

Resolution to change the explanation of dose equivalent in the SI Brochure

The Comité International des Poids et Mesures,

considering that

- the current definition of the SI unit of dose equivalent (sievert) includes a factor " N , (product of any other multiplying factors) stipulated by the International Commission on Radiological Protection" (ICRP), and
- both the ICRP and the International Commission on Radiation Units and Measurements have decided to delete this factor N as it is no longer deemed to be necessary and
- the current SI definition of H including the factor N is causing some confusion

decides to change the explanation in the brochure "Le Système International d'Unités (SI)" to the following:

The quantity dose equivalent H is the product of the absorbed dose D of ionizing radiation and the dimensionless factor Q (quality factor) defined as a function of linear energy transfer by the International Commission on Radiation Units and Measurements:

$$H = Q \cdot D$$

Thus, for a given radiation, the numerical value of H in joules per kilogram may differ from that of D in joules per kilogram depending on the value of Q .

The Comité further

decides to maintain the final sentence in the explanation as follows:

In order to avoid any risk of confusion between the absorbed dose D and the dose equivalent H , the special names for the respective units should be used, that is, the name gray should be used instead of joules per kilogram for the unit of absorbed dose D and the name sievert instead of joules per kilogram for the unit of dose equivalent H .

This resolution was agreed by the CIPM in October 2002

Background information

In 1986, a Joint Task Group of the ICRP and the ICRU published a report entitled "The quality factor in radiation protection" [1] in which it is recommended (page 11) that the additional factor N be eliminated from the equation for dose equivalent. **"Since the factor N originally included in the definition of the dose equivalent has not found any practical application and no value different from unity has been given by the ICRP or is expected to be given, it is recommended that N no longer be part of the definition."**

Subsequent publications of both the ICRU and the ICRP no longer use the factor N in the definition of dose equivalent. For example in ICRU Report 51 Quantities and units in radiation protection dosimetry (1993), dose equivalent is defined as $H = Q D$. Similarly in the "Glossary of terms and definitions of quantities", on page ix of ICRP Publication 74 Conversion coefficients for use in radiological protection against external radiation (1996), dose equivalent is defined as $H = Q D$.

[1] ICRU Report 40 The quality factor in radiation protection (1986), Bethesda, ICRU