



EUROPIUM-157

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Eu-157
Atomic number (Z): 63
Mass number (A): 157
Neutron number (N): 94

RADIOACTIVE DECAY

Decay modes: β^-
Half-life: 15.18 [h]
Decay constant: 1.2684×10^{-5} [1/s]
Daughters: Gd-157 (100.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.39611 [MeV]
Mean photon energy: 0.29297 [MeV]
Air kerma rate constant, Γ_{10} : 1.181×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 1.181×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 6.346×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : $0.000 \times 10^{+00}$ [Gy $\cdot$ kg/Bq $\cdot$ s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 6.346×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 4.694×10^{-14} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

Dose point kernel source: **Graves, et al. Medical Physics. 2019 Nov.; 46(11):5284-5293.**

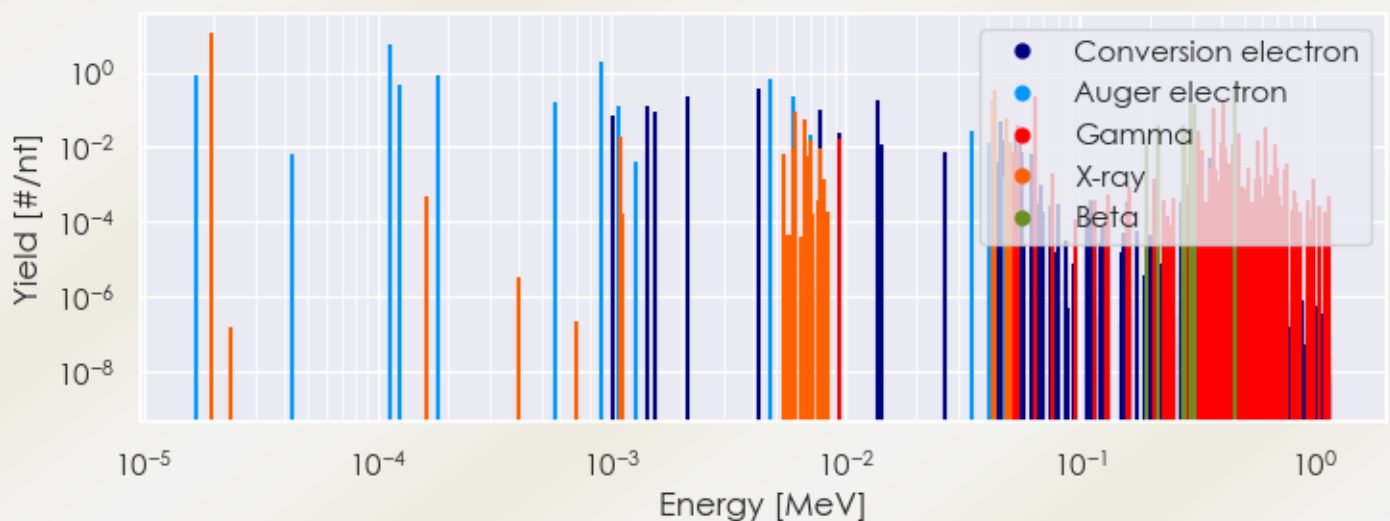
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Eu-157 DPK.csv

SUMMARY SPECTRA (PLOT)

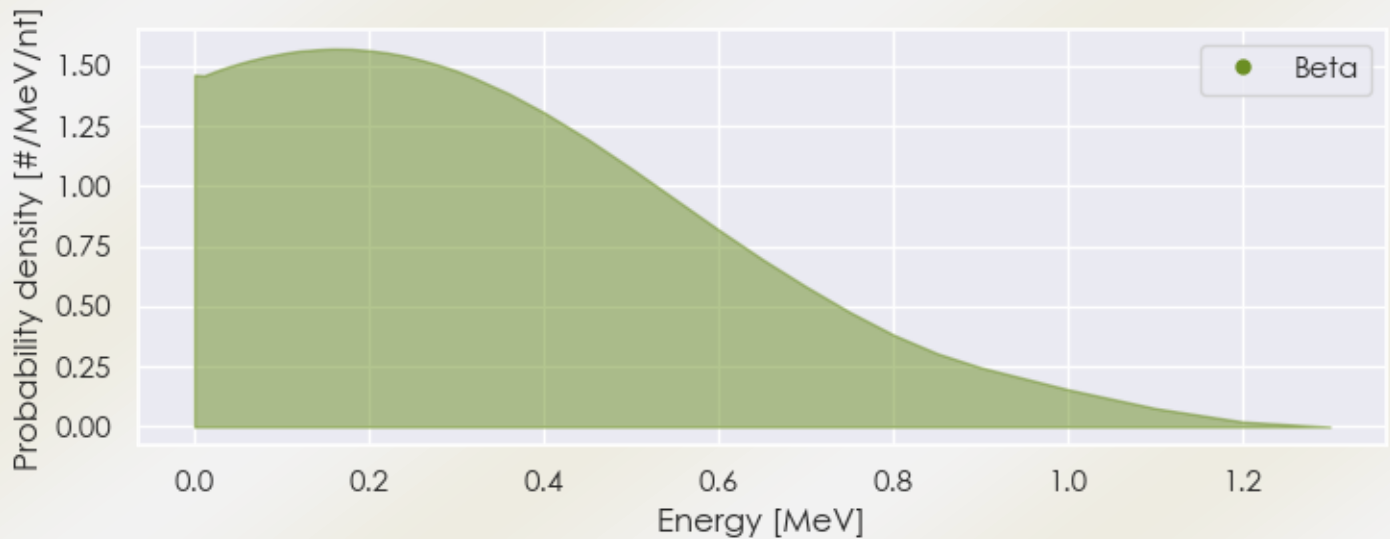
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Eu-157 Summary Spectrum.csv

BETA SPECTRA (PLOT)

Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated beta spectra file here: www.mirdsoft.org/products/MIRDspecs/Eu-157 Beta Spectrum.csv

TABULATED DATA

SUMMARY SPECTRA (TABLE)

Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**

Note: Radiations with yield < 0.01 are excluded from the table, but are available in the linked *.csv data.

Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Eu-157 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.94229e-05	1.214e+01	X-ray
1.09378e-03	1.862e-02	X-ray
6.04290e-03	8.533e-02	X-ray
6.71540e-03	5.633e-02	X-ray
7.08639e-03	1.451e-02	X-ray
9.36500e-03	1.639e-02	Gamma
4.23559e-02	1.793e-01	X-ray
4.30603e-02	3.225e-01	X-ray
4.86161e-02	3.277e-02	X-ray
4.87612e-02	6.338e-02	X-ray

5.00239e-02	1.398e-02	X-ray
5.45480e-02	3.740e-02	Gamma
6.39290e-02	2.299e-01	Gamma
3.18710e-01	2.893e-02	Gamma
3.70509e-01	1.100e-01	Gamma
3.98953e-01	1.320e-02	Gamma
4.09135e-01	2.673e-02	Gamma
4.10723e-01	1.749e-01	Gamma
4.50761e-01	1.221e-02	Gamma
4.74625e-01	2.519e-02	Gamma
5.70937e-01	1.562e-02	Gamma
6.19303e-01	3.553e-02	Gamma
6.87502e-01	1.177e-02	Gamma
1.90776e-01	1.980e-02	Beta
2.14447e-01	2.970e-02	Beta
2.15714e-01	3.960e-02	Beta
2.75571e-01	3.960e-02	Beta
2.79500e-01	2.970e-02	Beta
2.95049e-01	2.178e-01	Beta
3.10800e-01	1.485e-01	Beta
4.61338e-01	4.752e-01	Beta
1.68638e-05	8.158e-01	Auger electron
1.13400e-04	5.459e+00	Auger electron
1.23333e-04	4.499e-01	Auger electron
1.82073e-04	8.387e-01	Auger electron
5.68170e-04	1.622e-01	Auger electron
8.97333e-04	1.854e+00	Auger electron
1.01520e-03	7.170e-02	Conversion electron
1.07434e-03	1.256e-01	Auger electron
1.41800e-03	1.341e-01	Conversion electron
1.53100e-03	8.540e-02	Conversion electron
2.12230e-03	2.257e-01	Conversion electron
4.24500e-03	3.693e-01	Conversion electron
4.76922e-03	6.762e-01	Auger electron
5.92473e-03	2.371e-01	Auger electron
7.11459e-03	2.059e-02	Auger electron
7.82320e-03	1.018e-01	Conversion electron
9.36500e-03	2.481e-02	Conversion electron

1.36260e-02	1.828e-01	Conversion electron
1.40970e-02	1.224e-02	Conversion electron
3.47387e-02	2.798e-02	Auger electron
4.11460e-02	1.385e-02	Auger electron
4.34842e-02	1.129e-02	Conversion electron
4.61982e-02	4.880e-02	Conversion electron
4.66010e-02	1.509e-02	Conversion electron
4.73053e-02	1.365e-02	Conversion electron
5.30062e-02	1.734e-02	Conversion electron
5.55792e-02	1.784e-02	Conversion electron

USEFUL LINKS

Isotope decay characteristics are periodically updated as better measurements can be made - changes that may not be reflected on this page. Please see useful links:

National Nuclear Data Center (NNDC): <https://www.nndc.bnl.gov/nudat3/mird/>

International Atomic Energy Agency (IAEA) Livechart: <https://www-nds.iaea.org/relnsd/vcharthtml/VChartHTML.html>

REFERENCE LINKS

ICRP Report 107: <https://www.icrp.org/publication.asp?id=ICRP%20Publication%20107>

Graves et al. Dose Point Kernels: <https://doi.org/10.1002/mp.13789>

MIRD Decay Schemes 2nd Edition: https://sites.snmmi.org/SNMMI-MAIN/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=0-932004-80-6