Radiation Unit Converter: Bq–Ci, Gy–rad, Sv–rem, Roentgen

Converts activity (Bq and Ci), absorbed dose (Gy and rad) and equivalent dose (Sv and rem), and exposure in roentgen to C/kg and air kerma.

Method: SI and legacy radiation units; radiation weighting

Input parameters

Unit system: SI

Parameter	Value	Unit
Activity	37.000	GBq
Absorbed dose	10.000	mGy
Radiation weighting factor	1.0000	
Exposure (roentgen)	1.0000	

Calculated results

Parameter	Value	Unit
Activity (Ci)	1.0000	Ci
Activity (mCi)	1,000.0	mCi
Absorbed dose (rad)	1.0000	rad
Equivalent dose (mSv)	10.000	mSv
Equivalent dose (rem)	1.0000	rem
Exposure (mC/kg)	0.25800	
Air kerma for the exposure	8.7643	mGy

Notes for this case

• 1 Ci = 3.7 × 10^{10} Bq (exact); 1 rad = 0.01 Gy; 1 rem = 0.01 Sv. Equivalent dose H = w_R·D (w_R = 1 for photons and electrons, 20 for alpha particles; neutrons depend on energy). 1 R = 2.58 × 10^{-4} C/kg of air (exact), and with W/e = 33.97 J/C for dry air, 1 R corresponds to about 8.76 mGy air kerma. Effective dose needs tissue weighting factors as well.

Formula and method

$$1\ \mathrm{Ci} = 3.7 \times 10^{10}\ \mathrm{Bq}, \quad H = w_R D, \quad 1\ \mathrm{R} = 2.58 \times 10^{-4}\ \mathrm{C/kg}$$

Variables

A	Activity	Bq
D	Absorbed dose	Gy
w_R	Radiation weighting factor	-
X	Exposure (roentgen)	-
H	Equivalent dose (mSv)	Gy
K_{air}	Air kerma for the exposure	Gy

Method and standards

Radiation units.

Assumptions and limits

- Exact definitions; air W/e = 33.97 J/C.

References

SI and legacy radiation units; radiation weighting

Report details

Report reference	FCC-SWG3-DWB6 (the same inputs always give the same reference)
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Software release	FireCAD Calc, release of 22 November 2026
Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/general/unit-conversions/radiation-unit-converter

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.