



Ta-170 (6.76m) ECB+	Ta-172 (36.8m) ECB+	Ta-173 (3.14h)	Ta-174 (1.14h) ECB+	Ta-175 (10.5h) ECB+	Ta-176 (8.09h) ECB+	Ta-177 (56.56h) EC
Hf-169 (3.24m) ECB+	Hf-170 (16.01h) EC	Hf-172 (1.87y) EC	Hf-173 (2.0E+15y) A	Hf-174 (2.0E+15y) A	Hf-175 (70d) EC	Hf-176 (STABLE)
Lu-167 (51.5m) CB+	Lu-169 (34.06h) ECB+	Lu-171 (2.012d) ECB+	Lu-172 (6.70e) ECB+	Lu-173 (1.37y) EC	Lu-174 (3.31y) ECB+	Lu-175 (STABLE)

HAFNIUM-172

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Hf-172
Atomic number (Z): 72
Mass number (A): 172
Neutron number (N): 100

RADIOACTIVE DECAY

Decay modes: Electron capture
Half-life: 1.87 [y]
Decay constant: 1.1746×10^{-8} [1/s]
Daughters: Lu-172m (100.0%)
Radioactive daughters: Lu-172m

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.08284 [MeV]
Mean photon energy: 0.10616 [MeV]
Air kerma rate constant, Γ_{10} : 8.013×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 8.013×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 1.327×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy $\cdot$ kg/Bq $\cdot$ s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta+, e-}$: 1.327×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.701×10^{-14} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

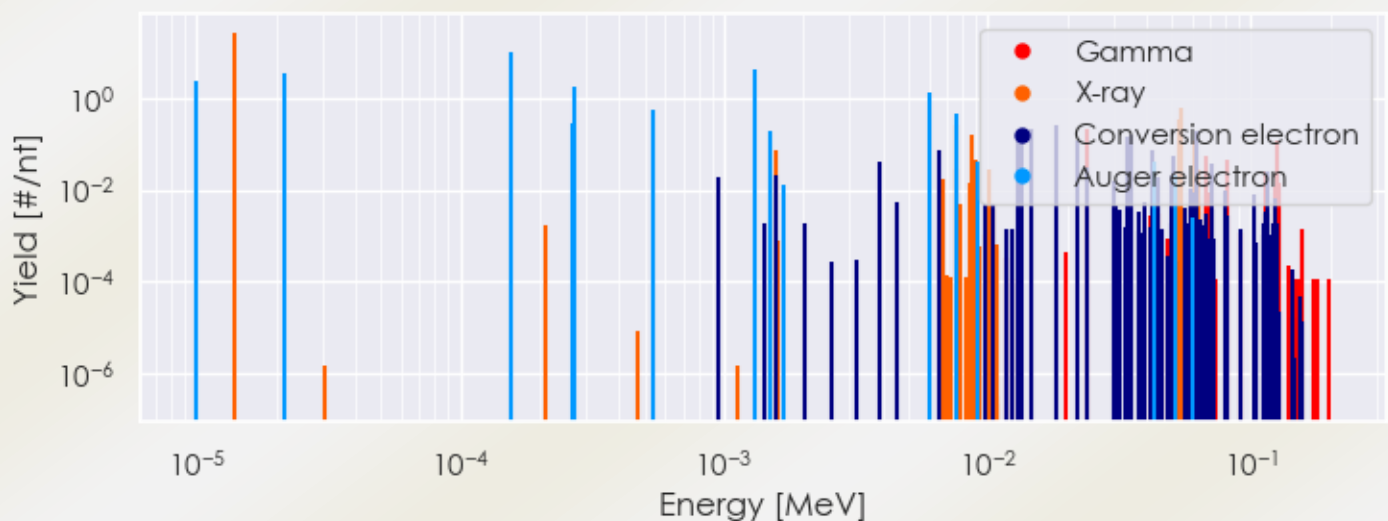
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Hf-172 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/Hf-172 Summary 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/Hf-172 Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Hf-172%20Summary%20Spectrum.csv)

Energy [MeV]	Yield [#/(nt)] if > 0.01	Radiation type
1.40000e-05	2.664e+01	X-ray
1.57013e-03	7.259e-02	X-ray
6.77270e-03	1.746e-02	X-ray
7.59238e-03	2.839e-02	X-ray
7.64541e-03	2.507e-01	X-ray
8.58698e-03	1.480e-02	X-ray
8.72221e-03	1.608e-01	X-ray
8.82888e-03	1.936e-02	X-ray
9.04389e-03	4.313e-02	X-ray
1.01636e-02	2.893e-02	X-ray
2.39331e-02	2.034e-01	Gamma
5.30692e-02	3.423e-01	X-ray
5.41988e-02	6.011e-01	X-ray
6.06500e-02	1.130e-02	Gamma
6.11839e-02	6.370e-02	X-ray
6.14258e-02	1.231e-01	X-ray
6.30318e-02	1.424e-02	X-ray
6.30870e-02	2.754e-02	X-ray
6.73500e-02	5.311e-02	Gamma
8.17513e-02	4.520e-02	Gamma
1.14061e-01	2.554e-02	Gamma
1.22916e-01	1.141e-02	Gamma
1.25812e-01	1.130e-01	Gamma
1.27910e-01	1.458e-02	Gamma
9.99700e-06	2.332e+00	Auger electron
2.16363e-05	3.293e+00	Auger electron
1.56475e-04	9.502e+00	Auger electron

2.67017e-04	2.916e-01	Auger electron
2.69095e-04	1.729e+00	Auger electron
5.36462e-04	5.602e-01	Auger electron
9.55001e-04	1.865e-02	Conversion electron
1.31020e-03	3.956e+00	Auger electron
1.48642e-03	1.904e-01	Auger electron
1.56500e-03	2.019e-02	Conversion electron
1.69167e-03	1.235e-02	Auger electron
3.90800e-03	4.194e-02	Conversion electron
6.00209e-03	1.253e+00	Auger electron
6.54800e-03	7.331e-02	Conversion electron
7.56019e-03	4.582e-01	Auger electron
9.14995e-03	4.248e-02	Auger electron
1.30881e-02	1.579e-01	Conversion electron
1.35601e-02	1.476e-01	Conversion electron
1.46899e-02	2.114e-01	Conversion electron
1.83093e-02	2.568e-01	Conversion electron
2.19170e-02	1.202e-01	Conversion electron
2.39331e-02	3.132e-02	Conversion electron
3.02850e-02	1.579e-02	Conversion electron
3.37970e-02	1.365e-01	Conversion electron
3.49268e-02	1.562e-01	Conversion electron
4.21539e-02	7.300e-02	Conversion electron
4.32341e-02	3.958e-02	Auger electron
4.41700e-02	1.944e-02	Conversion electron
4.98050e-02	2.162e-02	Conversion electron
5.06190e-02	5.574e-02	Conversion electron
5.15128e-02	2.036e-02	Auger electron
5.91450e-02	1.031e-02	Conversion electron
6.23700e-02	1.836e-01	Conversion electron
7.09063e-02	3.617e-02	Conversion electron
1.14967e-01	2.569e-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