Questions and Answers Concerning the Use of UV Lights and Dymax Adhesives

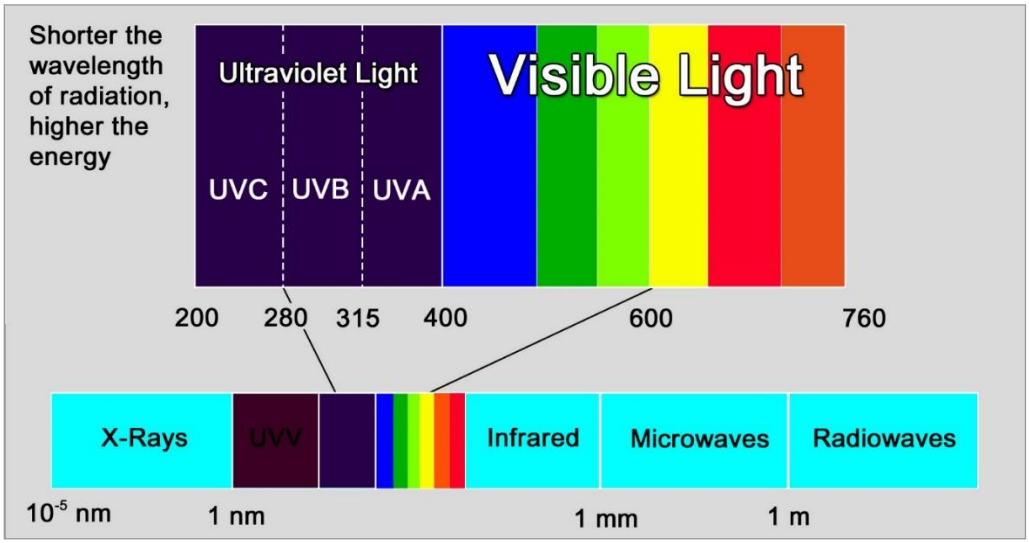
The following is a list of questions that have cropped up on a regular basis with respect to UV lights and light-curable adhesives.

The answers are accurate and agree with published government standards; however, all usage and plant conditions cannot be incorporated in these answers and as such are intended for general information only.

What Is Ultraviolet (UV) Light?

Ultraviolet light is a form of energy that occupies a small portion of the electromagnetic radiation spectrum, with a shorter wavelength than that of visible light and a longer wavelength than that of X-rays. Visible light has a wavelength of 380-700 nanometers (nm), while ultraviolet energy has a wavelength of 180-400 nanometers.

UV occurs naturally in sunlight and is that part of the sun's emissions that cause tanning or sunburns and creates vitamin D in the skin.



How Is Ultraviolet Light Measured?

Ultraviolet light is usually characterized by wavelength or wavenumber. Wavelength is the term of preference for many scientists and engineers, and is expressed in terms of nanometers, often abbreviated as nm.

The strength of UV lamps is sometimes listed as the number of Watts per linear inch of the tubular light bulb. For example, 300 Watt-per-inch lamps are commonly used in UV ink “dryers”. This measurement is frequently confused with the strength of the incident light striking an object, which is the only useful way to estimate cure speed of adhesives.

Intensity is milliwatts per square centimeter (mW/cm^2) is always measured at a particular wavelength and at the working distance away from the light bulb.

Are There Different Types of Ultraviolet Light?

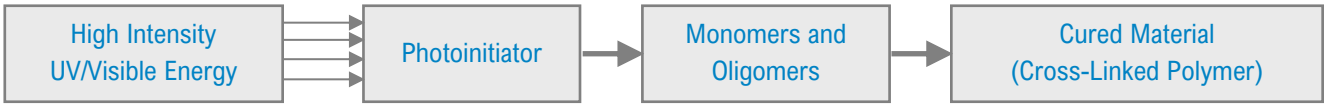
The ultraviolet region is divided into three regions:

UV-A	Long wavelength	320-380 nanometers
UV-B	Medium wavelength	280-320 nanometers
UV-C	Short wavelength	180-280 nanometers

Dymax UV light-curable adhesives typically use the UV-A region for curing. Dymax visible light-curable adhesives typically take advantage of both the UV-A and the visible light (380-500 nm) coming from the light source.

How Does Light Cure Adhesives?

The photons emitted by UV energy of sufficient intensity and specific wavelength carry enough energy to push certain molecules into reactive states. These molecules, known as photoinitiators, initiate a process known as polymerization which turns the liquid adhesive into a solid bond. The resultant polymer chains cross-link together forming a strong, solid structure. The reaction molecularly changes a liquid to a solid.



What Is Light Curing?

Light curing is a process of curing a material with ultraviolet and visible light energy. Materials such as marking or screening inks, coatings, adhesives, or encapsulants can cure rather than set or dry in a quick, efficient, economical process. Curing takes seconds or fractions of seconds instead of hours.

