Neutron Radiation Weighting Factor and Equivalent Dose

Radiation weighting factor for neutrons of a given energy from the ICRP continuous function, and the equivalent dose from a neutron absorbed dose.

Method: ICRP radiation weighting factor for neutrons

Input parameters

Unit system: SI

Parameter	Value	Unit
Neutron energy	1.0000	MeV
Neutron absorbed dose	0.10000	mGy

Calculated results

Parameter	Value	Unit
Radiation weighting factor	20.692	
Equivalent dose	2.0692	mSv

Notes for this case

• ICRP 103 continuous function of neutron energy (MeV); photons and electrons have w_R = 1, alphas 20. Equivalent dose H = w_R D for a single radiation type; sum over radiation types for mixed fields.

Formula and method

$$w_R = 2.5 + 18.2e^{-[\ln E_n]^2/6}\ (E_n < 1\ \text{MeV}),\quad 5.0 + 17.0e^{-[\ln(2E_n)]^2/6}\ (1\text{–}50\ \text{MeV})$$

Variables

E_n	Neutron energy	J
D	Neutron absorbed dose	Gy
w_R	Radiation weighting factor	-
H	Equivalent dose	Gy

Method and standards

Radiation weighting.

Assumptions and limits

- Single neutron energy; external exposure.

References

ICRP radiation weighting factor for neutrons

Report details

Report reference	FCC-5VBT-EECT (the same inputs always give the same reference)
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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/boilers-power-plant/nuclear-power/neutron-radiation-weighting-factor

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.