

irradiance (at a point of a surface), E

Radiant power, P , of all wavelengths incident from all upward directions on a small element of surface containing the point under consideration divided by the area of the element. SI unit is W m^{-2} .

Notes:

1. Mathematical definition: $E = \frac{dP}{dS}$. If the radiant power is constant over the surface area considered, $E = \frac{P}{S}$.
2. Alternative definition: Integral, taken over the hemisphere visible from the given point, of the expression $L \cos \theta d\Omega$, where L is the *radiance* at the given point in the various directions of the incident elementary beams of solid angle Ω and θ is the angle between any of the beams and the normal to the surface at the given point.

$$E = \int_{2\pi} L \cos \theta d\Omega$$

3. This term refers to a beam not scattered or reflected by the target or its surroundings. For a beam incident from all directions, *fluence rate* (E_0) is an equivalent term.
4. $E = \int_{\lambda} E_{\lambda} d\lambda$ where E_{λ} is the *spectral irradiance* at wavelength λ .

Source:

PAC, 2007, 79, 293 (*Glossary of terms used in photochemistry, 3rd edition (IUPAC Recommendations 2006)*) on page 357