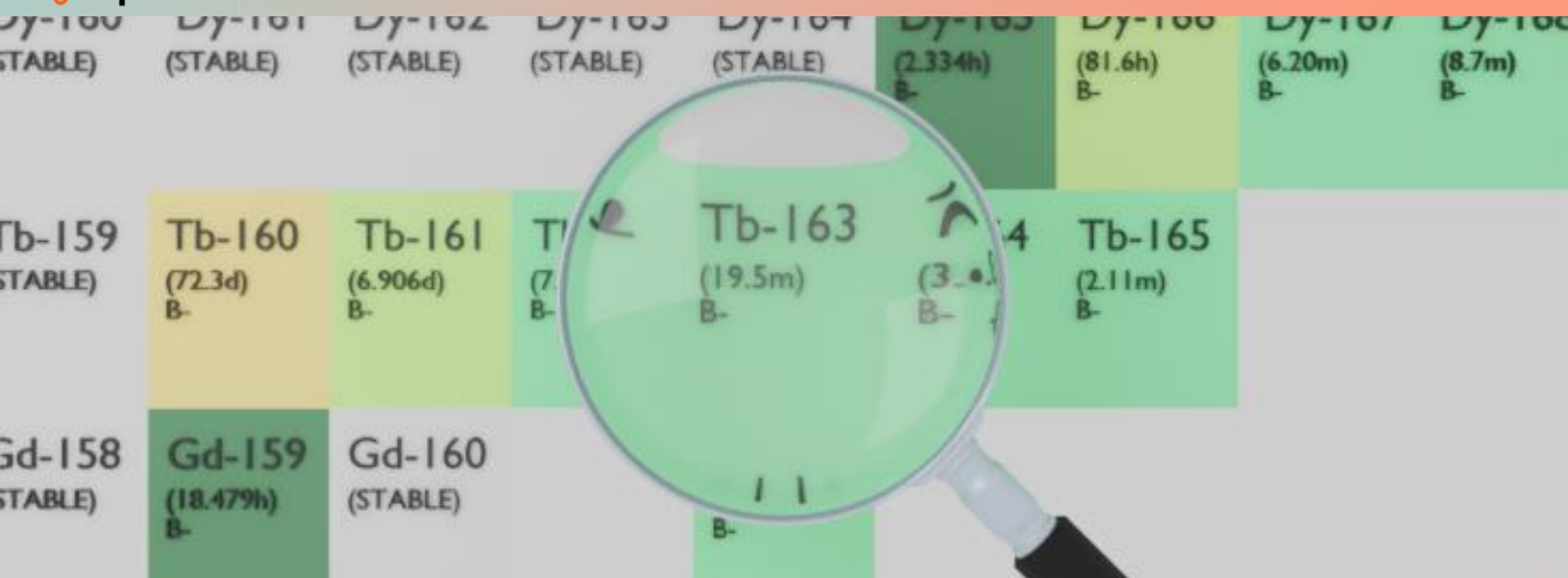




TERBIUM-163

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Tb-163
Atomic number (Z): 65
Mass number (A): 163
Neutron number (N): 98

RADIOACTIVE DECAY

Decay modes: β^-
Half-life: 19.5 [m]
Decay constant: $5.9243\text{e-}04$ [1/s]
Daughters: Dy-163 (100.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.35968 [MeV]
Mean photon energy: 0.78873 [MeV]
Air kerma rate constant, Γ_{10} : $2.969\text{e-}17$ [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : $2.969\text{e-}17$ [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : $5.763\text{e-}14$ [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : $0.000\text{e+}00$ [Gy $\cdot$ kg/Bq $\cdot$ s]

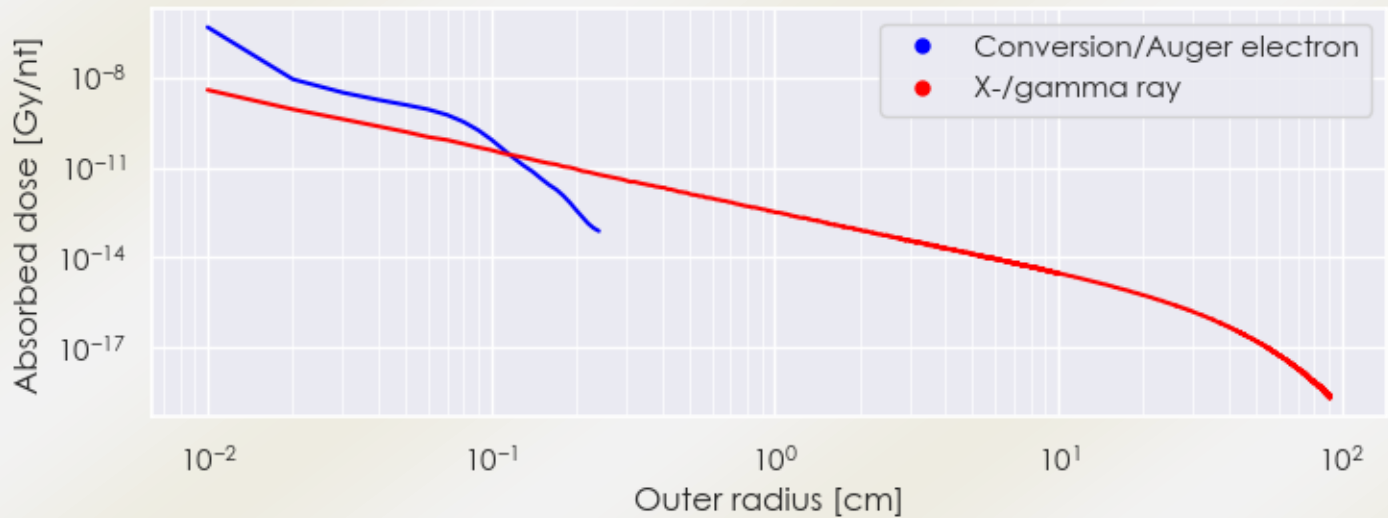
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta+, e-}$: 5.763×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.264×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

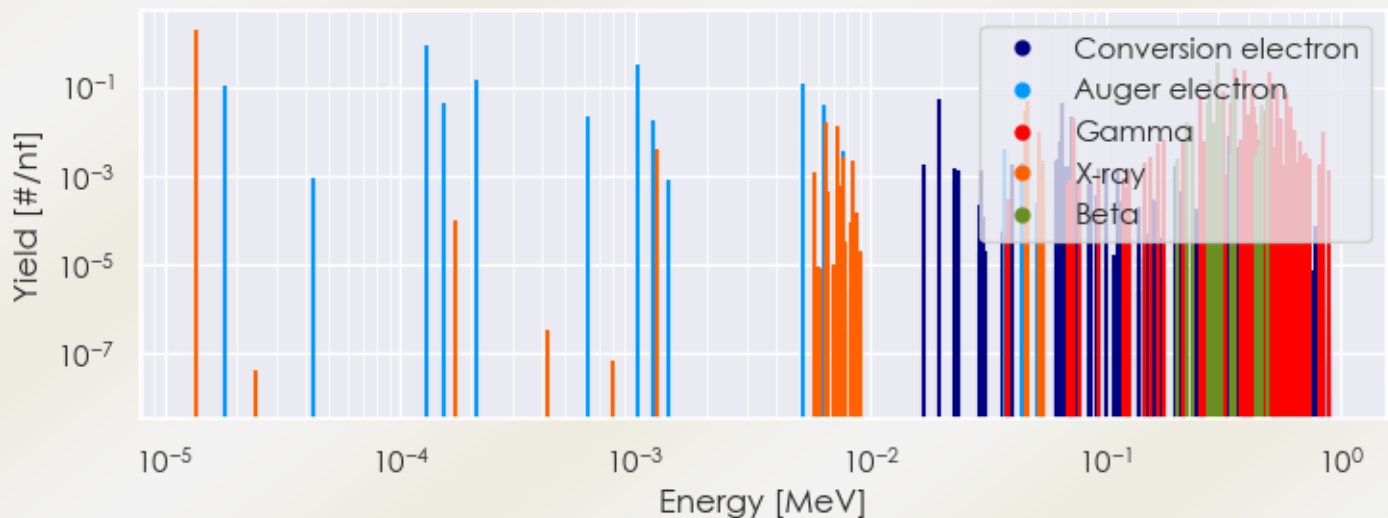
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Tb-163 DPK.csv

SUMMARY SPECTRA (PLOT)

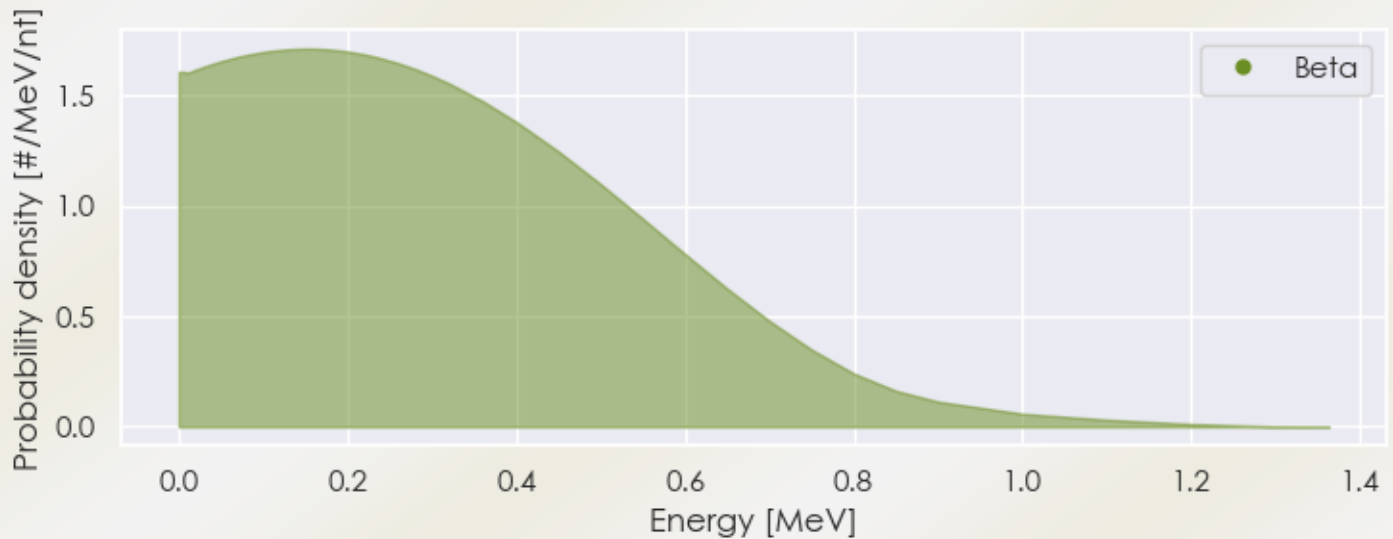
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Tb-163 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/Tb-163 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/Tb-163 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.36963e-05	2.016e+00	X-ray
6.48150e-03	1.598e-02	X-ray
7.25411e-03	1.310e-02	X-ray
4.52703e-02	2.830e-02	X-ray
4.60801e-02	5.058e-02	X-ray
5.21989e-02	1.006e-02	X-ray
7.34000e-02	2.025e-02	Gamma
2.50800e-01	6.728e-02	Gamma
3.16400e-01	8.325e-02	Gamma
3.38500e-01	4.523e-02	Gamma

3.47800e-01	6.165e-02	Gamma
3.51200e-01	2.632e-01	Gamma
3.54300e-01	4.635e-02	Gamma
3.86300e-01	4.523e-02	Gamma
3.89800e-01	2.430e-01	Gamma
4.01900e-01	2.498e-02	Gamma
4.15000e-01	5.378e-02	Gamma
4.21900e-01	1.148e-01	Gamma
4.27600e-01	3.510e-02	Gamma
4.34800e-01	1.418e-02	Gamma
4.59800e-01	1.148e-02	Gamma
4.62400e-01	2.205e-02	Gamma
4.75400e-01	2.948e-02	Gamma
4.86700e-01	1.103e-02	Gamma
4.94500e-01	2.250e-01	Gamma
5.07500e-01	4.612e-02	Gamma
5.33000e-01	9.450e-02	Gamma
5.45300e-01	1.688e-02	Gamma
5.59500e-01	2.048e-02	Gamma
5.83900e-01	7.020e-02	Gamma
6.08300e-01	3.690e-02	Gamma
6.30100e-01	1.125e-02	Gamma
8.33400e-01	1.013e-02	Gamma
2.22844e-01	1.560e-02	Beta
2.32306e-01	1.365e-02	Beta
2.73739e-01	4.387e-02	Beta
2.79208e-01	1.501e-01	Beta
2.86708e-01	1.560e-02	Beta
2.98904e-01	3.392e-01	Beta
3.08710e-01	4.387e-02	Beta
3.45414e-01	1.121e-01	Beta
3.56883e-01	1.111e-01	Beta
4.64001e-01	3.802e-02	Beta
4.83904e-01	1.462e-02	Beta
4.86305e-01	8.871e-02	Beta
1.81686e-05	1.105e-01	Auger electron
1.28585e-04	9.199e-01	Auger electron
1.53346e-04	4.531e-02	Auger electron

2.11070e-04	1.468e-01	Auger electron
6.32237e-04	2.219e-02	Auger electron
1.01693e-03	3.249e-01	Auger electron
1.19175e-03	1.764e-02	Auger electron
5.12334e-03	1.148e-01	Auger electron
6.38389e-03	4.037e-02	Auger electron
1.95390e-02	5.518e-02	Conversion electron
6.48093e-02	3.960e-02	Conversion electron
6.56190e-02	4.261e-02	Conversion electron
7.17379e-02	2.123e-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