**DECREE ON RADIATION ACTIVITIES**

(UV1)

**UNOFFICIAL TRANSLATION**

*Prepared by the Slovenian Nuclear Safety Administration in October 2020.*

*The official text of the Decree is located on the pages* of [*the Legal Information System*](http://www.pisrs.si/Pis.web/pregledPredpisa?id=URED7625)*.*

***WARNING:*** *The unofficial text of this Act is just an informative work tool, for which the Slovenian Nuclear Safety Administration does not guarantee.*

Pursuant to the eighth and tenth paragraph of the Article 16, the fourth paragraph of the Article 18, the fourth paragraph of the Article 21, the seventh paragraph of the Article 33, the second paragraph of the Article 85, the third paragraph of the Article 138 and the second paragraph of the Article 144 of the Ionising Radiation Protection and Nuclear Safety Act (Official Gazette of the Republic of Slovenia, No. 76/17) the Government of the Republic of Slovenia hereby issues the

### D E C R E E on radiation activities

### GENERAL PROVISIONS

### Article 1 (Content)

(1) This Decree governs:

* + sources of ionising radiation (hereinafter: radiation sources) the intended use of which is not subject to notification; any small amounts of radioactive substances or low specific activity related to these radiation sources and not exceeding the exemption levels; and the handling of radiation sources which are exempt under the law on ionising radiation protection and nuclear safety;
  + radiation work that is not subject to notification;
  + criteria for the classification of tasks related to radiation work that involves the use of open sources of radiation;
  + criteria for identifying high-activity and dangerous radiation sources;
  + eligibility criteria for the use of objects of general use;
  + clearance levels and criteria for conditional clearance on the basis of which radioactive substances may be released from control;
  + radiation work for which a licence is required;
  + the types of radiation sources that must be entered in the register of radiation sources before they are used;
  + the types of radiation sources for which a licence must be obtained before they are used;
  + criteria for classifying facilities as radiation facilities and minor radiation facilities;
  + radioactive substances subject to physical security measures;
  + criteria for the duration of licences for carrying out radiation work, registration of the radiation work, using radiation sources and the operation of a radiation or nuclear facility,
  + individual values ​​for specific activities to exempt or waive the control of artificial and natural radionuclides, values ​​for highly active sources, values ​​for hazardous sources and quantities of nuclear material for transport set out in the Annex, which forms an integral part of this Regulation.

(2) This Decree transposes the provisions of Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom (OJ L 13, 17.1.2014, p.1), as last amended by the Corrigendum to Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from ionizing radiation and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom ( OJ L 72, 17.3.2016, p. 69).

### Article 2 (Terms)

The terms used in these Decree shall have the following meaning:

* 1. dose rate is the time derivative of a given dose (absorbed, equivalent, effective, committed equivalent, committed effective) or its equivalents (ambient, directional, personal) and refers to the rate of change of the dose in unit time. The unit of dose rate is Gy/s or Sv/s;
  2. the competent authority means the administrative body issuing a licence or registration to carry out radiation work in accordance with the law on ionising radiation protection and nuclear safety;
  3. radiotoxicity means toxicity caused by the ionising radiation of a radionuclide and its progeny that has become lodged in the human body. Radiotoxicity is linked both to the radioactive properties of a radionuclide and the element’s physical and chemical properties and its metabolism in the body or organ in which it has become lodged;
  4. specific activity means the activity of a substance divided by its mass. The unit of specific activity is Bq/kg, Bq/m3 or Bq/l;
  5. a dangerous radiation source is a radiation source that may cause permanent damage to people handling it if they do not apply safety and security or physical protection measures. The dangerous radiation source is specified in Table 5 of the Annex to this Decree. Dangerous radiation sources are categorised on the basis of current activity.
  6. moderate quantity means less than three tonnes per year and per facility.

**II. NOTIFYING THE INTENTION TO CARRY OUT RADIATION WORK, EXEMPTION AND CLEARANCE CRITERIA**

**Article 3**

**(Exemption levels for radioactive substances)**

A radioactive substance is considered to be exempted and no notification of intent is required if the radiation activity includes:

* radioactive substances where the total activity of a single artificial radionuclide in the substance does not exceed the exemption level set out in the third column of Table 3 in the Annex to this Decree, or
* radioactive substances where the specific activity of a single artificial radionuclide in the substance does not exceed the specific activity set out in Table 1 or Table 2 for naturally occurring radionuclides in the Annex to this Decree.

**Article 4**

**(Exemptions for radioactive substances in respect of their quantity)**

1. Activities involving small quantities of radioactive substances or low specific activity, comparable to the exemption values laid down in Tables 1, 2 and 3 in the Annex to this Decree shall be considered as an activity inherently safe.
2. In activities where the quantities of radioactive substances or their specific activity are lower than exemption values set out in Tables 1, 2 and 3 in the Annex to this Decree, it is considered that the risk to individuals from radiation exposure is so low that there is no need for control by the competent authority.
3. In the case of moderate quantities of material, for the purpose of the exemption for activity-specific values in the second column of Table 3 of the Annex to this Decree shall be used instead of the values set out in Table 1 of the Annex to this Decree.
4. The values laid down in the third column of Table 3 in the Annex to this Decree shall apply to the total inventory of radioactive substances held by a person or company at any point in time. The competent authority may apply these values to smaller entities or packages, for instance to exempt the transport or storage of exempted consumer products, if the general exemption criteria referred to in the act, governing ionizing radiation protection and nuclear safety, have been met.

**Article 5**

**(Special exemption cases for radioactive substances)**

1. For radionuclides not contained in Tables 1 and 3 in the Annex to this Decree, the competent authority shall determine the exemption levels for activities in specific activities by taking over the exemption levels for those radionuclides listed in Tables 1 and 3 in the Annex to this Decree, which are in radiotoxicity most similar to these radionuclides.
2. Radionuclides are classified into the following groups according to radiotoxicity:

* first group: exemption level ≤ 104 Bq;
* second group: 104 Bq < exemption level ≤ 105 Bq;
* third group: 105 Bq < exemption level ≤ 106 Bq;
* fourth group: 106 Bq < exemption level ≤ 107 Bq and
* fifth group: exemption level > 107 Bq.

1. Where radiation activity involves materials containing different artificial radionuclides, the exemption criterion shall be deemed to be fulfilled if at least one of the following conditions applies to these radionuclides:

∑ 𝐾𝐴𝑖 ≤ 1

𝐼𝑉𝐾𝐴𝑖

𝑖

or

∑ 𝐴𝑖 ≤ 1

𝐼𝑉𝐴𝑖

𝑖

where:

* *A(i)* refers to the activity of an individual radionuclide,
* *IVA(i)* refers to the activity exemption level of an individual radionuclide,
* *KA(i)* refers to the specific activity of a radionuclide and
* *IVKA(i)* refers to the specific activity exemption level of an individual radionuclide.

1. Where no other possibility exists, the condition set out in the preceding paragraph shall be verified on the basis of best estimates of the composition of the radionuclide mix.
2. The values in Table 2 in the Annex of the Decree shall apply individually to each parent radionuclide.

**Article 6**

**(Eligibility criteria for the use of general use products)**

1. In the procedure of issuing the licence for the import or production of general use products, the intended use of which may mean a new type of radiation activity, the competent authority must verify whether:

* the design of the general use product justifies its intended use;
* the design of the general use products ensures that the exposure is kept to a minimum:

a) in normal use;

1. due to the consequences of misuse; and
2. to the lowest possible level in the event of accidental exposure;

* the general use product is designed to meet criteria for exemption from the law governing ionizing radiation protection and nuclear safety, and the activity of the radionuclide in the general use product does not exceed the value in the third column of Table 3 of the Annex to this Decree,
* is already type-approved and does not require special precautions for final disposal after cessation of use;
* the product is properly labeled, and appropriate documentation is prepared for the consumer with instructions for proper use and disposal after use.

1. In the procedure referred to in the preceding paragraph, the competent authority may also determine the conditions regarding the technical and physical characteristics of the general use product.
2. For general use products containing the radionuclide Th-232, the exemption value of 104 Bq shall apply.

**Article 7**

**(Specific cases of acceptability of general use products based on radiation protection assessment)**

If the activity of a radionuclide in a general use product exceeds the values in the third column of Table 3 of the Annex to this Decree, the production or import od such products is justified only if the radiation protection assessment shows that the individual will not receive a dose greater than normal of the order of 10 μSv per year and during an emergency greater than 1 mSv per year, assuming that the probability of an accident is less than 0.01 per year. The radiation protection assessment is made in the eligibility assessment procedure.

**Article 8**

**(use of general use products containing radionuclides and already in use)**

For general use products that contain added radionuclides and are already in use, but have never been assessed for eligibility under the law governing ionizing radiation protection and nuclear safety, the competent authority must assess the eligibility of their continued use, alert the public to possible risks, publish recommended ways of handling such products and the population that owns them, enable their collection and thus ensure safe further handling of such products.

**Article 9   
(Categories of tasks for open radiation sources)**

1. For the purpose of notifying the intention, and having issued a licence, to perform work involving an open radiation source, any task constituting radiation work shall be classified in one of the three categories depending on:
   * the type of radionuclide,
   * the total maximum activity handled at any time, and
   * the manner in which the open radiation source is used to perform the task.
2. Each task falling within the scope of radiation work involving the use of an open radiation source shall be classified in one of the categories referred to in the preceding paragraph on the basis of the activity value of the open radiation source, as indicated in the table below:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Categories of tasks that constitute radiation work involving the use of an open radiation source** | | |
|  | III | II | I |
| **Maximum total activity**  **(A) handled at any one time** | A < 10 x the exemption level\* | 10 x the exemption level  < A < 10 000 x the exemption level\* | A > 10 000 x the exemption level\* |

\*activity as indicated in the third column of Table 3 in the Annex to this Decree

1. Activity values for the open radiation sources listed in the task classification table in the preceding paragraph shall be multiplied as follows, depending on the manner in which a task is performed:
   * by a factor of 100 for storage;
   * by a factor of 10 for very basic tasks involving liquids (e.g. dilution of basic liquids);
   * by a factor of 1 for normal tasks involving chemicals (e.g. standard chemical processes);
   * by a factor of 0.1 for complex tasks involving liquids and substances that may involve airborne particulates and that require safety equipment.
2. **CLASSIFICATION OF ACTIVITIES AND RADIATION SOURCES**

**Article 10**

**(Criteria and conditions for classification of activities for which registration of radiation practice is required)**

1. Registration is required for radiation activities where the following conditions are met:

* Workers are not classified as occupationally exposed workers;
* The overall risk of radiation activity is low according to the criteria in the regulation determining the content of radiation protection assessment; and
* Radiation protection measures do not depend on the place of use and storage of radiation sources.

1. The provisions for registration referred to in the preceding paragraph shall not apply to radiation activities in health and veterinary medicine.

**Article 11**

**(Exemption or clearance on the basis of a radiation protection assessment)**

1. Notwithstanding the provision of the previous Article the registration or licence to carry out radiation practice is not mandatory where the activity or specific activity of radioactive substances listed in Table 1, 2 or 3 in the Annex to this Decree has been exceeded, however in the procedure of notification of an activity or radiation source it must be assessed based on the radiation protection assessment that the clearance conditions from law governing the radiation protection and nuclear safety and for the performance of radiation activities or the use of radiation source are met:
   * no worker needs to be treated as an exposed worker;
   * the effective dose associated with the use of artificial radionuclides and expected to be incurred by a member of the public due to the exempted practice will not exceed the order of 10 μSv in a year; and
   * the dose increment per a member of the public caused by naturally occurring radionuclides due to the exempted practice and allowing for the prevailing background radiation from natural radiation sources, will not exceed 1 mSv in a year. The assessment of doses to members of the public shall take into account not only pathways of exposure through airborne or liquid effluent, but also pathways resulting from the disposal or recovery of solid residues.
2. Disused radioactive substances cleared in accordance with the law on ionising radiation protection and nuclear safety (as per the preceding paragraph) shall be treated as provided for by the radiation protection assessment.

**Article 12**

**(Licence to carry out radiation practice)**

1. A licence to carry out radiation practice must be obtained for:
   1. management and decommissioning of a radiation or nuclear facility;
   2. the deliberate addition of radioactive substances in the manufacture and manufacture of products of general use or medicinal products and the import or export of such products or medicinal products;
   3. intentional administration of radioactive substances to persons for medicinal purposes;
   4. deliberate administration of radioactive substances to animals for the purpose of veterinary inspection, treatment or research, if this affects exposure;
   5. use of the X-ray devices, radiation sources and particle accelerators other than electron microscopes;
   6. disposal processing or re-use of radioactive substances or materials containing radioactive substances and originating from the use of radiation sources or the performance of radiation practice under the law governing ionizing radiation protection and nuclear safety, for which the competent authority has not decided that they are no longer considered under the law governing ionizing radiation protection and nuclear safety;
   7. activities characterized by previous gaseous or liquid releases of radioactive substances for their reuse or recovery;
   8. mixing of radioactive and non-radioactive substances for their reuse or recovery;
   9. transporting nuclear substances;
   10. transporting radioactive substances;
   11. performing technical inspections of radiation sources;
   12. operation of aircraft and spacecraft in which flight crew members may receive annual effective doses due to cosmic radiation greater than 6mSv;
   13. maintenance, production, servicing, calibration or other similar work performed at radiation sources, if this is not included in the implementation of activities referred to in the previous points of this paragraph;
   14. removal (dismantling), maintenance and servicing of ionization fire detectors, which interfere with the radiation source;
   15. cessation of control of radioactive substances.
2. Notwithstanding the provisions of the previous paragraph, no licence to carry out radiation practice shall be required for:
   1. practice the implementation of which does not need to be notified under the law governing ionizing radiation protection and nuclear safety;
   2. practice involving only the radioactive substances referred to in Articles 3, 4, 5 and 11 of this Decree;
   3. practice for which the registration referred to in Article 10 of this Decree is sufficient;
   4. transporting radioactive substances with an activity not exceeding the activity indicated for category 2 in Table 5 in the Annex to this Decree;
   5. transporting nuclear substances in quantities not exceeding those indicated in Table 6 in the Annex to this Decree;
   6. the use of ionisation fire alarms compliant with the regulation on the use of radiation sources and performance of radiation work;
   7. work in a controlled area carried out by an external contractor under the responsibility of the licence holder, provided that the work carried out is specified in the licence holder’s radiation protection assessment.
3. If the work to be carried out by the external contractor is not specified in the licence holder’s radiation protection assessment, the contractor shall be required to obtain a licence to carry out radiation practice in a controlled area notwithstanding the provision of the indent 7 of the preceding paragraph if the radiation protection assessment indicates that the effective dose received by a worker could exceed the dose limit for a member of the public.

**Article 13   
(Unconditional clearance)**

1. No decision of the competent authority shall be required to clear a radioactive substance released in work that is subject to control under the law on ionising radiation protection and nuclear safety, where the specific activity of the solid material intended for reuse, recovery, conventional disposal or incineration does not exceed the values listed in the second column of Tables 1 and 2 in the annex hereto.
2. No decision of the competent authority shall be required to clear a radioactive substance containing more than one radionuclide, if the following condition has been met:

∑ 𝐾𝐴𝑖 ≤ 1

𝑂𝑉𝐾𝐴𝑖

𝑖

where KAi refers to specific activity and OVKAi refers to the specific activity level of a single radionuclide contained in the cleared substance.

1. Upon request by a licenced provider of radiation practice, the competent authority shall set clearance levels in respect of radionuclides not listed in Table 1 or 2 in the Annex to this Decree by assuming them to be identical to those of the radionuclides with the most similar level of radiotoxicity listed in either of the two tables. The values in Table 2 of the Annex to this Decree apply individually to each radionuclide precursor in the decay chain and not as the weighted sum referred to in the previous paragraph.
2. The competent authority may in the procedure of clearance of a radioactive substance for specific materials or materials originating from specific types of activities or specific routes of exposure, set values higher than those in Tables 1 or 2 of the Annex to this Decree, if met the general criteria for clearance set out in law governing ionizing radiation protection and nuclear safety and the criteria for exemption from Article 11 of this Decree.

**Article 14   
(Special exemption cases)**

1. Notwithstanding the provisions of this Decree, the clearance of material containing naturally occurring radionuclides originating from licensed radiation practice in which these radionuclides are processed for their radioactive, fissile or fertile properties shall be made contingent on the exemption criteria for artificial radionuclides laid down in the second indent of Article11 of this Decree.
2. In case of the use of sealed radiation sources, the competent authority may allow the cessation of control over them if their activity is below that indicated in the third column of Table 3 in the Annex to this Decree.

**Article 15  
(Clearance records)**

1. Users of radiation sources shall be obliged to keep a clearance record containing, as a minimum, information on the date of clearance, the quantity of the radioactive substance cleared and the manner in which it is handled.
2. Before clearing a radioactive substance, its user shall inform the competent authority thereof and submit the requisite evidence showing that clearance conditions have been met.

**Article 16**

**(Licence to use a radiation source and entry of a radiation source in the register of radiation sources)**

1. A licence to use a radiation source shall be required in respect of:
   1. high-activity radiation sources with an activity as laid down in Table 4 in the Annex to this Decree, including the container if it is made of depleted uranium;
   2. X-ray devices with a maximum potential difference exceeding 160 kV, where the radiation protection assessment defines the radiation risk from using such a device as ‘not small’;
   3. particle accelerator;
   4. open radiation sources with an activity exceeding the exemption level indicated in the third column of Table 3 in the Annex to this Decree.
2. Notwithstanding the provisions of the preceding paragraph, a licence shall be required for radiation sources used in medicine and veterinary medicine, except for calibration sources with an activity not exceeding the activity indicated in Table 4 in the Annex to this Decree.
3. A radiation source requiring only the entry in the register of radiation sources prior to use means a radiation source not meeting the criteria laid down in the first and second paragraphs of this Article.
4. Before a radiation source that has undergone any changes is used again, the licence to use that radiation source shall be renewed or the changes shall be entered in the register of radiation sources, if:
   1. the change to the radiation source could affect the level of protection against ionising radiation as determined in the radiation protection assessment;
   2. a radiation source used as a stationary source is relocated to different premises within the same facility or to a different facility, if the radiation protection assessment shows that the area of application has a significant effect in the radiation protection measures; or
   3. following the replacement of the X-ray tube in an X-ray machine, except for X-ray machines for which the manufacturer has provided in the technical documentation that their tubes can be routinely replaced by the user of this device and such tube is defined in the radiation protection assessment.
5. **CRITERIA FOR CLASSIFYING FACILITIES**

**Article 17 (Types of facilities)**

1. A facility shall be designated as a radiation facility if it:
   1. accommodates the production or processing of radioactive substances which could lead to the excessive exposure of members of the public;
   2. uses radiation sources for irradiating objects or foodstuffs with high dose rates, which could lead to deterministic effects in people if used in certain uncontrolled conditions;
   3. uses an accelerator that accelerates particles to over 25 MeV.
2. A facility shall be designated as a minor radiation facility if it uses:
   1. a radiotherapeutic device;
   2. an open radiation source in the performance of tasks involving open radiation sources and belonging to category I or II according to Article 9 of this Decree;
   3. an accelerator that accelerates particles to up to 25 MeV;
   4. one or more closed radiation sources delivering a dose rate in excess of 1 Sv/h at a distance of 1 m if no protection is used.
3. **CRITERIA FOR THE TERM OF VALIDITY OF A LICENCE OR REGISTRATION**

**Article 18**

**(Term of validity of a licence or registration and applying for an extension)**

1. The term of validity of a licence to carry out radiation practice shall be made contingent principally on the information in the radiation protection assessment.
2. Upon the first issue of a licence to carry out radiation practice, this licence shall be issued for a maximum of five years.
3. The validity of the registration of radiation practice shall be issued for 10 years.
4. The decision on the period of validity of the licence for the use of radiation source shall take into account mainly data from radiation protection assessment, the recommended lifetime of the radiation source determined by the radiation source manufacturer, the activity of a radiation source if it is a highly active radiation source and the data from the radiological intervention program in the case of exposure for medical purposes.
5. When deciding on the period operation of a nuclear or radiation facility, the data from the safety report shall be taken into account.
6. Applications to extend a licence to carry out radiation practice or use a radiation source may be submitted to the competent authority, in principle no earlier than two months before the licence expiry date.
7. **PHYSICAL SECURITY MEASURES** **Article 19**

**(Physical security of radioactive substances)**

1. For dangerous radiation sources of category 1 listed in Table 5 in the Annex to this Decree physical protection measures shall be implemented in accordance with the regulations governing the physical protection of nuclear facility, nuclear and radioactive materials and the transport of nuclear materials.
2. The physical security measures referred to in the previous paragraph must also be implemented if the facility is housing dangerous radiation sources containing different radionuclides for which the sum of the quotients of the activity of an individual radionuclide and the values laid down in Table 5 in the Annex to this Decree is greater than 1.
3. **TRANSITIONAL AND FINAL PROVISIONS** **Article 20**

**(End of validity)**

On the date of entry into force of this Decree, the Decree on radiation work (Official Gazette of the Republic of Slovenia, No. 8/17 and 76/17 – ZVISJV-1) shall cease to be valid.

**Article 21 (Entry into force)**

This Decree shall enter into force on the 15th day following that of its publication in the Official Gazette of the Republic of Slovenia.

No: 00719-21/2018/1

Ljubljana, 21th March 2018 EVA: 2017-2550-0083

Government of the Republic of Slovenia

Dr Miro Cerar Prime Minister

**ANNEX**

**Table 1: The specific activity values for artificial radionuclides warranting exemption or clearance of solid material irrespective of its quantity or type**

|  |  |
| --- | --- |
| **Radionuclide** | **Specific activity (kBq/kg)** |
| H-3 | 100 |
| Be-7 | 10 |
| C-14 | 1 |
| F-18 | 10 |
| Na-22 | 0.1 |
| Na-24 | 1 |
| Si-31 | 1 000 |
| P-32 | 1 000 |
| P-33 | 1 000 |
| S-35 | 100 |
| Cl-36 | 1 |
| Cl-38 | 10 |
| K-42 | 100 |
| K-43 | 10 |
| Ca-45 | 100 |
| Ca-47 | 10 |
| Sc-46 | 0.1 |
| Sc-47 | 100 |
| Sc-48 | 1 |
| V-48 | 1 |
| Cr-51 | 100 |
| Mn-51 | 10 |
| Mn-52 | 1 |
| Mn-52 m | 10 |
| Mn-53 | 100 |
| Mn-54 | 0.1 |
| Mn-56 | 10 |
| Fe-52\* | 10 |
| Fe-55 | 1 000 |
| Fe-59 | 1 |
| Co-55 | 10 |
| Co-56 | 0.1 |
| Co-57 | 1 |
| Co-58 | 1 |
| Co-58 m | 10 000 |
| Co-60 | 0.1 |
| Co-60 m | 1 000 |
| Co-61 | 100 |
| Co-62 m | 10 |
| Ni-59 | 100 |
| Ni-63 | 100 |
| Ni-65 | 10 |
| Cu-64 | 100 |
| Zn-65 | 0.1 |
| Zn-69 | 1 000 |
| Zn-69 m\* | 10 |
| Ga-72 | 10 |
| Ge-71 | 10 000 |
| As-73 | 1 000 |
| As-74 | 10 |

|  |  |
| --- | --- |
| **Radionuclide** | **Specific activity**  **(kBq/kg)** |
| As-76 | 10 |
| As-77 | 1 000 |
| Se-75 | 1 |
| Br-82 | 1 |
| Rb-86 | 100 |
| Sr-85 | 1 |
| Sr-85 m | 100 |
| Sr-87 m | 100 |
| Sr-89 | 1 000 |
| Sr-90\* | 1 |
| Sr-91\* | 10 |
| Sr-92 | 10 |
| Y-90 | 1 000 |
| Y-91 | 100 |
| Y-91 m | 100 |
| Y-92 | 100 |
| Y-93 | 100 |
| Zr-93 | 10 |
| Zr-95\* | 1 |
| Zr-97\* | 10 |
| Nb-93 m | 10 |
| Nb-94 | 0.1 |
| Nb-95 | 1 |
| Nb-97\* | 10 |
| Nb-98 | 10 |
| Mo-90 | 10 |
| Mo-93 | 10 |
| Mo-99\* | 10 |
| Mo-101\* | 10 |
| Tc-96 | 1 |
| Tc-96 m | 1 000 |
| Tc-97 | 10 |
| Tc-97 m | 100 |
| Tc-99 | 1 |
| Tc-99 m | 100 |
| Ru-97 | 10 |
| Ru-103\* | 1 |
| Ru-105\* | 10 |
| Ru-106\* | 0.1 |
| Rh-103 m | 10 000 |
| Rh-105 | 100 |
| Pd-103\* | 1 000 |
| Pd-109\* | 100 |
| Ag-105 | 1 |
| Ag-110 m\* | 0.1 |
| Ag-111 | 100 |
| Cd-109\* | 1 |
| Cd-115\* | 10 |
| Cd-115 m\* | 100 |
| In-111 | 10 |
| In-113 m | 100 |
| In-114 m\* | 10 |
| In-115 m | 100 |
| Sn-113\* | 1 |
| Sn-125 | 10 |
| Sb-122 | 10 |
| Sb-124 | 1 |
| Sb-125\* | 0.1 |

|  |  |
| --- | --- |
| **Radionuclide** | **Specific activity**  **(kBq/kg)** |
| Te-123 m | 1 |
| Te-125 m | 1 000 |
| Te-127 | 1 000 |
| Te-127 m\* | 10 |
| Te-129 | 100 |
| Te-129 m\* | 10 |
| Te-131 | 100 |
| Te-131 m\* | 10 |
| Te-132\* | 1 |
| Te-133 | 10 |
| Te-133 m | 10 |
| Te-134 | 10 |
| I-123 | 100 |
| I-125 | 100 |
| I-126 | 10 |
| I-129 | 0.01 |
| I-130 | 10 |
| I-131 | 10 |
| I-132 | 10 |
| I-133 | 10 |
| I-134 | 10 |
| I-135 | 10 |
| Cs-129 | 10 |
| Cs-131 | 1 000 |
| Cs-132 | 10 |
| Cs-134 | 0.1 |
| Cs-134 m | 1 000 |
| Cs-135 | 100 |
| Cs-136 | 1 |
| Cs-137\* | 0.1 |
| Cs-138 | 10 |
| Ba-131 | 10 |
| Ba-140 | 1 |
| La-140 | 1 |
| Ce-139 | 1 |
| Ce-141 | 100 |
| Ce-143 | 10 |
| Ce-144 | 10 |
| Pr-142 | 100 |
| Pr-143 | 1 000 |
| Nd-147 | 100 |
| Nd-149 | 100 |
| Pm-147 | 1 000 |
| Pm-149 | 1 000 |
| Sm-151 | 1 000 |
| Sm-153 | 100 |
| Eu-152 | 0.1 |
| Eu-152 m | 100 |
| Eu-154 | 0.1 |
| Eu-155 | 1 |
| Gd-153 | 10 |
| Gd-159 | 100 |
| Tb-160 | 1 |
| Dy-165 | 1 000 |
| Dy-166 | 100 |
| Ho-166 | 100 |
| Er-169 | 1 000 |
| Er-171 | 100 |

|  |  |
| --- | --- |
| **Radionuclide** | **Specific activity**  **(kBq/kg)** |
| Tm-170 | 100 |
| Tm-171 | 1 000 |
| Yb-175 | 100 |
| Lu-177 | 100 |
| Hf-181 | 1 |
| Ta-182 | 0.1 |
| W-181 | 10 |
| W-185 | 1 000 |
| W-187 | 10 |
| Re-186 | 1 000 |
| Re-188 | 100 |
| Os-185 | 1 |
| Os-191 | 100 |
| Os-191 m | 1 000 |
| Os-193 | 100 |
| Ir-190 | 1 |
| Ir-192 | 1 |
| Ir-194 | 100 |
| Pt-191 | 10 |
| Pt-193 m | 1 000 |
| Pt-197 | 1 000 |
| Pt-197 m | 100 |
| Au-198 | 10 |
| Au-199 | 100 |
| Hg-197 | 100 |
| Hg-197 m | 100 |
| Hg-203 | 10 |
| Tl-200 | 10 |
| Tl-201 | 100 |
| Tl-202 | 10 |
| Tl-204 | 1 |
| Pb-203 | 10 |
| Bi-206 | 1 |
| Bi-207 | 0.1 |
| Po-203 | 10 |
| Po-205 | 10 |
| Po-207 | 10 |
| At-211 | 1 000 |
| Ra-225 | 10 |
| Ra-227 | 100 |
| Th-226 | 1 000 |
| Th-229 | 0.1 |
| Pa-230 | 10 |
| Pa-233 | 10 |
| U-230 | 10 |
| U-231\* | 100 |
| U-232\* | 0.1 |
| U-233 | 1 |
| U-236 | 10 |
| U-237 | 100 |
| U-239 | 100 |
| U-240\* | 100 |
| Np-237\* | 1 |
| Np-239 | 100 |
| Np-240 | 10 |
| Pu-234 | 100 |
| Pu-235 | 100 |
| Pu-236 | 1 |

|  |  |
| --- | --- |
| **Radionuclide** | **Specific activity**  **(kBq/kg)** |
| Pu-237 | 100 |
| Pu-238 | 0.1 |
| Pu-239 | 0.1 |
| Pu-240 | 0.1 |
| Pu-241 | 10 |
| Pu-242 | 0.1 |
| Pu-243 | 1 000 |
| Pu-244\* | 0.1 |
| Am-241 | 0.1 |
| Am-242 | 1 000 |
| Am-242 m\* | 0.1 |
| Am-243\* | 0.1 |
| Cm-242 | 10 |
| Cm-243 | 1 |
| Cm-244 | 1 |
| Cm-245 | 0.1 |
| Cm-246 | 0.1 |
| Cm-247\* | 0.1 |
| Cm-248 | 0.1 |
| Bk-249 | 100 |
| Cf-246 | 1 000 |
| Cf-248 | 1 |
| Cf-249 | 0.1 |
| Cf-250 | 1 |
| Cf-251 | 0.1 |
| Cf-252 | 1 |
| Cf-253 | 100 |
| Cf-254 | 1 |
| Es-253 | 100 |
| Es-254\* | 0.1 |
| Es-254 m\* | 10 |
| Fm-254 | 10 000 |
| Fm-255 | 100 |

The values in the table are given for individual radionuclides; where applicable, \* marks short-lived radionuclides in secular equilibrium with the parent nuclide.

\*Parent radionuclides, and their progeny whose dose contributions are taken into account in the dose calculation (thus requiring only the exemption level of the parent radionuclide to be considered), are listed in the following table:

|  |  |
| --- | --- |
| **Parent radionuclide** | **Progeny** |
| Fe-52 | Mn-52 m |
| Zn-69 m | Zn-69 |
| Sr-90 | Y-90 |
| Sr-91 | Y-91 m |
| Zr-95 | Nb-95 |
| Zr-97 | Nb-97 m, Nb-97 |
| Nb-97 | Nb-97 m |
| Mo-99 | Tc-99 m |
| Mo-101 | Tc-101 |
| Ru-103 | Rh-103 m |
| Ru-105 | Rh-105 m |
| Ru-106 | Rh-106 |
| Pd-103 | Rh-103 m |
| Pd-109 | Ag-109 m |
| Ag-110 m | Ag-110 |
| Cd-109 | Ag-109 m |
| Cd-115 | In-115 m |
| Cd-115 m | In-115 m |
| In-114 m | In-114 |
| Sn-113 | In-113 m |
| Sb-125 | Te-125 m |
| Te-127 m | Te-127 |
| Te-129 m | Te-129 |
| Te-131 m | Te-131 |
| Te 132 | I-132 |
| Cs-137 | Ba-137 m |
| Ce-144 | Pr-144, Pr-144 m |
| U-232 | Th-228, Ra-224, Rn-220, Po- 216, Pb-212, Bi-212, Tl-208 |
| U-240 | Np-240 m, Np-240 |
| Np237 | Pa-233 |
| Pu-244 | U-240, Np-240 m, Np-240 |
| Am-242 m | Np-238 |
| Am-243 | Np-239 |
| Cm-247 | Pu-243 |
| Es-254 | Bk-250 |
| Es-254 m | Fm-254 |

**Table 2: The specific activity values for naturally occurring radionuclides warranting exemption or clearance**

Values for exemption or clearance for naturally occurring radionuclides in solid materials in secular equilibrium with their progeny:

|  |  |
| --- | --- |
| Natural radionuclides from the U-238 decay chain | 1 kBq/kg |
| Natural radionuclides from the Th-232 decay chain | 1 kBq/kg |
| K-40 | 10 kBq/kg |

The values in Table 2 apply to all radionuclides in the decay chain of U-238 or Th-232; however, higher values may be applied to the radionuclides in either of the two decay chains which are not in secular equilibrium with the parent radionuclide.

**Table 3: Exemption levels**

Total activity values for exemption (third column) and exemption values for specific activities in moderate amounts (less than three tonnes per year per facility) of any type of material (second column).

|  |  |  |
| --- | --- | --- |
| **Radionuclide** | **Activity concentration (kBq kg-1)** | **Activity (Bq)** |
| H-3 | 1 × 106 | 1 × 109 |
| Be-7 | 1 000 | 1 × 107 |
| C-14 | 10 000 | 1 × 107 |
| O-15 | 100 | 1 × 109 |
| F-18 | 10 | 1 × 106 |
| Na-22 | 10 | 1 × 106 |
| Na-24 | 10 | 1 × 105 |
| Si-31 | 1 000 | 1 × 106 |
| P-32 | 1 000 | 1 × 105 |
| P-33 | 1 × 105 | 1 × 108 |
| S-35 | 1 × 105 | 1 × 108 |
| Cl-36 | 10 000 | 1 × 106 |
| Cl-38 | 10 | 1 × 105 |
| Ar-37 | 1 × 106 | 1 × 108 |
| Ar-41 | 100 | 1 × 109 |
| K-40\*\* | 100 | 1 × 106 |
| K-42 | 100 | 1 × 106 |
| K-43 | 10 | 1 × 106 |
| Ca-45 | 10 000 | 1 × 107 |
| Ca-47 | 10 | 1 × 106 |
| Sc-46 | 10 | 1 × 106 |
| Sc-47 | 100 | 1 × 106 |
| Sc-48 | 10 | 1 × 105 |
| V-48 | 10 | 1 × 105 |
| Cr-51 | 1 000 | 1 × 107 |
| Mn-51 | 10 | 1 × 105 |
| Mn-52 | 10 | 1 × 105 |
| Mn-52 m | 10 | 1 × 105 |
| Mn-53 | 10 000 | 1 × 109 |
| Mn-54 | 10 | 1 × 106 |
| Mn-56 | 10 | 1 × 105 |
| Fe-52 | 10 | 1 × 106 |
| Fe-55 | 10 000 | 1 × 106 |
| Fe-59 | 10 | 1 × 106 |
| Co-55 | 10 | 1 × 106 |
| Co-56 | 10 | 1 × 105 |
| Co-57 | 100 | 1 × 106 |

|  |  |  |
| --- | --- | --- |
| **Radionuclide** | **Activity concentration (kBq kg-1)** | **Activity (Bq)** |
| Co-58 | 10 | 1 × 106 |
| Co-58 m | 10 000 | 1 × 107 |
| Co-60 | 10 | 1 × 105 |
| Co-60 m | 1 000 | 1 × 106 |
| Co-61 | 100 | 1 × 106 |
| Co-62 m | 10 | 1 × 105 |
| Ni-59 | 10 000 | 1 × 108 |
| Ni-63 | 1 × 105 | 1 × 108 |
| Ni-65 | 10 | 1 × 106 |
| Cu-64 | 100 | 1 × 106 |
| Zn-65 | 10 | 1 × 106 |
| Zn-69 | 10 000 | 1 × 106 |
| Zn-69 m | 100 | 1 × 106 |
| Ga-72 | 10 | 1 × 105 |
| Ge-71 | 10 000 | 1 × 108 |
| As-73 | 1 000 | 1 × 107 |
| As-74 | 10 | 1 × 106 |
| As-76 | 100 | 1 × 105 |
| As-77 | 1 000 | 1 × 106 |
| Se-75 | 100 | 1 × 106 |
| Br-82 | 10 | 1 × 106 |
| Kr-74 | 100 | 1 × 109 |
| Kr-76 | 100 | 1 × 109 |
| Kr-77 | 100 | 1 × 109 |
| Kr-79 | 1 000 | 1 × 105 |
| Kr-81 | 10 000 | 1 × 107 |
| Kr-83 m | 1 × 105 | 1 × 1012 |
| Kr-85 | 1 × 105 | 10 000 |
| Kr-85 m | 1 000 | 1 × 1010 |
| Kr-87 | 100 | 1 × 109 |
| Kr-88 | 100 | 1 × 109 |
| Rb-86 | 100 | 1 × 105 |
| Sr-85 | 100 | 1 × 106 |
| Sr-85 m | 100 | 1 × 107 |
| Sr-87 m | 100 | 1 × 106 |
| Sr-89 | 1 000 | 1 × 106 |
| Sr-90\*\*\* | 100 | 10 000 |
| Sr-91 | 10 | 1 × 105 |
| Sr-92 | 10 | 1 × 106 |
| Y-90 | 1 000 | 1 × 105 |
| Y-91 | 1 000 | 1 × 106 |
| Y-91 m | 100 | 1 × 106 |
| Y-92 | 100 | 1 × 105 |
| Y-93 | 100 | 1 × 105 |
| Zr-93[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 1 000 | 1 × 107 |

|  |  |  |
| --- | --- | --- |
| **Radionuclide** | **Activity concentration (kBq kg-1)** | **Activity (Bq)** |
| Zr-95 | 10 | 1 × 106 |
| Zr-97[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 10 | 1 × 105 |
| Nb-93 m | 10 000 | 1 × 107 |
| Nb-94 | 10 | 1 × 106 |
| Nb-95 | 10 | 1 × 106 |
| Nb-97 | 10 | 1 × 106 |
| Nb-98 | 10 | 1 × 105 |
| Mo-90 | 10 | 1 × 106 |
| Mo-93 | 1 000 | 1 × 108 |
| Mo-99 | 100 | 1 × 106 |
| Mo-101 | 10 | 1 × 106 |
| Tc-96 | 10 | 1 × 106 |
| Tc-96 m | 1 000 | 1 × 107 |
| Tc-97 | 1 000 | 1 × 108 |
| Tc-97 m | 1 000 | 1 × 107 |
| Tc-99 | 10 000 | 1 × 107 |
| Tc-99 m | 100 | 1 × 107 |
| Ru-97 | 100 | 1 × 107 |
| Ru-103 | 100 | 1 × 106 |
| Ru-105 | 10 | 1 × 106 |
| Ru-106[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 100 | 1 × 105 |
| Rh-103 m | 10 000 | 1 × 108 |
| Rh-105 | 100 | 1 × 107 |
| Pd-103 | 1 000 | 1 × 108 |
| Pd-109 | 1 000 | 1 × 106 |
| Ag-105 | 100 | 1 × 106 |
| Ag-108 m | 10 | 1 × 106 |
| Ag-110 m | 10 | 1 × 106 |
| Ag-111 | 1 000 | 1 × 106 |
| Cd-109 | 10 000 | 1 × 106 |
| Cd-115 | 100 | 1 × 106 |
| Cd-115 m | 1 000 | 1 × 106 |
| In-111 | 100 | 1 × 106 |
| In-113 m | 100 | 1 × 106 |
| In-114 m | 100 | 1 × 106 |
| In-115 m | 100 | 1 × 106 |
| Sn-113 | 1 000 | 1 × 107 |
| Sn-125 | 100 | 1 × 105 |
| Sb-122 | 100 | 10 000 |
| Sb-124 | 10 | 1 × 106 |
| Sb-125 | 100 | 1 × 106 |
| Te-123 m | 100 | 1 × 107 |
| Te-125 m | 1 000 | 1 × 107 |
| Te-127 | 1 000 | 1 × 106 |
| Te-127 m | 1 000 | 1 × 107 |

|  |  |  |
| --- | --- | --- |
| **Radionuclide** | **Activity concentration (kBq kg-1)** | **Activity (Bq)** |
| Te-129 | 100 | 1 × 106 |
| Te-129 m | 1 000 | 1 × 106 |
| Te-131 | 100 | 1 × 105 |
| Te-131 m | 10 | 1 × 106 |
| Te-132 | 100 | 1 × 107 |
| Te-133 | 10 | 1 × 105 |
| Te-133 m | 10 | 1 × 105 |
| Te-134 | 10 | 1 × 106 |
| I-123 | 100 | 1 × 107 |
| I-125 | 1 000 | 1 × 106 |
| I-126 | 100 | 1 × 106 |
| I-129 | 100 | 1 × 105 |
| I-130 | 10 | 1 × 106 |
| I-131 | 100 | 1 × 106 |
| I-132 | 10 | 1 × 105 |
| I-133 | 10 | 1 × 106 |
| I-134 | 10 | 1 × 105 |
| I-135 | 10 | 1 × 106 |
| Xe-131 m | 10 000 | 10 000 |
| Xe-133 | 1 000 | 10 000 |
| Xe-135 | 1 000 | 1 × 1010 |
| Cs-129 | 100 | 1 × 105 |
| Cs-131 | 1 000 | 1 × 106 |
| Cs-132 | 10 | 1 × 105 |
| Cs-134 m | 1 000 | 1 × 105 |
| Cs-134 | 10 | 10 000 |
| Cs-135 | 10 000 | 1 × 107 |
| Cs-136 | 10 | 1 × 105 |
| Cs-137[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 10 | 10 000 |
| Cs-138 | 10 | 10 000 |
| Ba-131 | 100 | 1 × 106 |
| Ba-140\*\*\* | 10 | 1 × 105 |
| La-140 | 10 | 1 × 105 |
| Ce-139 | 100 | 1 × 106 |
| Ce-141 | 100 | 1 × 107 |
| Ce-143 | 100 | 1 × 106 |
| Ce-144[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 100 | 1 × 105 |
| Pr-142 | 100 | 1 × 105 |
| Pr-143 | 10 000 | 1 × 106 |
| Nd-147 | 100 | 1 × 106 |
| Nd-149 | 100 | 1 × 106 |
| Pm-147 | 10 000 | 1 × 107 |
| Pm-149 | 1 000 | 1 × 106 |
| Sm-151 | 10 000 | 1 × 108 |
| Sm-153 | 100 | 1 × 106 |

|  |  |  |
| --- | --- | --- |
| **Radionuclide** | **Activity concentration (kBq kg-1)** | **Activity (Bq)** |
| Eu-152 | 10 | 1 × 106 |
| Eu-152 m | 100 | 1 × 106 |
| Eu-154 | 10 | 1 × 106 |
| Eu-155 | 100 | 1 × 107 |
| Gd-153 | 100 | 1 × 107 |
| Gd-159 | 1 000 | 1 × 106 |
| Tb-160 | 10 | 1 × 106 |
| Dy-165 | 1 000 | 1 × 106 |
| Dy-166 | 1 000 | 1 × 106 |
| Ho-166 | 1 000 | 1 × 105 |
| Er-169 | 10 000 | 1 × 107 |
| Er-171 | 100 | 1 × 106 |
| Tm-170 | 1 000 | 1 × 106 |
| Tm-171 | 10 000 | 1 × 108 |
| Yb-175 | 1 000 | 1 × 107 |
| Lu-177 | 1 000 | 1 × 107 |
| Hf-181 | 10 | 1 × 106 |
| Ta-182 | 10 | 10 000 |
| W-181 | 1 000 | 1 × 107 |
| W-185 | 10 000 | 1 × 107 |
| W-187 | 100 | 1 × 106 |
| Re-186 | 1 000 | 1 × 106 |
| Re-188 | 100 | 1 × 105 |
| Os-185 | 10 | 1 × 106 |
| Os-191 | 100 | 1 × 107 |
| Os-191 m | 1 000 | 1 × 107 |
| Os-193 | 100 | 1 × 106 |
| Ir-190 | 10 | 1 × 106 |
| Ir-192 | 10 | 10 000 |
| Ir-194 | 100 | 1 × 105 |
| Pt-191 | 100 | 1 × 106 |
| Pt-193 m | 1 000 | 1 × 107 |
| Pt-197 | 1 000 | 1 × 106 |
| Pt-197 m | 100 | 1 × 106 |
| Au-198 | 100 | 1 × 106 |
| Au-199 | 100 | 1 × 106 |
| Hg-197 | 100 | 1 × 107 |
| Hg-197 m | 100 | 1 × 106 |
| Hg-203 | 100 | 1 × 105 |
| Tl-200 | 10 | 1 × 106 |
| Tl-201 | 100 | 1 × 106 |
| Tl-202 | 100 | 1 × 106 |
| Tl-204 | 10 000 | 10 000 |
| Pb-203 | 100 | 1 × 106 |
| Pb-210\*\*\* | 10 | 10 000 |

|  |  |  |
| --- | --- | --- |
| **Radionuclide** | **Activity concentration (kBq kg-1)** | **Activity (Bq)** |
| Pb-212[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 10 | 1 × 105 |
| Bi-206 | 10 | 1 × 105 |
| Bi-207 | 10 | 1 × 106 |
| Bi-210 | 1 000 | 1 × 106 |
| Bi-212[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 10 | 1 × 105 |
| Po-203 | 10 | 1 × 106 |
| Po-205 | 10 | 1 × 106 |
| Po-207 | 10 | 1 × 106 |
| Po-210 | 10 | 10 000 |
| At-211 | 1 000 | 1 × 107 |
| Rn-220[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 10 000 | 1 × 107 |
| Rn-222[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 10 | 1 × 108 |
| Ra-223[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 100 | 1 × 105 |
| Ra-224[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 10 | 1 × 105 |
| Ra-225 | 100 | 1 × 105 |
| Ra-226[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 10 | 10 000 |
| Ra-227 | 100 | 1 × 106 |
| Ra-228[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 10 | 1 × 105 |
| Ac-228 | 10 | 1 × 106 |
| Th-226[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 1 000 | 1 × 107 |
| Th-227 | 10 | 10 000 |
| Th-228[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 100 | 10 000 |
| Th-229[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 100 | 1 000 |
| Th-230 | 100 | 10 000 |
| Th-231 | 1 000 | 1 × 107 |
| Th-234[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 1 000 | 1 × 105 |
| Pa-230 | 10 | 1 × 106 |
| Pa-231 | 100 | 1 000 |
| Pa-233 | 100 | 1 × 107 |
| U-230 | 10 | 1 × 105 |
| U-231 | 100 | 1 × 107 |
| U-232[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 100 | 1 000 |
| U-233 | 10 | 10 000 |
| U-234 | 10 | 10 000 |
| U-235[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 10 | 10 000 |
| U-236 | 10 | 10 000 |
| U-237 | 100 | 1 × 106 |
| U-238[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 10 | 10 000 |
| U-239 | 100 | 1 × 106 |
| U-240 | 1 000 | 1 × 107 |
| U-240[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 10 | 1 × 106 |
| Np-237[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 100 | 1 000 |
| Np-239 | 100 | 1 × 107 |
| Np-240 | 10 | 1 × 106 |
| Pu-234 | 100 | 1 × 107 |

|  |  |  |
| --- | --- | --- |
| **Radionuclide** | **Activity concentration (kBq kg-1)** | **Activity (Bq)** |
| Pu-235 | 100 | 1 × 107 |
| Pu-236 | 10 | 10 000 |
| Pu-237 | 1 000 | 1 × 107 |
| Pu-238 | 100 | 10 000 |
| Pu-239 | 100 | 10 000 |
| Pu-240 | 100 | 1 000 |
| Pu-241 | 100 | 1 × 105 |
| Pu-242 | 100 | 10 000 |
| Pu-243 | 1 000 | 1 × 107 |
| Pu-244 | 100 | 10 000 |
| Am-241 | 100 | 10 000 |
| Am-242 | 1 000 | 1 × 106 |
| Am-242 m[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 100 | 10 000 |
| Am-243[\*\*\*](http://eur-lex.europa.eu/legal-content/en/TXT/?uri=CELEX%3A32013L0059&ntr3-L_2014013EN.01004501-E0003) | 100 | 1 000 |
| Cm-242 | 100 | 1 × 105 |
| Cm-243 | 100 | 10 000 |
| Cm-244 | 10 | 10 000 |
| Cm-245 | 100 | 1 000 |
| Cm-246 | 100 | 1 000 |
| Cm-247 | 100 | 10 000 |
| Cm-248 | 100 | 1 000 |
| Bk-249 | 1 000 | 1 × 106 |
| Cf-246 | 1 000 | 1 × 106 |
| Cf-248 | 10 | 10 000 |
| Cf-249 | 100 | 1 000 |
| Cf-250 | 10 | 10 000 |
| Cf-251 | 100 | 1 000 |
| Cf-252 | 10 | 10 000 |
| Cf-253 | 100 | 1 × 105 |
| Cf-254 | 100 | 1 000 |
| Es-253 | 100 | 1 × 105 |
| Es-254 | 10 | 10 000 |
| Es-254 m | 100 | 1 × 106 |
| Fm-254 | 10 000 | 1 × 107 |
| Fm-255 | 1 000 | 1 × 106 |

\*\*Potassium salts in quantities less than 1 000 kg are exempted.

These values do not generally apply in work with naturally-occurring radionuclides.

The values given in the third column of the table apply to artificial radionuclides and also to some naturally-occurring radionuclides in consumer products.

\*\*\*Parent radionuclides, and their progeny whose dose contributions are taken into account in the dose calculation (thus requiring only the exemption level of the parent radionuclide to be considered), are listed in the table below:

|  |  |
| --- | --- |
| **Parent radionuclide** | **Progeny** |
| Sr-90 | Y-90 |
| Zr-93 | Nb-93 m |
| Zr-97 | Nb-97 |
| Ru-106 | Rh-106 |
| Ag-108 m | Ag-108 |
| Cs-137 | Ba-137 m |
| Ba-140 | La-140 |
| Ce-144 | Pr-144 |
| Pb-210 | Bi-210, Po-210 |
| Pb-212 | Bi-212, Tl-208 (0.36), Po-212 (0.64) |
| Bi-212 | Tl-208 (0.36), Po-212 (0.64) |
| Rn-220 | Po-216 |
| Rn-222 | Po-218, Pb-214, Bi-214, Po-214 |
| Ra-223 | Rn-219, Po-215, Pb-211, Bi-211, Tl-207 |
| Ra-224 | Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) |
| Ra-226 | Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210 |
| Ra-228 | Ac-228 |
| Th-226 | Ra-222, Rn-218, Po-214 |
| Th-228 | Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) |
| Th-229 | Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209 |
| Th-234 | Pa-234 m |
| U-230 | Th-226, Ra-222, Rn-218, Po-214 |
| U-232 | Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) |
| U-235 | Th-231 |
| U-238 | Th-234, Pa-234 m |
| U-240 | Np-240 m |
| Np237 | Pa-233 |
| Am-242 m | Am-242 |
| Am-243 | Np-239 |

**Table 4: Minimum activity values defining high-activity radiation sources**

|  |  |
| --- | --- |
| **Radionuclide** | **Activity (TBq)** |
| Am-241 | 0.06 |
| Am-241/Be-9\* | 0.06 |
| Cf-252 | 0.02 |
| Cm-244 | 0.05 |
| Co-60 | 0.03 |
| Cs-137 | 0.10 |
| Gd-153 | 1.00 |
| Ir-192 | 0.08 |
| Pm-147 | 40.0 |
| Pu-238 | 0.06 |
| Pu-239/Be-9\* | 0.06 |
| Ra-226 | 0.04 |
| Se-75 | 0.20 |
| Sr-90 (Y-90) | 1.00 |
| Tm-170 | 20.0 |
| Yb-169 | 0.30 |

\*The activity given is that of the alpha-emitting radionuclide.

For radionuclides not listed in the table below, the relevant activity is identical to the D-value defined in the IAEA publication Dangerous quantities of radioactive material (D-values), (EPR-D- VALUES 2006).

**Table 5: Minimum activity values (Bq) defining sources as category 1, 2 or 3 dangerous radiation sources**

|  |  |  |  |
| --- | --- | --- | --- |
| ***Radionuclide*** | ***Category 1*** | ***Category 2*** | ***Category 3*** |
| ***1 000 x D*** | ***10 x D*** | ***D*** |
| ***Activity (Bq)*** | ***Activity (Bq)*** | ***Activity (Bq)*** |
| Am-241 | 6 x 1013 | 6 x 1011 | 6 x 1010 |
| Am-241/Be | 6 x 1013 | 6 x 10n | 6 x 1010 |
| Au-198\* | 2 x 1014 | 2 x 1012 | 2 x 1011 |
| Cd-109\* | 2 x 1016 | 2 x 1014 | 2 x 1013 |
| Cf-252 | 2 x 1013 | 2 x 1011 | 2 x 1010 |
| Cm-244 | 5 x 1013 | 5 x 1011 | 5 x 1010 |
| Co-57\* | 7 x 1014 | 7 x 1012 | 7 x 1011 |
| Co-60 | 3 x 1013 | 3 x 1011 | 3 x 1010 |
| Cs-137 | 1 x 1014 | 1 X 1012 | 1 x 1011 |
| Fe-55\* | 8 x 1017 | 8 x 1015 | 8 x 1014 |
| Gd-153 | 1 x 1015 | 1 x 1013 | 1 x 1012 |
| Ge-68\* | 7 x 1014 | 7 x 1012 | 7 x 1011 |
| 1-131\* | 2 x 1014 | 2 x 1012 | 2 x 1011 |
| Ir-192 | 8 x 1013 | 8 x 1011 | 8 x 1010 |
| Mo-99\* | 3 x 1014 | 3 x 1012 | 3 x 1011 |
| Ni-63\* | 6 x 1016 | 6 x 1014 | 6 x 1013 |
| Pd-103\* | 9 x 1016 | 9 x 1014 | 9 x 1013 |
| Pm-147 | 4 x 1016 | 4 x 1014 | 4 x 1013 |
| Po-210\* | 6 x 1013 | 6 x 1011 | 6 x 1010 |
| Pu-238 | 6 x 1013 | 6 x 1011 | 6 x 1010 |
| Pu-239a/Be | 6 x 1013 | 6 x 1011 | 6 x 1010 |
| Ra-226 | 4 x 1013 | 4 x 1011 | 4 x 1010 |
| Ru-106 (Rh-106)\* | 3 x 1014 | 3 x 1012 | 3 x 1011 |
| Se-75 | 2 x 1014 | 2 x 1012 | 2 x 1011 |
| Sr-90 (Y-90) | 1 x 1015 | 1 x 1013 | 1 x 1012 |
| Tc-99m\* | 7 x 1014 | 7 x 1012 | 7 x 1011 |
| Tl-204\* | 2 x 1016 | 2 x 1014 | 2 x 1013 |
| Tm-170 | 2 x 1016 | 2 x 1014 | 2 x 1013 |
| Yb-169 | 3 x 1014 | 3 x 1012 | 3 x 1011 |

\*In practice these radionuclides are very unlikely to have the activity levels that would place them within Category 1, 2 or 3.

The classification is based on the activity of source D which could lead to severe deterministic effects if used in certain uncontrolled conditions.

The possibility of uncontrolled nuclear fission (criticality) must be considered for activities exceeding category 3 values several fold.

Where several sources are close together, i.e. within the same device or room, the competent authority shall take into account their joint activity to determine the source category.

**Table 6: Quantities of nuclear substances for transportation**

|  |  |
| --- | --- |
| **Nuclear substance** | **Quantity** |
| depleted uranium | 350 kg |
| thorium | 200 kg |
| naturally occurring uranium | 100 kg |
| low-enriched uranium | 1 kg |
| highly enriched uranium | 5 g |
| plutonium | 5 g |

Where more than one nuclear substance is concerned, the sum of the quotients of the actual quantity of one substance and the values given in the second column of this table shall be taken into account. No permit for transporting nuclear substances shall be required where the sum of the quotients is less than 1.