



Tm-162 (1.70m) EC+	Tm-163 (1.810h) ECB+	Tm-164 (2.0m) ECB+	Tm-166 (7.70h) ECB+	Tm-167 (9.3d) ECB+	Tm-168 (93.1d) ECB+B-	Tm-169 (STABLE)	Tm-170 (128.6d) B-EC
Er-161 (3.21h) CB+	Er-162 (STABLE)	Er-163 (75.0m) ECB+	Er-164 (STABLE)	Er-166 (STABLE)	Er-167 (STABLE)	Er-168 (STABLE)	Er-169 (9.40d) B-

THULIUM-166

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Tm-166
Atomic number (Z): 69
Mass number (A): 166
Neutron number (N): 97

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture
Half-life: 7.7 [h]
Decay constant: 2.5005×10^{-5} [1/s]
Daughters: Er-166 (100.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.08918 [MeV]
Mean photon energy: 1.97676 [MeV]
Air kerma rate constant, Γ_{10} : 6.638×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 6.690×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 1.429×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000×10^0 [Gy $\cdot$ kg/Bq $\cdot$ s]

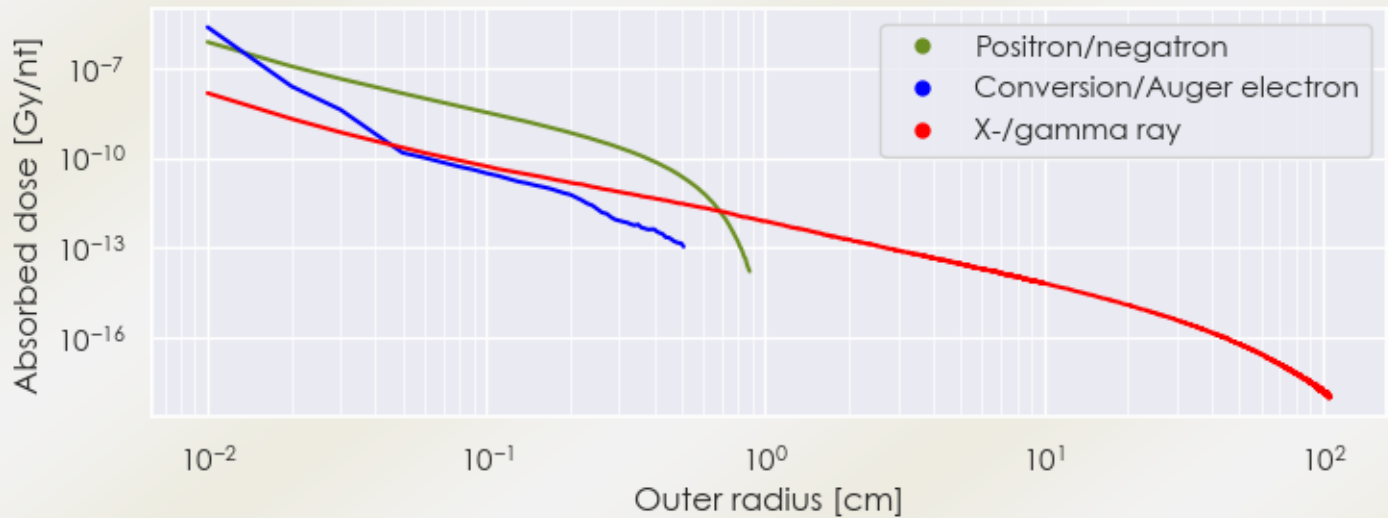
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 1.429×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 3.167×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

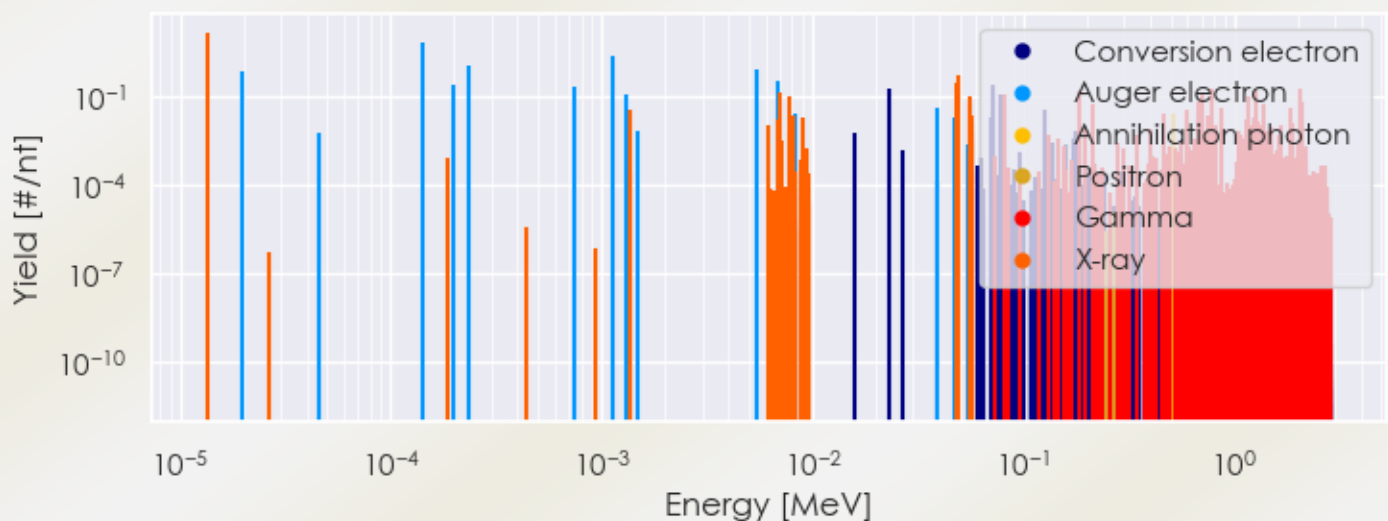
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Tm-166 DPK.csv

SUMMARY SPECTRA (PLOT)

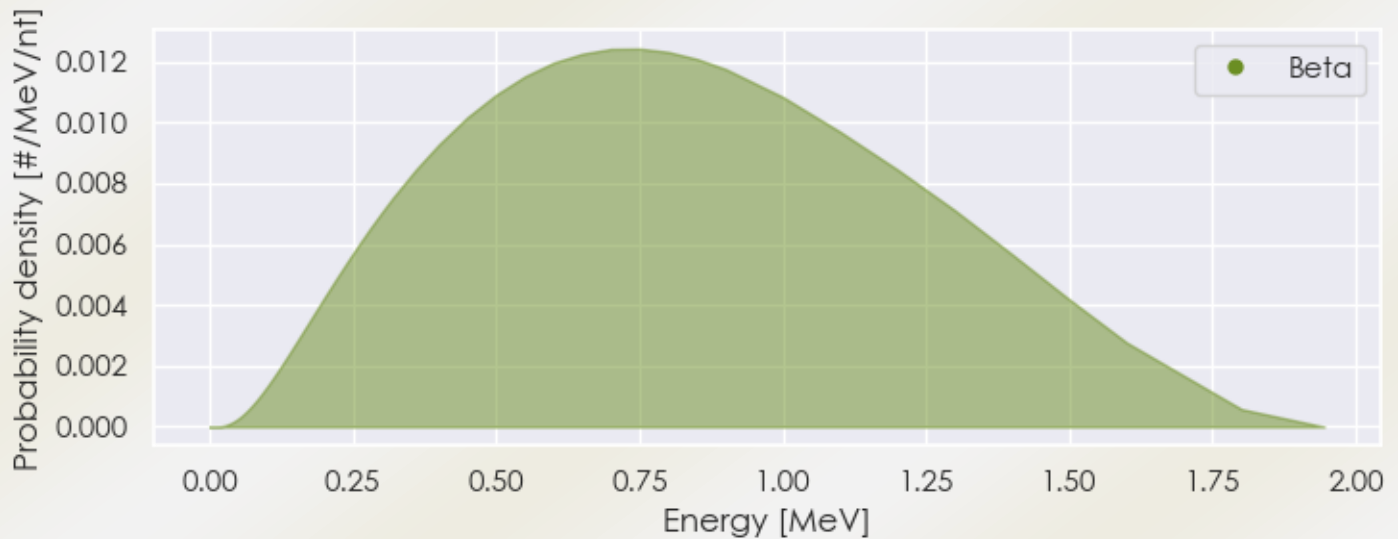
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Tm-166 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/Tm-166 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/Tm-166 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.35449e-05	1.449e+01	X-ray
1.36754e-03	3.485e-02	X-ray
6.89239e-03	1.512e-02	X-ray
6.93539e-03	1.336e-01	X-ray
7.81980e-03	1.048e-01	X-ray
8.17512e-03	2.272e-02	X-ray
9.09455e-03	1.852e-02	X-ray
4.82994e-02	2.865e-01	X-ray
4.92265e-02	5.083e-01	X-ray
5.55822e-02	5.295e-02	X-ray

5.57777e-02	1.023e-01	X-ray
5.72170e-02	1.172e-02	X-ray
5.72611e-02	2.268e-02	X-ray
8.05850e-02	1.142e-01	Gamma
1.84405e-01	1.606e-01	Gamma
2.15185e-01	5.235e-02	Gamma
4.59600e-01	2.506e-02	Gamma
5.11000e-01	2.645e-02	Annihilation photon
5.94409e-01	3.459e-02	Gamma
5.98764e-01	2.104e-02	Gamma
6.72242e-01	6.124e-02	Gamma
6.74788e-01	2.570e-02	Gamma
6.91250e-01	7.390e-02	Gamma
7.05333e-01	1.096e-01	Gamma
7.57798e-01	2.330e-02	Gamma
7.78814e-01	1.890e-01	Gamma
7.85904e-01	9.904e-02	Gamma
8.10290e-01	1.092e-02	Gamma
8.75650e-01	4.063e-02	Gamma
1.15235e+00	1.550e-02	Gamma
1.17670e+00	9.545e-02	Gamma
1.20387e+00	1.038e-02	Gamma
1.23543e+00	1.852e-02	Gamma
1.27354e+00	1.486e-01	Gamma
1.30072e+00	1.332e-02	Gamma
1.34704e+00	1.094e-02	Gamma
1.37419e+00	5.594e-02	Gamma
1.65276e+00	1.058e-02	Gamma
1.86794e+00	4.045e-02	Gamma
1.89512e+00	1.210e-02	Gamma
2.05236e+00	1.720e-01	Gamma
2.07953e+00	6.294e-02	Gamma
2.09213e+00	1.561e-02	Gamma
8.79022e-01	1.197e-02	Positron
1.98170e-05	7.021e-01	Auger electron
1.41537e-04	6.522e+00	Auger electron
2.00012e-04	2.312e-01	Auger electron
2.35628e-04	1.108e+00	Auger electron

7.37863e-04	1.926e-01	Auger electron
1.13430e-03	2.430e+00	Auger electron
1.30991e-03	1.207e-01	Auger electron
5.48039e-03	8.433e-01	Auger electron
6.85582e-03	3.006e-01	Auger electron
8.26345e-03	2.709e-02	Auger electron
2.30110e-02	1.871e-01	Conversion electron
3.94671e-02	3.778e-02	Auger electron
4.69039e-02	1.911e-02	Auger electron
7.08688e-02	1.818e-02	Conversion electron
7.13102e-02	2.159e-01	Conversion electron
7.22376e-02	2.226e-01	Conversion electron
7.87888e-02	1.117e-01	Conversion electron
8.05850e-02	2.938e-02	Conversion electron
1.26831e-01	3.296e-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