

**There are many benefits to UV-LED curing verses mercury vapor curing: low heat to the substrate, consistent & long bulb life, low energy consumption, near visible UV output for safer work environment, no ozone emissions, and high UV output to cure LED formulated inks.**

## Lamp Configurations

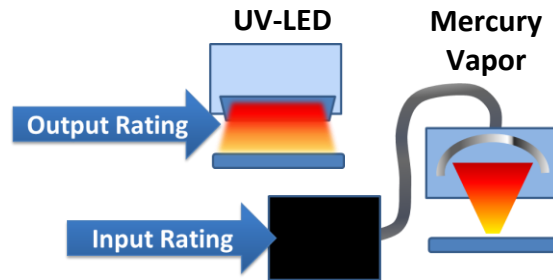
Nazdar's UV-LED inks have been specifically formulated to cure at 395 nanometers (nm). In general, UV-LED systems have a tolerance range of +/-5 nm and an nm output curve that is relatively narrow but spans approximately +/- 15 nm. The initiators selected for UV-LED inks target this range, but are also reactive outside this range. This means that UV-LED inks should be reactive to both UV-LED and mercury vapor curing systems. This may vary to some degree depending on the specific ink's color and pigment load.

With the introduction of 4+ watts, 395 nm UV-LED light sources, inks can effectively be cured at processing speeds typical for screen and digital printing. Systems that are below 4 watts would require a thinner ink deposit, lower pigmented ink, closer distance between the lamp and the printed ink and slower scanning / belt speed when curing.

Currently in the market, manufacturing a 4+ watts system requires access to higher quality UV-LED lamps with a more sophisticated cooling system. Accessing parts and assembling a lamp to gain effective curing remains out of reach for those thinking of assembling their own units.

## Cooling Configurations

UV-LED lamps require cooling at the lamp and electronics to run efficiently and effectively. A good cooling system should have a lamp life of 20,000+ hours of continual usage. Two types of systems are used: air cooling and water cooling. Water cooling tends to be more effective and is not affected by the surrounding unit's environment. However, a water chiller has a higher upfront cost, needs to be maintained on a regular basis, and has a potential for leaking. More UV-LED manufacturers are developing air cooled systems that are built into the lamp head itself. Air cooling systems are incorporated into the lamp head and tend to have less maintenance. The caution to using air cooling is that the environment should be clean and kept at room temperatures or cooler.



## UV-LED to Mercury Vapor

UV-LED is unlike mercury vapor curing systems in that they are not focused or use reflectors; instead, the light directed at the substrate is diffused. Reference the illustration.

In addition, UV-LED systems are rated on their output or how much light is generated at the lamps. For example, a 4 watt UV-LED system refers to 4 watts of energy emitted from the lamps. Mercury vapor curing systems are rated based on their input of energy. For example, a curing system can be set to 200 or 300 watts. A radiometer is then used to measure the output of the system; typical output for a graphics screen printer is about 400 to 600 mW.

Because of these differences, it becomes difficult to determine how to compare apples to apples energy consumption between systems. As a very general guideline, a 4 watt UV-LED system at ¼" to ½" is similar to a 300 watt mercury vapor system with typical lamp to print distances 6+ inches. In general, UV-LED provides a 30-50% reduction in energy consumption to run the lamp and cooling system. This does not take into account energy needed to cool or heat the displaced air pulled through a mercury vapor system.

## Related Nazdar Products

Contact your Nazdar distributor for product availability and offering.

## UV-LED Screen Inks

- 2300 Series UV-LED / UV Container Ink
- 2400 Series UV-LED membrane switch ink