

APPENDIX H - Radiation Quality Factors (Q) And Radiation Weighting Factors (W_R)

H.1 Introduction

The radiation-absorbed dose is insufficient by itself to predict either the severity or the probability of the harmful effects on health resulting from irradiation under unspecified conditions. The radiation Q or radiation W_R allows for the radiation effect on the detriment of the microscopic distribution of the absorbed energy. When the distribution of radiation is not known at all points in the volume of interest, the following values of Q or W_R should be used for both external and internal radiation.

The ICRP has established the radiation Q in ICRP-26 and the W_R in ICRP-60.

H.2 Radiation Q and W_R

Table H-1 specifies the weighting factors for the different radiations. The values are the same as specified, only the terminology in ICRP-26 and ICRP-60 has changed.

Table H-1. Radiation Q and W_R

Radiation	Q	W_R
X-rays and gamma	1	1
Beta	1	1
Alpha	20	20

Therefore, Q and W_R are multipliers that are used to determine the dose equivalent (H) at a point in tissue. The H is determined by the following equation.

$$H = DQ \text{ or } DW_R$$

Where:

D = Absorbed dose

Q or W_R = Radiation Quality Factor or radiation Weighting Factor, respectively

The DU oxides found on the battlefield are alpha and beta-gamma emitters. Therefore, for the same biological endpoint, the alpha particle is 20 times more effective in producing an effect than a beta particle or a photon (x-rays and gamma rays).