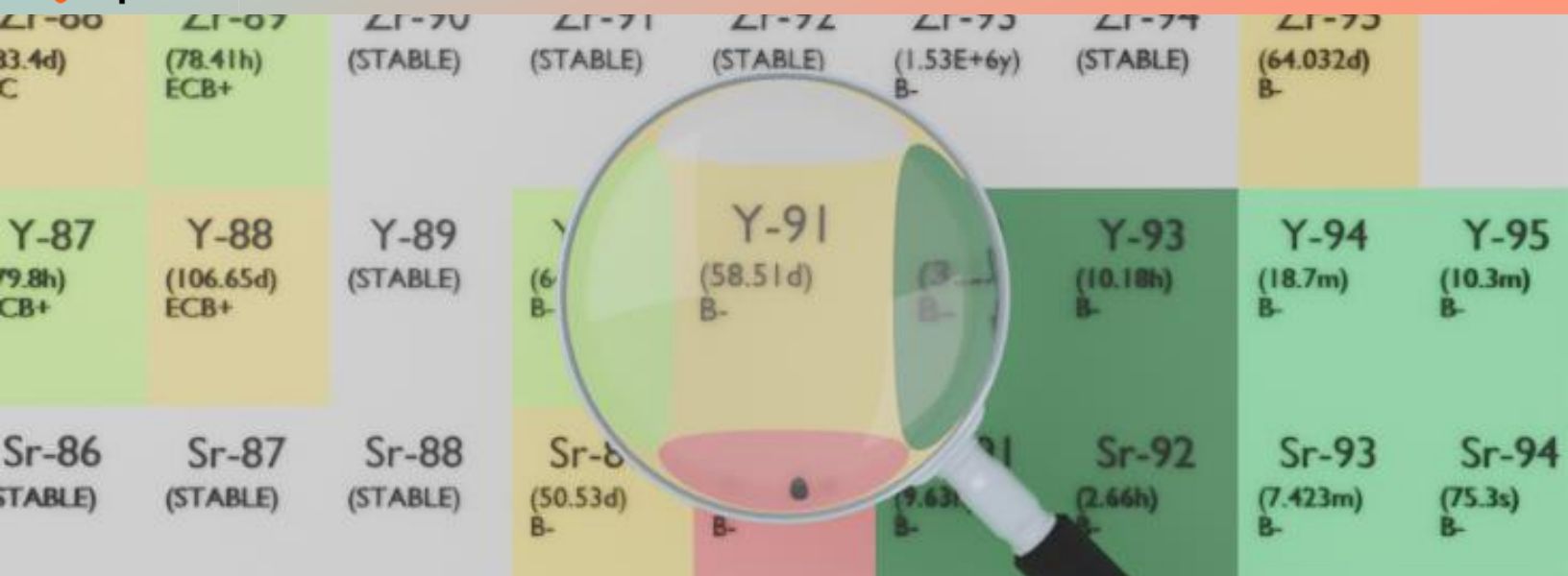




|                         |                           |                   |                         |                         |                        |                        |                         |                        |
|-------------------------|---------------------------|-------------------|-------------------------|-------------------------|------------------------|------------------------|-------------------------|------------------------|
| Y-87<br>(79.8h)<br>ECB+ | Y-88<br>(106.65d)<br>ECB+ | Y-89<br>(STABLE)  | Y-90<br>(6.41h)<br>B-   | Y-91<br>(58.51d)<br>B-  | Y-92<br>(14.9h)<br>B-  | Y-93<br>(10.18h)<br>B- | Y-94<br>(18.7m)<br>B-   | Y-95<br>(10.3m)<br>B-  |
| Sr-86<br>(STABLE)       | Sr-87<br>(STABLE)         | Sr-88<br>(STABLE) | Sr-89<br>(15.29m)<br>B- | Sr-90<br>(50.53d)<br>B- | Sr-91<br>(9.63h)<br>B- | Sr-92<br>(2.66h)<br>B- | Sr-93<br>(7.423m)<br>B- | Sr-94<br>(75.3s)<br>B- |

## YTTRIUM-91

### SUMMARY DATA

#### GENERAL

#### CLASSIFICATION

Isotope: Y-91  
Atomic number (Z): 39  
Mass number (A): 91  
Neutron number (N): 52

#### RADIOACTIVE DECAY

Decay modes:  $\beta^-$   
Half-life: 58.51 [d]  
Decay constant:  $1.3711 \times 10^{-7}$  [1/s]  
Daughters: Zr-91 (100.0%)  
Radioactive daughters: None

#### DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]  
Mean electron energy: 0.60318 [MeV]  
Mean photon energy: 0.00313 [MeV]  
Air kerma rate constant,  $\Gamma_{10}$ :  $1.077 \times 10^{-19}$  [Gy  $\cdot$  m<sup>2</sup>/Bq  $\cdot$  s]  
Air kerma coefficient,  $K_{\text{air}}$ :  $1.077 \times 10^{-19}$  [Gy  $\cdot$  m<sup>2</sup>/Bq  $\cdot$  s]  
Equilibrium dose constant for weakly-penetrating radiations ( $\alpha$  and/or electrons),  $\Delta_{\text{wp}}$ :  $9.664 \times 10^{-14}$  [Gy  $\cdot$  kg/Bq  $\cdot$  s]  
Equilibrium dose constant for alphas,  $\Delta_{\alpha}$ : 0.000e+00 [Gy  $\cdot$  kg/Bq  $\cdot$  s]

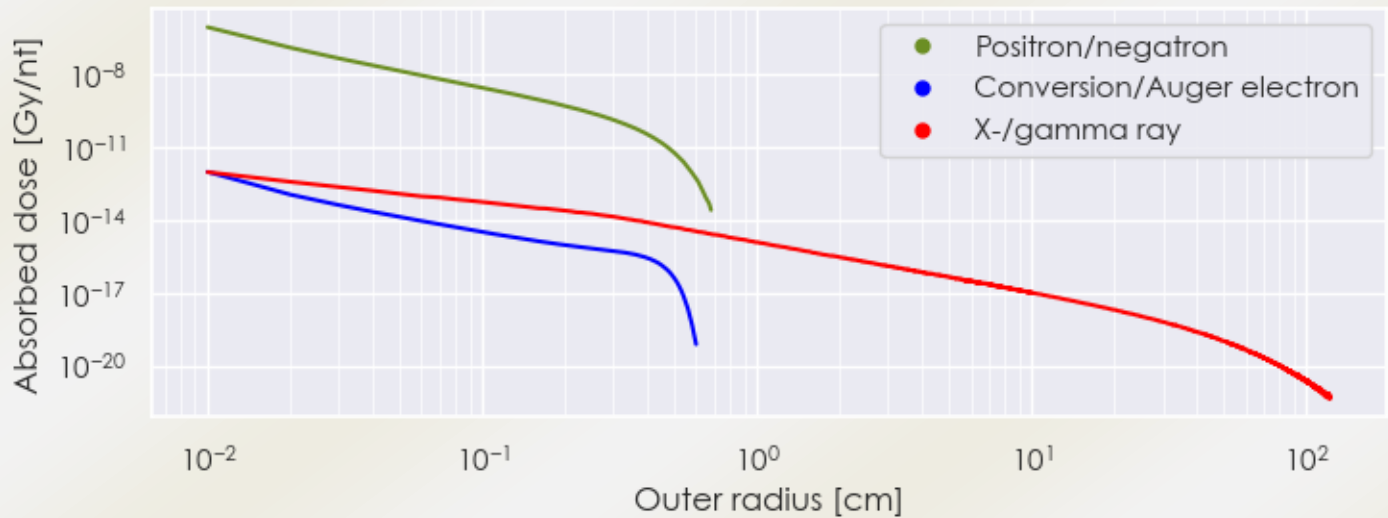
Equilibrium dose constant for betas/electrons,  $\Delta_{\beta-, \beta+, e-}$ :  $9.664 \times 10^{-14}$  [Gy·kg/Bq·s]

Equilibrium dose constant for photons,  $\Delta_p$ :  $5.015 \times 10^{-16}$  [Gy·kg/Bq·s]

## DOSE POINT KERNELS (PLOT)

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

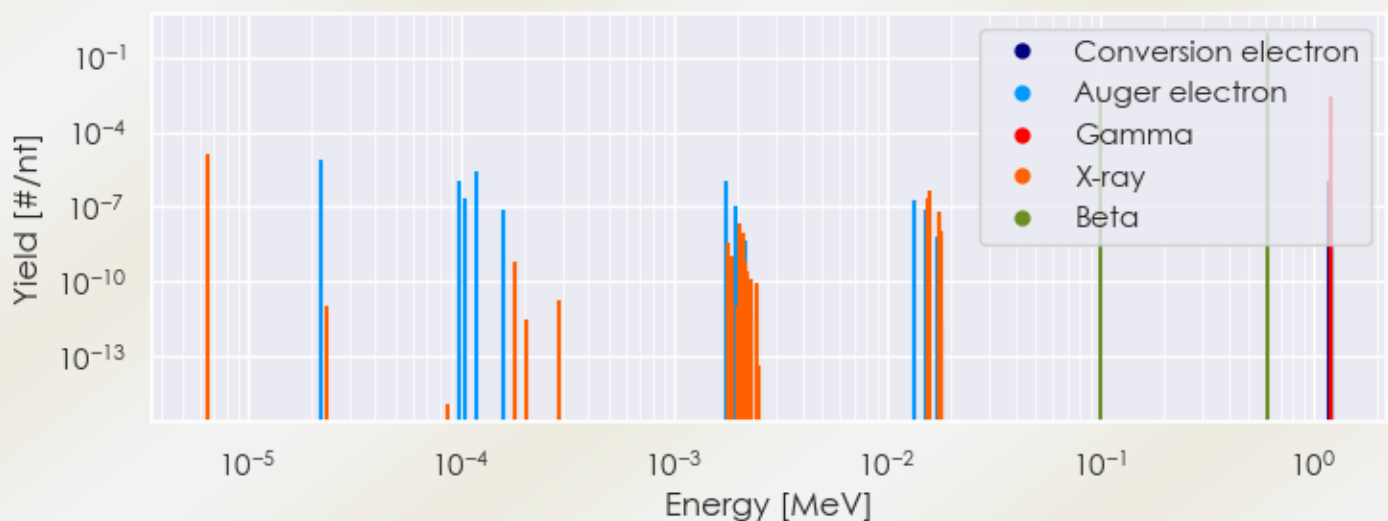
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: [www.mirdsoft.org/products/MIRDspecs/Y-91 DPK.csv](http://www.mirdsoft.org/products/MIRDspecs/Y-91 DPK.csv)

## SUMMARY SPECTRA (PLOT)

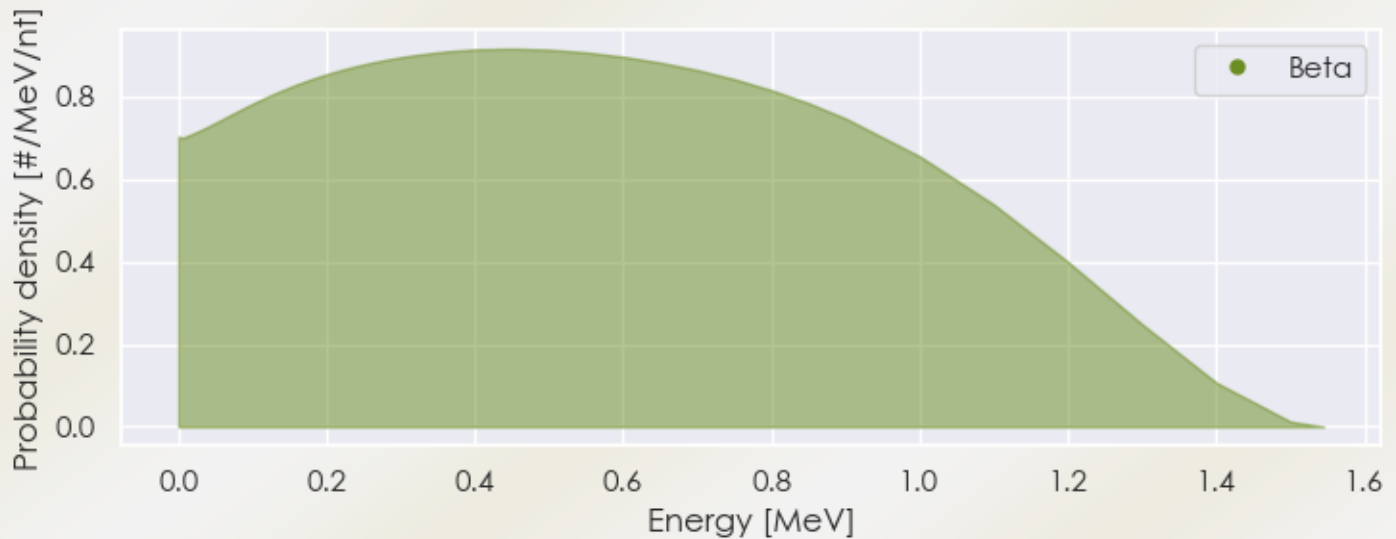
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: [www.mirdsoft.org/products/MIRDspecs/Y-91 Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Y-91 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/Y-91 Beta Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Y-91 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/Y-91 Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Y-91 Summary Spectrum.csv)

| Energy [MeV] | Yield [# / nt] if > 0.01 | Radiation type |
|--------------|--------------------------|----------------|
| 6.04499e-01  | 9.974e-01                | Beta           |

## 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](https://sites.snmmi.org/SNMML-MAIN/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=0-932004-80-6)