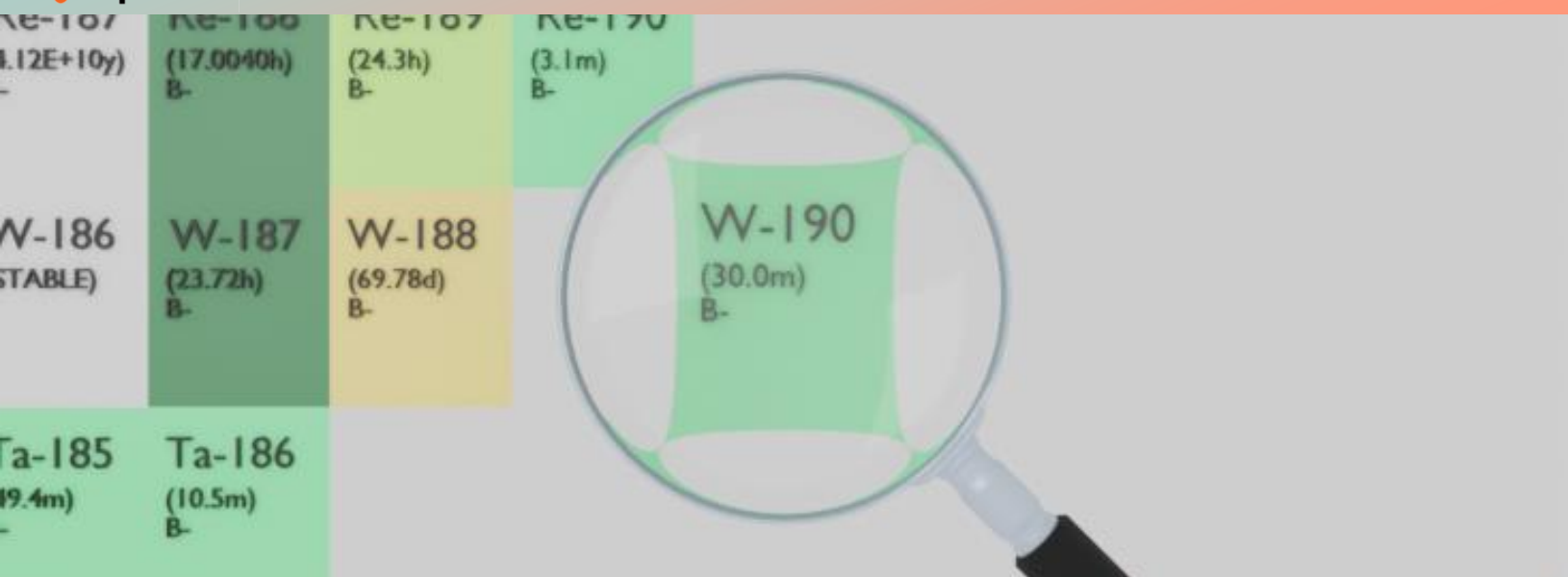




TUNGSTEN-190

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: W-190
Atomic number (Z): 74
Mass number (A): 190
Neutron number (N): 116

RADIOACTIVE DECAY

Decay modes: β^-
Half-life: 30.0 [m]
Decay constant: 3.8508×10^{-4} [1/s]
Daughters: Re-190 (100.0%)
Radioactive daughters: Re-190

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.47711 [MeV]
Mean photon energy: 0.15111 [MeV]
Air kerma rate constant, Γ_{10} : 1.412×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 1.412×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 7.644×10^{-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, $\Delta_{\beta, \beta^+, e^-}$: 7.644×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 2.421×10^{-14} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

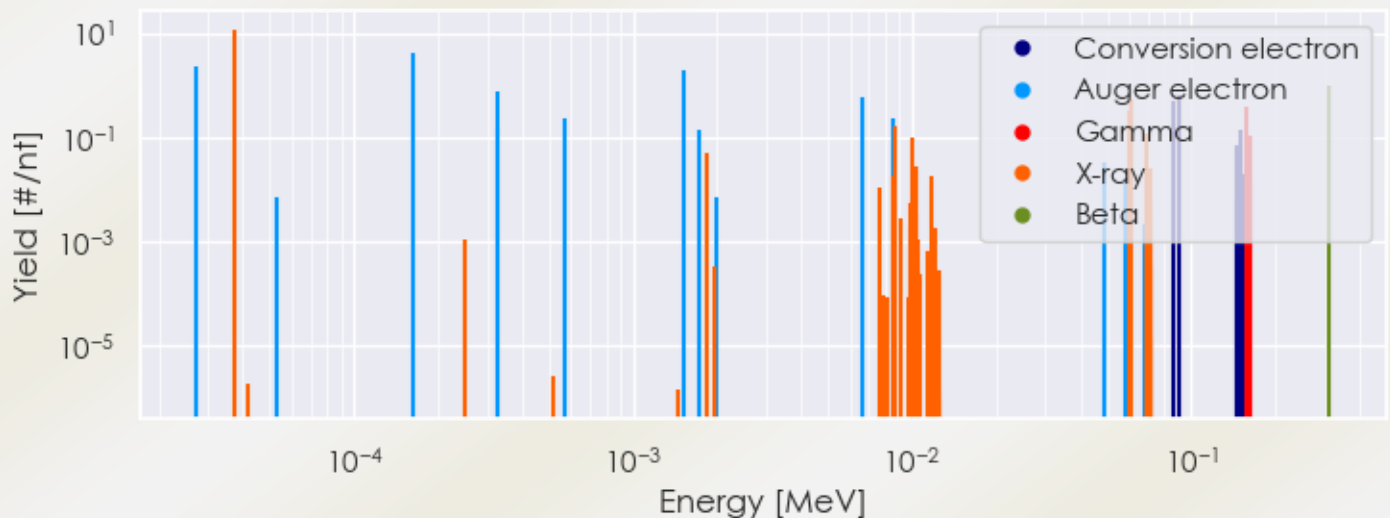
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/W-190 DPK.csv

SUMMARY SPECTRA (PLOT)

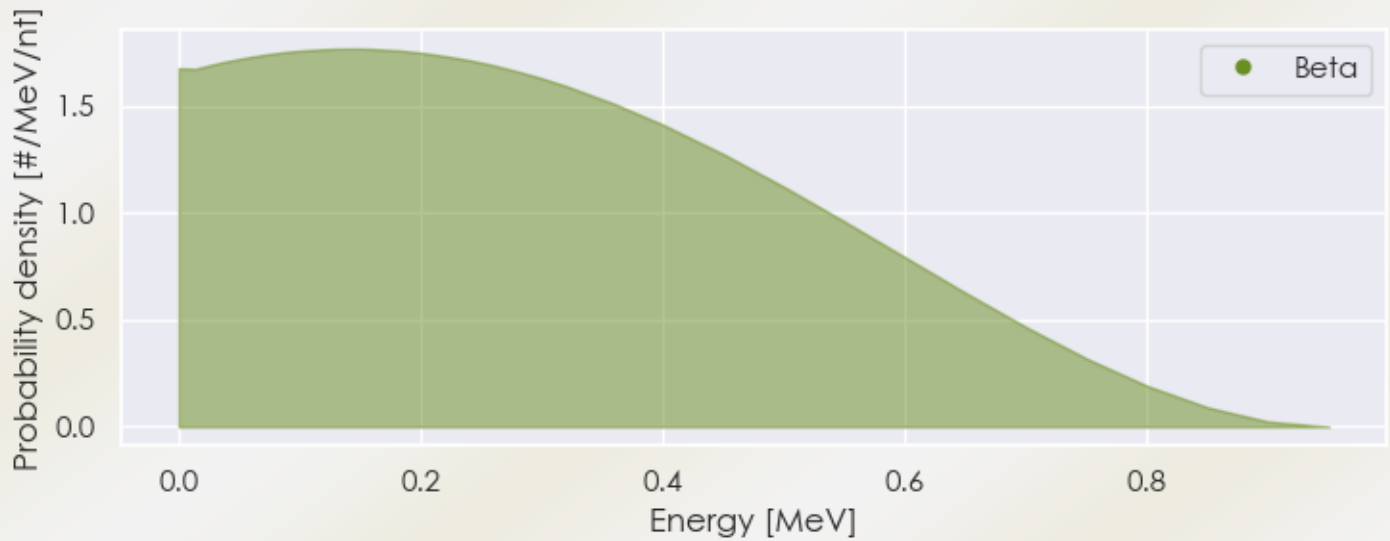
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/W-190 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/W-190 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/W-190 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
3.76164e-05	1.190e+01	X-ray
1.84752e-03	4.795e-02	X-ray
7.62641e-03	1.051e-02	X-ray
8.57622e-03	1.796e-02	X-ray
8.64532e-03	1.585e-01	X-ray
1.00312e-02	9.539e-02	X-ray
1.02735e-02	2.840e-02	X-ray
1.17147e-02	1.797e-02	X-ray
5.98631e-02	3.148e-01	X-ray
6.13181e-02	5.442e-01	X-ray

6.91788e-02	5.882e-02	X-ray
6.94956e-02	1.137e-01	X-ray
7.13392e-02	1.346e-02	X-ray
7.14134e-02	2.615e-02	X-ray
1.57600e-01	3.900e-01	Gamma
1.62100e-01	1.100e-01	Gamma
3.13399e-01	1.000e+00	Beta
2.73022e-05	2.341e+00	Auger electron
1.62295e-04	3.992e+00	Auger electron
3.24858e-04	7.818e-01	Auger electron
3.28664e-04	1.480e-01	Auger electron
5.72664e-04	2.350e-01	Auger electron
1.52534e-03	1.893e+00	Auger electron
1.71497e-03	1.343e-01	Auger electron
6.67631e-03	5.872e-01	Auger electron
8.50153e-03	2.289e-01	Auger electron
1.03558e-02	2.214e-02	Auger electron
4.85493e-02	3.202e-02	Auger electron
5.80540e-02	1.687e-02	Auger electron
8.57440e-02	4.781e-01	Conversion electron
9.02440e-02	6.570e-01	Conversion electron
1.45092e-01	6.942e-02	Conversion electron
1.49592e-01	1.401e-01	Conversion electron
1.50107e-01	1.787e-02	Conversion electron
1.51562e-01	2.013e-02	Conversion electron
1.55240e-01	1.751e-02	Conversion electron
1.59740e-01	4.369e-02	Conversion electron
1.62100e-01	1.291e-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