

Solar radiation unit conversions

1 BTU = 251.9958 Calorie

1 BTU = 1055.056 Joule

1 BTU = 1055.056 Watt-sec

1 Langley = 1 Cal/cm²

1 Cal = 4.1868 Joules

1 Watt = 1 Joule/sec

1 Watt-sec = 1 Joule

1 Watt/m² = 0.085985 Lang/hour (see Conversion Sequence 1)

1 Lang/hour = 11.6300 Watt/m² (see Conversion Sequence 1)

1 Langley = 41868 Joules/m² (see Conversion Sequence 2)

1 Langley = 41868 Watt-sec/m² (see Conversion Sequence 2)

1 Watt/cm² = 3170 BTU/ft²-hour (see Conversion Sequence 3)

1 Watt/m² = 0.3170 BTU/ft²-hour (see Conversion Sequence 3)

1 Langley/day = 0.484583 Watt/m² (see Conversion Sequence 4)

1 Langley/day = 0.153613 BTU/ft²-hour (see Conversion Sequence 4)

1 Watt = 3.41216 BTU/hour (see Conversion Sequence 5)

Conversion sequence 1:

$$\frac{\text{Lang}}{\text{hour}} = \frac{\text{Cal}}{\text{cm}^2 \text{hour}} * \frac{\text{Watt-sec}}{0.2388459 \text{Cal}} * \frac{\text{hour}}{3600 \text{sec}} * \frac{10000 \text{cm}^2}{\text{m}^2}$$

$$\frac{\text{Lang}}{\text{hour}} = 11.6300 \frac{\text{Watt}}{\text{m}^2} \quad \text{or} \quad \frac{\text{Watt}}{\text{m}^2} = 0.085985 \frac{\text{Lang}}{\text{hour}}$$

Conversion Sequence 2:

$$\text{Lang} = \frac{\text{Cal}}{\text{cm}^2} * \frac{4.1868 \text{Joule}}{\text{Cal}} * \frac{10000 \text{cm}^2}{\text{m}^2}$$

$$\text{Lang} = 41868 \frac{\text{Joule}}{\text{m}^2} = 41868 \frac{\text{Watt-sec}}{\text{m}^2}$$

Conversion Sequence 3:

$$\frac{\text{Watt} - \text{sec}}{\text{m}^2 - \text{sec}} = \frac{\text{BTU}}{1055.056} * \frac{1}{\text{m}^2 - \text{sec}} * \frac{3600\text{sec}}{\text{hour}} * \frac{\text{m}^2}{10.76391\text{ft}^2}$$

$$\frac{\text{Watt}}{\text{m}^2} = 0.3170 \frac{\text{BTU}}{\text{ft}^2 \text{hour}}$$

Conversion Sequence 4:

$$\frac{\text{Lang}}{\text{hour}} * \frac{24\text{hour}}{\text{day}} = 11.6300 \frac{\text{Watt}}{\text{m}^2} \quad (\text{from Conversion Sequence 1})$$

$$\frac{\text{Lang}}{\text{day}} = \frac{11.6300}{24} \frac{\text{Watt}}{\text{m}^2} = 0.484583 \frac{\text{Watt}}{\text{m}^2}$$

$$\frac{\text{Lang}}{\text{day}} = 0.484583 \frac{\text{Watt}}{\text{m}^2} * \frac{0.3170 \frac{\text{BTU}}{\text{ft}^2 \text{hour}}}{\frac{\text{Watt}}{\text{m}^2}} \quad (\text{from Conversion Sequence 3})$$

$$\frac{\text{Lang}}{\text{day}} = 0.153613 \frac{\text{BTU}}{\text{ft}^2 \text{hour}}$$

Conversion Sequence 5:

$$\frac{\text{Watt}}{\text{m}^2} * \text{ft}^2 = 0.3170 \frac{\text{BTU}}{\text{ft}^2 \text{hour}} * \text{ft}^2 \quad (\text{from Conversion Sequence 3})$$

$$\frac{\text{Watt}}{\text{m}^2} * \text{ft}^2 * \frac{\text{m}^2}{10.76391\text{ft}^2} = 0.3170 \frac{\text{BTU}}{\text{hour}} \quad \text{Watt} = 3.41216 \frac{\text{BTU}}{\text{hour}}$$