the fissile material has been sufficiently conservative.

203. The package containing a fissile material shall be designed so that when it is subjected to the tests for normal conditions laid down in Sub-chapter 8.8 of this Regulation, the technical design of the package does not allow entry of more than 10 cm^3 of water in the package.

204. The package containing a fissile material shall be designed so that it could be used at ambient temperature from -40 °C to 38 °C unless the competent authority has otherwise laid down in the certificate of approval.

205. When determining the sub-criticality of an individual isolated package, it shall be assumed that water may enter in all empty rooms of the package and escape from those which are located in the interior of the containment system.

206. If there are special details in the technical design of the package which prevent entry of water in or its escape from empty rooms even due to a worker error, it may be assumed that water percolation from these rooms does not take place.

207. In order for the special parts which prevent entry of water in or its escape from empty rooms could be recognised as multiple high standard water barriers, it is necessary to ensure that they remain waterproof if the package is subjected to the I test sequence for accident conditions laid down in Sub-chapter 8.8 of this Regulation.

208. When assessing the sub-criticality of the packages containing a fissile material, it shall be assumed that there is at least 20 cm thick water layer around the containment system or any other neutron reflector which is better than water.

209. The package containing a fissile material shall be designed so that, by subjecting the package to the I test sequence for the accident conditions laid down in Sub-chapter 8.8 of this Regulation, the containment system of the package would not change its place in the package and the package would be in sub-critical condition even when there is a 20 cm thick water layer around it.

210. The package containing a fissile material which is intended for transport by air shall be designed so that the package is in sub-critical condition if it is subjected to the II test sequence for the accident conditions laid down in Sub-chapter 8.8 of this Regulation and there is a 20 cm thick water layer around it (entry of water in the package or its escape therefrom shall be ignored). Sub-criticality assessments shall ignore special details if, by exposing the package to the II test sequence for accident conditions laid down in Sub-chapter 8.8 of this Regulation, it is proved that water may not enter into the package or escape from it.

8. Tests for the Radioactive Material and Package

8.1. Test Types

211. The puncture-tearing test for accident conditions is an inspection during which a sample drops from the height of 1 m onto a 20 cm long toughened soft steel rod (with a diameter 15.0 ± 0.5 cm) which is vertically affixed on a target. The upper end of the rod is even and horizontal, the rounding radius of the surface edges thereof is less than 6 mm. The length of the rod may exceed 20 cm if thus even greater damages are caused to the package.

212. The puncture-tearing test for severe accident conditions is an inspection during which a sample which weighs less than 250 kg is placed on a target and a toughened soft steel rod of 250 kg having a conical shaped is dropped onto it with the sharp end from the height of 3 m.

The diameter of the narrow end of the rod shall be 2.5 cm, the diameter of the wide end – 20 cm, the length – 30 cm.

213. The burying test for severe accident conditions is an inspection during which a sample, for which the maximum designed internal pressure is provided in the packaging and which is in thermal equilibrium position if the ambient temperature is 38 °C, is buried in 38 °C warm soil with thermal conductivity of 0.33 W/mK.

214. The penetration test for normal conditions is an inspection during which a sample is affixed on a target and a metal rod of 6 kg (with the diameter of 3.2 cm) with a hemispherical end drops onto the sample from the height of 1 m on the sample. The distance of the fall shall be measured from the lowest point of the rod to the point of impact on the surface of the sample. The impact point of the rod shall be selected in the centre of the weakest point of the package where the containment system may be damaged if the rod penetrates deep enough. During the test the rod may not be exposed to significant deformation.

215. The penetration test for severe accident conditions is an inspection during which a toughened soft steel rod having a conical shape is placed vertically on a target with the sharp end up and a sample which weighs more than 250 kg falls drops onto the rod from the height of 3 m. The diameter of the narrow end of the rod is 2.5 cm, the diameter of the wide end – 20 cm, the length and mass of the rod shall be selected such that the sample would suffer maximum damage.

216. The heat test for accident conditions is an inspection during which a sample is heated in air to a temperature of 800 °C, held at that temperature for 10 minutes and then allowed to cool down.

217. The drop test for accident conditions is an inspection during which a sample drops onto a goal from the height of 9 m so as to suffer maximum damage.

218. The free drop test for normal conditions is an inspection during which a sample drops onto a target from such height so that the sample would suffer maximum damage (free drop distance for normal conditions is laid down in Annex 13 to this Regulation).

219. The bending test for accident conditions is an inspection during which a long and thin sample (longer than 10 cm, the length must be at least 10 times larger than width) is rigidly clamped in a horizontal position against the surface of the ground so that one half of its length would protrude from the face of the clamp and the sample would be oriented in such a position so that it would suffer maximum damage. The free end of the sample shall be struck with the flat face of a hammer (in the diameter of 25 mm, rounding radius of the edges 3.0 ± 0.3 mm) so that the impact would be equal to that resulting from a drop of an item weighing 1.4 kg from the height of 1 m.

220. The leakage test for accident conditions is an inspection during which a sample is immersed, for seven days at ambient temperature, in such amount of water so that after the test the remaining free amount of water would be at least 10 % of the volume of the sample to be examined. It is necessary to ensure that before the test the pH level of the water to be used for the inspection is from 6 to 8 and electrical conductivity in the temperature of 20 °C does not exceed 1 mS/m:

220.1. the I leakage test for accident conditions is such an inspection after which the total radioactivity in water is measured;

220.2. the II leakage test for accident conditions is an inspection which is carried out in two stages:

220.2.1. the first stage – water together with a sample is heated up to the temperature of 50±5 °C, and the sample is kept in water for four hours, afterwards the total radioactivity of water is measured;

220.2.2. the second stage – the sample taken out of the water shall be kept at the temperature of 30 °C for at least seven days, the relative humidity of air – not less than 90 %, the first stage shall be repeated afterwards.

221. An additional penetration test for normal conditions is an inspection during which a sample is placed on a target and a metal rod of 6 kg (with the diameter of 3.2 cm) with a hemispherical end is dropped onto it from the height of 1.7 m. The distance of the fall shall be measured from the lowest point of the rod to the point of impact on the surface of the sample. The impact point of the rod shall be selected in the centre of the weakest point of the package where the containment system may be damaged if the rod penetrates deep enough. During the performance of the test the rod may not be exposed to significant deformation.

222. The stacking test for normal conditions is an inspection during which a sample is exposed for 24 hours to a compressive load which is created by an item placed on the package the mass of which is equivalent to actual weight of five or more packages, and the pressure which is equivalent to the multiplication of the pressure of 13 kPa with the area of vertical projection of the package.

223. The percussion test for accident conditions is an inspection during which a sample is placed on a sheet of lead which is at least 25 mm thick (hardness number 3.5–4.5 on the Vickers scale) and which is located on an even solid surface, and the sample is strucked by the flat face of a soft steel hammer (in the diameter of 25 mm, the rounding radius of edges 3.0 ± 0.3 mm) so that the impact would be equal to that resulting from a drop of an item weighing 1.4 kg from the height of 1 m and the sample would suffer the maximum damage. A new lead plate shall be used in each test.

224. The pressure test for accident conditions is an inspection during which the maximum operating conditions are created within the packaging (internal pressure not lower than 1.38 MPa, external pressure – 2.78 MPa, ambient temperature from -40 °C to 121 °C). If the caused pressure is less than 2.76 MPa, the package requires a multilateral certificate of approval. The measuring instruments which are able to detect leakage the speed of which is 0.1 Pa·l/sec shall be used for the test.

225. The thermal test for accident conditions is an inspection during which a sample (the surface absorption coefficient 0.8) for which the maximum total radioactivity is provided in the package and which is in thermal equilibrium position if the ambient temperature is 38 °C, taking into account the solar heat (in conformity with Annex 12 to this Regulation), is placed for 30 minutes in hydrocarbon and air flame the average temperature of which is 800 °C and which is sufficiently strong to cause emission coefficient 0.9. The sample shall be stored until its cools down to the initial thermal equilibrium position. During the inspection, the sample may not be artificially cooled down, and also sample combustion may not be stopped if any has started.

226. The thermal test for severe accident conditions is an inspection which is carried out in the same way as the thermal test for accident conditions, only the heating time is 60 minutes.

227. The impact test for accident conditions is an inspection during which a sample is placed on a target so as to suffer the maximum damage by the horizontal drop of a 500 kg toughened soft steel squared board the length of the edge of which is 1 m from 9 m.

228. The impact test for severe accident conditions is an inspection during which a sample is thrown towards a target with a speed of at least 90 m/s so that the sample would suffer the maximum damage.

229. The water immersion test for accident conditions is an inspection during which a sample is immersed under water to a certain depth for eight hours in such a position that may cause maximum leakage of the radioactive content from the package:

229.1. I water immersion test for accident conditions is an inspection during which a sample is immersed under water to a depth of at least 0.9 m;

229.2. II water immersion test for accident conditions is an inspection during which a sample is immersed under water to a depth of at least 15 m. External pressure shall be at least 150 kPa.

230. Water immersion test for severe accident conditions is an inspection during which a sample is immersed under water to a depth of at least 200 m for one hour in such a position that may cause maximum leakage of the radioactive content from the package: External pressure shall be at least 2 MPa.

231. Water spray test for normal conditions is an inspection during which a sample is sprayed with water simulating rainfall of one hour the intensity of which is 5 cm of precipitation per hour.

8.2. General Requirements for the Performance of Tests

232. Tests for the radioactive materials and packages shall be performed by the testing and calibration laboratories which have been accredited by the Latvian National Accreditation Bureau.

233. The results of tests performed in foreign countries shall be recognised in the Republic of Latvia in conformity with laws and regulations of the Republic of Latvia which provide for the recognition of the certificates of conformity issued in foreign countries. The results of these tests shall be assessed by the Centre.

234. The target – a sheet of solid material with even horizontal surface which is used for drop, penetration, puncture-tearing and impact tests and the properties of which do not practically change after the impact is made on the sample – is used:

234.1. for the penetration test under normal conditions;
234.2. for the drop test under normal conditions;
234.3. for the additional penetration test under normal conditions;
234.4. for the puncture-tearing test under accident conditions;
234.5. for the drop test under accident conditions;
234.6. for the impact test under accident conditions;
234.7. for the puncture-tearing test under severe accident conditions;
234.8. for the penetration test under severe accident conditions;
234.9. for the impact test under severe accident conditions.

235. Before a test it is necessary to ensure that the radioactive contamination of the package surface does not exceed the following values:

235.1. for beta and gamma emitters and low toxicity alpha emitters per 300 cm^2 of available surface – 4 Bq/cm^2;

235.2. for other alpha emitters per 300 cm^2 of available surface – 0.4 Bq/cm^2.

236. To verify that the radioactive material or package is able to withstand transport under the relevant conditions, any of the following methods (or their combination) shall be used:

236.1. the performance of tests with samples of LSA-III material, special form radioactive material, low dispersible radioactive material or with prototypes or models of the packaging by imitating the possible radioactive content in the sample or packaging as precise as possible and preparing the package in the same way as preparing it for the transport;

236.2. the performance of tests by using models of minimised size and adjusting the parameters to be used in the test accordingly in order to imitate testing of real radioactive material or package as precise as possible. If the previous experience proves that such test is acceptable for the examination of the technical design of the package, the models shall include all significant features of the item to be researched;

236.3. a reference to positive results of the relevant tests performed previously;

236.4. calculations or justified arguments if the veracity of the calculation methods and parameters, in assessing with a conservative model, are generally accepted.

237. After testing of samples, prototypes or models, a conservative model shall be used in order to ascertain that also the real package could withstand the relevant tests.

238. A sample of the package shall be examined before testing in order to find and register defects and damages:

238.1. deviations from the technical design;

238.2. constructive defects;

238.3. corrosion or deterioration of other type;

238.4. deformation.

239. After the test:

239.1. the defects and damages of the packages shall be identified and registered;

239.2. conformity of the containment system and protection against ionising radiation with the relevant safety requirements shall be examined;

239.3. for the package containing a fissile material it shall be examined whether the package is in a sub-critical condition.

240. One sample of the package may be used for the tests for normal conditions if during the time interval between the water spray test for normal conditions and the next test water soaks deeply in the sample and drying of the outer surface of the sample does not take place. If previous researches have not been carried out, it may be assumed that this time interval is two hours provided that the sample is sprayed with water from all sides simultaneously. If the sample has been sprayed with water from all sides sequentially, a time interval is not required between the tests.

8.3. Performance of Tests for the Radioactive Material

241. The sample of solid material which is equivalent to a full LSA-III material package shall be subjected to I leakage test for accident conditions.

242. The sample of a special form radioactive material or its imitator shall be subjected to the following tests for accident conditions (new sample may be used for each pair of tests):

242.1. the drop test for accident conditions and II leakage test for accident conditions;

242.2. the percussion test for accident conditions and II leakage test for accident conditions;

242.3. the bending test for accident conditions and II leakage test for accident conditions;

242.4. heat test for accident conditions and II leakage test for accident conditions.

243. The sample of the low dispersible radioactive material or its imitator shall be subjected to the following tests for accident conditions (new sample may be used for each pair of tests):

243.1. the thermal test for severe accident conditions and I leakage test for accident conditions;

243.2. the impact test for severe accident conditions and I leakage test for accident conditions.

8.4. Performance of Tests for the Industrial Package

244. The sample of the type IP-2 package shall be subjected to the following tests for normal conditions (one same sample may be used for both tests):

244.1. the drop test;

244.2. the stacking test.

245. The sample of the type IP-3 package shall be subjected to the following tests for normal conditions:

245.1. the water spray test and drop test;

245.2. the water spray test and stacking test;

245.3. the water spray test and penetration test.

8.5. Performance of Tests for the Type A Package

246. The sample of the type A package shall be subjected to the following tests for normal conditions:

246.1.the water spray test and drop;

246.2. the water spray test and stacking test;

246.3. the water spray test and penetration test.

247. After the tests for normal conditions, a sample of the type A package which contains liquid or gaseous radioactive material shall be subjected to the following tests (new sample may be used for each test):

247.1. the drop test for accident conditions;

247.2. the additional penetration test for normal conditions.

248. If it is proven that any of the tests laid down in Paragraph 247 of this Regulation may cause even greater damages to the relevant sample, the sample shall be tested only with this test.

8.6. Performance of Tests for the Type B Package

249. The sample of the type B package shall be subjected to the following tests for normal conditions:

249.1. the water spray test and drop test;

249.2. the water spray test and stacking test;

249.3. the water spray test and penetration test.

250. After performance of the tests for normal conditions, the sample of the type B package with thermal protection shall be subjected to the following tests for accident conditions (one of the following test sequences for accident conditions shall be selected where the sample would receive the maximum damage):

250.1. the drop test, puncture-tearing test and thermal test for accident conditions;

250.2. the puncture-tearing test, impact test and thermal test.

251. After performance of the tests for normal conditions, the sample of the type B package shall be subjected to the I test sequence for accident conditions (the same or another sample may be used for the II water immersion test (tests) for accident conditions):

251.1. if the sample mass is not more than 500 kg, volume by weight does not exceed 1000 kg/m^3 and total radioactivity does not exceed 1000 A_2:

251.1.1. the puncture-tearing test;

251.1.2. the impact test;

251.1.3. the thermal test;

251.1.4. the II water immersion test;

251.2. if the sample mass is 500 kg and more and volume by weight exceeds 1000 kg/m^3 or total radioactivity exceeds 1000 A_2:

251.2.1. the drop test;

251.2.2. the puncture-tearing test;

251.2.3. the thermal test;

251.2.4. the II water immersion test.

252. The order of the tests laid down in Sub-paragraphs 251.1.1, 251.1.2, 251.2.1 and 251.2.2 of this Regulation shall be selected so that the sample would receive the maximum damage in the thermal test for accident conditions.

253. After performance of the tests for normal conditions, the sample of the type B package shall be subjected to the I test sequence for accident conditions (the same or another sample may be used for the II water immersion test (tests) for accident conditions):

253.1. the drop test;

253.2. the puncture-tearing test;

253.3. the impact test;

253.4. the thermal test;

253.5. the II water immersion test.

254. The order of the tests laid down in Sub-paragraphs 253.1, 253.2 and 253.3 of this Regulation shall be selected so that the sample would receive the maximum damage in the thermal test for accident conditions.

255. If possible, after the I test sequence and II test sequence for accident conditions the water immersion test for severe accident conditions shall also be performed.

256. If the total radioactivity of the type B package exceeds 10^5A_2, it can be subjected only to the water immersion test for severe accident conditions.

8.7. Performance of Tests for the Type C Package

257. The sample of the type C package shall be subjected to the following tests for normal conditions:

257.1. the water spray test and drop test;

257.2. the water spray test and stacking test;

257.3. the water spray test and penetration test.

258. After performance of the tests for normal conditions, a sample of the type C package shall be subjected to the following tests:

258.1. if the mass of the package is 250 kg and more:

258.1.1. the drop test for accident conditions;

258.1.2. the impact test for accident conditions;

258.1.3. the penetration test for severe accident conditions;

258.1.4. the thermal test for severe accident conditions;

258.1.5. the impact test for severe accident conditions (other sample may be used for the test);

258.2. if the mass of the package is less than 250 kg:

258.2.1. the drop test for accident conditions;

258.2.2. the impact test for accident conditions;

258.2.3. the puncture-tearing test for severe accident conditions;

258.2.4. the thermal test for severe accident conditions;

258.2.5. the impact test for severe accident conditions (other sample may be used for the test).

259. The type C package may be subjected only to the water immersion test for severe accident conditions.

260. The type C package may be exposed only to the burying test for severe accident conditions.

8.8. Performance of Tests for the Package Containing a Fissile Material

261. The sample of the package containing a fissile material shall be subjected to the following tests for normal conditions:

261.1. the water spray test and drop test;

261.2. the water spray test and stacking test;

261.3. the water spray test and penetration test.

262. After performance of the tests for normal conditions, the sample of the package containing a fissile material shall be subjected to the I test sequence for accident conditions:

262.1. if the mass of the sample is less than 500 kg and volume by weight does not exceed 1000 kg/m^3:

262.1.1. the puncture-tearing test;

262.1.2. the impact test;

262.1.3. the thermal test;

262.1.4. the I water immersion test;

262.2. if the mass of the sample is 500 kg and more and volume by weight is 1000 kg/m^3 and more:

262.2.1. the puncture-tearing test;

262.2.2. the drop test;

262.2.3. the thermal test;

262.2.4. the I water immersion test.

263. The order of the tests laid down in Sub-paragraphs 262.1.1, 262.1.2, 262.2.1 and 262.2.2 of this Regulation shall be selected so that the sample would receive the maximum damage in the thermal test for accident conditions.

264. The sample containing a fissile material may be subjected only to the II water immersions test for accident conditions if it is proved that this test causes even more damages to the sample than the I test sequence for accident conditions.

265. The sample of the package containing a fissile material shall be subjected to the II test sequence for accident conditions:

265.1. if the mass of the package is 250 kg and more:

265.1.1. the drop test for accident conditions;

265.1.2. the impact test for accident conditions;

265.1.3. the penetration test for severe accident conditions;

265.1.4. the thermal test for severe accident conditions;

265.1.5. the impact test for severe accident conditions (other sample may be used);

265.1.6. the I water immersion test for accident conditions;

265.2. if the mass of the package is less than 250 kg:

265.2.1. the drop test for accident conditions;

265.2.2. the impact test for accident conditions;

265.2.3. the puncture-tearing test for severe accident conditions;

265.2.4. the thermal test for severe accident conditions;

265.2.5. the impact test for severe accident conditions (other sample may be used);

265.2.6. the I water immersion test for accident conditions.

8.9. Performance of Tests for the Package Containing Uranium Hexafluoride

266. The sample of the package containing uranium hexafluoride shall be subjected to the I test sequence for accident and normal conditions:

266.1. the pressure test for accident conditions;

266.2. the drop test for normal conditions;

266.3. the thermal test for accident conditions.

267. The sample of the package containing uranium hexafluoride shall be subjected to the following tests for normal conditions:

267.1. the water spray test and drop test;

267.2. the water spray test and stacking test;

267.3. the water spray test and penetration test.

268. After performance of the tests for normal conditions, the sample of the package containing uranium hexafluoride shall be subjected to the II test sequence for accident conditions:

268.1. if the mass of the sample is less than 500 kg and volume by weight is not greater than 1000 kg/m^3:

268.1.1. the puncture-tearing test;

268.1.2. the impact test;

268.1.3. the thermal test;

268.1.4. the I water immersion test;

268.2. if the mass of the sample is 500 kg and more and volume by weight is more than1000 kg/m^3:

268.2.1. the puncture-tearing test;

268.2.2. the drop test;

268.2.3. the thermal test;

268.2.4. the I water immersion test.

269. The order of the tests laid down in Sub-paragraphs 268.1.1, 268.1.2, 268.2.1 and 268.2.2 of this Regulation shall be selected so that the sample would receive the maximum damage in the thermal test for accident conditions.

270. The sample may be subjected only to the II water immersion test for accident conditions if it is proved that this test causes even more damages to the sample than the tests laid down in the II test sequence for accident conditions.

9. Certificate of Approval and Procedures for the Issue Thereof

9.1. General Requirements for Certification of Conformity

271. The certificate of approval is necessary for:

271.1. the technical design of the special form radioactive material;

271.2. the technical design of the low dispersible radioactive material;

271.3. the technical design of the package containing 0.1 kg and more uranium hexafluoride;

271.4. the technical design of the package containing a fissile material;

271.5. the technical design of the type B package;

271.6. the technical design of the type C package;

271.7. the transport under special arrangement;

271.8. the radiation safety and nuclear safety programme which is intended for exclusive use of a cargo vessel;

271.9. the calculations of limits for those radionuclides for which the values A1 and A2 are not laid down in Annex 1 to this Regulation (the Centre shall approve them only when a multilateral certificate of approval is necessary for the calculations of limits accepted by the competent authority of the foreign country);

271.10. the transport which is laid down in Sub-chapter 9.4 of this Regulation.

272. For a technical design which does not require the certificate of approval issued by the Centre, the consignor shall, upon a request of the Centre, issue a statement that the technical design of the package corresponds to the requirements of laws and regulation for the transport of radioactive materials.

273. In order to obtain the certificate of approval, the producer of the radioactive material and (or) packaging, the consignor, the carrier or consignee shall submit a request to the Centre. Based on the safety assessments and test results, the Centre shall issue the certificate of approval in which it indicates that the technical design, special arrangement or transport corresponds to the relevant requirements, and also assign the identification sign for the technical design, special arrangement or transport.

274. The place, date and term of validity, and also the regulations of the Republic of Latvia and international regulations, including the regulations of the International Atomic Energy Agency for the safe transport of the radioactive materials (SS-6 or ST-1) in accordance with which the certificate of approval is issued.

275. The certificate of approval issued by the competent authorities of foreign countries shall be recognised in the Republic of Latvia (hereinafter – the initial certificate of approval), if there is a mutual agreement between the Republic of Latvia and the relevant foreign country on the recognition of the conformity assessment systems.

276. The Centre shall assess the issued initial certificate of approval and the conformity of the laws and regulations of the relevant foreign country with the laws and regulations of the Republic of Latvia. If there are any doubts of the conformity of the requirements for the issue of the certificate of approval with the relevant laws and regulations of the Republic of Latvia, the Centre shall request to perform the tests laid down in this Regulation or to use any other assessment method laid down in Paragraph 236 of this Regulation or combination thereof.

277. If a multilateral certificate of approval is required, the Centre shall approve the initial certificate of approval which has been issued by the competent authority of the foreign country in which the technical design has been established or which carries out the transport, or issues a separate certificate of approval as annex to the initial certificate of approval.

278. The consignor shall submit to the Centre the information regarding serial numbers assigned by the competent authorities for each packaging which has been produced in conformity with the approved technical design. The Centre shall establish the Register of Serial Numbers for the serial numbers assigned by the foreign competent authorities and the Centre.

9.2. Certificate of Approval of the Special Form Radioactive Material and Low Dispersible Radioactive Material

279. The technical design of the special form radioactive material requires a unilateral certificate of approval.

280. The technical design of the low dispersible radioactive material requires a multilateral certificate of approval.

281. The following information shall be provided in the certificate of approval for the special form radioactive material or low dispersible radioactive material:

281.1. the description of physical and chemical properties of the radioactive material or, if the radioactive material is in the form of capsule, the information regarding the content thereof;

281.2. the description of the technical design of the capsules to be used;

281.3. the information regarding the tests performed and results thereof or certification substantiated by calculations that the radioactive material conforms to the relevant standards;

281.4. the information regarding the quality assurance programme;

281.5. the information regarding any activities before consignment of the radioactive material which are planned to be taken by the consignor.

282. The following information shall be provided in the certificate of approval for the special form radioactive material or low dispersible radioactive material:

282.1. the name, address and registration number of the authority issuing the certificate of approval;

282.2. the type of the certificate of approval (the certificate of approval for the special form radioactive material or low dispersible radioactive material);

282.3. the identification sign;

282.4. the name, registration number and address of the producer or supplier of the radioactive material;

282.5. the indication to the special form radioactive material or low dispersible radioactive material;

282.6. the description of the special form radioactive material or low dispersible radioactive material;

282.7. the specifications of the technical design (the copies of the relevant designs shall be appended);

282.8. the specification of the radioactive content, also the description of the total radioactivity , physical condition and chemical content;

282.9. the registration number of the quality assurance programme or reference to the quality certificate;

282.10. the identification number, type, form and make of the technical design;

282.11. the information regarding the activities which are to be taken before the transport of the radioactive material.

9.3. Certificate of Approval of the Technical Design of the Package

283. A unilateral certificate of approval is required for the type B(U) package, except for a type B(U) package containing a low dispersible radioactive material, and the type (C) package.

284. The package which is designed for the transport of 0.1 kg and more uranium hexafluoride, the type B(M) package, the package containing a fissile material (except for the fissile material to which Paragraph 200 of this Regulation applies) and the type B(U) package if a low dispersible radioactive material is transported therein requires a multilateral certificate of approval.

285. The following information shall be indicated in the request for the certificate of approval for the package containing uranium hexafluoride:

285.1. the information which certifies that the package conforms to the requirements laid down in Sub-chapter 7.4 of this Regulation (also technical drawings, list of materials, design methods);

285.2. the description of the quality assurance programmes;

285.3. the information regarding any activities which are planned by the consignor before the transport.

286. The following information shall be indicated in the request for the certificate of approval for the type B(U) and type C package:

286.1. detailed description of the radioactive material by indicating the physical condition and chemical content thereof, as well as the type of ionising radiation;

286.2. detailed description of the technical design (also technical drawings, the list of the materials to be used and design methods);

286.3. information regarding the tests carried out and results thereof or certification substantiated by calculations that the technical design complies with the requirements for use;

286.4. the instructions for using and servicing the packaging;

286.5. information regarding the materials of the technical design of the containment system and specifications thereof, and also information regarding the procedures for sampling and tests to be carried out if the maximum operating pressure exceeds 100 kPa;

286.6. substantiated assumptions which are used in safety analyses as the technical characteristics of nuclear fuel if the estimated radioactive content is irradiated nuclear fuel;

286.7.special requirements for storage to ensure heat dissipation from the package by taking into account different vehicles or freight containers;

286.8. reproducible illustration (not larger than 21 x 30 cm) showing the construction of the package;

286.9. the description of the quality assurance programme.

287. The following information shall be indicated in the request for the certificate of approval for the type B(M) package in addition to information laid down for the request for the certificate of approval for the type B(U) package:

287.1. the maximum difference of pressure if packages are transported by air (95 kPa);

287.2. the freezing point if liquids are transported;

287.3. the maximum operating pressure (700 kPa);

287.4. the maximum temperature on the surface of the package;

287.5. the restrictions for the use of the package;

287.6. the recommended additional operating control measures during transport;

287.7. the information regarding restrictions on the transport type and special stacking, transport, unloading or servicing procedures;

287.8. permissible environmental conditions during transport;

287.9. the information regarding radiolysis and chemical reaction products which may affect the safety of transport.

288. The necessary information regarding the conformity of the technical design with the requirements for the package containing a fissile material shall be indicated, and also the description of the quality assurance programme shall be provided in the request for the certificate of approval for the package containing a fissile material.

289. The following information shall be indicated in the certificate of approval for the technical designs of packages:

289.1. the name, registration number and address of the authority issuing the certificate of approval;

289.2. the type of the certificate of approval (the certificate of approval for the type B(U) or C package);

289.3. the identification sign;

289.4. the name, registration number and address of the manufacturer or supplier of the packaging;

289.5. any restrictions on the type of transport, if any required;

289.6. the notification that the respective certificate of approval does not release the consignor from the fulfilment of the requirements which have been assigned thereto by the competent authority of the country through which the consignment is transported or to which this consignment is delivered;

289.7. a reference to the certificate of approval approved by other competent authority for alternative radioactive content or to additional technical data;

289.8. the transport permit, if any required;

289.9. the packaging identification;

289.10. the description of the packaging with reference to drawings or specification of the technical design;

289.11. reproducible illustrations (not larger than 21 x 30 cm) which show the construction of the package together with a short description of the package materials, gross mass, main external dimensions and outer appearance;

289.12. the specification of the technical design with a reference to drawings;

289.13. the specification of the permitted radioactive content, physical condition and chemical content of the radioactive material, maximum total radioactivity (also total radioactivity of main isotopes) and amount in grams (for a fissile material) and whether the relevant material is the special form radioactive material or low dispersible radioactive material;

289.14. the additional information regarding the packages containing a fissile material:

289.14.1. a detailed description of the permitted radioactive material;

289.14.2. the nuclear criticality index;

289.14.3. a reference to the documentation which attests the safety of the radioactive content based on the nuclear criticality;

289.14.4. any special details which prevent the entry of water in or its escape from empty rooms;

289.14.5. any assumptions used for the assessment of the nuclear criticality;

289.14.6. the range of ambient temperature laid down in the technical design of the package;

289.15. for the type B(M) package – the notification in which the requirements with which the package does not conform with and any other additional information which may be useful for other competent authorities are indicated;

289.16. the additional measures for the operating control when preparing, loading, storing, unloading and servicing the consignment (also special stacking requirements in order to ensure heat dissipation);

289.17. the information of the consignor regarding use of packages or specific actions to be taken before transport;

289.18. permissible environmental conditions during transport;

289.19. the registration number of the quality assurance programme or reference to the quality certificate;

289.20. the identification number, type, form and make of the technical design;

289.21. indication regarding actions in the radiation emergency or radiation accident situation.

9.4. Certificate of Approval for Transport

290. A multilateral certificate of approval for transport (the certificate of approval for the package and certificate of approval for the transport may be joined in one certificate of approval) is required for:

290.1. the transport of the type B(M) package if the technical design of the package allows for regular ventilation;

290.2. the transport of the type B(M) package if the package contains the radioactive material the total radioactivity of which is more than 3×10^3 A_1 or 3×10^3 A_2, or 1000 TBq (the lowest value shall be chosen);

290.3. the transport of the package containing a fissile material if the sum of the transport indices of individual packages exceeds 50;

290.4. the radiation safety and nuclear safety programme for the transport with exclusive use cargo vessels.

291. The following information shall be indicated in the request for the certificate of approval for transport:

291.1. the time period necessary for transport;

291.2. the actual radioactive content, the intended type of transport, the type of vehicle and possible and recommended route;

291.3. the special safety precautions and special administrative and operating control which is indicated in the certificate of approval of the technical design.

292. The following information shall be indicated in the certificate of approval for transport:

292.1. the name, registration number and address of the authority issuing the certificate of approval;

292.2. the type of the certificate of approval (the certificate of approval for the transport of the type B(M) package if the technical design allows for a regular ventilation or the total radioactivity of the radioactive material of the package is more than $3 \times 10^3 A_1$ or $3 \times 10^3 A_2$, or 1000 TBq, as well as for the transport of the packages containing the fissile

material if the sum of transport indices of individual packages exceeds 50 or for the radiation safety and nuclear safety programme for exclusive use in cargo vessels);

292.3. the identification sign;

292.4. the name, registration number and address of the producer and manufacturer, person preparing the consignment or supplier of the radioactive material and packaging;

292.5. restrictions on the type of transport and type of freight container, and also the restrictions related to selection of the route or co-ordinated transport route;

292.6. the notification that the respective certificate of approval does not release the consignor from the fulfilment of the requirements which have been assigned thereto by the competent authority of the country through which the consignment is transported or to which this consignment is delivered;

292.7. the additional measures for the operating control when preparing, loading, storing, unloading and servicing the consignment (also special stacking requirements in order to ensure heat dissipation);

292.8. the information regarding specific actions to be taken before transport;

292.9. the information regarding the certificate of approval of the technical design;

292.10. the specification of the permitted radioactive content, physical condition and chemical content of the radioactive materials, maximum total radioactivity (also total radioactivity of main isotopes) and amount in grams (for the fissile material) and whether the relevant material is the special form radioactive material or low dispersible radioactive material;

292.11. indication regarding actions in the radiation emergency or radiation accident situation;

292.12. the registration number of the quality assurance programme or reference to the quality certificate;

292.13. the identification number, type, form and make of the technical design;

9.5. Certificate of Approval for Transport Under Special Arrangement

293. A consignment which is transported under special arrangement in the territories of several countries requires a multilateral certificate of approval.

294. The following information shall be indicated in the request for the certificate of approval for transport under special arrangement:

294.1. the information regarding the conformity of general safety level at least with such level which ensures the fulfilment of the requirements laid down in this Regulation;

294.2. the justification why the consignment may not be prepared in conformity with the requirements of this Regulation;

294.3. the statement on special safety precautions and special administrative control of operation which is necessary to compensate the non-conformity of the consignment with the requirements of this Regulation.

295. The following information shall be indicated in the certificate of approval for transport under special arrangement:

295.1. the name, registration number and address of the authority issuing the certificate of approval;

295.2. the type of the certificate of approval (for the transport of the consignment under special arrangement);

295.3. the identification sign;

295.4. the name, registration number and address of the producer and manufacturer, person preparing the consignment or supplier of the radioactive material and packaging;

295.5. the type (types) of transport;

295.6. any restrictions on the type of transport and freight container, and also the instructions related to the choice of route;

295.7. the notification that the respective certificate of approval does not release the consignor from the fulfilment of the requirements which have been assigned thereto by the competent authority of the country through which the freight is consignment or to which this consignment is delivered;

295.8. the reference to certificates of conformity issued by other competent authorities or to additional technical data;

295.9. the description of the packaging by referring to the drawings or specification of the technical design;

295.10. the reproducible illustrations (not larger than 21 x 30 cm) demonstrating the construction of the package together with a short description of the packaging, and also materials to be used, gross mass, main external dimensions and outer appearance;

295.11. the specification for the permitted radioactive content, physical condition and chemical content of the radioactive material, maximum total radioactivity (also total radioactivity of the main isotopes) and amount in grams (for a fissile material) and whether the relevant material is the special form radioactive material or low dispersible radioactive material;

295.12. the following information shall be additionally provided for the technical design of the package containing a fissile material:

295.12.1. a detailed description of the permitted radioactive content;

295.12.2. the nuclear criticality index;

295.12.3. a reference to the documentation which certifies the safety of the radioactive content in respect to nuclear criticality;

295.12.4. any special details which prevent entry of water in empty rooms or its escape therefrom;

295.12.5. any assumptions used for the assessment of the nuclear criticality;

295.12.6. the range of ambient temperature laid down for transport under special arrangement;

295.13. the additional measures for the control of operation when preparing, loading, storing, unloading and servicing the consignment (including special stacking requirements to ensure heat dissipation);

295.14. justification of the need for special arrangement;

295.15. special safety precautions which compensate the non-conformity of the consignment with the requirements laid down in this Regulation;

295.16. the information of the consignor regarding use of packages or specific actions to be taken before transport;

295.17. permissible environmental conditions during transport;

295.18. indication of actions in the radiation emergency or radiation accident event;

295.19. the registration number of the quality assurance programme or reference to the quality certificate;

295.20. the identification number, type, form and make of the technical design.

9.6. Identification of the Certificate of Approval

296. The identification sign of the certificate of approval shall consist of the international vehicle registration identification code of the country, number and type code of the certificate of approval (VRI/number/code).

297. The following requirements have been laid down for the identification sign:

297.1. the identification sign of that country shall be used in the certificate of approval the competent authority of which has issued the certificate of approval;

297.2. the assigned number shall be unique and specific for each technical design or transport;

297.3. the identification sign shall indicate the connection between the certificate of approval of the technical design and certificate of approval of the transport;

297.4. certificates of conformity have the following codes:

297.4.1. a type A package containing a fissile material – AF;

297.4.2. a type B package – B(U) or B(M);

297.4.3. a type B package containing a fissile material – B(U)F or B(M)F;

297.4.4. a type C package – C;

297.4.5. a type C package containing a fissile material – CF;

297.4.6. an industrial package – I;

297.4.7. an industrial package for fissile materials – IF;

297.4.8. the special form radioactive material – S;

297.4.9. the low dispersible radioactive material – LD;

297.4.10. transport – T;

297.4.11. transport under special arrangement – X;

297.4.12. the packages containing uranium hexafluoride – H(U) or H(M);

297.5. the symbols "-96" shall be added to the certificate of approval of the package and radioactive materials after the package code.

298. The codes shall be used as follows in the certificate of approval:

298.1. each certificate of approval and each package shall have a corresponding identification sign which has been laid down in Paragraph 297 of this Regulation (except for the packages the type code of the technical design of which has only the symbols "-96" after the second slash (shall not be indicated in the marking of T or X packaging));

298.2. if the certificate of approval of the technical design and certificate of approval of the transport are joined, the codes shall not be repeated;

298.3. if the initial certificate of approval is approved for a multilateral certificate of approval, only that identification sign shall be used which is issued by the country in which the technical design of the package has been developed or which carries out the transport;

298.4. if each next country issues its own certificate of approval for a multilateral certificate of approval, each certificate of approval shall have its own identification sign, but the technical design of the package shall have all identification signs;

298.5. a notation on the review of the certificate of approval shall be written in round brackets after the identification sign;

298.6. additional symbols which are necessary in accordance with the national requirements shall be indicated in brackets at the end of the identification sign;

298.7. the identification sign on the packaging need not be changed after review of the certificate of approval of the technical design. The marking shall be changed only when, upon reviewing the certificate of approval of the technical design of the package, the letter code of the type of the technical design of the package to be indicated after the second slash changes.

Prime Minister A. Bērziņš

Minister for Environmental Protection
and Regional Development V. Makarovs

Annex 1
Cabinet Regulation No. 307
3 July 2001

Limits A_1 and A_2, and the Specific and Total Radioactivity Limits

No.	Radionuclide	A_1 (TBq)	A_2 (TBq)	Specific radioactivity limit for the material (Bq/g)	Total radioactivity limit for consignment (Bq)
1	2	3	4	5	6
	Actinium				
1.	^{225}Ac a)	8×10^{-1}	6×10^{-3}	1×10^{1}	1×10^{4}
2.	^{227}Ac a)	9×10^{-1}	9×10^{-5}	1×10^{-1}	1×10^{3}
3.	^{228}Ac	6×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
	Silver				
4.	^{105}Ag	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
5.	^{108m}Ag a)	7×10^{-1}	7×10^{-1}	1×10^{1} b)	1×10^{6} b)
6.	^{110m}Ag a)	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
7.	^{111}Ag	2×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
	Aluminium				
8.	^{26}Al	1×10^{-1}	1×10^{-1}	1×10^{1}	1×10^{5}
	Americium				
9.	^{241}Am	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
10.	^{242m}Am a)	1×10^{1}	1×10^{-3}	1×10^{0} b)	1×10^{4} b)
11.	^{243}Am a)	5×10^{0}	1×10^{-3}	1×10^{0} b)	1×10^{3} b)
	Argon				
12.	^{37}Ar	4×10^{1}	4×10^{1}	1×10^{6}	1×10^{8}
13.	^{39}Ar	4×10^{1}	2×10^{1}	1×10^{7}	1×10^{4}
14.	^{41}Ar	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{9}
	Arsenic				
15.	^{72}As	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
16.	^{73}As	4×10^{1}	4×10^{1}	1×10^{3}	1×10^{7}
17.	^{74}As	1×10^{0}	9×10^{-1}	1×10^{1}	1×10^{6}
18.	^{76}As	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
19.	^{77}As	2×10^{1}	7×10^{-1}	1×10^{3}	1×10^{6}
	Astatine				
20.	^{211}At a)	2×10^{1}	5×10^{-1}	1×10^{3}	1×10^{7}
	Gold				
21.	^{193}Au	7×10^{0}	2×10^{0}	1×10^{2}	1×10^{7}

22.	^{194}Au	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
23.	^{195}Au	1×10^{1}	6×10^{0}	1×10^{2}	1×10^{7}
24.	^{198}Au	1×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
25.	^{199}Au	1×10^{1}	6×10^{-1}	1×10^{2}	1×10^{6}
	Barium				
26.	^{131}Ba a)	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
27.	^{133}Ba	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
28.	^{133m}Ba	2×10^{1}	6×10^{-1}	1×10^{2}	1×10^{6}
29.	^{140}Ba a)	5×10^{-1}	3×10^{-1}	1×10^{1} b)	1×10^{5} b)
	Beryllium				
30.	^{7}Be	2×10^{1}	2×10^{1}	1×10^{3}	1×10^{7}
31.	^{10}Be	4×10^{1}	6×10^{-1}	1×10^{4}	1×10^{6}
	Bismuth				
32.	^{205}Bi	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
33.	^{206}Bi	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
34.	^{207}Bi	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
35.	^{210}Bi	1×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
36.	^{210m}Bi a)	6×10^{-1}	2×10^{-2}	1×10^{1}	1×10^{5}
37.	^{212}Bi a)	7×10^{-1}	6×10^{-1}	1×10^{1} b)	1×10^{5} b)
	Berkelium				
38.	^{247}Bk	8×10^{0}	8×10^{-4}	1×10^{0}	1×10^{4}
39.	^{249}Bk a)	4×10^{1}	3×10^{-1}	1×10^{3}	1×10^{6}
	Bromine				
40.	^{76}Br	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
41.	^{77}Br	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
42.	^{82}Br	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
	Carbon				
43.	^{11}C	1×10^{0}	6×10^{-1}	1×10^{1}	1×10^{6}
44.	^{14}C	4×10^{1}	3×10^{0}	1×10^{4}	1×10^{7}
	Calcium				
45.	^{41}Ca	without a limit	without a limit	1×10^{5}	1×10^{7}
46.	^{45}Ca	4×10^{1}	1×10^{0}	1×10^{4}	1×10^{7}
47.	^{47}Ca a)	3×10^{0}	3×10^{-1}	1×10^{1}	1×10^{6}
	Cadmium				
48.	^{109}Cd	3×10^{1}	2×10^{0}	1×10^{4}	1×10^{6}
49.	^{113m}Cd	4×10^{1}	5×10^{-1}	1×10^{3}	1×10^{6}
50.	^{115m}Cd a)	3×10^{0}	4×10^{-1}	1×10^{2}	1×10^{6}
51.	^{115m}Cd	5×10^{-1}	5×10^{-1}	1×10^{3}	1×10^{6}
	Cerium				
52.	^{139}Ce	7×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
53.	^{141}Ce	2×10^{1}	6×10^{-1}	1×10^{2}	1×10^{7}

54.	^{143}Ce	9×10^{-1}	6×10^{-1}	1×10^{2}	1×10^{6}
55.	^{144}Ce a)	2×10^{-1}	2×10^{-1}	1×10^{2} b)	1×10^{5} b)
	Californium				
56.	^{248}Cf	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{4}
57.	^{249}Cf	3×10^{0}	8×10^{-4}	1×10^{0}	1×10^{3}
58.	^{250}Cf	2×10^{1}	2×10^{-3}	1×10^{1}	1×10^{4}
59.	^{251}Cf	7×10^{0}	7×10^{-4}	1×10^{0}	1×10^{3}
60.	^{252}Cf	5×10^{-2}	3×10^{-3}	1×10^{1}	1×10^{4}
61.	^{253}Cf a)	4×10^{1}	4×10^{-2}	1×10^{2}	1×10^{5}
62.	^{254}Cf	1×10^{-3}	1×10^{-3}	1×10^{0}	1×10^{3}
	Chlorine				
63.	^{36}Cl	1×10^{1}	6×10^{-1}	1×10^{4}	1×10^{6}
64.	^{38}Cl	2×10^{-1}	2×10^{-1}	1×10^{1}	1×10^{5}
	Curium				
65.	^{240}Cm	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
66.	^{241}Cm	2×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
67.	^{242}Cm	4×10^{1}	1×10^{-2}	1×10^{2}	1×10^{5}
68.	^{243}Cm	9×10^{0}	1×10^{-3}	1×10^{0}	1×10^{4}
69.	^{244}Cm	2×10^{1}	2×10^{-3}	1×10^{1}	1×10^{4}
70.	^{245}Cm	9×10^{0}	9×10^{-4}	1×10^{0}	1×10^{3}
71.	^{246}Cm	9×10^{0}	9×10^{-4}	1×10^{0}	1×10^{3}
72.	^{247}Cm a)	3×10^{0}	1×10^{-3}	1×10^{0}	1×10^{4}
73.	^{248}Cm	2×10^{-2}	3×10^{-4}	1×10^{0}	1×10^{3}
	Cobalt				
74.	^{55}Co	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
75.	^{56}Co	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
76.	^{57}Co	1×10^{1}	1×10^{1}	1×10^{2}	1×10^{6}
77.	^{58}Co	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
78.	^{58m}Co	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
79.	^{60}Co	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
	Chromium				
80.	^{51}Cr	3×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
	Caesium				
81.	^{129}Cs	4×10^{0}	4×10^{0}	1×10^{2}	1×10^{5}
82.	^{131}Cs	3×10^{1}	3×10^{1}	1×10^{3}	1×10^{6}
83.	^{132}Cs	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{5}
84.	^{134}Cs	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{4}
85.	^{134m}Cs	4×10^{1}	6×10^{-1}	1×10^{3}	1×10^{5}
86.	^{135}Cs	4×10^{1}	1×10^{0}	1×10^{4}	1×10^{7}
87.	^{136}Cs	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{5}
88.	^{137}Cs a)	2×10^{0}	6×10^{-1}	1×10^{1} b)	1×10^{4} b)
	Copper				

89.	^{64}Cu	6×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
90.	^{67}Cu	1×10^{1}	7×10^{-1}	1×10^{2}	1×10^{6}
	Dysprosium				
91.	^{159}Dy	2×10^{1}	2×10^{1}	1×10^{3}	1×10^{7}
92.	^{165}Dy	9×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
93.	^{166}Dy a)	9×10^{-1}	3×10^{-1}	1×10^{3}	1×10^{6}
	Erbium				
94.	^{169}Er	4×10^{1}	1×10^{0}	1×10^{4}	1×10^{7}
95.	^{171}Er	8×10^{-1}	5×10^{-1}	1×10^{2}	1×10^{6}
	Europium				
96.	^{147}Eu	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
97.	^{148}Eu	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
98.	^{149}Eu	2×10^{1}	2×10^{1}	1×10^{2}	1×10^{7}
99.	^{150}Eu (short-lived)	2×10^{0}	7×10^{-1}	1×10^{3}	1×10^{6}
100.	^{150}Eu (long-lived)	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
101.	^{152}Eu	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
102.	^{152m}Eu	8×10^{-1}	8×10^{-1}	1×10^{2}	1×10^{6}
103.	^{154}Eu	9×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
104.	^{155}Eu	2×10^{1}	3×10^{0}	1×10^{2}	1×10^{7}
105.	^{156}Eu	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
	Fluorine				
106.	^{18}F	1×10^{0}	6×10^{-1}	1×10^{1}	1×10^{6}
	Iron				
107.	^{52}Fe a)	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{6}
108.	^{55}Fe	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{6}
109.	^{59}Fe	9×10^{-1}	9×10^{-1}	1×10^{1}	1×10^{6}
110.	^{60}Fe a)	4×10^{1}	2×10^{-1}	1×10^{2}	1×10^{5}
	Gallium				
111.	^{67}Ga	7×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
112.	^{68}Ga	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{5}
113.	^{72}Ga	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
	Gadolinium				
114.	^{146}Gd a)	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
115.	^{148}Gd	2×10^{1}	2×10^{-3}	1×10^{1}	1×10^{4}
116.	^{153}Gd	1×10^{1}	9×10^{0}	1×10^{2}	1×10^{7}
117.	^{159}Gd	3×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
	Germanium				
118.	^{68}Ge a)	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{5}
119.	^{71}Ge	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{8}
120.	^{77}Ge	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
	Hafnium				
121.	^{172}Hf a)	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}

122.	^{175}Hf	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
123.	^{181}Hf	2×10^{0}	5×10^{-1}	1×10^{1}	1×10^{6}
124.	^{182}Hf	without a limit	without a limit	1×10^{2}	1×10^{6}
	Mercury				
125.	^{194}Hg a)	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
126.	^{195m}Hg a)	3×10^{0}	7×10^{-1}	1×10^{2}	1×10^{6}
127.	^{197}Hg	2×10^{1}	1×10^{1}	1×10^{2}	1×10^{7}
128.	^{197m}Hg	1×10^{1}	4×10^{-1}	1×10^{2}	1×10^{6}
129.	^{203}Hg	5×10^{0}	1×10^{0}	1×10^{2}	1×10^{5}
	Holmium				
130.	^{166}Ho	4×10^{-1}	4×10^{-1}	1×10^{3}	1×10^{5}
131.	^{166m}Ho	6×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
	Iodine				
132.	^{123}I	6×10^{0}	3×10^{0}	1×10^{2}	1×10^{7}
133.	^{124}I	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
134.	^{125}I	2×10^{1}	3×10^{0}	1×10^{3}	1×10^{6}
135.	^{126}I	2×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
136.	^{129}I	without a limit	without a limit	1×10^{2}	1×10^{5}
137.	^{131}I	3×10^{0}	7×10^{-1}	1×10^{2}	1×10^{6}
138.	^{132}I	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
139.	^{133}I	7×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
140.	^{134}I	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
141.	^{135}I a)	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
	Indium				
142.	^{111}In	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
143.	^{113m}In	4×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
144.	^{114m}In a)	1×10^{1}	5×10^{-1}	1×10^{2}	1×10^{6}
145.	^{115m}In	7×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
	Iridium				
146.	^{189}Ir a)	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
147.	^{190}Ir	4×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
148.	^{192}Ir	1×10^{1}	5×10^{-1}	1×10^{2}	1×10^{6}
149.	^{194}Ir	7×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
	Potassium				
150.	^{40}K	9×10^{-1}	9×10^{-1}	1×10^{2}	1×10^{6}
151.	^{42}K	2×10^{-1}	2×10^{-1}	1×10^{2}	1×10^{6}
152.	^{43}K	7×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
	Krypton				
153.	^{81}Kr	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
154.	^{85}Kr	1×10^{1}	1×10^{1}	1×10^{5}	1×10^{4}

155.	^{85m}Kr	8×10^{0}	3×10^{0}	1×10^{3}	1×10^{10}
156.	^{87}Kr	2×10^{-1}	2×10^{-1}	1×10^{2}	1×10^{9}
	Lanthanum				
157.	^{137}La	3×10^{1}	6×10^{0}	1×10^{3}	1×10^{7}
158.	^{140}La	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
	Lutetium				
159.	^{172}Lu	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
160.	^{173}Lu	8×10^{0}	8×10^{0}	1×10^{2}	1×10^{7}
161.	^{174}Lu	9×10^{0}	9×10^{0}	1×10^{2}	1×10^{7}
162.	^{174m}Lu	2×10^{1}	1×10^{1}	1×10^{2}	1×10^{7}
163.	^{177}Lu	3×10^{1}	7×10^{-1}	1×10^{3}	1×10^{7}
	Magnesium				
164.	^{28}Mg a)	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
	Manganese				
165.	^{52}Mn	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
166.	^{53}Mn	without a limit	without a limit	1×10^{4}	1×10^{9}
167.	^{54}Mn	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
168.	^{56}Mn	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
	Molybdenum				
169.	^{93}Mo	4×10^{1}	2×10^{1}	1×10^{3}	1×10^{8}
170.	^{99}Mo a)	1×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
	Nitrogen				
171.	^{13}N	9×10^{-1}	6×10^{-1}	1×10^{2}	1×10^{9}
	Sodium				
172.	^{22}Na	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
173.	^{24}Na	2×10^{-1}	2×10^{-1}	1×10^{1}	1×10^{5}
	Niobium				
174.	^{93m}Nb	4×10^{1}	3×10^{1}	1×10^{4}	1×10^{7}
175.	^{94}Nb	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
176.	^{95}Nb	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
177.	^{97}Nb	9×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
	Neodymium				
178.	^{147}Nd	6×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
179.	^{149}Nd	6×10^{-1}	5×10^{-1}	1×10^{2}	1×10^{6}
	Nickel				
180.	^{59}Ni	without a limit	without a limit	1×10^{4}	1×10^{8}
181.	^{63}Ni	4×10^{1}	3×10^{1}	1×10^{5}	1×10^{8}
182.	^{65}Ni	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
	Neptunium				
183.	^{235}Np	4×10^{1}	4×10^{1}	1×10^{3}	1×10^{7}

184.	^{236}Np (short-lived)	2×10^{1}	2×10^{0}	1×10^{3}	1×10^{7}
185.	^{236}Np (long-lived)	9×10^{0}	2×10^{-2}	1×10^{2}	1×10^{5}
186.	^{237}Np	2×10^{1}	2×10^{-3}	1×10^{0} b)	1×10^{3} b)
187.	^{239}Np	7×10^{0}	4×10^{-1}	1×10^{2}	1×10^{7}
	Osmium				
188.	^{185}Os	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
189.	^{191}Os	1×10^{1}	2×10^{0}	1×10^{2}	1×10^{7}
190.	^{191m}Os	4×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
191.	^{193}Os	2×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
192.	^{194}Os a)	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
	Phosphorus				
193.	^{32}P	5×10^{-1}	5×10^{-1}	1×10^{3}	1×10^{5}
194.	^{33}P	4×10^{1}	1×10^{0}	1×10^{5}	1×10^{8}
	Protactinium				
195.	^{230}Pa a)	2×10^{0}	7×10^{-2}	1×10^{1}	1×10^{6}
196.	^{231}Pa	4×10^{0}	4×10^{-4}	1×10^{0}	1×10^{3}
197.	^{233}Pa	5×10^{0}	7×10^{-1}	1×10^{2}	1×10^{7}
	Lead				
198.	^{201}Pb	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
199.	^{202}Pb	4×10^{1}	2×10^{1}	1×10^{3}	1×10^{6}
200.	^{203}Pb	4×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
201.	^{205}Pb	without a limit	without a limit	1×10^{4}	1×10^{7}
202.	^{210}Pb a)	1×10^{0}	5×10^{-2}	1×10^{1} b)	1×10^{4} b)
203.	^{212}Pb a)	7×10^{-1}	2×10^{-1}	1×10^{1} b)	1×10^{5} b)
	Palladium				
204.	^{103}Pd a)	4×10^{1}	4×10^{1}	1×10^{3}	1×10^{8}
205.	^{107}Pd	without a limit	without a limit	1×10^{5}	1×10^{8}
206.	^{109}Pd	2×10^{0}	5×10^{-1}	1×10^{3}	1×10^{6}
	Promethium				
207.	^{143}Pm	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
208.	^{144}Pm	7×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
209.	^{145}Pm	3×10^{1}	1×10^{1}	1×10^{3}	1×10^{7}
210.	^{147}Pm	4×10^{1}	2×10^{0}	1×10^{4}	1×10^{7}
211.	^{148m}Pm a)	8×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
212.	^{149}Pm	2×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
213.	^{151}Pm	2×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
	Polonium				
214.	^{210}Po	4×10^{1}	2×10^{-2}	1×10^{1}	1×10^{4}
	Praseodymium				
215.	^{142}Pr	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{5}

216.	^{143}Pr	3×10^{0}	6×10^{-1}	1×10^{4}	1×10^{6}
	Platinum				
217.	^{188}Pt a)	1×10^{0}	8×10^{-1}	1×10^{1}	1×10^{6}
218.	^{191}Pt	4×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
219.	^{193}Pt	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
220.	^{193m}Pt	4×10^{1}	5×10^{-1}	1×10^{3}	1×10^{7}
221.	^{195m}Pt	1×10^{1}	5×10^{-1}	1×10^{2}	1×10^{6}
222.	^{197}Pt	2×10^{1}	6×10^{-1}	1×10^{3}	1×10^{6}
223.	^{197m}Pt	1×10^{1}	6×10^{-1}	1×10^{2}	1×10^{6}
	Plutonium				
224.	^{236}Pu	3×10^{1}	3×10^{-3}	1×10^{1}	1×10^{4}
225.	^{237}Pu	2×10^{1}	2×10^{1}	1×10^{3}	1×10^{7}
226.	^{238}Pu	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
227.	^{239}Pu	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
228.	^{240}Pu	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{3}
229.	^{241}Pu a)	4×10^{1}	6×10^{-2}	1×10^{2}	1×10^{5}
230.	^{242}Pu	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
231.	^{244}Pu a)	4×10^{-1}	1×10^{-3}	1×10^{0}	1×10^{4}
	Radium				
232.	^{223}Ra a)	4×10^{-1}	7×10^{-3}	1×10^{2} b)	1×10^{5} b)
233.	^{224}Ra a)	4×10^{-1}	2×10^{-2}	1×10^{1} b)	1×10^{5} b)
234.	^{225}Ra a)	2×10^{-1}	4×10^{-3}	1×10^{2}	1×10^{5}
235.	^{226}Ra a)	2×10^{-1}	3×10^{-3}	1×10^{1} b)	1×10^{4} b)
236.	^{228}Ra a)	6×10^{-1}	2×10^{-2}	1×10^{1} b)	1×10^{5} b)
	Rubidium				
237.	^{81}Rb	2×10^{0}	8×10^{-1}	1×10^{1}	1×10^{6}
238.	^{83}Rb a)	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
239.	^{84}Rb	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
240.	^{86}Rb	5×10^{-1}	5×10^{-1}	1×10^{2}	1×10^{5}
241.	^{87}Rb	without a limit	without a limit	1×10^{4}	1×10^{7}
242.	Rb (natural)	without a limit	without a limit	1×10^{4}	1×10^{7}
	Rhenium				
243.	^{184}Re	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
244.	^{184m}Re	3×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
245.	^{186}Re	2×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
246.	^{187}Re	without a limit	without a limit	1×10^{6}	1×10^{9}
247.	^{188}Re	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{5}
248.	^{189}Re a)	3×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
249.	Re (natural)	without a limit	without a limit	1×10^{6}	1×10^{9}

	Rhodium				
250.	^{99}Rh	2×10^{0}	2×10^{0}	1×10^{1}	1×10^{6}
251.	^{101}Rh	4×10^{0}	3×10^{0}	1×10^{2}	1×10^{7}
252.	^{102}Rh	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
253.	^{102m}Rh	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
254.	^{103m}Rh	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{8}
255.	^{105}Rh	1×10^{1}	8×10^{-1}	1×10^{2}	1×10^{7}
	Radon				
256.	^{222}Rn a)	3×10^{-1}	4×10^{-3}	1×10^{1} b)	1×10^{8} b)
	Ruthenium				
257.	^{97}Ru	5×10^{0}	5×10^{0}	1×10^{2}	1×10^{7}
258.	^{103}Ru a)	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
259.	^{105}Ru	1×10^{0}	6×10^{-1}	1×10^{1}	1×10^{6}
260.	^{106}Ru a)	2×10^{-1}	2×10^{-1}	1×10^{2} b)	1×10^{5} b)
	Sulphur				
261.	^{35}S	4×10^{1}	3×10^{0}	1×10^{5}	1×10^{8}
	Antimony				
262.	^{122}Sb	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{4}
263.	^{124}Sb	6×10^{-1}	6×10^{-1}	1×10^{1}	1×10^{6}
264.	^{125}Sb	2×10^{0}	1×10^{0}	1×10^{2}	1×10^{6}
265.	^{126}Sb	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
	Scandium				
266.	^{44}Sc	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{5}
267.	^{46}Sc	5×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
268.	^{47}Sc	1×10^{1}	7×10^{-1}	1×10^{2}	1×10^{6}
269.	^{48}Sc	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
	Selenium				
270.	^{75}Se	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
271.	^{79}Se	4×10^{1}	2×10^{0}	1×10^{4}	1×10^{7}
	Silicon				
272.	^{31}Si	6×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
273.	^{32}Si	4×10^{1}	5×10^{-1}	1×10^{3}	1×10^{6}
	Samarium				
274.	^{145}Sm	1×10^{1}	1×10^{1}	1×10^{2}	1×10^{7}
275.	^{147}Sm	without a limit	without a limit	1×10^{1}	1×10^{4}
276.	^{151}Sm	4×10^{1}	1×10^{1}	1×10^{4}	1×10^{8}
277.	^{153}Sm	9×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
	Tin				
278.	^{113}Sn a)	4×10^{0}	2×10^{0}	1×10^{3}	1×10^{7}
279.	^{117m}Sn	7×10^{0}	4×10^{-1}	1×10^{2}	1×10^{6}
280.	^{119m}Sn	4×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}

281.	^{121m}Sn a)	4×10^{1}	9×10^{-1}	1×10^{3}	1×10^{7}
282.	^{123}Sn	8×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
283.	^{125}Sn	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{5}
284.	^{126}Sn a)	6×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
	Strontium				
285.	^{82}Sr a)	2×10^{-1}	2×10^{-1}	1×10^{1}	1×10^{5}
286.	^{85m}Sr	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
287.	^{85}Sr	5×10^{0}	5×10^{0}	1×10^{2}	1×10^{7}
288.	^{87m}Sr	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
289.	^{89}Sr	6×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
290.	^{90}Sr a)	3×10^{-1}	3×10^{-1}	1×10^{2} b)	1×10^{4} b)
291.	^{91}Sr a)	3×10^{-1}	3×10^{-1}	1×10^{1}	1×10^{5}
292.	^{92}Sr a)	1×10^{0}	3×10^{-1}	1×10^{1}	1×10^{6}
	Tritium				
293.	T (^{3}H)	4×10^{1}	4×10^{1}	1×10^{6}	1×10^{9}
	Tantalum				
294.	^{178}Ta (long-lived)	1×10^{0}	8×10^{-1}	1×10^{1}	1×10^{6}
295.	^{179}Ta	3×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
296.	^{182}Ta	9×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{4}
	Terbium				
297.	^{157}Tb	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
298.	^{158}Tb	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
299.	^{160}Tb	1×10^{0}	6×10^{-1}	1×10^{1}	1×10^{6}
	Technetium				
300.	^{95m}Tc a)	2×10^{0}	2×10^{0}	1×10^{1}	1×10^{6}
301.	^{96}Tc	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
302.	^{96m}Tc a)	4×10^{-1}	4×10^{-1}	1×10^{3}	1×10^{7}
303.	^{97}Tc	without a limit	without a limit	1×10^{3}	1×10^{8}
304.	^{97m}Tc	4×10^{1}	1×10^{0}	1×10^{3}	1×10^{7}
305.	^{98}Tc	8×10^{-1}	7×10^{-1}	1×10^{1}	1×10^{6}
306.	^{99}Tc	4×10^{1}	9×10^{-1}	1×10^{4}	1×10^{7}
307.	^{99m}Tc	1×10^{1}	4×10^{0}	1×10^{2}	1×10^{7}
	Tellurium				
308.	^{121}Te	2×10^{0}	2×10^{0}	1×10^{1}	1×10^{6}
309.	^{121m}Te	5×10^{0}	3×10^{0}	1×10^{2}	1×10^{5}
310.	^{123m}Te	8×10^{0}	1×10^{0}	1×10^{2}	1×10^{7}
311.	^{125m}Te	2×10^{1}	9×10^{-1}	1×10^{3}	1×10^{7}
312.	^{127}Te	2×10^{1}	7×10^{-1}	1×10^{3}	1×10^{6}
313.	^{127m}Te a)	2×10^{1}	5×10^{-1}	1×10^{3}	1×10^{7}
314.	^{129}Te	7×10^{-1}	6×10^{-1}	1×10^{2}	1×10^{6}
315.	^{129m}Te a)	8×10^{-1}	4×10^{-1}	1×10^{3}	1×10^{6}

316.	^{131m}Te a)	7×10^{-1}	5×10^{-1}	1×10^{1}	1×10^{6}
317.	^{132}Te a)	5×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{7}
	Thorium				
318.	^{222}Th	1×10^{1}	5×10^{-3}	1×10^{1}	1×10^{4}
319.	^{228}Th a)	5×10^{-1}	1×10^{-3}	1×10^{0} b)	1×10^{4} b)
320.	^{229}Th	5×10^{0}	5×10^{-4}	1×10^{0} b)	1×10^{3} b)
321.	^{230}Th	1×10^{1}	1×10^{-3}	1×10^{0}	1×10^{4}
322.	^{231}Th	4×10^{1}	2×10^{-2}	1×10^{3}	1×10^{7}
323.	^{232}Th	without a limit	without a limit	1×10^{1}	1×10^{4}
324.	^{234}Th a)	3×10^{-1}	3×10^{-1}	1×10^{3} b)	1×10^{5} b)
325.	Th (nat.)	without a limit	without a limit	1×10^{0} b)	1×10^{3} b)
	Titanium				
326.	^{44}Ti a)	5×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
	Thallium				
327.	^{200}Tl	9×10^{-1}	9×10^{-1}	1×10^{1}	1×10^{6}
328.	^{201}Tl	1×10^{1}	4×10^{0}	1×10^{2}	1×10^{6}
329.	^{202}Tl	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}
330.	^{204}Tl	1×10^{1}	7×10^{-1}	1×10^{4}	1×10^{4}
	Thulium				
331.	^{167}Tm	7×10^{0}	8×10^{-1}	1×10^{2}	1×10^{6}
332.	^{170}Tm	3×10^{0}	6×10^{-1}	1×10^{3}	1×10^{6}
333.	^{171}Tm	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{8}
	Uranium				
334.	^{230}U (quick sorption in lungs) a), d)	4×10^{1}	1×10^{-1}	1×10^{1} b)	1×10^{5} b)
335.	^{230}U (average sorption in lungs) a), e)	4×10^{1}	4×10^{-3}	1×10^{1}	1×10^{4}
336.	^{230}U (slow sorption in lungs) a), f)	3×10^{1}	3×10^{-3}	1×10^{1}	1×10^{4}
337.	^{232}U (quick sorption in lungs) d)	4×10^{1}	1×10^{-2}	1×10^{0} b)	1×10^{3} b)
338.	^{232}U (average sorption in lungs) e)	4×10^{1}	7×10^{-3}	1×10^{1}	1×10^{4}
339.	^{232}U (slow sorption in lungs) f)	1×10^{1}	1×10^{-3}	1×10^{1}	1×10^{4}
340.	^{233}U (quick sorption in lungs) d)	4×10^{1}	9×10^{-2}	1×10^{1}	1×10^{4}
341.	^{233}U (average sorption in lungs) e)	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
342.	^{233}U (slow sorption in lungs) f)	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{5}
343.	^{234}U (quick sorption in	4×10^{1}	9×10^{-2}	1×10^{1}	1×10^{4}

	lungs) d)				
344.	^{234}U (average sorption in lungs) e)	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
345.	^{234}U (slow sorption in lungs) f)	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{5}
346.	^{235}U (all types of sorption) a), d), e), f)	without a limit	without a limit	1×10^{1} b)	1×10^{4} b)
347.	^{236}U (quick sorption in lungs) d)	without a limit	without a limit	1×10^{1}	1×10^{4}
348.	^{236}U (average sorption in lungs) e)	4×10^{1}	2×10^{-2}	1×10^{2}	1×10^{5}
349.	^{236}U (slow sorption in lungs) f)	4×10^{1}	6×10^{-3}	1×10^{1}	1×10^{4}
350.	^{238}U (all types of sorption) d), e), f)	without a limit	without a limit	1×10^{1} b)	1×10^{4} b)
351.	U (natural)	without a limit	without a limit	1×10^{0} b)	1×10^{3} b)
352.	U (enriched with ^{235}U from 0.72 % to 20 % or less)	without a limit	without a limit	1×10^{0}	1×10^{3}
353.	U (depleted) h)	without a limit	without a limit	1×10^{0}	1×10^{3}
	Vanadium				
354.	^{48}V	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{5}
355.	^{49}V	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{7}
	Wolfram				
356.	^{178}W a)	9×10^{0}	5×10^{0}	1×10^{1}	1×10^{6}
357.	^{181}W	3×10^{1}	3×10^{1}	1×10^{3}	1×10^{7}
358.	^{185}W	4×10^{1}	8×10^{-1}	1×10^{4}	1×10^{7}
359.	^{187}W	2×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
360.	^{188}W a)	4×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
	Xenon				
361.	^{122}Xe a)	4×10^{-1}	4×10^{-1}	1×10^{2}	1×10^{9}
362.	^{123}Xe	2×10^{0}	7×10^{-1}	1×10^{2}	1×10^{9}
363.	^{127}Xe	4×10^{0}	2×10^{0}	1×10^{3}	1×10^{5}
364.	^{131m}Xe	4×10^{1}	4×10^{1}	1×10^{4}	1×10^{4}
365.	^{133}Xe	2×10^{1}	1×10^{1}	1×10^{3}	1×10^{4}
366.	^{135}Xe	3×10^{0}	2×10^{0}	1×10^{3}	1×10^{10}
	Yttrium				
367.	^{87}Y a)	1×10^{0}	1×10^{0}	1×10^{1}	1×10^{6}
368.	^{88}Y	4×10^{-1}	4×10^{-1}	1×10^{1}	1×10^{6}
369.	^{90}Y	3×10^{-1}	3×10^{-1}	1×10^{3}	1×10^{5}
370.	^{91}Y	6×10^{-1}	6×10^{-1}	1×10^{3}	1×10^{6}
371.	^{91m}Y	2×10^{0}	2×10^{0}	1×10^{2}	1×10^{6}

372.	^{92}Y	2×10^{-1}	2×10^{-1}	1×10^{2}	1×10^{5}
373.	^{93}Y	3×10^{-1}	3×10^{-1}	1×10^{2}	1×10^{5}
	Ytterbium				
374.	^{169}Yb	4×10^{0}	1×10^{0}	1×10^{2}	1×10^{7}
375.	^{175}Yb	3×10^{1}	9×10^{-1}	1×10^{3}	1×10^{7}
	Zinc				
376.	^{65}Zn	2×10^{0}	2×10^{0}	1×10^{1}	1×10^{6}
377.	^{69}Zn	3×10^{0}	6×10^{-1}	1×10^{4}	1×10^{6}
378.	^{69m}Zn a)	3×10^{0}	6×10^{-1}	1×10^{2}	1×10^{6}
	Zirconium				
379.	^{88}Zr	3×10^{0}	3×10^{0}	1×10^{2}	1×10^{6}
380.	^{93}Zr	without a limit	without a limit	1×10^{3} b)	1×10^{7} b)
381.	^{95}Zr a)	2×10^{0}	8×10^{-1}	1×10^{1}	1×10^{6}
382.	^{97}Zr a)	4×10^{-1}	4×10^{-1}	1×10^{1} b)	1×10^{5} b)

Notes.
a) Values A_1 and (or) A_2 include contributions of those daughter products the half-life period of which is less than 10 days.
b) The mother radionuclides and daughter radionuclides which are on the century balance (in accordance with Cabinet Regulation No. 288 of 3 July 2001, Regulations Regarding Activities with Sources of Ionising Radiation for which a Special Permit (Licence) or Permit is not Required).
c) Limit may be determined by measuring the decay speed or dose rate of ionising radiation in the distance of 1 m from the package.
d) These values shall apply only to UF_6, UO_2F_2 and $UO_2(NO_3)_2$ uranium compounds.
e) These values shall apply only to UO_3, UF_4, UCl_4 and hexavalent uranium compounds.
f) These values shall apply to other uranium compounds which are not referred to in Sub-paragraphs “d” and “e”.
g) These values shall apply only to unirradiated natural uranium.
h) The amount of uranium 235 is less than 0.72 percentage by weight.

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Annex 2.
Cabinet Regulation No. 307
3 July 2001

Limits A_1 and A_2, and also Specific and Total Radioactivity Limits for Unknown Radionuclides or Mixtures Thereof

No.	Radioactive content	A_1 (TBq)	A_2 (TBq)	Specific radioactivity limit for materials (Bq/g)	Total radioactivity for consignments (Bq)
1.	Only the presence of beta and gamma emitting radionuclides is known	0.1	0.02	1×10^{-1}	1×10^{4}
2.	Presence of alpha emitting radionuclides is known	0.2	9×10^{-5}	1×10^{-1}	1×10^{3}
3.	No data available	0.001	9×10^{-5}	1×10^{-1}	1×10^{3}

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Annex 3
Cabinet Regulation No. 307
3 July 2001

Total Radioactivity Limits[1] for the Excepted Package

No.	Package content	Tool or item		Material
		limit for a separate unit	limit for the package	limit for the package
1.	**Solid substance:**			
1.1.	special form	10^{-2} A_1	A_1	10^{-3} A_1
1.2.	other forms	10^{-2} A_2	A_2	10^{-3} A_2
2.	**Liquid**	10^{-3} A_2	10^{-1} A_2	10^{-4} A_2
3.	**Gas:**			
3.1.	tritium	2 x 10^{-2} A_2	2 x 10^{-1} A_2	2 x 10^{-2} A_2
3.2.	special form	10^{-3} A_1	10^{-2} A_1	10^{-3} A_1
3.3.	other forms	10^{-3} A_2	10^{-2} A_2	10^{-3} A_2

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Annex 4
Cabinet Regulation No. 307
3 July 2001

Total Radioactivity Limits of a Vehicle for a Packaged or Unpackaged LSA Material and SCO Object in the Industrial Package

No.	Material type	Total radioactivity limit for a vehicle (except for ships in internal waters)	Total radioactivity limit for a ship in internal waters
1.	LSA-I material	without a limit	without a limit
2.	LSA-II material and LSA-III non-combustible solid material	without a limit	100 x A_2
3.	LSA-II material and LSA-III combustible solid material and all liquids and gases	100 x A_2	10 x A_2
4.	SCO object	100 x A_2	10 x A_2

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Annex 5
Cabinet Regulation No. 307
3 July 2001

Multiplication Coefficients for a Large Size Cargo

No.	Cargo size[1]	Multiplication coefficient
1.	Cargo size £ 1 m^2	1
2.	1 m^2 < cargo size £ 5 m^2	2
3.	5 m^2 < cargo size £ 20 m^2	3
4.	20 m^2 < cargo size	10

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Annex 6
Cabinet Regulation No. 307
3 July 2001

Categories of the Package and Overpack

No.	Transport index	Maximum dose rate of ionising radiation at any point of the external surface (P, mSv/h)	Category
1.	TI > 0[1]	P < 0.005	I-WHITE
2.	0 < TI < 1[1]	0.005 < P < 0.5	II-YELLOW
3.	1 < TI < 10	0.5 < P < 2	III-YELLOW
4.	TI > 10	2 < P < 10	III-YELLOW[2]

Notes.
[1]If the measured transport index does not exceed 0.05, its value is 0.
[2]Shall be used only under exclusive conditions.

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Annex 7
Cabinet Regulation No. 307
3 July 2001

UN Numbers, Package Name, and also Description of the Package Content and Additional Hazards

No.	UN number	Package name	Package content	Additional hazards
1	2	3	4	5
1.	2910	Radioactive material, excepted package – limited material quantity		
2.	2911	Radioactive material, excepted package – instrument or item[1]		
3.	2909	Radioactive material, excepted package – items manufactured from unirradiated natural or depleted uranium or unirradiated natural thorium[1]		
4.	2908	Radioactive material, excepted package – empty packaging		
5.	2912	Radioactive material, low specific radioactivity (LSA-I)	Does not contain fissile material or contains such amount of fissile material to which Paragraph 200 of this Regulation applies	
6.	3321	Radioactive material, low specific radioactivity (LSA-II)	Does not contain fissile material or contains such amount of fissile material to which Paragraph 200 of this Regulation applies	
7.	3322	Radioactive material, low specific radioactivity (LSA-III)	Does not contain fissile material or contains such amount of fissile material to which Paragraph 200 of this Regulation applies	
8.	2913	Radioactive material, surface contaminated objects (SCO-I or SCO-II)	Does not contain fissile material or contains such amount of fissile material to which Paragraph 200 of this Regulation applies	
9.	2915	Radioactive material. type A package	Does not contain the radioactive material of specific form, fissile material or contains such amount of fissile material to which Paragraph 200 of this Regulation applies	
10.	3332	Radioactive material. type A package, special form	Does not contain fissile material or contains such amount of fissile	

			material to which Paragraph 200 of this Regulation applies	
11.	2916	Radioactive material, type B(U) package	Does not contain fissile material or contains such amount of fissile material to which Paragraph 200 of this Regulation applies	
12.	2917	Radioactive material, type B(M) package	Does not contain fissile material or contains such amount of fissile material to which Paragraph 200 of this Regulation applies	
13.	3323	Radioactive material, type C package	Does not contain fissile material or contains such amount of fissile material to which Paragraph 200 of this Regulation applies	
14.	2919	Radioactive material, transport under special arrangement	Does not contain fissile material or contains such amount of fissile material to which Paragraph 200 of this Regulation applies	
15.	2978	Radioactive material, uranium hexafluoride	Does not contain fissile material or contains such amount of fissile material to which Paragraph 200 of this Regulation applies	Corrosive (UN Class 8)
16.	3324	Radioactive material, low specific radioactivity (LSA-II), fissile material		
17.	3325	Radioactive material, low specific radioactivity (LSA-III), fissile material		
18.	3326	Radioactive material, surface contaminated objects (SCO-I or SCO-II), fissile material		
19.	3327	Radioactive material, type A package, fissile material	Without a special form	
20.	3333	Radioactive material, type A package, special form radioactive material, fissile material		
21.	3328	Radioactive material, type B(U) package, fissile material		
22.	3329	Radioactive material, type B(M) package, fissile material		
23.	3330	Radioactive material, type C package, fissile material		
24.	3331	Radioactive material, transport under special arrangement, fissile material		

25.	2977	Radioactive material, uranium hexafluoride, fissile material		Corrosive (UN Class 8)

Note.
[1]If between two or more alternative variants is the conjunction “or”, only one of these variants shall be used.

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Annex 8
Cabinet Regulation No. 307
3 July 2001

Labels and posters
I. Radiation symbols

Radiation symbol is in the form of the clover leaf. Its three proportional parts are laid around the central circle the radius of which is X. The minimum size of X is 4 mm.

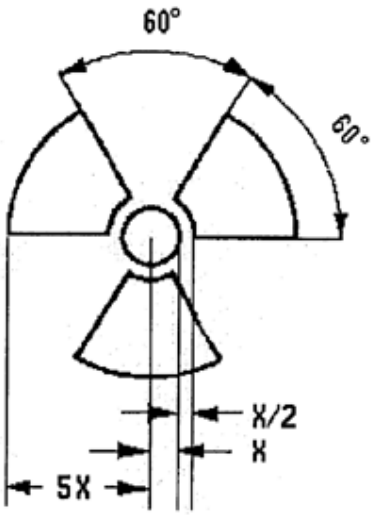

Figure 1

II. Category I-WHITE label

The background of the label is white, radiation symbol and block capitals – black, the category sign – red.

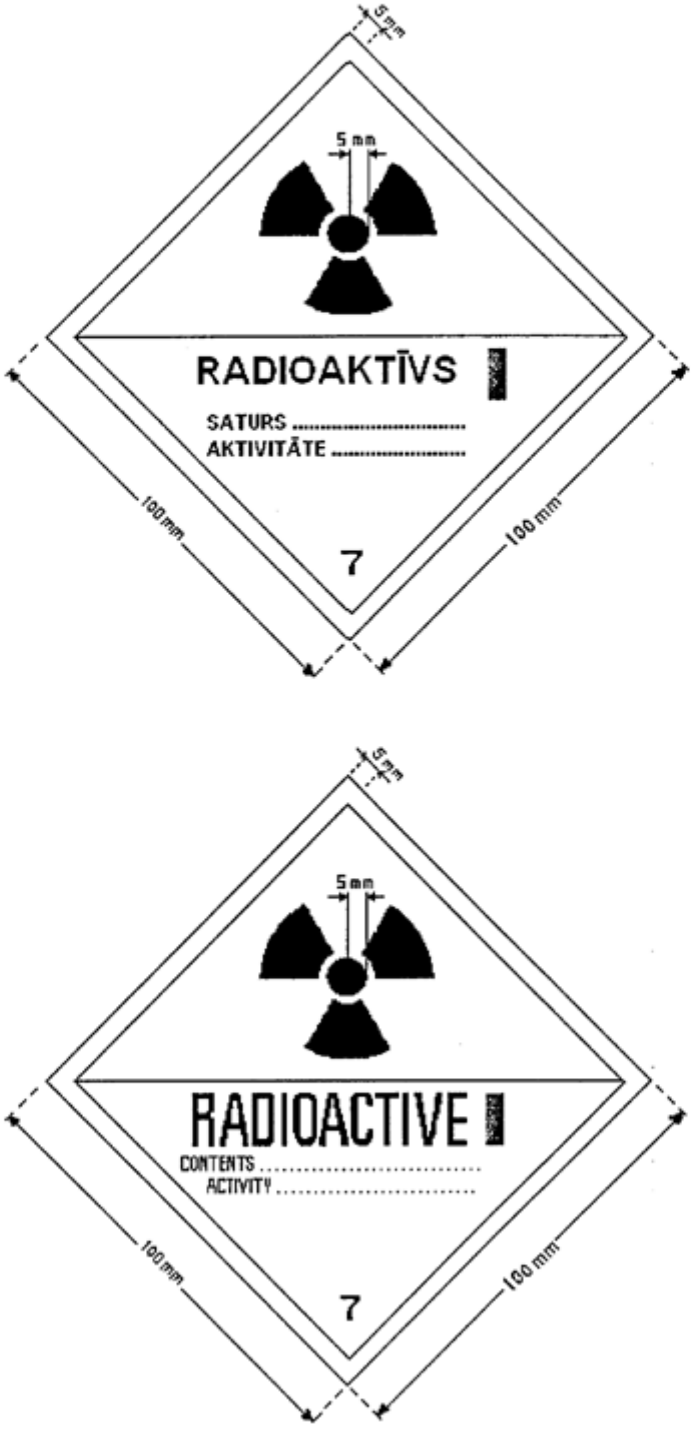

Figure 2

III. Category II-YELLOW label

The background of the upper part is yellow, the bottom – white, radiation symbol and block capitals – black, the category sign – red.

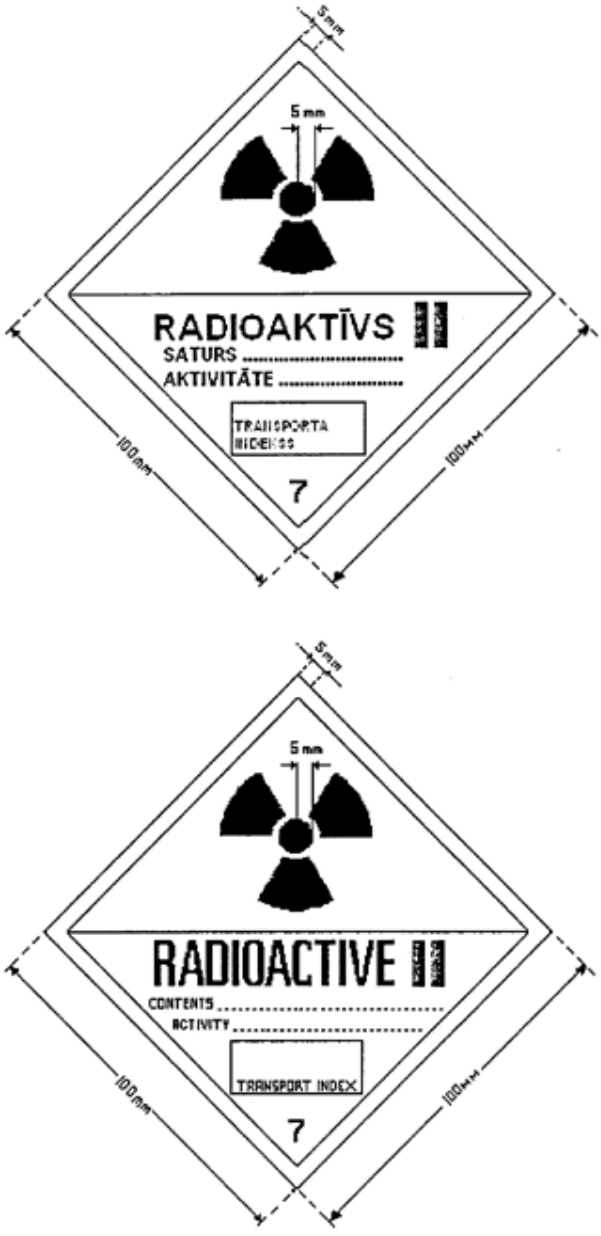

Figure 3

IV. Category III-YELLOW label

The background of the upper part is yellow, the bottom – white, radiation symbol and block capitals – black, the category sign – red.

Figure 4

V. Nuclear criticality safety index sign

The background of the label is white, the block capitals – black.

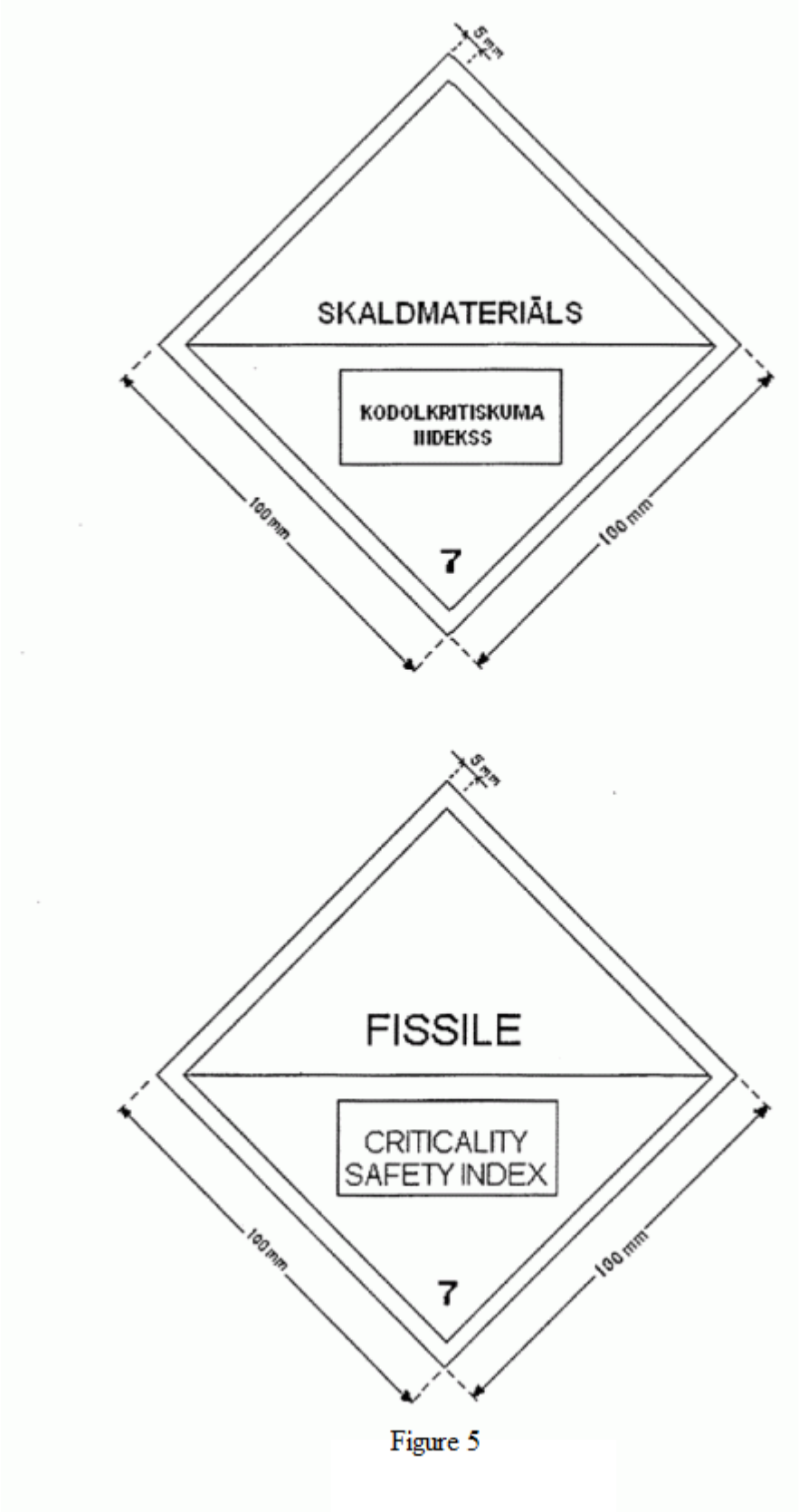

Figure 5

VI. Poster

The minimum dimensions are indicated in Figure 6. If the poster of larger size is required, the drawing proportions shall be kept. The height of figure "7" may not be less than 25 mm. The background of the upper part of the poster is yellow, the lower – white, radiation symbol and block capitals – black. Indication of radiation is not mandatory on the lower part. This poster is used to show the UN number of the consignment.

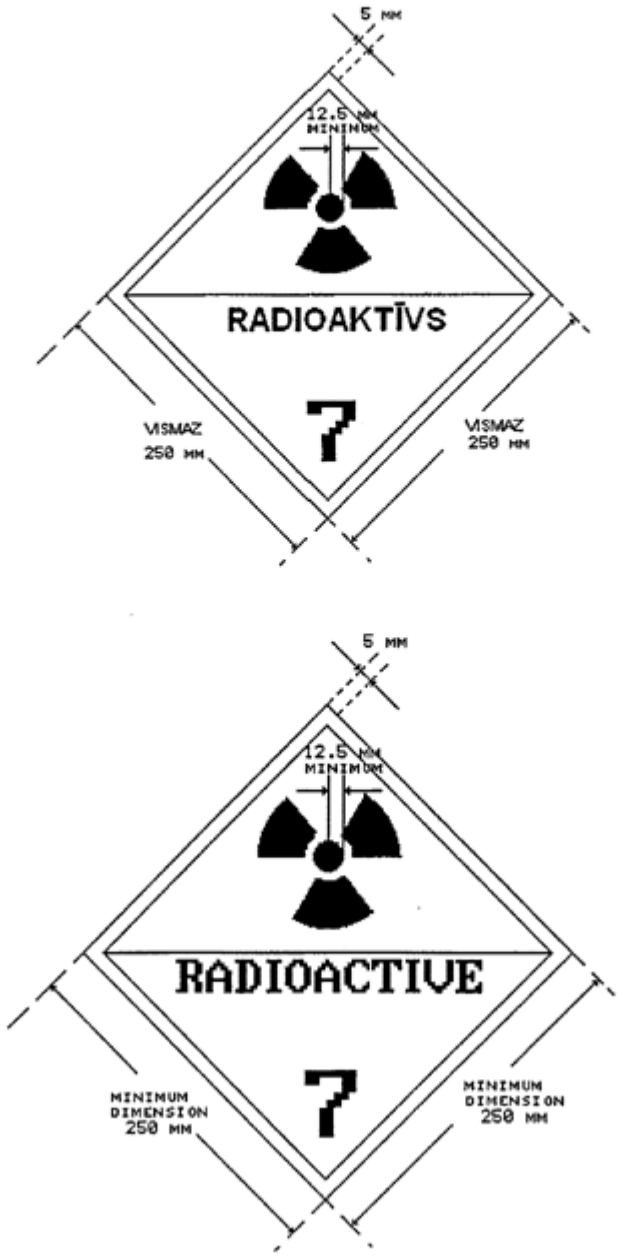

Figure 6

VII. Poster for the indication of the United Nations Organisations (UN) number

The background of the poster is orange, the line of the frame and the UN number – black. The symbol **** designates the place of the UN number of the radioactive material.

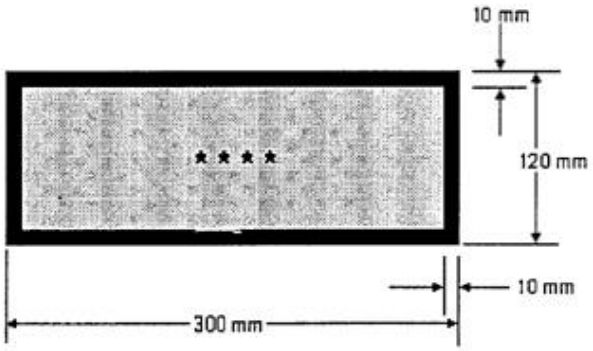

Figure 7

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Annex 9
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Emergency Card

1. Name of the dangerous substance.

2. Other names (synonyms) of the dangerous substance.

3. Class of the dangerous substance (sub-class, category, group).

4. Dangerousness identification number and explanation thereof.

5. Identification number of the dangerous substance.

6. Drawing of the dangerousness sign.

7. The maximal gross weight of the dangerous substance or weight of one package and the maximum quantity which may be transported in one vehicle.

8. Possible hazards during transport:
8.1. explosivity of the dangerous substance and methods for the prevention of critical situations;
8.2. fire risk of the dangerous substance and methods for the prevention of ignition, extinguishing mediums and installations;
8.3. danger to living organisms and methods for the prevention of critical situations;
8.4. other types of hazards.

9. Personal protective equipment:
9.1. for respiratory tract;
9.2. for eyes;
9.3. for skin.

10. Provision of the first aid in case of contact with the dangerous substance:
10.1. by inhaling (also if breathing has stopped);
10.2. by the dangerous substance getting into eyes or on skin;
10.3. by swallowing the dangerous substance.

11. Actions if the package is damaged, and also in other possible radiation emergencies or radiation accident events.

12. Methods and means for the decontamination of territory.

13. Actions in the case of vehicle failure.

14. Manufacturer of the dangerous consignment or consignor.

15. The person responsible for transport.

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Annex 10
Cabinet Regulation No. 307
3 July 2001

Requirements for the Industrial Package Containing the LSA material and SCO Object

No.	Content	Exclusive use packages	Packages not used exclusively
1.	**LSA-I**:		
1.1.	solid substance	IP-1	IP-1
1.2.	liquid	IP-1	IP-2
2.	**LSA-II**:		
2.1.	solid substance	IP-2	IP-2
2.2.	liquid	IP-2	IP-3
3.	**LSA-III**	IP-2	IP-3
4.	**SCO**:		
4.1.	SCO-I	IP-1	IP-1
4.2.	SCO-II	IP-2	IP-2

Note.
The LSA-I material and SCO-I object may be transported unpackaged under the conditions laid down in Paragraph 124 of this Regulation.

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Annex 11
Cabinet Regulation No. 307
3 July 2001

Limits of Transport Index and Nuclear Criticality Index for a Freight Container and All Materials and Packages Present in a Vehicle

No.	Type of the freight container or vehicle	Limit for the sum of transport indices	Limit for the sum nuclear criticality indices	
		not transported under exclusive use conditions	not transported under exclusive use conditions	is transported under exclusive use conditions
1	2	3	4	5
1.	Small freight container	50	50	not used
2.	Large freight container	50	50	100
3.	Vehicle	50	50	100
4.	Passenger aircraft	50	50	not used
5.	Cargo aircraft	200	50	100
6.	Inland waterway transport	50	50	100
7.	Packages, overpacks or small freight containers placed in the freight compartment or in the delimited area on board of a sea-going vessel[1]	50	50	100
8.	Large freight containers placed in the freight compartment or in the delimited area on board of a sea-going vessel	200	50	100
9.	Sea-going vessel on board of which packages, overpacks or small freight containers are placed[1]	200	200[2]	200[3]
10.	Sea-going vessel on board of which large freight containers are placed[1]	without a limit	without a limit[2]	without a limit[3]

Notes.
[1]Packages or overpacks transported in a vehicle may be transported together on board a ship if they are not unloaded from the vehicle.
[2]The consignment shall be placed so that the sum of nuclear criticality indices in each separate group would not exceed 100 and the groups would be in the distance of at least six metres from each other. The room between the groups may be taken by another consignment if it is not prohibited by the provisions for the transport of dangerous goods.

[3]The consignment shall be placed so that the sum of nuclear criticality indices in each individual group would not exceed 50 and the groups would be in the distance of at least six metres from each other.

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Annex 12
Cabinet Regulation No. 307
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Solar Heat Parameters

No.	Form of the surface and layout	Solar heat 12 hours per day (W/m^2)
1.	Base	-
2.	Other surfaces	800
3.	Flat surfaces which are not transported horizontally:	
3.1.	all surfaces	200[1]
3.2.	curved surfaces	400[1]

Note.
[1]Sinus function with assumed absorption coefficient may be used as an alternative and the re-radiation from the neighbouring objects may be ignored.

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Annex 13
Cabinet Regulation No. 307
3 July 2001

Free Drop Distance for the Drop Test under Normal Conditions

No.	Package mass (kg)	Free fall distance (m)
1.	m < 5000	1.2
2.	5000 £ m < 10000	0.9
3.	10000 £ m < 15000	0.6
4.	15000 £ m	0.3

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