



Rules of Thumb*

***With permission from the Manual of Policies and Procedures for Radiation Protection, for the University of Minnesota, Department of Environmental Health and Safety, Radiation Protection Program, January 2000**

A. Alpha Particles

1. Alpha particles emitting radioisotopes (^{226}Ra , ^{241}Am , ^{210}Po) are highly radiotoxic because alpha radiation presents a significant internal hazard.
2. Most alpha particles present no external radiation hazard because they cannot penetrate the protective layer of the skin covering the body surface. An alpha particle of at least 7.5 MeV is required to penetrate a tissue thickness of 0.07 mm, which is the thickness of the dead layer of skin covering the body.

B. Beta Particles

1. A beta particle of a least 0.07 MeV is required to penetrate the protective layer of skin (0.07 mm).
2. The range of a beta particle in air is approximately 12 feet/MeV. The range of the maximum energy beta from ^{32}P would be $1.71 \text{ MeV} \times 12 \text{ ft/MeV} = 20 \text{ ft}$.
3. The range of beta particles in gram/cm^2

