Topic: Calculator

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04/27/2024

Calculator.net

home / math

Math Calculators

Use the basic math calculator to do simple calculations or use one of the following calculators.

- Scientific Calculator
- Fraction Calculator
- Percentage Calculator
- Random Number Generator
- Percent Error Calculator
- Exponent Calculator
- Binary Calculator
- Hex Calculator
- Half-Life Calculator
- Quadratic Formula Calculator
- Log Calculator
- Ratio Calculator
- Root Calculator
- Least Common Multiple Calculator
- Greatest Common Factor Calculator
- Factor Calculator
- Rounding Calculator
- Matrix Calculator
- Scientific Notation Calculator
- Big Number Calculator

Statistics

- Standard Deviation Calculator
- Number Sequence Calculator
- Sample Size Calculator
- Probability Calculator
- Statistics Calculator
- Mean, Median, Mode, Range Calculator
- Permutation and Combination Calculator
- Z-score Calculator
- Confidence Interval Calculator

Geometry

- Triangle Calculator
- Volume Calculator
- Slope Calculator
- Area Calculator
- Distance Calculator
- Circle Calculator
- Surface Area Calculator
- Pythagorean Theorem Calculator
- Right Triangle Calculator

U.S. Department of Health & Human Services
REMM RADIATION EMERGENCY MEDICAL MANAGEMENT
Guidance on Diagnosis a

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You are here: Home > Radiation Units and Conversion Factors

Radiation Units and Conversion Factors

- International System of Units (SI) Unit and Common Unit Terminclogy
- Conversion Equivalence
- Prefixes Often Used with SI Units
- Dose Unit Conversion Tool
- Radioactivity Unit Conversion Tool
- Exposure Unit Conversion Tool
- Conversion Factors
- References

Dose Unit Conversion Tool

Insert a number with up to 2 decimal points

Absorbed Dose

rad
centigray (cGy)
gray (Gy)
Convert Clear

Dose Equivalent

rem
millisievert (mSv)
sievert (Sv)
Convert Clear

Radioactivity Unit Conversion Tool

Insert a number with up to 2 decimal points
Results are expressed in E-notation*

curie (Ci)
becquerel (Bq)
millicurie (mCi)
megabecquerel (MBq)
Convert Clear

*E-notation examples:
3.05e+9 = 3.05 x 10^{9}
7.26e-3 = 7.26 x 10^{-3}

top of page

Exposure Unit Conversion Tool

Insert a number with up to 2 decimal points
Results are expressed in E-notation*

roentgen (R)
coulomb/kg (C/kg)
Convert Clear

*E-notation examples:
3.05e+9 = 3.05 x 10^{9}
7.26e-3 = 7.26 x 10^{-3}

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half life calculator

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Calculator.net
https://www.calculator.net/half-life-calc...

Half-Life Calculator

WEB **Calculate** the **half-life,** mean lifetime, and decay constant of a substance undergoing exponential decay using this online tool. Learn the definition, formula, and applications of **half-life** in radioactive and non-radioactive ...

EXPLORE FURTHER

- **Half-life problems involving carbon-14** - ChemTeam — chemteam.info
- **Half-Life Calculator** - Radioactive decay calculator — gigacalculator.com
- **Drug Half-Life Calculator** — omnicalculator.com
- **Radioactive Decay Calculator** - Free Online Calculator - BYJU'S — byjus.com
- How can I calculate the **half life** of an element? | Socratic — socratic.org

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Omni Calculator
https://www.omnicalculator.com/chemistry/half-life

Half-Life Calculator

WEB 3 days ago · Learn how to **calculate half-life,** the time required for half of a radioactive substance to decay, using this online tool. Enter the initial and final quantities, the time ...

Estimated Reading Time: 4 mins

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home / math / half-life calculator

Half-Life Calculator

The following tools can generate any one of the values from the other three in the half-life formula for a substance undergoing decay to decrease by half.

Half-Life Calculator

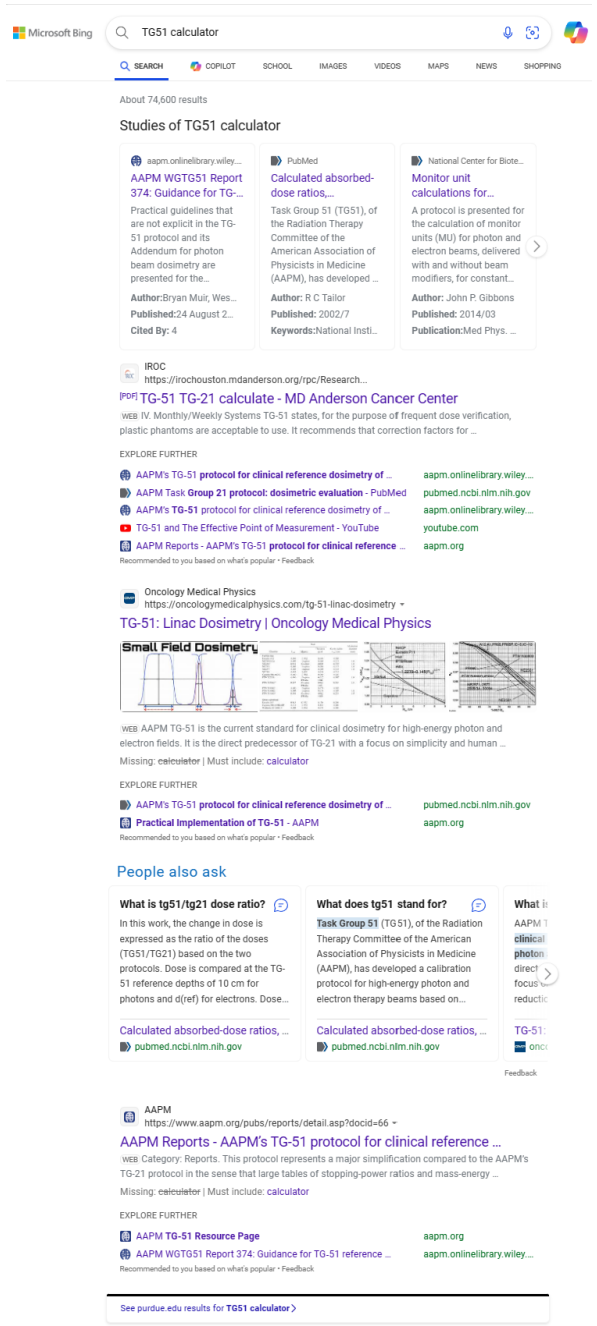
Result

half-life, $t_{1/2}$ = 15.051499783199

mean lifetime, τ = 21.714724093908
decay constant, λ = 0.046051701862542

quantity remains N_t	initial quantity N_0	time t	half-life $t_{1/2}$
10	100	50	

Calculate Clear



TG-51 TG-21 calculate.doc (mdanderson.org)

https://irochouston.mdanderson.org/rpc/Research_tg51/TG-51/TG-51%20TG-21%20calculate.pdf

CALCULATION FORM

(to document changes in absorbed dose as a result of implementing the AAPM TG-51* dosimetry protocol)

INSTITUTION _____ DATE _____

Person doing Calibrations and/or Calculations _____ Phone _____

I. Please complete this form for the dosimetry system used for therapy machine calibration at your institution. Also complete, as far as possible, the worksheets for every megavoltage beam at your institution; Worksheet A for calibrating photon beams, Worksheet B for calibrating electron beams using Cylindrical Chambers, Worksheet C to calculate $k_{ecal} N_{D,W}^{^{60}Co}$ for plane-parallel chambers, and Worksheet D for calibrating electron beams using Plane-Parallel Chambers. It is suggested that this calculation form and the worksheets in the protocol be completed as far as possible before measurements are made. If you utilize different measurement systems for different machines please indicate.

II. Dosimetry System **prior** to implementing the TG-51 Protocol.

a. For photons
Make and model of chamber _____
Cobalt-60 chamber exposure Calibration factor, N_X _____
Make and Model of electrometer _____
Electrometer calibration factor, N_E _____
Polarizing Potential _____ volts.
Phantom: Material _____ Density _____ g/cm^3
How is chamber protected for measurements in phantom:
Material _____ Thickness _____
Equation used to determine dose rate if different from TG-21: _____

b. For electrons (complete if different from photons)
Make and model of chamber _____
Cobalt-60 chamber exposure Calibration factor, N_X _____
N_{gas} for parallel plate chamber assigned with farmer chamber _____
Make and Model of electrometer _____
Electrometer calibration factor, N_E _____
Polarizing Potential _____ volts.
Phantom: Material _____ Density _____ g/cm^3
How is chamber protected for measurements in phantom:
Material _____ Thickness _____
Equation used to determine dose rate if different from TG-21: _____

* Medical Physics 26 (9), Sept. 1999

G:\web\TG-51 TG-21 calculate.doc

III. Dosimetry System for TG-51 Protocol

a. For photons
Make and model of chamber _____
Absorbed dose Calibration factor for Cobalt-60, $N_{D,W}^{^{60}Co}$ _____ (cGy/coul)
Make and Model of electrometer _____
Electrometer calibration factor P_{elec} (coul/rdg) _____
Polarizing Potential _____ volts.
How is chamber protected for measurements in water:
Material _____ Thickness _____ g/cm^2
Comments: _____

If chamber or equivalent chamber is not listed in TG-51, provide the following information:
Wall: Material _____ Thickness _____
Inner diameter of chamber _____
How was K_Q determined? _____

IV. Monthly/Weekly Systems

TG-51 states, for the purpose of frequent dose verification, plastic phantoms are acceptable to use. It recommends that correction factors for monthly/weekly systems be determined at the time of the annual water calibration.

Make and model of chamber _____
Make and Model of electrometer _____
Phantom: Material _____ Density _____ g/cm^3

Machine	Treatment Beam (e.g. 6x, 9e)	Field Size (cm x cm)	Depth (cm)	Distance SCD' (cm)	θ Correction factor OR θ Expected Reading (K_{TP} corrected)

V. Determine change in calculated dose rate (cGy/min or cGy/mu). Please follow the steps listed below to determine the change in the calculated absorbed dose (rate).

a. Determine absorbed dose rate for each photon and electron beam according to your previous calibration protocol and fill in the following information. (Please do not adjust the monitor yet).

Prior to TG-51 prior to adjusting monitor

For TG-21 Dose is specified to muscle θ or water θ

Machine	Treatment Beam (e.g. 6x, 9e)	Field Size (cm x cm)	Calibration Depth(cm)/ SSD	Dose Specification Point Depth(cm)/ SSD	Prior to TG-51 Dose rate (cGy/min-cGy/mu)

b. Determine absorbed dose rate, without adjusting monitor for each photon and electron beam according to the TG-51 protocol. Please fill in the following information and complete Worksheets A, B and D begun earlier. (Please do not adjust the monitor yet).

TG-51 prior to adjusting monitor

For TG-51 Dose is specified to muscle θ or water θ

Machine	Treatment Beam (e.g. 6x, 9e)	Field Size (cm x cm)	Calibration Depth(cm)/ SSD	Dose Specification Point Depth(cm)/ SSD	TG-51 Dose rate (cGy/min-cGy/mu)

Medical Physics Tools
https://www.medical-physics-tools.org/

TG51 second check (cylindrical chamber with pulsed beam)

Disclaimer
This online TG51 spread sheet is meant as a secondary independent check of TG51 measurement, or for educational purposes. It should not be used as a primary calculatior
for k_Q are chosen from the fit $k_Q = A + B \cdot 10^{-3} \cdot \%dd(10)_x + C \cdot 10^{-5} \cdot (\%dd(10)_x)^2$, given in the TG51 Addendum (McEwen et al. 2014) Table I.

If a photon energy is selected, the electron specific entries are grayed out, and are highlighted with lavender if an electron energy is selected. The calcualtion is performed
copying the data text from the I/O box below (JSON format). Pasting the text from the saved file can later be used to populate the table using the 'read' button.

P_{ion} and P_{pol} can be typed directly if those are known in advance, in which case, the reading at opposite polarity and lower voltage should not be entered.

I/O bar

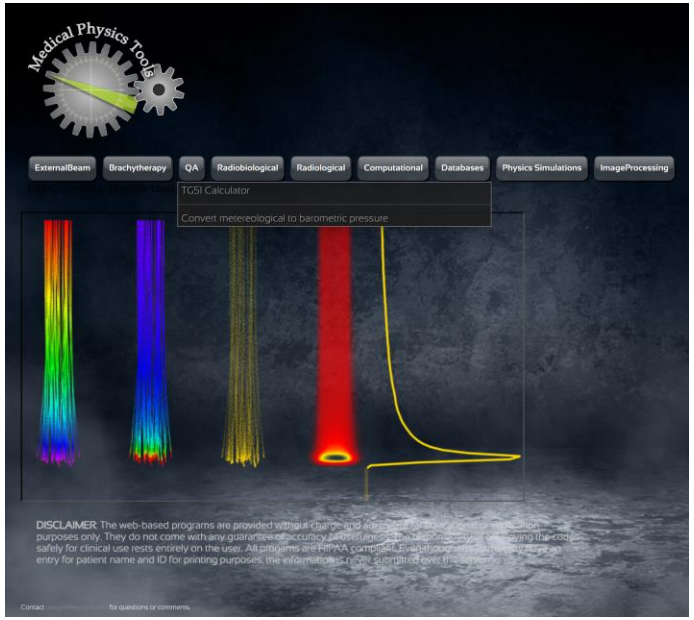
Copy table to clipboard | Read data into table | Hide needless stuff for printing

Paste text from previous calc if needed, or start a new calculation

Institution | Physicist | Date

Append Column | Calc

Linac	
Modality	
Energy	4MV
Chamber model	Capintec PR-06C/G*
Chamber s/n	
Cavity radius [cm]	
P_{rp}	
P_{elect}	
$N_{D,w}^{^{60}Co}$ [cGy/nC]	
$\%dd(10)_x$	
R_{50} [cm]	
$d_{ref} = 0.6R_{50} - 0.1$ [cm]	
T [°C]	
P [mmHg]	
V_H	+300V
V_L	+150V
M_{raw}^{+} [nC]	
M_{raw}^{-} [nC]	
M_{raw}^{H} [nC]	
M_{raw}^{L} [nC]	
$M_{raw}(d_{ref} + 0.5r_{cav})$ [nC]	
P_{gr}	
P_{TP}	
P_{pol}	
P_{ion}	
k_{ecal}	
$k'_{R_{50}}$	
k_Q	
D_{10cm}^{ph} or $D_{d_{ref}}^{e-}$ [cGy]	
clinical $TMR_{10\times10}(10)$ or $\frac{1}{100}PDD(d_{ref})$	
MU delivered	
$\frac{D}{MU}$ at d_{max} [cGy/MU]	



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397 connections

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About

https://medical-physics-tools.org
Specialties: Medical Physics: Radiation Therapy.
Medical Linear Accelerators (Varian, Elekta, Tomotherapy),
Other radiation machines: Gamma Knife, CT simulator
HDR Brachytherapy: Accuboost, Mammosite, skin applicators, gyn applicators.
LDR Brachytherapy: SIRS infusion, Prostate implants, Gliasite.
EMR systems: Mosaiq, Aria.
Radiation treatment planning systems: Pinnacle, Eclipse, Oncentra.
Programming Languages: C++/PHP/Html/CSS/Javascript/MySQL/OpenGL/SVG/postscript.
Research Interests: Radiation Physics dose calculations and Monte Carlo radiation transport.

TG51 Protocol Calculator

N_d,w(Co-60):

1

kQ:

0.906

M_raw:

13.64nC

P_ion:

1

P_pol:

0.99

p_tp:

0.9933

p_elec:

1.001

P_leak:

0.992

p_rp:

1.1

Calculate

Result: 13.273841663073929

The equation is:

$$D_{w,Q} = N_{d,w(Co-60)} \cdot kQ \cdot M_{raw} \cdot P_{ion} \cdot P_{pol} \cdot p_{tp} \cdot p_{elec} \cdot P_{leak} \cdot p_{rp}$$

The equation with input numbers is:

$$D_{w,Q} = 1 \cdot 0.906 \cdot 13.64 \cdot 1 \cdot 0.99 \cdot 0.9933 \cdot 1.001 \cdot 0.992 \cdot 1.1$$

https://axz91.github.io/medical_physics_calculator/TG51_calculator.html

Radionuclide - Radium Equivalent Msss Converter

Choose Radionuclide: 192Ir
Activity in mCi: 15
Convert
Activity in mg-RaEq: 8.527272727272727
Activity in Bq: 3.16 \times 10^{8}

Calculation Process:

$$15\ \text{mCi} \times \frac{4.69\ \frac{\text{R}\cdot\text{cm}^2}{\text{mCi}\cdot\text{h}}}{8.25\ \frac{\text{R}\cdot\text{cm}^2}{\text{mg}\cdot\text{h}}} = 8.527272727272727\ \text{mg-RaEq}$$

$$8.527272727272727\ \text{mg-RaEq} \times 37 \times 10^{6}\ \frac{\text{Bq}}{\text{mg-RaEq}} = 3.16 \times 10^{8}\ \text{Bq}$$

https://axz91.github.io/medical_physics_calculator/Radionuclide_Radium_Equivalent_Msss_Converter.html

Further

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