



A Guide to SI Units in Radiation Protection

EXPOSURE

Roentgen (R), the charge produced in air by x or gamma rays. The SI unit is in terms of coulombs per kilogram of air ($C\ kg^{-1}$).

$$1\ R = 2.58 \times 10^{-4}\ C\ kg^{-1} \qquad 1\ C\ kg^{-1} = 3,876\ R$$

KERMA

(Kinetic Energy Released in Material)

The SI unit is the gray.

$$1\ \text{gray (Gy)} = 100\ \text{rad} \qquad 1\ \text{rad} = 0.01\ \text{Gy}$$

An exposure of 1 R ($2.58 \times 10^{-4}\ C\ kg^{-1}$) corresponds to an air kerma of about 0.87 rad (8.7 mGy) or a tissue kerma of about 0.97 rad (9.7 mGy).

RADIATION ABSORBED DOSE

The SI unit is the gray (Gy).

$$1\ \text{gray} = 100\ \text{rad} \qquad 1\ \text{rad} = 0.01\ \text{Gy}$$

RADIATION DOSE EQUIVALENT

The SI unit is the sievert (Sv).

$$1\ \text{sievert (Sv)} = 100\ \text{rem} \qquad 1\ \text{rem} = 0.01\ \text{Sv}$$

ACTIVITY

The SI unit of activity is the becquerel (Bq).

$$1\ \text{becquerel (Bq)} = 1\ \text{disintegration per second}$$

$$1\ \text{Bq} = 2.7 \times 10^{-11}\ \text{Curie (Ci)} \qquad 1\ \text{Ci} = 3.7 \times 10^{10}\ \text{Bq} = 37\ \text{Gbq}$$

ADDITIONAL USEFUL CONVERSIONS

1 uCi	=	37 kBq
1 mCi	=	37 MBq
1 Bq	=	27 pCi
370 MBq	=	10 mCi
1 uSv	=	0.1 mrem

COMMON PREFIXES FOR SI UNITS

Submultiples	Multiples
10^{-3} milli m	10^3 kilo k
10^{-6} micro u	10^6 mega M
10^{-9} nano n	10^9 giga G
10^{-12} pico p	10^{12} tera T