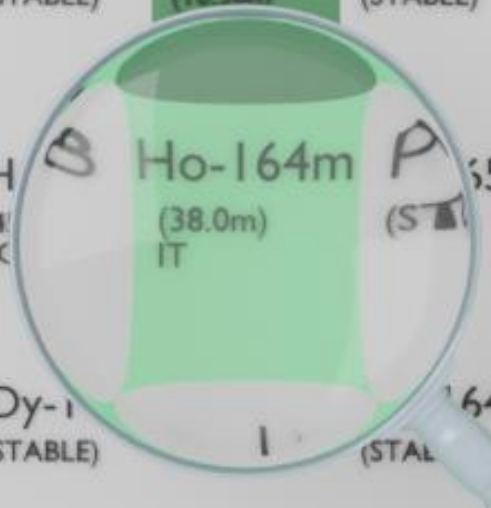




Er-161 (3.21h) CB+	Er-162 (STABLE)	Er-163 (75.0m) ECB+	Er-164 (STABLE)	Er-165 (10.36h)	Er-166 (STABLE)	Er-167 (STABLE)	Er-168 (STABLE)	Er-169 (9.40d) B-
Ho-160 (25.6m) CB+	Ho-161 (2.48h) EC	Ho-162 (15.0m) ECB+	Ho-163 (4.1m) EC	Ho-164m (38.0m) IT	Ho-165 (STABLE)	Ho-166 (26.80h) B-	Ho-167 (3.1h) B-	Ho-168 (2.99m) B-
Dy-159 (144.4d) C	Dy-160 (STABLE)	Dy-161 (STABLE)	Dy-162 (STABLE)	Dy-163 (STABLE)	Dy-164 (STABLE)	Dy-165 (2.334h) B-	Dy-166 (81.6h) B-	Dy-167 (6.20m) B-

HOLMIUM-164M

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Ho-164m
Atomic number (Z): 67
Mass number (A): 164
Neutron number (N): 97

RADIOACTIVE DECAY

Decay modes: Internal transition
Half-life: 38.0 [m]
Decay constant: 3.0401×10^{-4} [1/s]
Daughters: Ho-164 (100.0%)
Radioactive daughters: Ho-164

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.09264 [MeV]
Mean photon energy: 0.04723 [MeV]
Air kerma rate constant, Γ_{10} : 2.553×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 2.553×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 1.484×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000×10^0 [Gy $\cdot$ kg/Bq $\cdot$ s]

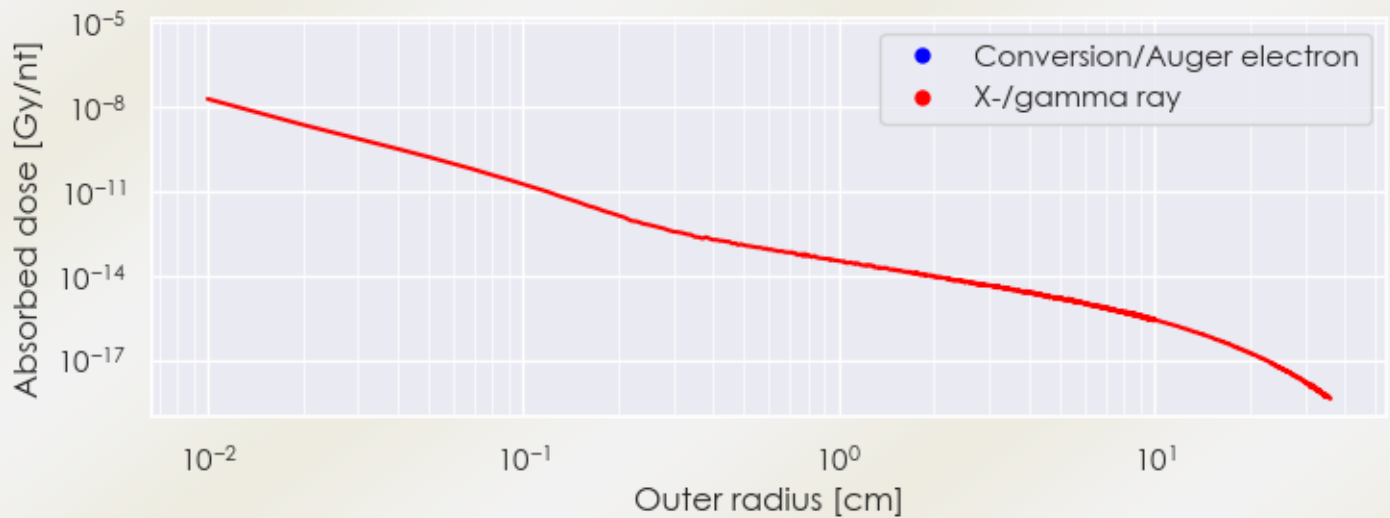
Equilibrium dose constant for betas/electrons, $\Delta_{\beta-, \beta+, e-}$: 1.484×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 7.567×10^{-15} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

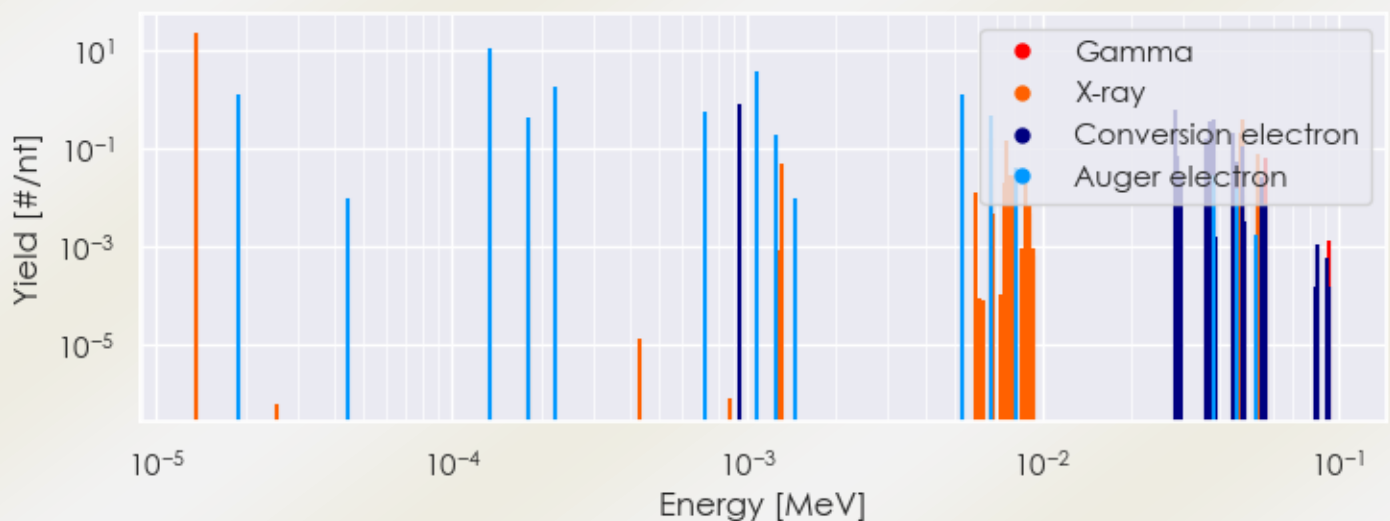
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Ho-164m 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/Ho-164m 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/Ho-164m Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Ho-164m%20Summary%20Spectrum.csv)

Energy [MeV]	Yield [# / n ^t] if > 0.01	Radiation type
1.36515e-05	2.324e+01	X-ray
1.30135e-03	4.780e-02	X-ray
5.95920e-03	1.245e-02	X-ray
6.66650e-03	1.863e-02	X-ray
6.70640e-03	1.647e-01	X-ray
7.44982e-03	2.007e-02	X-ray
7.53349e-03	1.394e-01	X-ray
7.63171e-03	2.764e-02	X-ray
7.89548e-03	2.793e-02	X-ray
8.75507e-03	2.456e-02	X-ray
3.73400e-02	1.088e-01	Gamma
4.67702e-02	2.098e-01	X-ray
4.76373e-02	3.737e-01	X-ray
5.37885e-02	3.871e-02	X-ray
5.39705e-02	7.482e-02	X-ray
5.53966e-02	1.655e-02	X-ray
5.66400e-02	6.608e-02	Gamma
1.89749e-05	1.227e+00	Auger electron
1.34642e-04	1.060e+01	Auger electron
1.81368e-04	4.424e-01	Auger electron
2.24828e-04	1.835e+00	Auger electron
7.16688e-04	5.342e-01	Auger electron
9.41005e-04	7.736e-01	Conversion electron
1.07755e-03	3.625e+00	Auger electron
1.25831e-03	1.902e-01	Auger electron
5.38129e-03	1.261e+00	Auger electron
6.70856e-03	4.485e-01	Auger electron

8.07264e-03	4.025e-02	Auger electron
2.79798e-02	5.932e-01	Conversion electron
2.84113e-02	6.846e-02	Conversion electron
2.92783e-02	2.725e-02	Conversion electron
3.56115e-02	1.533e-01	Conversion electron
3.68613e-02	3.482e-01	Conversion electron
3.73400e-02	4.303e-02	Conversion electron
3.77283e-02	3.905e-01	Conversion electron
3.82545e-02	2.900e-02	Auger electron
4.40615e-02	2.026e-01	Conversion electron
4.54244e-02	1.459e-02	Auger electron
4.57900e-02	5.376e-02	Conversion electron
4.72798e-02	1.059e-01	Conversion electron
4.77113e-02	1.093e-02	Conversion electron
5.49115e-02	2.666e-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