

# Package ‘RadData’

April 12, 2024

**Version** 1.0.2

**Type** Package

**Title** Nuclear Decay Data for Dosimetric Calculations - ICRP 107

**Description** Nuclear Decay Data for Dosimetric Calculations from the International Commission on Radiological Protection from ICRP Publication 107. Ann. ICRP 38 (3). Eckerman, Keith and Endo, Akira 2008 <[doi:10.1016/j.icrp.2008.10.004](https://doi.org/10.1016/j.icrp.2008.10.004)> <<https://www.icrp.org/publication.asp?id=ICRP%20Publication%20107>>.

This is a database of the physical data needed in calculations of radionuclide-specific protection and operational quantities. The data is prescribed by the ICRP, the international authority on radiation dose standards, for estimating dose from the intake of or exposure to radionuclides in the workplace and the environment. The database contains information on the half-lives, decay chains, and yields and energies of radiations emitted in nuclear transformations of 1252 radionuclides of 97 elements.

**License** GPL-2

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**Encoding** UTF-8

**LazyData** true

**LazyDataCompression** xz

**RoxygenNote** 7.3.1

**Depends** R (>= 3.5.0)

**Suggests** radsafer

**URL** <https://github.com/markhogue/RadData>

**BugReports** <https://github.com/markhogue/RadData/issues>

**NeedsCompilation** no

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**Repository** CRAN

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ICRP_07.BET	<i>Beta data</i>
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### Description

Beta data

### Usage

ICRP\_07.BET

### Format

A tibble with 3 variables.

RN Nuclide name, e.g. Tc-99m

E\_MeV Energy grid point (MeV)

A Number of beta particles per MeV per nuclear transformation at this energy

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ICRP_07.NDX	<i>Radionuclide Data Index</i>
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### Description

The index file from ICRP-107 Nuclear Decay Data for Dosimetric Calculations

### Usage

ICRP\_07.NDX

**Format**

A tibble with 32 variables, 31 original variables from ICRP, plus the derived decay\_constant variable.

RN Name of nuclide; e.g. Am-241, Tc-99m  
 half\_life Half-life of nuclide. Caution - units vary.  
 units Half-life units: ls, microsecond; ms, millisecond; s, second; m, minute; d, day; y, year  
 decay\_mode A, alpha; B-, beta minus; B+, beta plus; EC, electron capture; IT, isomeric transition; SF, spontaneous fission  
 pointer\_rad Not functional. Originally, location of nuclide in the ICRP\_07.RAD file  
 pointer\_bet Not functional. Originally, location of nuclide in ICRP\_07.BET file  
 pointer\_ack Not functional. Originally, location of nuclide in ICRP\_07.ACK file  
 pointer\_nsf Not functional. Originally, location of nuclide in ICRP\_07.NSF file  
 progeny\_1 Radioactive progeny number 1  
 pointer\_1 Location of progeny number 1 in RN dataset  
 branch\_1 Branching fraction to progeny number 1  
 progeny\_2 Radioactive progeny number 2  
 pointer\_2 Location of progeny number 2 in RN dataset  
 branch\_2 Branching fraction to progeny number 2  
 progeny\_3 Radioactive progeny number 3  
 pointer\_3 Location of progeny number 3 in RN dataset  
 branch\_3 Branching fraction to progeny number 3  
 progeny\_4 Radioactive progeny number 4  
 pointer\_4 Location of progeny number 4 in RN dataset  
 branch\_4 Branching fraction to progeny number 4  
 E\_alpha Energy of alpha emissions (MeV/nuclear transformation)  
 E\_electron Energy of electrons, including beta (MeV/nuclear transformation)  
 E\_photon Energy of photon emission (MeV/nuclear transformation)  
 num\_phot\_lt\_10k Number of photons of energy less than 10 keV  
 num\_phot\_gt\_10k Number of photons of energy greater than 10 keV  
 num\_betas Number of beta transitions  
 num\_mono\_e Number of mono-energetic electrons  
 num\_alpha Number of alpha transitions  
 AMU Atomic mass of radionuclide (Audi et al., 2003)  
 air\_kerma\_rate\_const Air-kerma rate constant ( $\text{Gy}\cdot\text{m}^2/\text{Bq s}$ )  
 air\_kerma\_coef Point source air-kerma coefficient ( $\text{Gy}\cdot\text{m}^2/\text{Bq s}$ )  
 decay\_constant Decay constant in inverse seconds.

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 ICRP\_07.RAD

*Radionuclide file*


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### Description

Data on the energy and yield of each radiation emitted in nuclear transformations of the radionuclide.

### Usage

ICRP\_07.RAD

### Format

A tibble with 6 variables.

RN Nuclide name, e.g. Tc-99m

code\_AN Short alphanumeric code for radiation type. See rad\_codes for description.

E\_MeV Numeric. Energy of the radiation in MeV

prob Numeric. Yield of the radiation (/nuclear transformation)

code\_num Numeric code for radiation type. See rad\_codes for description.

is\_photon Logical. Allows selection of all photons.

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 rad\_codes

*Radiation code table*


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### Description

A small table providing association of code\_num, code\_AN and description

### Usage

rad\_codes

### Format

A tibble with 3 variables.

A table used for cross-linking numerical, alphabetical and textual references for a radiation emission type, such as: 1, G, Gamma Rays.

code\_num Numeric code for radiation type.

code\_AN Alphabetical abbreviation, some with + or -.

description Description of radiation emission type.

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