

Conversion_Units_1999.txt

This information is taken from an article by Dr. Kathy S. Grant in the August 1987 copy of Journal of Civil Defense.

Table 1 International System of Units (SI) and conventional units.(for 80 col.

Physical Quantity	SI UNIT	Conventional unit	Relationship
			10
Activity	becquerel(Bq)	curie (Ci)	1 Ci = 37 X 10^9 Bq
	s^{-1}		1 Ci = 37 Gbq(gigabequerels)
	(s ⁻¹)(s to the negative one power)		
			-4
Exposure (gamma & X-ray only)	coulomb/kilogram (C/kg)	roentgen(R)	1 R = 2.58 X 10^{-4} C/kg
	(no special name)		1 R = 258 uC/kg(microC/kg)

Conversion_Units_1999.txt			
Absorbed	gray (Gy)	rad	1 rad = 0.01 Gy
Dose	(J/kg)		1 rad = 10 mGy(milliGray)
Dose	sievert (Sv)	rem	1 rem = 0.01 Sv
Equivalent	(J/kg)		1 rem = 10 mSv(milliSieverts)

(you can see why Petr Beckmann compares using Bequerels to measure radiation is like using angstroms to measure shoelace length)

Table 2. Quality factor (Q) for different kinds of radiation

Q	Type of Radiation
1	X-ray, gamma, and electrons(beta)
2-3	Thermal Neutrons
10	Fast neutrons and protons
20	Alpha particles

Table 3 SI prefixes (sysop's shorthand 10/4 = ten to the fourth power, 10/-7 = ten to the negative seventh power etc.)

Conversion_Units_1999.txt

Factor	Prefix	Symbol
10/18	exa	E
10/15	peta	P
10/12	tera	T
10/9	giga	G
10/6	mega	M
10/3	kilo	k
10/-3	milli	m
10/-6	micro	u
10/-9	nano	n
10/-12	pico	p
10/-15	femto	f
10/-18	atto	a

(for those of you lacking lower case everything below mega M symbol is in lower case, the micro is a backwards lower case u)

(surprise your friends, use these in your day to day speech, "I don't give a femtodamn about it!")

Conversion_Units_1999.txt

Activity

A curie was defined as the activity of radon in equilibrium with one gram of radium. This value was later standardized at 3.7×10^{10} per second.

A bequerel is one disintegration per second. By convention
 $1 \text{ Ci} = 3.7 \times 10^{10} \text{ Bq}$. (note that no attempt is made to compensate for the fact that various elements when disintegrating release more than one particle or form of radiation)

Exposure

The roentgen measures the amount of ionization that gamma rays or xrays produce in air.

In SI $1 \text{ R} = 2.58 \times 10^{-4}$ coulombs per kilogram. The coulomb is not an SI base unit; it is defined as an ampere-second)

Absorbed dose

The rad is defined as 100 ergs absorbed per gram of material (0.01 J/kg)

The gray is defined as 1 joule (J) absorbed per kilogram of material.

Therefore, 100 rad = 1 Gray.

Dose equivalent

Equal amounts of radiation can do differing amounts of biological damage.

This is mostly due to the volume of the absorption, example alpha radiation dumps all of its energy in to just the point of contact and gamma sources spread the energy throughout an much large volume of tissue.

To adjust this difference they have come up with a quality factor. The REM is Roentgen Effect in Man.

The SI dose equivalent (H) = D X Q X N, where D=Dose in grays, Q=quality factor, and N=a further modifying factor that the author didn't explain.