DETERMINING EPROM ERASURE OR STERILIZATION TIME

Sterilization dosage = (UV intensity) x (Exposure time). Therefore,

Sterilization time in seconds = \[
\frac{\text{Sterilization dosage} \times 1,000,000}{\text{Intensity}} \quad (\mu \text{W} \cdot \text{sec/cm}^2) \times \frac{1}{\mu \text{W/cm}^2}
\]

or

\[
\frac{\text{Sterilization dosage} \times 1,000,000}{\text{Intensity}} \quad (\mu \text{W} \cdot \text{sec/cm}^2) \times \frac{1}{\mu \text{W/cm}^2}
\]

Notice the term “\( \mu \)” in the numerator of the second equation - this is not in the first equation. By multiplying the numerator in the first equation by 1,000,000, you are converting watts into microwatts. One microwatt = one watt x 10^{-6} (10 to the (-6) power).

Assume you are sterilizing ostrich or emu eggs and the sterilization dosage = 8800 \( \mu \text{W} \cdot \text{sec/cm}^2 \); the intensity of the light source is 1500 \( \mu \text{W/cm}^2 \). Note that we are referring to micro\text{watt seconds}. Since the dosage is already in microwatts, there is no need to multiply the numerator by 1,000,000.

The resulting equation would be:

\[
\frac{8800 \mu \text{W} \cdot \text{sec/cm}^2}{1500 \mu \text{W/cm}^2} = 5.87 \text{ seconds}
\]

Now assume you are erasing EPROMs and the recommended erasure dosage is 15W.sec/cm^2. Assume the intensity of the light source is 18,000W/cm^2. The equation would be:

\[
\frac{15 \text{W sec/cm}^2 \times 1,000,000}{18,000 \mu \text{W/cm}^2 \times 60} \quad \text{You get} \quad \frac{15,000,000 \mu \text{W sec/cm}^2}{18,000 \mu \text{W/cm}^2 \times 60} =
\]

\[
\frac{833.33 \text{ sec.}}{60} = 13.89 \text{ minutes}
\]