

Effective dose coefficient

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A measure of the hazard of nuclear material is provided by the toxicity and in particular its radiotoxicity arising from its radioactive “quality” rather than the chemical toxicity. The radiotoxicity of a nuclide is determined by its effective dose coefficient $e(T)$, which accounts for radiation and tissue weighting factors, metabolic and biokinetic information. The quantity T is the integration time in years following intake. For adults, the integration time is 50 years, such that the radiotoxicity (in Sievert, Sv) or committed effective dose resulting from intake of a particular nuclide is the product of the effective dose coefficient (units Sv/Bq) and the activity (in Bq) of that nuclide i.e.

Committed effective dose = Activity \cdot $e(50)$.

The two main pathways for intake of a radionuclide are through ingestion and inhalation. Accordingly one can differentiate between the ingestion dose coefficient $e_{\text{ing}}(50)$ and the inhalation dose coefficient $e_{\text{inh}}(50)$ for inhalation.

References

The effective dose coefficients given in the Nucleonica databases are taken from:

- Dose Coefficients for Intakes of Radionuclides by Workers, ICRP Publication 68, Ann. ICRP 24 (4), 1994 (<http://www.icrp.org/publication.asp?id=ICRP%20Publication%2068>)
- Age-dependent Doses to the Members of the Public from Intake of Radionuclides - Part 5 Compilation of Ingestion and Inhalation Coefficients, ICRP Publication 72, Ann. ICRP 26 (1), 1995 (<http://www.icrp.org/publication.asp?id=ICRP%20Publication%2072>)
- ICRP Publications (<http://www.icrp.org/publications.asp>)

See Also... Biological Effect of Ionising Radiation, Effective dose, Equivalent dose, Committed effective dose, Committed equivalent dose, Risk factor, Radon dose conversion factors

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