

1.11: Exitance M

The **exitance** of an extended surface is the rate at which it is radiating energy (in all directions) per unit area. The usual symbol is M and the units are W m^{-2} . It is an intrinsic property of the radiating surface and is not dependent on the position of an observer.

Most readers will be aware that some property of a black body is equal to σT^4 . Technically it is the exitance (integrated over all wavelengths, with no subscript on the M) that is equal to σT^4 , so that, in our notation, the [Stefan-Boltzmann law](#) would be written

$$M = \sigma T^4, \quad (1.11.1)$$

where σ has the value $5.7 \times 10^{-8} \text{W m}^{-2} \text{K}^{-4}$.

Likewise the familiar Planck equation for a black body:

$$M_\lambda = \frac{2\pi hc^2}{\lambda^5 (e^{hc/kT} - 1)} \quad (1.11.2)$$

gives the exitance per unit wavelength interval.

The word "emittance" is an older word for what is now called exitance.

The **emissivity** of a radiating surface is the ratio of its exitance at a given wavelength and temperature to the exitance of a black body at that wavelength and temperature.

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