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Calculating Cure Times for Specific UV Doses

UV cure time calculation for stationary lamp

UV dose (mJ/cm^2) = Intensity (mW/cm^2) x Time (Sec)

mW = mJ/sec

1 J = 1000 mJ

$$\text{Time} = \frac{\text{UV dose (mJ/cm}^2\text{)}}{\text{Intensity (mJ/cm}^2\text{ sec)}}$$

For example:
If an adhesive needs 10 J/ cm^2 to be cured, then the calculation is as follows

UV dose = 10 J/ cm^2 = 10,000 mJ/ cm^2

If the intensity of the lamp is 2000 mW/cm^2 and if the adhesive sees all of the light (there is no light lost in the curing set up), then cure time is calculated as below

$$\text{Time} = \frac{\text{10,000 mJ/ cm}^2}{\text{2,000 mJ/ cm}^2\text{ sec}}$$

So the cure time = 5 sec at the curing distance of 1 cm

When setting up cure time – it is OK to over cure slightly. So the cure time set up can be 2-5 times that of the recommended cure time.

Speed setting calculation for Conveyor system lamp

UV dose (J/cm^2) = Power (WPC) / Speed (cm/second)

WPC = Watt/cm
Watt = Joule / sec
WPC = J / cm sec

Therefore, the speed of the conveyor = Power (J / cm sec) /UV dose (J/cm^2)

For example:
If an adhesive needs 10 J/ cm^2 to be cured, and the lamp power is 100 WPC, then the calculation is as follows

Speed of the conveyor = 100 J/cm sec ÷ 10 J/cm^2 = 10 cm per second

When setting up the cure time, it is OK to over cure slightly. So the cure speed set up can be 2-5 times slower than the recommended conditions.