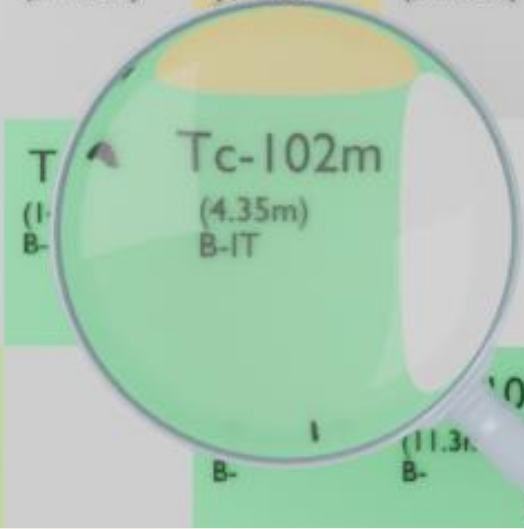




Ru-97 (STABLE)	Ru-100 (STABLE)	Ru-101 (STABLE)	Ru-102 (STABLE)	Ru-103 (39.26d)	Ru-104 (STABLE)	Ru-105 (4.44h) B-	Ru-106 (373.59d) B-	Ru-107 (3.75m) B-
Tc-98 (4.2E+6y) B-	Tc-99 (2.11E+5y) B-	Tc-100 (8.01E+4y) B-	Tc-101 (1.42E+5y) B-	Tc-102m (4.35m) B-IT	Tc-104 (18.3m) B-	Tc-105 (7.6m) B-		
Mo-97 (STABLE)	Mo-98 (STABLE)	Mo-99 (65.94h) B-						

TECHNETIUM-102M

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Tc-102m
Atomic number (Z): 43
Mass number (A): 102
Neutron number (N): 59

RADIOACTIVE DECAY

Decay modes: β^- , Internal transition
Half-life: 4.35 [m]
Decay constant: $2.6557\text{e-}03$ [1/s]
Daughters: Tc-102 (2.0%), Ru-102 (98.0%)
Radioactive daughters: Tc-102

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.7902 [MeV]
Mean photon energy: 2.47442 [MeV]
Air kerma rate constant, Γ_{10} : $8.328\text{e-}17$ [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : $8.328\text{e-}17$ [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : $1.266\text{e-}13$ [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy $\cdot$ kg/Bq $\cdot$ s]

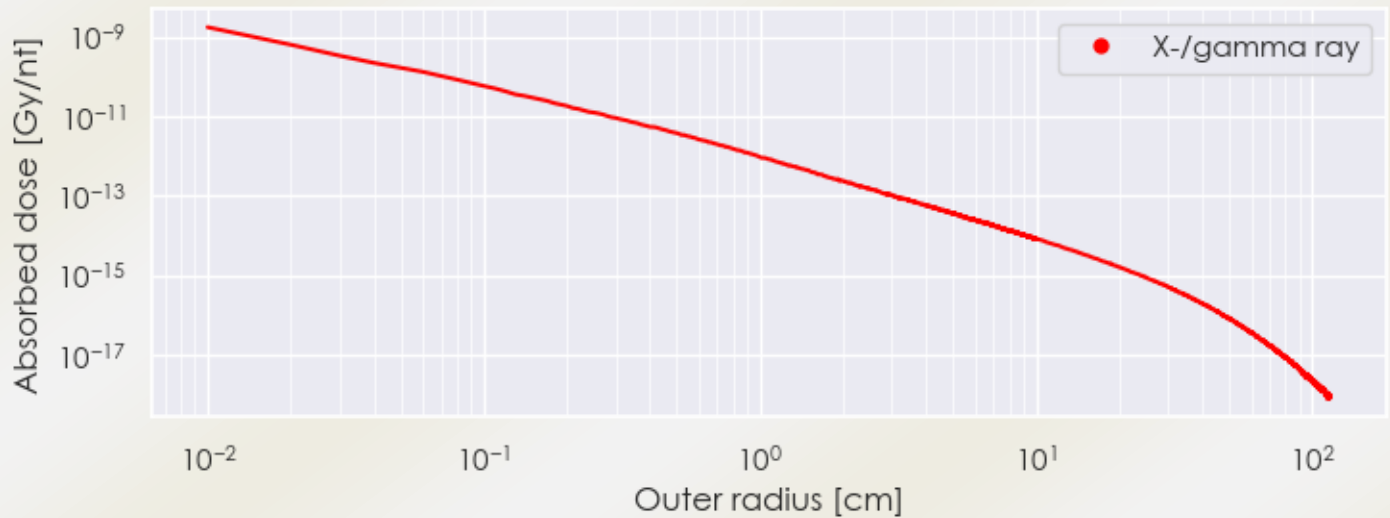
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta+, e^-}$: 1.266×10^{-13} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 3.964×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

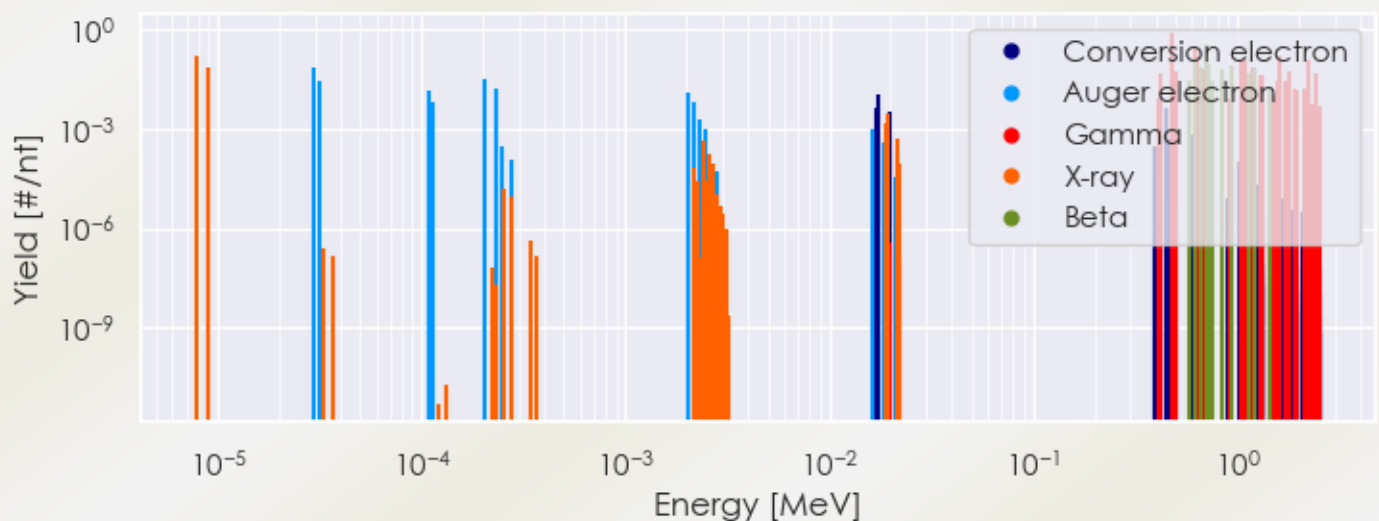
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Tc-102m DPK.csv

SUMMARY SPECTRA (PLOT)

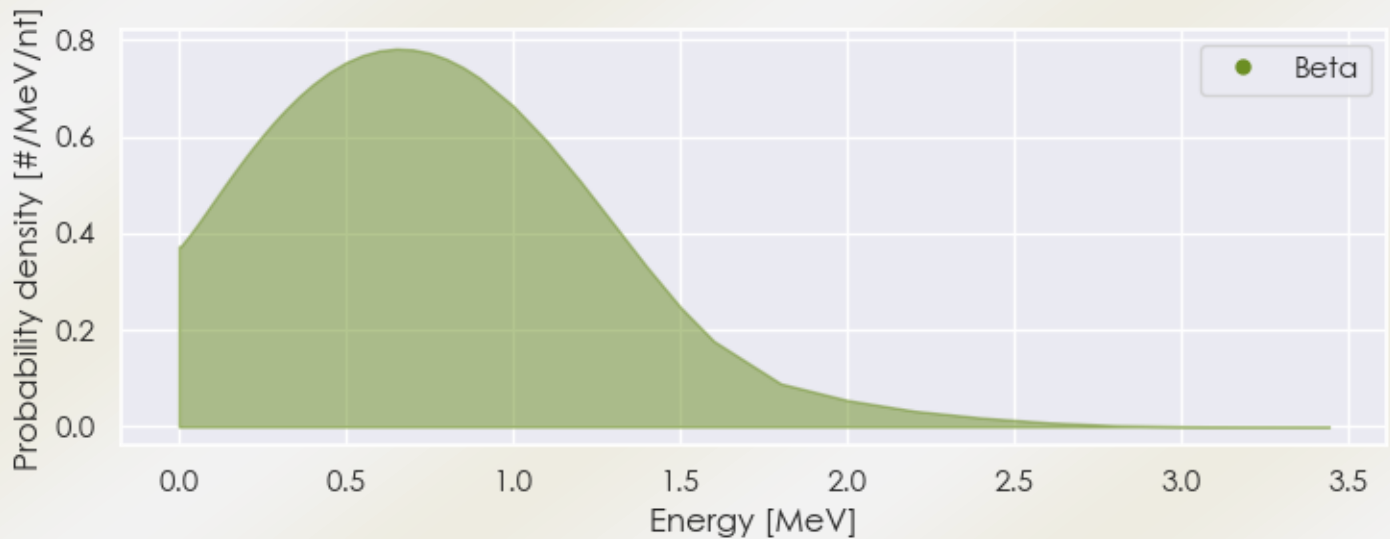
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Tc-102m 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/Tc-102m 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/Tc-102m Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
7.87358e-06	1.582e-01	X-ray
8.90939e-06	6.998e-02	X-ray
4.18400e-01	4.604e-02	Gamma
4.75200e-01	8.526e-01	Gamma
4.97200e-01	5.968e-02	Gamma
6.28100e-01	2.617e-01	Gamma
6.30200e-01	1.577e-01	Gamma
6.91800e-01	2.302e-02	Gamma
6.95600e-01	2.558e-02	Gamma

6.96900e-01	6.224e-02	Gamma
1.04640e+00	1.262e-01	Gamma
1.07470e+00	1.279e-02	Gamma
1.10330e+00	1.236e-01	Gamma
1.11310e+00	2.251e-02	Gamma
1.12750e+00	1.168e-02	Gamma
1.19760e+00	7.503e-02	Gamma
1.29250e+00	4.263e-02	Gamma
1.33860e+00	4.092e-02	Gamma
1.59620e+00	2.771e-02	Gamma
1.61530e+00	1.543e-01	Gamma
1.71120e+00	2.814e-02	Gamma
1.81070e+00	5.798e-02	Gamma
1.90730e+00	1.637e-02	Gamma
1.94580e+00	1.535e-02	Gamma
1.96700e+00	1.449e-02	Gamma
2.13920e+00	1.782e-02	Gamma
2.22570e+00	5.712e-02	Gamma
2.24470e+00	1.185e-01	Gamma
2.43840e+00	4.604e-02	Gamma
5.82401e-01	2.798e-02	Beta
6.25357e-01	1.036e-01	Beta
6.70019e-01	7.568e-02	Beta
7.13027e-01	3.465e-01	Beta
7.21141e-01	9.061e-02	Beta
7.60605e-01	2.688e-02	Beta
8.39593e-01	6.373e-02	Beta
8.49107e-01	2.440e-02	Beta
9.42550e-01	8.464e-02	Beta
1.13865e+00	4.839e-02	Beta
1.23043e+00	7.070e-02	Beta
1.46527e+00	1.693e-02	Beta
2.93426e-05	6.939e-02	Auger electron
3.14582e-05	2.901e-02	Auger electron
1.08024e-04	1.464e-02	Auger electron
2.04214e-04	3.498e-02	Auger electron
2.31863e-04	1.608e-02	Auger electron
2.03463e-03	1.317e-02	Auger electron

1.73224e-02

1.131e-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/SNMML-MAIN/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=0-932004-80-6