

(This is an unofficial translation of the text effective on April 10, 2017)

**Ministerial Decree 11/2010. (III.4.) KHEM issued by  
the Minister of transport, telecommunication and energy  
on the rules of accountancy for and control of radioactive materials, and on the  
corresponding data provisions**

Based on the authorization given by sub-paragraph *b*) of paragraph (1) of Section 68 of the Act CXVI of 1996 on atomic energy, in agreement with the minister of health in its scope of authority as specified in sub-paragraph *a*) of Section 1 of the Govt. Decree 161/2006. (VII. 28.) Korm. on the scope of duty and authority of the minister of health, the minister of environment and water in its scope of authority as specified in sub-paragraph *a*) of Section 1 and paragraph (2) of Section 3 of Govt. Decree 165/2006. (VII. 28.) Korm. on the scope of duty and authority of the minister of environment and water, the minister of justice and law enforcement in its scope of authority as specified in sub-paragraph *n*) of Section 1 of Govt. Decree 164/2006. (VII. 28.) Korm. on the scope of duty and authority of the minister of justice and law enforcement, and with the minister without portfolio supervising the civil security services in its scope of authority as specified in sub-paragraph *a*) of Section 1 of Govt. Decree 177/2007. (VII. 1.) Korm. on the scope of duty and authority of the minister without portfolio supervising the civil security services, by taking account of the sub-paragraph *e*) of Section 1 of Prime Minister decree 8/2006. (XII. 23.) ME on the assignment of ministers supervising government offices, I order as follows:

**Chapter I**  
**General provisions**  
*Section 1: Scope*

**Section 1**

(1) The regulations specified in this decree shall apply, with the exemptions defined in paragraph (2), to all radioactive material, including:

- a*) source materials used for manufacturing of radioactive sources by manufacturers and processors of radioactive sources (hereinafter referred to as source materials);
- b*) natural materials and ores including naturally occurring radioactive materials, if the activity concentration of such material is higher than tenfold of the general exemption activity concentration as specified in Annex 2 of Govt. Decree 487/2015. (XII.30.) on the protection against ionizing radiation and the corresponding licensing, reporting (notification) and inspection system;
- c*) radioactive wastes.

(2) The regulations specified in this decree shall not apply to

- a*) radioactive materials falling under the scope of Govt. Decree 124/1997. (VII. 18.) Korm. on radioactive materials and equipment producing ionising radiation that are not under the scope of the Act CXVI of 1996 on Atomic Energy (hereinafter referred to as Govt. Decree);
- b*) radioactive materials below the exemption activity concentration or exemption activity level as specified in the government decree on the protection against ionizing radiation and the corresponding licensing, reporting (notification) and inspection system;
- c*) nuclear fuel and spent nuclear fuel;

- d) shielding, packaging, ballasts and counter-weights made of depleted uranium;
  - e) materials becoming radioactive by contamination of radioactive materials or activation, if they do not belong to the scope of radioactive wastes and source materials;
  - f) radioactive materials being at places identified in Paragraphs (2)-(4) of Section 1 of the Govt. decree 330/2007. (XII.13.) Korm on the border area and rules of entering and staying in border area without the purpose of crossing the border.
- (3) The regulations of both the Ministerial Decree 7/2007. (III. 6.) IRM on the accountancy for and control of nuclear materials (hereinafter referred to as IRM decree) and this decree shall apply simultaneously to materials falling under the scope of the IRM decree.

## *Section 2: Definitions*

### **Section 2**

(1) Under the scope of this decree

- a) *holder*: who permanently or temporarily stores, uses or processes any radioactive material, including the manufacturers, suppliers and users, but excluding those who hold regulatory licenses for long-term storage, disposal or temporary storage;
- b) *manufacturer*: who manufactures a source;
- c) *low and intermediate level radioactive waste*: radioactive waste in which the heat generation can be neglected, including:
  - ca) *short lived radioactive waste*: such low and intermediate level waste, in which the half life of radionuclides does not exceed 30 years and which contains long lived alpha emitting radionuclides in a limited concentration only (this concentration is 4000 Bq/g for a package, whilst 400 Bq/g as an average value for the whole radioactive waste quantity),
  - cb) *long lived radioactive waste*: such low and intermediate level waste, in which the half life of radionuclides and/or the concentration of alpha emitting radionuclides exceeds the limit values specified for short lived radioactive waste;
  - cc) *low level radioactive waste*: such radioactive waste, in which the sum of ratios of activity concentration values to the exemption activity concentration values of each radionuclide is greater than 1, but do not exceed 1000;
  - cd) *intermediate level radioactive waste*: such radioactive waste, in which the sum of ratios of activity concentration values to exemption activity concentration values of each radionuclide is greater than 1000;
  - d) *high level radioactive waste*: such radioactive waste, the heat dissipation of which shall be taken into account during the design of storage and disposal as well as during operation of the installation;
- e) *not exempted consumer product*: equipment containing radioactive sources that are either listed in sub-paragraphs a)-d) of paragraph (1) of Section 3 of the Govt. Decree but not exempted due to exceeding of the defined dose limit, or not used according to its purpose and therefore fall under the scope of the Act CXVI of 1996 on atomic energy (hereinafter referred to as Atv.);
- f) *high activity sealed source*: a sealed source that contains such radioactive material, the activity of which, including the activity of those daughter nuclides that have half-lives shorter than 10 days, at the time when it was manufactured or at the time of first placing on the market, exceeds 0.5 GBq for Cf-252, or exceeds the D value defined in the ADR decree, and which includes the capsule, where applicable, as an integral part of the radioactive source;
- g) *D activity*: an isotope specific normalising factor used for determination of the threat level of radioactive sources;
- h) *radioactive source container*: containment of a sealed source not being an integral part of the source; it is meant for transport, handling, etc.;

*i) supplier:* who, whether costless or not, supplies or makes available a radioactive source, excluding the manufacturer in the scope of radioactive sources manufactured by it.

(2) With regard to radioactive materials under the ownership of any organizational unit of the Hungarian Defence Forces, the rights and obligations defined in this decree fall under the competence of the Hungarian Defence Forces.

(3) The terms not defined in paragraph (1) shall be explained pursuant to Section 2 of the Atv, Section 4 of Govt. decree 487/2015. (XII.30.) on the protection against ionizing radiation and the corresponding licensing, reporting (notification) and inspection system, and paragraphs 1 and 4 of Section 2 of Govt. Decree 34/2009. (II. 20.) Korm. on the licensing of transport of radioactive wastes and spent fuels through borders.

## **Chapter II**

### **Accountancy for radioactive materials**

#### *Section 3: Rules for individual identification of radioactive materials required for accountancy and control*

#### **Section 3**

For a high activity sealed source the manufacturer or the supplier shall ensure the following arrangements:

*a)* the radioactive source shall be identified by a unique number (hereinafter referred to as fabrication number) provided by the manufacturer to the radioactive source and the radioactive source container;

*b)* the fabrication number shall be engraved or sealed on the radioactive source and its radioactive source container; if this is not feasible or in the case of reusable transport containers, the radioactive source container shall at least have information on the nature of the radioactive source;

*c)* the radioactive source container, and where practicable the radioactive source shall be marked and labelled with an appropriate sign to warn people of radiation hazard; if the radioactive source cannot be signed accordingly, then a written explanation shall be provided about the reasons thereof;

*d)* a photograph shall be provided of each manufactured radioactive source design type and of the typical radioactive source container.

#### **Section 4**

(1) All radioactive material shall be provided with a certificate in Hungarian language by the supplier, or if the radioactive source will not be subject to trade, with the exemptions specified in paragraph (2), by the manufacturer.

(2) The certification of a found or seized radioactive source that cannot be identified in the central register is regulated by another law.

(3) The certificate of sealed radioactive sources shall include the following data:

*a)* certificate number;

- b)* name and address of manufacturer;
- c)* name and address of supplier;
- d)* radionuclide (element and mass number);
- e)* activity, reference date of activity;
- f)* purpose of application;
- g)* fabrication number provided by the manufacturer;
- h)* product identifier (if known);
- i)* service period (if known);
- j)* active length, active diameter, total length, total diameter (if known);
- k)* type of capsule (if known);
- l)* for special form radioactive material the certificate number;
- m)* physical and chemical form (if known);
- n)* quantity, unit of quantity;
- o)* date when the certificate was issued;
- p)* official signature of the issuer of the certificate.

(4) The certificate of open irradiative sources shall include the following data:

- a)* certificate number;
- b)* name and address of manufacturer;
- c)* name and address of supplier;
- d)* radionuclide (element and mass number);
- e)* activity, reference date of activity;
- f)* purpose of application;
- g)* physical and chemical form (if known);
- h)* quantity, unit of quantity;
- i)* date when the certificate was issued;
- j)* official signature of the issuer of the certificate.

(5) The certificate of source materials used for production shall include the following data:

- a)* certificate number;
- b)* name and address of manufacturer;
- c)* radionuclide (element and mass number);
- d)* activity, reference date of activity;
- e)* purpose of application;
- f)* physical and chemical form (if known);
- g)* quantity, unit of quantity;
- h)* date when the fabrication document was issued;
- i)* official signature of the issuer of the fabrication document.

(6) The certificate of NORMx10 shall include the following data:

- a)* certificate number;
- b)* radionuclide (element and mass number);
- c)* activity concentration, reference date of activity concentration;
- d)* purpose of application;
- e)* physical and chemical form (if known);
- f)* quantity, unit of quantity;
- g)* date when the document was issued;
- h)* name and official signature of the issuer of the document.

## **Section 5**

(1) The Hungarian Atomic Energy Authority (hereinafter referred to as Authority) issues an official warrant at the time when the radioactive source is first placed on market, and at the request of the owner, and at the request of the new owner as defined in paragraph (3) of Section 11 when the ownership of the sealed radioactive source changes, with the exemption of sealed radioactive sources that are qualified to radioactive waste. The owner shall submit the application at least 30 working days before radioactive source is first placed on market; the new owner shall submit the application within 30 days subsequent to the change of ownership.

(2) The official warrant is provided for the individual identification of sealed sources as well as for certification of the owner thereof. The official warrant, beyond the content elements specified in the Act on the general rules of administrative regulatory procedures, shall include the following data:

*a)* Authority identifier;

*b)* number of the original certificate;

*c)* name and address of the owner;

*d)* radionuclide (element and mass number);

*e)* original activity, the reference date of activity;

*f)* purpose of the application;

*g)* fabrication number;

*h)* service period (if known);

*i)* physical and chemical form (if known);

*j)* for a high activity sealed source a photograph of the radioactive source design type and of the radioactive source container provided by the manufacturer or the supplier of the radioactive source.

(3) Until the issuance of the official warrant, the sealed radioactive sources are identified by the original certificate.

### *Section 4: Central register*

## **Section 6**

(1) A computerized national central register shall be maintained on radioactive materials. The establishment, operation of the central register and the inspection of local registers is the duty of the Authority within its scope of authority regarding nuclear and radioactive materials.

(2) The costs of operation of the central register shall be planned in the frame of the annual budget of the Authority.

(3) The Isotope Institute of the Hungarian Academy of Sciences provides support to the Authority in the establishment of the technical conditions (receipt, evaluation and computerized processing of data) of regulatory supervision with regard to accountancy for radioactive sources.

### *Section 5: Local register*

## **Section 7**

(1) Local register of owned and hold radioactive materials shall be maintained by owners and holders. The local register shall contain the following information of the radioactive materials:

*a)* licensed maximum inventory;

*b)* actual inventory;

*c)* type;

- d)* activity;
- e)* purpose of application;
- f)* storage location;
- g)* method of application (use up).

(2) Separate register shall be maintained on

- a)* sealed radioactive sources, including sealed radioactive sources qualified to radioactive waste;
- b)* open radioactive sources excluding radioactive waste, not exempted consumer goods, NORMx10 and source material;
- c)* radioactive waste excluding sealed radioactive sources that are qualified to radioactive waste.

(3) At the establishment of the local register, the person responsible for the register shall provide data to the Authority in line with the rules for inventory taking in such an electronic format that is supported by the central register.

(4) The following occurrences with regard to radioactive material shall be recorded in the local register without undue delay:

- a)* every inventory change;
- b)* every use up and application, suspension of application;
- c)* decay below exemption level;
- d)* total use-up;
- e)* clearance from regulatory control;
- f)* qualification to radioactive waste.

(5) For sealed sources, excluding sealed sources qualified to radioactive waste, the local register shall contain:

*a)* purpose of application;

*b)* date of application;

*c)* place of application;

*d)* name of person obliged for the maintenance of the register,

*da)* name of a natural person or

*db)* the name of the leader of legal entity of an economic company, or if the legal entity is led by a legal entity, then the name of the actually proceeding natural person;

*e)* the name of the radiation protection officer.

(6) For radioactive sources falling under the scope of sub-paragraph *b)* of paragraph (2), the local register, in addition to those listed in paragraph (1), shall contain the quantity (activity and weight or volume) of the used up radioactive material.

(7) For radioactive waste, the local register shall include the following data:

*a)* name and address of the owner or holder;

*b)* class of radioactive waste;

*c)* basis for classification;

*d)* type of storage;

*e)* waste form;

*f)* packaging;

*g)* quantity, quantity unit;

*h)* element and mass number of the radionuclide (if known);

*i)* activity, reference date of activity (if known);

*j)* method how the activity was determined;

*k)* date of qualification to waste, number of the qualification record, name and address of the person performed the qualification.

(8) The low and intermediate level radioactive waste, based on the half-live, activity concentration and exemption activity concentration of contained radionuclides shall be classified either as short lived or long lived, and either as low level or intermediate level radioactive wastes.

(9) The fundamental documents of the local register are:

*a)* certificates,

*b)* official warrants,

*c)* documents certifying the change of the owner or holder,

*d)* closed isotope-register books.

(10) The fundamental documents of the register as listed in paragraph (9) shall be stored until the deadline defined in Sub-section (2) of Section 16 of the Atomic Act, and then they shall be handed over to the Authority. These documents are managed by the Authority in accordance with Sub-section (6) of Section 16 of the Atomic Act and then taken to the archive database. The Authority informs the government office performing radiation health tasks on the hand-over and placement to archive database of such data.

(11) In the case of termination of the application, the local register, with the exemption specified in paragraph (12) shall be closed by a closing inventory taking, in accordance with sub-paragraph *c)* of paragraph (1) of Section 10.

(12) The local register shall be closed by a delivery-acceptance record (contract), if subsequent to the termination of the application

*a)* un-used residual radioactive material will be further used up, or

*b)* radioactive waste or the radioactive material to be disposed will be handed over to a recognized facility.

### **Section 8**

The register, with the exemption described in Section 9, shall be maintained in electronic format, with accountancy software provided free of charge to the owners and holders by the Authority.

### **Section 9**

At the request of the owner or the holder, the Authority may license the maintenance of a local register differing from that specified in Section 8. The license application shall present that the register maintained in a different way is applicable to handle the data listed in paragraphs (1)-(6) of Section 7 and it fully supports the inventory taking and data provision requirements determined in Sections 10-13. The internal document governing the operation of the owner or the holder that specifies the rules for local register in line with this decree shall also be submitted as a part of the license application.

## **Chapter III**

### **Data provisions and inspection**

#### **Section 10**

(1) The owner and the holder shall take the inventory of radioactive materials under its possession

*a)* once every calendar year in such a way that the interval between two subsequent inventory taking does not exceed 12 months;

*b)* at the request of the Authority;

*c)* at the termination of the application, pursuant to paragraphs (11)-(12) of Section 7.

(2) The owner and the holder, through the person responsible for the register, shall provide data on the outcome of inventory taking to the Authority within 15 days thereafter, in an electronic format that is supported by the central register.

#### **Section 11**

(1) The data provided on inventory taking of radioactive sources falling under sub-paragraph *a)* of paragraph (2) of Section 7 shall include:

*a)* authority identifier of the radioactive source;

*b)* number of the certificate;

*c)* date when the certificate was issued;

*d)* radionuclide (element and mass number) and its original activity;

*e)* date of original activity;

*f)* purpose of application;

*g)* fabrication number;

*h)* service period;

*i)* physical, chemical form (if known);

*j)* number of certificate of special form radioactive material (if known);



- k)* date when taken to inventory;
- l)* number of license for the given radioactive material of the owner and holder;
- m)* validity period of the license;
- n)* issuer of the license.

(2) The owner and the holder shall provide data to the Authority on any changes occurring in the inventory of registered radioactive sources falling under the scope of sub-paragraph *a)* of paragraph (2) of Section 7 within 15 days in an electronic format that is supported by the central register.

(3) In the case of change of ownership regarding a radioactive source falling under the scope of sub-paragraph *a)* of paragraph (2) of Section 7 (hereinafter referred to as the transfer of the radioactive source) the Authority issue a new official warrant at the request of the new owner of the radioactive source. The transfer of radioactive sources shall be recorded. The copy of such a record shall be submitted to the Authority by the previous owner. In the case of change of ownership, if the transferred radioactive source has already had official warrant, then this warrant shall be attached to the record certifying the ownership change. In the case of change of ownership regarding a radioactive source, subsequent to the transfer, with the exemption of sealed radioactive sources that are qualified to radioactive waste, the Authority will issue a new official warrant to the new owner including the data thereof.

(4) The document recording the change of ownership regarding a radioactive source falling under the scope of sub-paragraph *a)* of paragraph (2) of Section 7 shall contain the following data:

- a)* Authority identifier of the radioactive source (if known);
- b)* certificate number;
- c)* fabrication number, or if missing the unique number of the radioactive source;
- d)* radionuclide (element and mass number);
- e)* its original activity, reference date of activity;
- f)* place and date of its transfer;
- g)* name, address and license number of previous owner;
- h)* name and signature of the representative of the previous owner;
- i)* name, address and license number of the new owner;
- j)* name and signature of the representative of the new owner.

(5) In the case of planned export or import of a sealed radioactive source with the activity exceeding ten times the D activity, the owner or the holder shall submit an advance notification to the Authority at least 30 days before the planned transport, which notification shall include the following data:

- a)* name, address and phone number of the manufacturer or the suppliers;
- b)* radionuclide (element and mass number);
- c)* activity, reference date of activity;
- d)* purpose of application;
- e)* time interval containing the date of the planned transport.

(6) The D activity values of radionuclides are listed in the Annex of this decree.

(7) The notification specified above does not substitute the further data provision obligations that are prescribed in the decree.

## **Section 12**

For radioactive sources falling under the scope of sub-paragraph *b)* of paragraph (2) of Section 7, the data provision on the outcome of inventory taking shall include, beyond the actual inventory of the radioactive materials, the cumulative inventory change data for the inventory taking interval per each radionuclides (and per type) as follows:

- a)* accepted total quantity (original activity, and weight or volume);
- b)* transferred total quantity (original activity, and weight or volume);
- c)* used up quantity (original activity, and weight or volume);
- d)* actual inventory (activity, and weight or volume);
- e)* purpose of application;
- f)* physical and chemical form (if known);
- g)* license number of the owner or holder with regard to the given radioactive material;
- h)* validity period of the license;
- i)* issuer of the license.

### **Section 13**

For radioactive wastes falling under the scope of sub-paragraph *c)* of paragraph (2) of Section 7, the data provision on the outcome of inventory taking shall include, beyond the actual inventory of the radioactive wastes, the cumulative inventory change data for the inventory taking interval per each radioactive waste class as follows:

- a)* total accepted quantity (waste form, packaging);
- b)* total produced quantity (waste form, packaging);
- c)* total delivered quantity (waste form, packaging);
- d)* total decayed quantity (waste form, packaging);
- e)* total quantity of clearance from regulatory control (waste form, packaging);
- f)* application license number of the owner or the holder, license for storage operation of licensee of the radioactive waste storage and disposal facility;
- g)* validity period of the license;
- h)* issuer of the license.

### **Section 14**

(1) The owner and the holder shall provide data to the Authority about any change of the name, address or of the person obliged to maintain the register within 15 days subsequent to the change.

(2) The owner or holder, who exported a sealed radioactive source or undertook responsibility to accept its return, shall provide data to the Authority on this fact and the actual acceptance of return within 15 days subsequent to the export or the acceptance of return.

(3) The owner and the holder shall provide data to the Authority, without undue delay, on any loss or gain appearing during inventory taking of radioactive materials.

## **Section 15**

(1) In the case if any loss or gain appeared as the result of inventory taking, the Authority immediately notifies the Hungarian Police Headquarters (hereinafter referred to as ORFK), the civil national security services and the National Radiation Health Duty Service. The organizations listed in this paragraph inform the Authority about their actions affecting the scope of competence thereof.

## **Section 16**

(2) If the the OTH, the ORFK, the national security services or the Directorate General for National Disaster Management notices any violation of regulations specified in Section 7 as well as in Sections 10-13, then it informs the Authority without undue delay.

## **Chapter IV**

### **Closing provisions**

### **Section 17**

(1) This decree shall enter into force on the 30th day following its promulgation.

(4) This decree is meant to comply with Sub-sections b), g), h), l), m) and n) of Section 2, Section 4, Sub-sections (1)-(4) of Section 5, Sub-sections b) and d) of Section 6, Sub-sections (1)-(2) of Section 7, Sub-section (1) of Section 13, Section 14, and Sub-section (1) of Section 16 of the Council Directive 2003/122/Euratom of 22 December 2003 on the control of high-activity sealed radioactive sources and orphan sources.

Annex to Ministerial Decree 11/2010. (III. 4.) KHEM

*D values of the threat scale of radionuclides*

Radionuclide	D activity (TBq)
H-3	$2 \times 10^3$
Be-7	$1 \times 10^0$
Be-10	$3 \times 10^1$
C-11	$6 \times 10^{-2}$
C-14	$5 \times 10^1$
N-13	$6 \times 10^{-2}$
F-18	$6 \times 10^{-2}$
Na-22	$3 \times 10^{-2}$
Na-24	$2 \times 10^{-2}$
Mg-28	$2 \times 10^{-2}$
Al-26	$3 \times 10^{-2}$
Si-31	$1 \times 10^1$
Si-32	$7 \times 10^0$
P-32	$1 \times 10^1$
P-33	$2 \times 10^2$
S-35	$6 \times 10^1$
Cl-36	$2 \times 10^1$
Cl-38	$5 \times 10^{-2}$
Ar-37	$\infty$
Ar-39	$3 \times 10^2$
Ar-41	$5 \times 10^{-2}$
K-40	$\infty$
K-42	$2 \times 10^{-1}$
K-43	$7 \times 10^{-2}$
Ca-41	$\infty$
Ca-45	$1 \times 10^2$
Ca-47	$6 \times 10^{-2}$
Sc-44	$3 \times 10^{-2}$
Sc-46	$3 \times 10^{-2}$
Sc-47	$7 \times 10^{-1}$
Sc-48	$2 \times 10^{-2}$
Ti-44	$3 \times 10^{-2}$
V-48	$2 \times 10^{-2}$

V-49	$2 \times 10^3$
Cr-51	$2 \times 10^0$
Mn-52	$2 \times 10^{-2}$
Mn-53	$\infty$
Mn-54	$8 \times 10^{-2}$
Mn-56	$4 \times 10^{-2}$
Fe-52	$2 \times 10^{-2}$
Fe-55	$8 \times 10^2$
Fe-59	$6 \times 10^{-2}$
Fe-60	$6 \times 10^{-2}$
Co-55	$3 \times 10^{-2}$
Co-56	$2 \times 10^{-2}$
Co-57	$7 \times 10^{-1}$
Co-58	$7 \times 10^{-2}$
Co-58m	$7 \times 10^{-2}$
Co-60	$3 \times 10^{-2}$
Ni-59	$1 \times 10^3$
Ni-63	$6 \times 10^1$
Ni-65	$1 \times 10^{-1}$
Cu-64	$3 \times 10^{-1}$
Cu-67	$7 \times 10^{-1}$
Zn-65	$1 \times 10^{-1}$
Zn-69	$3 \times 10^1$
Zn-69m	$2 \times 10^{-1}$
Ga-67	$5 \times 10^{-1}$
Ga-68	$7 \times 10^{-2}$
Ga-72	$3 \times 10^{-2}$
Ge-68	$7 \times 10^{-2}$
Ge-71	$1 \times 10^3$
Ge-77	$6 \times 10^{-2}$
As-72	$4 \times 10^{-2}$
As-73	$4 \times 10^1$
As-74	$9 \times 10^{-2}$
As-76	$2 \times 10^{-1}$
As-77	$8 \times 10^0$
Se-75	$2 \times 10^{-1}$
Se-79	$2 \times 10^2$

Br-76	$3 \times 10^{-2}$
Br-77	$2 \times 10^{-1}$
Br-82	$3 \times 10^{-2}$
Kr-81	$3 \times 10^1$
Kr-85	$3 \times 10^1$
Kr-85m	$5 \times 10^{-1}$
Kr-87	$9 \times 10^{-2}$
Rb-81	$1 \times 10^{-1}$
Rb-83	$1 \times 10^{-1}$
Rb-84	$7 \times 10^{-2}$
Rb-86	$7 \times 10^{-1}$
Rb-87	$\infty$
Sr-82	$6 \times 10^{-2}$
Sr-85	$1 \times 10^{-1}$
Sr-85m	$1 \times 10^{-1}$
Sr-87m	$2 \times 10^{-1}$
Sr-89	$2 \times 10^1$
Sr-90	$1 \times 10^0$
Sr-91	$6 \times 10^{-2}$
Sr-92	$4 \times 10^{-2}$
Y-87	$9 \times 10^{-2}$
Y-88	$3 \times 10^{-2}$
Y-90	$5 \times 10^0$
Y-91	$8 \times 10^0$
Y-91m	$1 \times 10^{-1}$
Y-92	$2 \times 10^{-1}$
Y-93	$6 \times 10^{-1}$
Zr-88	$2 \times 10^{-2}$
Zr-93	$\infty$
Zr-95	$4 \times 10^{-2}$
Zr-97	$4 \times 10^{-2}$
Nb-93m	$3 \times 10^2$
Nb-94	$4 \times 10^{-2}$
Nb-95	$9 \times 10^{-2}$
Nb-97	$1 \times 10^{-1}$
Mo-93	$3 \times 10^2$
Mo-99	$3 \times 10^{-1}$

Tc-95m	$2 \times 10^{-1}$
Tc-96	$3 \times 10^{-2}$
Tc-96m	$3 \times 10^{-2}$
Tc-97	$\infty$
Tc-97m	$4 \times 10^1$
Tc-98	$5 \times 10^{-2}$
Tc-99	$3 \times 10^1$
Tc-99m	$7 \times 10^{-1}$
Ru-97	$3 \times 10^{-1}$
Ru-103	$1 \times 10^{-1}$
Ru-105	$8 \times 10^{-2}$
Ru-106	$3 \times 10^{-1}$
Rh-99	$1 \times 10^{-1}$
Rh-101	$3 \times 10^{-1}$
Rh-102	$3 \times 10^{-2}$
Rh-102m	$1 \times 10^{-1}$
Rh-103m	$9 \times 10^2$
Rh-105	$9 \times 10^{-1}$
Pd-103	$9 \times 10^1$
Pd-107	$\infty$
Pd-109	$2 \times 10^1$
Ag-105	$1 \times 10^{-1}$
Ag-108m	$4 \times 10^{-2}$
Ag-110m	$2 \times 10^{-2}$
Ag-111	$2 \times 10^0$
Cd-109	$2 \times 10^1$
Cd-113m	$4 \times 10^1$
Cd-115	$2 \times 10^{-1}$
Cd-115m	$3 \times 10^0$
In-111	$2 \times 10^{-1}$
In-113m	$3 \times 10^{-1}$
In-114m	$8 \times 10^{-1}$
In-115m	$4 \times 10^{-1}$
Sn-113	$3 \times 10^{-1}$
Sn-117m	$5 \times 10^{-1}$
Sn-119m	$7 \times 10^1$
Sn-121m	$7 \times 10^1$

Sn-123	$7 \times 10^0$
Sn-125	$1 \times 10^{-1}$
Sn-126	$3 \times 10^{-2}$
Sb-122	$1 \times 10^{-1}$
Sb-124	$4 \times 10^{-2}$
Sb-125	$2 \times 10^{-1}$
Sb-126	$2 \times 10^{-2}$
Te-121	$1 \times 10^{-1}$
Te-121m	$1 \times 10^{-1}$
Te-123m	$6 \times 10^{-1}$
Te-125m	$1 \times 10^1$
Te-127	$1 \times 10^1$
Te-127m	$3 \times 10^0$
Te-129	$1 \times 10^0$
Te-129m	$1 \times 10^0$
Te-131m	$4 \times 10^{-2}$
Te-132	$3 \times 10^{-2}$
I-123	$5 \times 10^{-1}$
I-124	$6 \times 10^{-2}$
I-125	$2 \times 10^{-1}$
I-126	$1 \times 10^{-1}$
I-129	$\infty$
I-131	$2 \times 10^{-1}$
I-132	$3 \times 10^{-2}$
I-133	$1 \times 10^{-1}$
I-134	$3 \times 10^{-2}$
I-135	$4 \times 10^{-2}$
Xe-122	$6 \times 10^{-2}$
Xe-123	$9 \times 10^{-2}$
Xe-127	$3 \times 10^{-1}$
Xe-131m	$1 \times 10^1$
Xe-133	$3 \times 10^0$
Xe-135	$3 \times 10^{-1}$
Cs-129	$3 \times 10^{-1}$
Cs-131	$2 \times 10^1$
Cs-132	$1 \times 10^{-1}$
Cs-134	$4 \times 10^{-2}$



Cs-134m	$4 \times 10^{-2}$
Cs-135	$\infty$
Cs-136	$3 \times 10^{-2}$
Cs-137	$1 \times 10^{-1}$
Ba-131	$2 \times 10^{-1}$
Ba-133	$2 \times 10^{-1}$
Ba-133m	$3 \times 10^{-1}$
Ba-140	$3 \times 10^{-2}$
La-137	$2 \times 10^1$
La-140	$3 \times 10^{-2}$
Ce-139	$6 \times 10^{-1}$
Ce-141	$1 \times 10^0$
Ce-143	$3 \times 10^{-1}$
Ce-144	$9 \times 10^{-1}$
Pr-142	$1 \times 10^0$
Pr-143	$3 \times 10^1$
Nd-147	$6 \times 10^{-1}$
Nd-149	$2 \times 10^{-1}$
Pm-143	$2 \times 10^{-1}$
Pm-144	$4 \times 10^{-2}$
Pm-145	$1 \times 10^1$
Pm-147	$4 \times 10^1$
Pm-148m	$3 \times 10^{-2}$
Pm-149	$6 \times 10^0$
Pm-151	$2 \times 10^{-1}$
Sm-145	$4 \times 10^0$
Sm-147	$\infty$
Sm-151	$5 \times 10^2$
Sm-153	$2 \times 10^0$
Eu-147	$2 \times 10^{-1}$
Eu-148	$3 \times 10^{-2}$
Eu-149	$2 \times 10^0$
Eu-150b	$2 \times 10^0$
Eu-150a	$5 \times 10^{-2}$
Eu-152	$6 \times 10^{-2}$
Eu-152m	$2 \times 10^{-1}$
Eu-154	$6 \times 10^{-2}$

Eu-155	$2 \times 10^0$
Eu-156	$5 \times 10^{-2}$
Gd-146	$3 \times 10^{-2}$
Gd-148	$4 \times 10^{-1}$
Gd-153	$1 \times 10^0$
Gd-159	$2 \times 10^0$
Tb-157	$1 \times 10^2$
Tb-158	$9 \times 10^{-2}$
Tb-160	$6 \times 10^{-2}$
Dy-159	$6 \times 10^0$
Dy-165	$3 \times 10^0$
Dy-166	$1 \times 10^0$
Ho-166	$2 \times 10^0$
Ho-166m	$4 \times 10^{-2}$
Er-169	$2 \times 10^2$
Er-171	$2 \times 10^{-1}$
Tm-167	$6 \times 10^{-1}$
Tm-170	$2 \times 10^1$
Tm-171	$3 \times 10^2$
Yb-169	$3 \times 10^{-1}$
Yb-175	$2 \times 10^0$
Lu-172	$4 \times 10^{-2}$
Lu-173	$9 \times 10^{-1}$
Lu-174	$8 \times 10^{-1}$
Lu-174m	$6 \times 10^{-1}$
Lu-177	$2 \times 10^0$
Hf-172	$4 \times 10^{-2}$
Hf-175	$2 \times 10^{-1}$
Hf-181	$1 \times 10^{-1}$
Hf-182	$5 \times 10^{-2}$
Ta-178a	$7 \times 10^{-2}$
Ta-179	$6 \times 10^0$
Ta-182	$6 \times 10^{-2}$
W-178	$9 \times 10^{-1}$
W-181	$5 \times 10^0$
W-185	$1 \times 10^2$
W-187	$1 \times 10^{-1}$

W-188	$1 \times 10^0$
Re-184	$8 \times 10^{-2}$
Re-184m	$7 \times 10^{-2}$
Re-186	$4 \times 10^0$
Re-187	$\infty$
Re-188	$1 \times 10^0$
Re-189	$1 \times 10^0$
Os-185	$1 \times 10^{-1}$
Os-191	$2 \times 10^0$
Os-191m	$1 \times 10^0$
Os-193	$1 \times 10^0$
Os-194	$7 \times 10^{-1}$
Ir-189	$1 \times 10^0$
Ir-190	$5 \times 10^{-2}$
Ir-192	$8 \times 10^{-2}$
Ir-194	$7 \times 10^{-1}$
Pt-188	$4 \times 10^{-2}$
Pt-191	$3 \times 10^{-1}$
Pt-193	$3 \times 10^3$
Pt-193m	$1 \times 10^1$
Pt-195m	$2 \times 10^0$
Pt-197	$4 \times 10^0$
Pt-197m	$9 \times 10^{-1}$
Au-193	$6 \times 10^{-1}$
Au-194	$7 \times 10^{-2}$
Au-195	$2 \times 10^0$
Au-198	$2 \times 10^{-1}$
Au-199	$9 \times 10^{-1}$
Hg-194	$7 \times 10^{-2}$
Hg-195m	$2 \times 10^{-1}$
Hg-197	$2 \times 10^0$
Hg-197m	$7 \times 10^{-1}$
Hg-203	$3 \times 10^{-1}$
Tl-200	$5 \times 10^{-2}$
Tl-201	$1 \times 10^0$
Tl-202	$2 \times 10^{-1}$
Tl-204	$2 \times 10^1$

Pb-201	$9 \times 10^{-2}$
Pb-202	$2 \times 10^{-1}$
Pb-203	$2 \times 10^{-1}$
Pb-205	$\infty$
Pb-210	$3 \times 10^{-1}$
Pb-212	$5 \times 10^{-2}$
Bi-205	$4 \times 10^{-2}$
Bi-206	$2 \times 10^{-2}$
Bi-207	$5 \times 10^{-2}$
Bi-210	$8 \times 10^0$
Bi-210m	$3 \times 10^{-1}$
Bi-212	$5 \times 10^{-2}$
Po-210	$6 \times 10^{-2}$
At-211	$5 \times 10^{-1}$
Rn-222	$4 \times 10^{-2}$
Ra-223	$1 \times 10^{-1}$
Ra-224	$5 \times 10^{-2}$
Ra-225	$1 \times 10^{-1}$
Ra-226	$4 \times 10^{-2}$
Ra-228	$3 \times 10^{-2}$
Ac-225	$9 \times 10^{-2}$
Ac-227	$4 \times 10^{-2}$
Ac-228	$3 \times 10^{-2}$
Th-227	$8 \times 10^{-2}$
Th-228	$4 \times 10^{-2}$
Th-229	$1 \times 10^{-2}$
Th-230	$7 \times 10^{-2}$
Th-231	$1 \times 10^1$
Th-232	$\infty$
Th-234	$2 \times 10^0$
Pa-230	$1 \times 10^{-1}$
Pa-231	$6 \times 10^{-2}$
Pa-233	$4 \times 10^{-1}$
U-230	$4 \times 10^{-2}$
U-232	$6 \times 10^{-2}$
U-233	$7 \times 10^{-2}$
U-234	$1 \times 10^{-1}$

U-235	$1 \times 10^{-4}$
U-236	$2 \times 10^{-1}$
U-238	$\infty$
U natural	$\infty$
U depleted	$\infty$
U enriched 10-20%	$8 \times 10^{-4}$
U enriched >20%	$1 \times 10^{-4}$
Np-235	$1 \times 10^2$
Np-236b	$7 \times 10^{-3}$
Np-236a	$8 \times 10^{-1}$
Np-237	$7 \times 10^{-2}$
Np-239	$5 \times 10^{-1}$
Pu-236	$1 \times 10^{-1}$
Pu-237	$2 \times 10^0$
Pu-238	$6 \times 10^{-2}$
Pu-239	$6 \times 10^{-2}$
Pu-240	$6 \times 10^{-2}$
Pu-241	$3 \times 10^0$
Pu-242	$7 \times 10^{-2}$
Pu-244	$3 \times 10^{-4}$
Am-241	$6 \times 10^{-2}$
Am-242m	$3 \times 10^{-1}$
Am-243	$2 \times 10^{-1}$
Am-244	$9 \times 10^{-2}$
Cm-240	$3 \times 10^{-1}$
Cm-241	$1 \times 10^{-1}$
Cm-242	$4 \times 10^{-2}$
Cm-243	$2 \times 10^{-1}$
Cm-244	$5 \times 10^{-2}$
Cm-245	$9 \times 10^{-2}$
Cm-246	$2 \times 10^{-1}$
Cm-247	$1 \times 10^{-3}$
Cm-248	$5 \times 10^{-3}$
Bk-247	$8 \times 10^{-2}$
Bk-249	$1 \times 10^1$
Cf-248	$1 \times 10^{-1}$
Cf-249	$1 \times 10^{-1}$
Cf-250	$1 \times 10^{-1}$

Cf-251	$1 \times 10^{-1}$
Cf-252	$2 \times 10^{-2}$
Cf-253	$4 \times 10^{-1}$
Cf-254	$3 \times 10^{-4}$
Pu-239/Be-9	$6 \times 10^{-2}$
Am-241/Be-9	$6 \times 10^{-2}$

**Notes and legends:**

- $\infty$ : The activity value of the given radioactive material as expressed in terms of D (that is the A/D value) is zero independently of the quantity of the radioactive material.
- If the radioactive material contains more than one radionuclide, then the sum of ratios of the activity of each radionuclide to the respective D activity provides the activity of the given material as expressed in terms of D.
- For Pu-239/Be-9 or Am-241/Be-9 neutron sources, the activity means the alpha activity of the Pu-239 or Am-241.