



THALLIUM-195

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Tl-195

Atomic number (Z): 81

Mass number (A): 195

Neutron number (N): 114

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture

Half-life: 1.16 [h]

Decay constant: 1.6598×10^{-4} [1/s]

Daughters: Hg-195 (99.7%), Hg-195m (0.344%)

Radioactive daughters: Hg-195, Hg-195m

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]

Mean electron energy: 0.07401 [MeV]

Mean photon energy: 1.22504 [MeV]

Air kerma rate constant, Γ_{10} : 5.083×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]

Air kerma coefficient, K_{air} : 5.131×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]

Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 1.186×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]

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

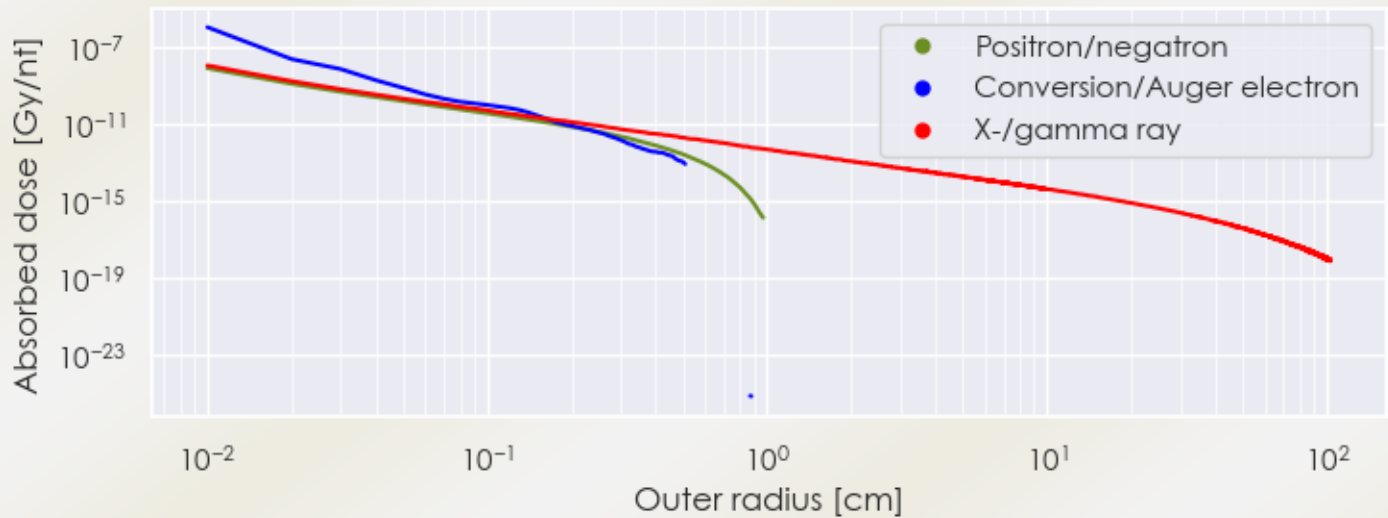
Equilibrium dose constant for betas/electrons, $\Delta_{\beta-, \beta+, e-}$: 1.186×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.963×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

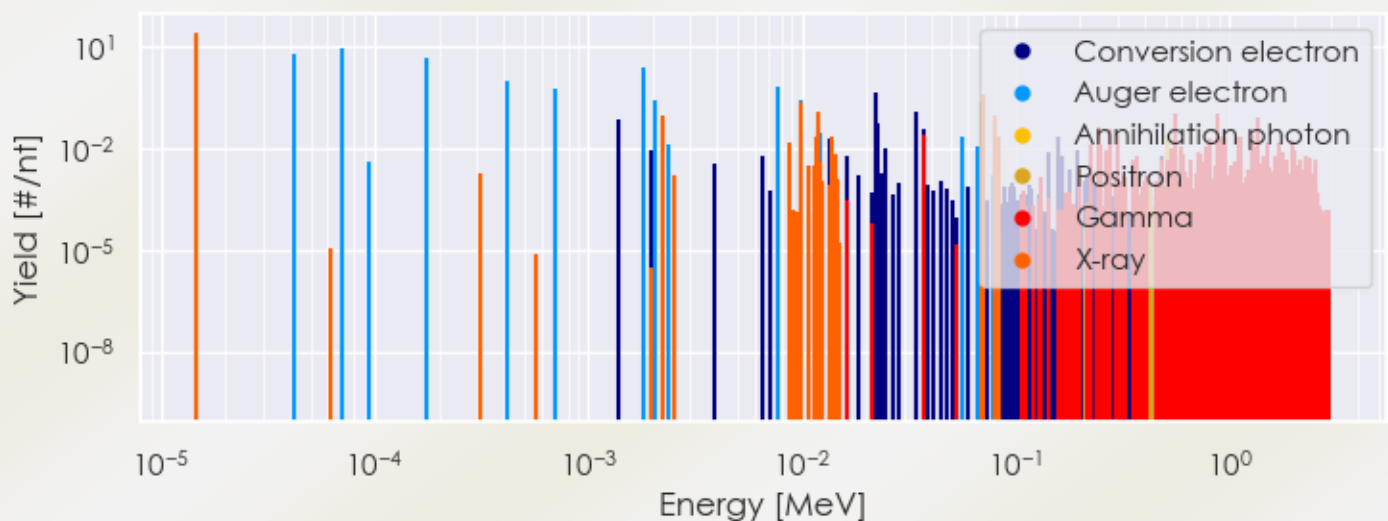
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/TI-195 DPK.csv

SUMMARY SPECTRA (PLOT)

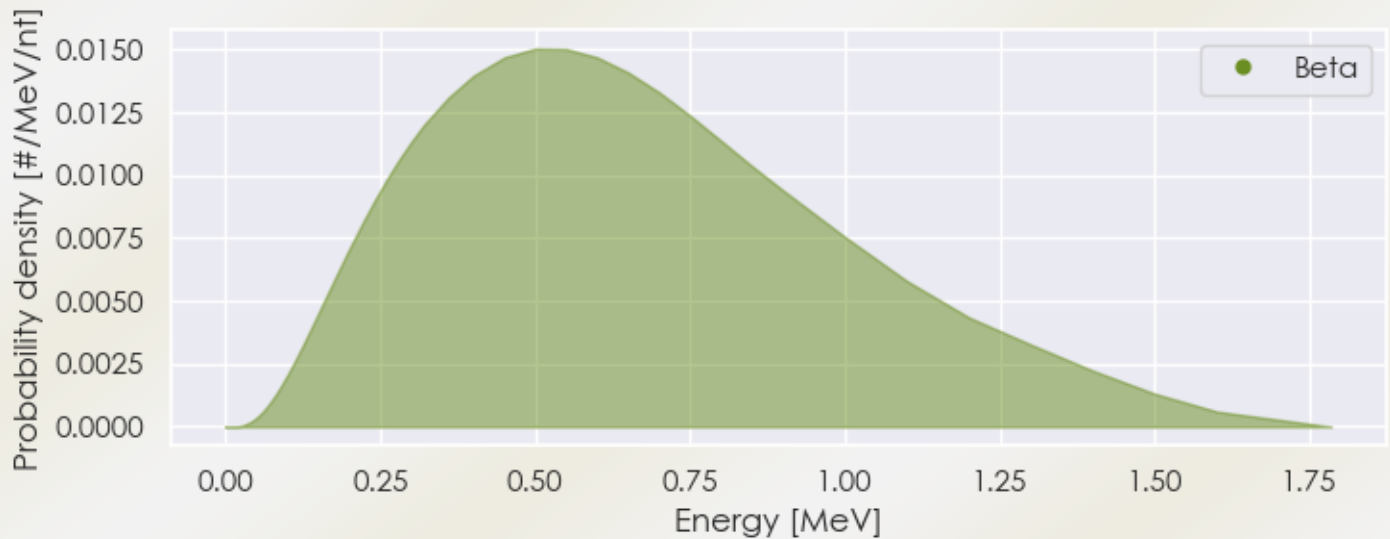
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/TI-195 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/TI-195 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/TI-195 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.47015e-05	2.691e+01	X-ray
2.22245e-03	8.747e-02	X-ray
8.75019e-03	1.505e-02	X-ray
9.89222e-03	2.626e-02	X-ray
9.98621e-03	2.313e-01	X-ray
1.15521e-02	2.092e-02	X-ray
1.18592e-02	1.158e-01	X-ray
1.19286e-02	4.366e-02	X-ray
1.19891e-02	2.371e-02	X-ray
1.38758e-02	2.313e-02	X-ray

3.70900e-02	2.476e-02	Gamma
6.90989e-02	2.434e-01	X-ray
7.10661e-02	4.125e-01	X-ray
8.00792e-02	4.557e-02	X-ray
8.05161e-02	8.818e-02	X-ray
8.26796e-02	1.074e-02	X-ray
8.27860e-02	2.104e-02	X-ray
2.25930e-01	1.281e-02	Gamma
2.42150e-01	4.305e-02	Gamma
2.47300e-01	1.291e-02	Gamma
2.79190e-01	3.748e-02	Gamma
3.00600e-01	2.405e-02	Gamma
5.11000e-01	2.468e-02	Annihilation photon
5.42160e-01	1.050e-02	Gamma
5.58380e-01	2.551e-02	Gamma
5.63520e-01	1.050e-01	Gamma
5.92590e-01	1.197e-02	Gamma
7.77680e-01	1.113e-02	Gamma
8.14680e-01	1.890e-02	Gamma
8.84470e-01	9.975e-02	Gamma
9.21590e-01	2.247e-02	Gamma
9.67460e-01	2.142e-02	Gamma
1.10033e+00	2.341e-02	Gamma
1.12166e+00	2.100e-02	Gamma
1.26951e+00	2.436e-02	Gamma
1.34778e+00	1.166e-02	Gamma
1.36388e+00	8.400e-02	Gamma
1.51162e+00	1.449e-02	Gamma
1.70588e+00	1.491e-02	Gamma
1.97775e+00	1.764e-02	Gamma
4.20471e-05	6.116e+00	Auger electron
7.02602e-05	8.903e+00	Auger electron
1.74734e-04	4.672e+00	Auger electron
4.20101e-04	1.022e+00	Auger electron
7.03828e-04	6.036e-01	Auger electron
1.38400e-03	6.977e-02	Conversion electron
1.80605e-03	2.397e+00	Auger electron
2.03815e-03	2.643e-01	Auger electron

2.39268e-03	1.303e-02	Auger electron
7.67971e-03	6.591e-01	Auger electron
9.89578e-03	2.820e-01	Auger electron
1.21461e-02	2.918e-02	Auger electron
1.33731e-02	1.932e-02	Conversion electron
2.22640e-02	4.730e-01	Conversion electron
2.28360e-02	5.172e-02	Conversion electron
2.48030e-02	1.053e-02	Conversion electron
3.42531e-02	1.253e-01	Conversion electron
3.70900e-02	3.927e-02	Conversion electron
5.57212e-02	2.161e-02	Auger electron
6.69357e-02	1.170e-02	Auger electron
1.58797e-01	2.124e-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