



MERCURY-193M

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Hg-193m

Atomic number (Z): 80

Mass number (A): 193

Neutron number (N): 113

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture, Internal transition

Half-life: 11.8 [h]

Decay constant: 1.6317×10^{-5} [1/s]

Daughters: Au-193m (89.2%), Hg-193 (7.1%), Au-193 (3.7%)

Radioactive daughters: Au-193m, Hg-193, Au-193

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]

Mean electron energy: 0.04695 [MeV]

Mean photon energy: 1.02393 [MeV]

Air kerma rate constant, Γ_{10} : 4.231×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]

Air kerma coefficient, K_{air} : 4.252×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]

Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 7.522×10^{-15} [Gy $\cdot$ kg/Bq $\cdot$ s]

Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy $\cdot$ kg/Bq $\cdot$ s]

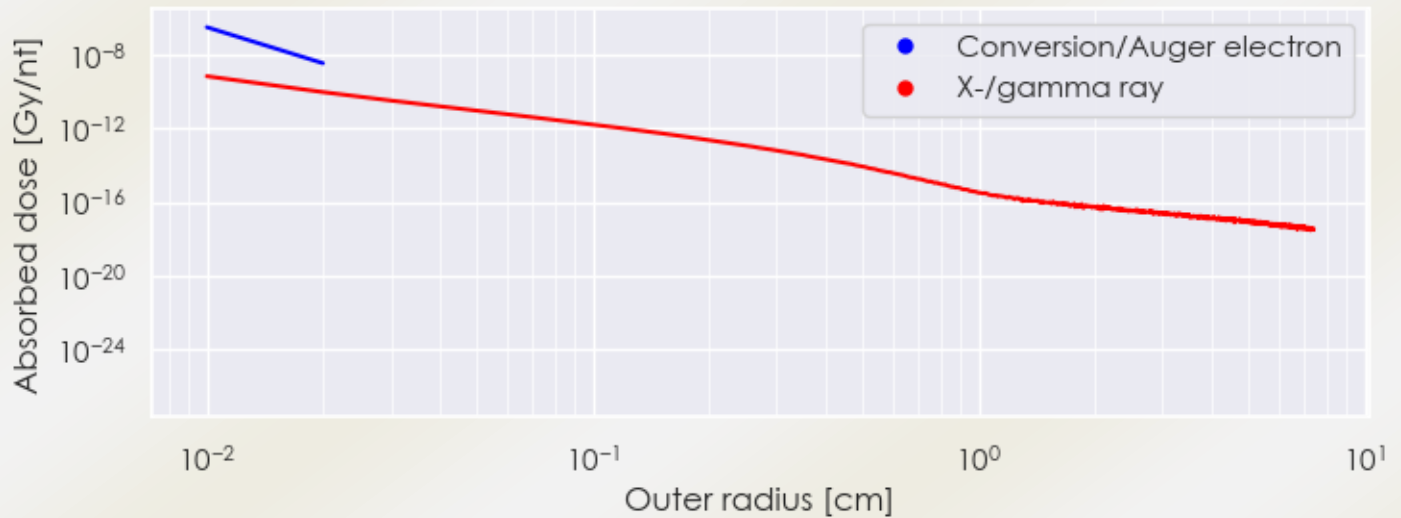
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 7.522×10^{-15} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.641×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

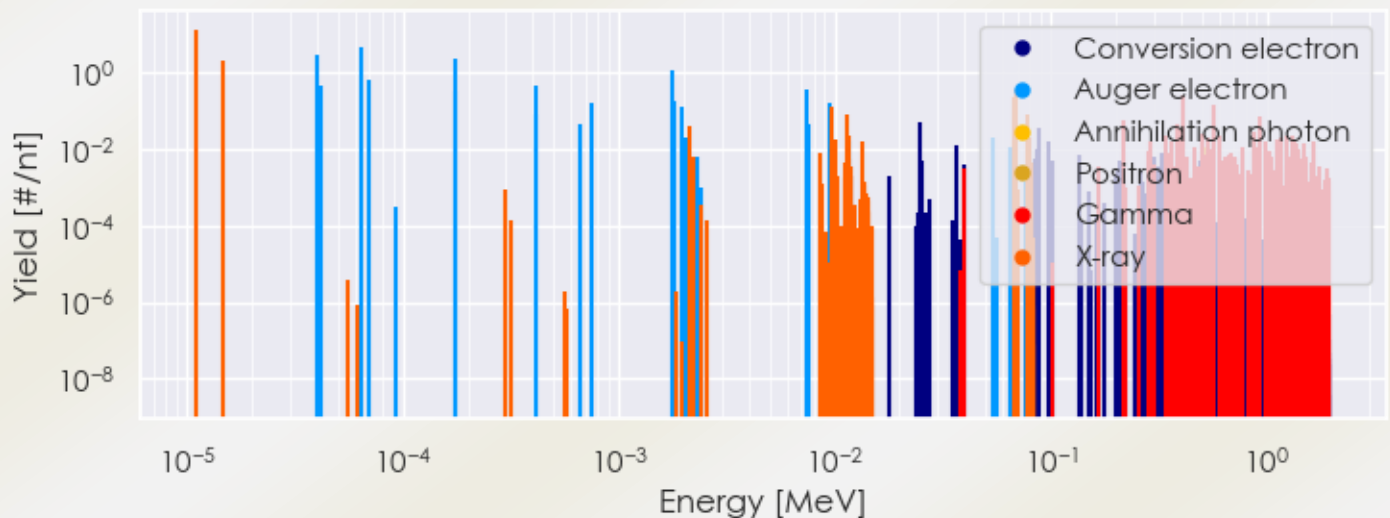
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Hg-193m DPK.csv

SUMMARY SPECTRA (PLOT)

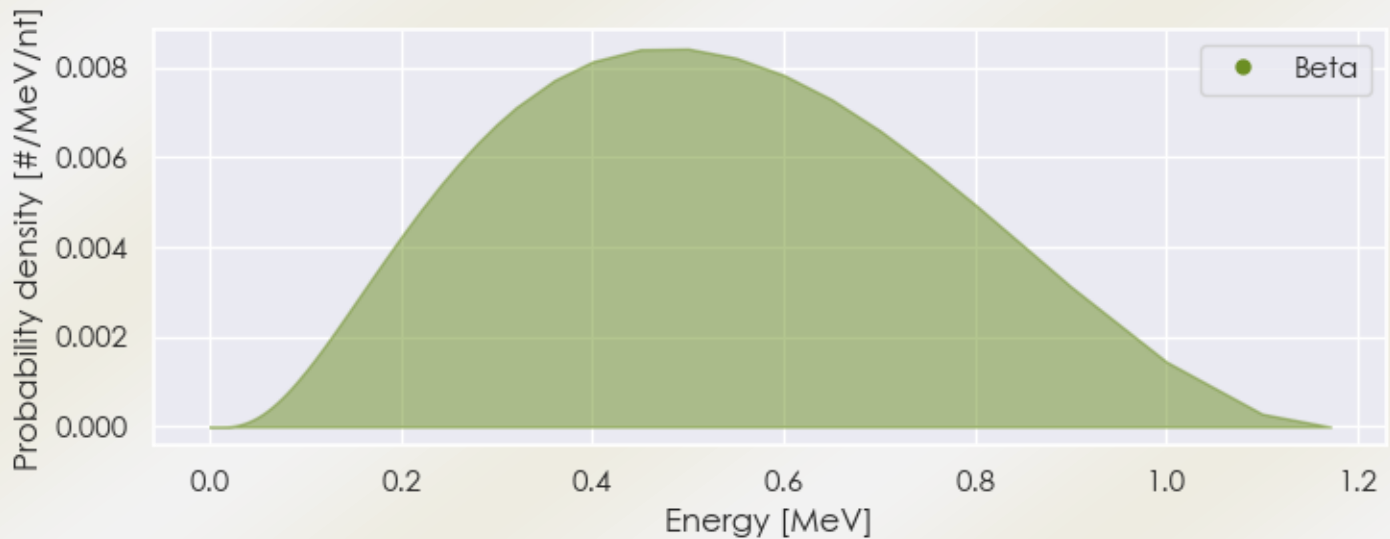
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Hg-193m 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/Hg-193m Beta Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Hg-193m%20Beta%20Spectrum.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/Hg-193m Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Hg-193m%20Summary%20Spectrum.csv)

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.10995e-05	1.342e+01	X-ray
1.46950e-05	1.948e+00	X-ray
2.14493e-03	4.084e-02	X-ray
9.62130e-03	1.383e-02	X-ray
9.70979e-03	1.218e-01	X-ray
9.98623e-03	1.822e-02	X-ray
1.14753e-02	7.548e-02	X-ray
1.15870e-02	2.275e-02	X-ray
1.34225e-02	1.490e-02	X-ray

6.71839e-02	2.193e-01	X-ray
6.90380e-02	3.731e-01	X-ray
7.78158e-02	4.104e-02	X-ray
7.82261e-02	7.941e-02	X-ray
8.04227e-02	1.880e-02	X-ray
2.18070e-01	5.312e-02	Gamma
2.90750e-01	1.561e-02	Gamma
3.41910e-01	2.165e-02	Gamma
3.64470e-01	1.662e-02	Gamma
3.82470e-01	4.330e-02	Gamma
3.94000e-01	3.122e-02	Gamma
4.07630e-01	2.518e-01	Gamma
4.61830e-01	1.108e-02	Gamma
4.99650e-01	2.543e-02	Gamma
5.11000e-01	1.059e-02	Annihilation photon
5.35150e-01	2.039e-02	Gamma
5.37080e-01	1.989e-02	Gamma
5.39030e-01	1.007e-02	Gamma
5.50630e-01	1.007e-02	Gamma
5.73250e-01	1.417e-01	Gamma
6.00650e-01	2.140e-02	Gamma
7.76570e-01	1.083e-02	Gamma
8.70050e-01	1.460e-02	Gamma
8.77760e-01	2.694e-02	Gamma
9.13060e-01	1.083e-02	Gamma
9.32370e-01	6.697e-02	Gamma
9.94610e-01	1.586e-02	Gamma
1.10980e+00	1.813e-02	Gamma
1.17400e+00	1.989e-02	Gamma
1.24130e+00	2.165e-02	Gamma
1.32550e+00	2.140e-02	Gamma
1.33960e+00	1.511e-02	Gamma
1.36510e+00	1.435e-02	Gamma
1.40660e+00	1.032e-02	Gamma
1.48610e+00	1.485e-02	Gamma
1.63940e+00	1.561e-02	Gamma
1.64850e+00	1.259e-02	Gamma
4.01452e-05	2.949e+00	Auger electron

4.20302e-05	4.434e-01	Auger electron
6.40895e-05	4.526e+00	Auger electron
7.01381e-05	6.440e-01	Auger electron
1.74283e-04	3.373e-01	Auger electron
1.74380e-04	2.389e+00	Auger electron
4.13057e-04	4.584e-01	Auger electron
4.13570e-04	7.561e-02	Auger electron
6.60007e-04	4.630e-02	Auger electron
7.56143e-04	1.626e-01	Auger electron
1.75361e-03	1.200e+00	Auger electron
1.80259e-03	1.736e-01	Auger electron
1.97360e-03	1.241e-01	Auger electron
2.03416e-03	1.914e-02	Auger electron
7.45029e-03	3.612e-01	Auger electron
7.52683e-03	4.565e-02	Auger electron
9.57861e-03	1.518e-01	Auger electron
9.73410e-03	1.948e-02	Auger electron
1.17351e-02	1.547e-02	Auger electron
2.46840e-02	4.796e-02	Conversion electron
3.66731e-02	1.242e-02	Conversion electron
5.42437e-02	1.996e-02	Auger electron
6.50992e-02	1.075e-02	Auger electron
8.64240e-02	1.045e-02	Conversion electron
8.89630e-02	3.519e-02	Conversion electron
9.84131e-02	1.641e-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/SNMML-MAIN/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=0-932004-80-6