Phoseon®

WhisperCure™ Technology

SMART UV LED

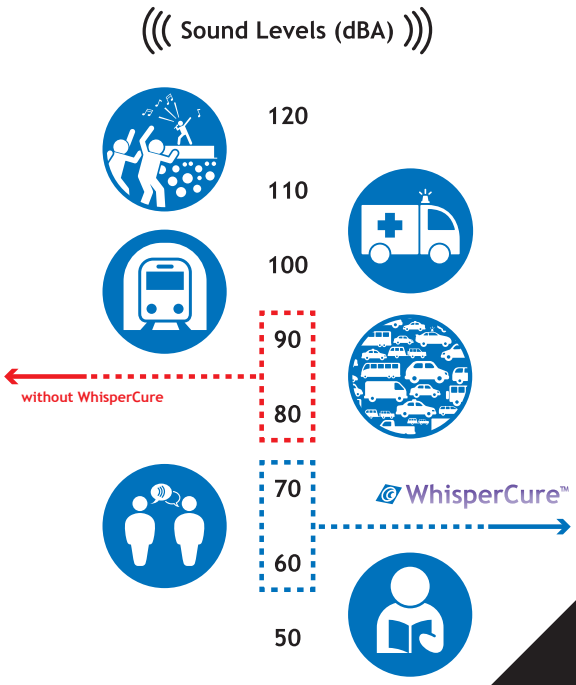
Stable, Consistent, Precise Curing

Background

LED curing has become the new standard for the majority of digital inkjet printers, in addition to enjoying rapid growth in both coating and adhesive applications. Collaboration between light source providers, materials companies, and machine builders quickly advanced LED curing capability to deliver three primary benefits: advanced capabilities, low operating economics, and environmental advantages.

Air-cooled LED light sources have grown in popularity due to their simple design and lower overall system prices (no need for a cooler or chiller; no water maintenance; no risk of condensation). To keep the LEDs operating at maximum efficiency, air-cooled systems use fans to move ambient air across heat-sinks to remove any heat generated by the diodes.

Sound is measured in decibels (dBA) on a logarithmic scale. The human ear has a large dynamic range and is sensitive to both actual sound as well as pitch and/or tone. The chart below provides some common dBA ratings. Due to the logarithmic scale, most humans perceive a doubling in sound with a 5 - 10dBA increase in sound.



Air-cooled Lamp Challenges

For Excelitas to provide increasingly powerful air-cooled lamps, more air-flow is required to remove the heat generated by LEDs. The amount of air flow is measured in Cubic Feet per Minute (CFM).
CFM is typically improved with either larger fans or increasing the speed at which the fans rotate.

There are two significant challenges to overcome. The product sound level is first. A fast rotating fan typically equates to increased sound as the fan's blades must turn at a high revolutions per minute (RPM). There are workplace safety regulations in place that specify machinery must operate at or below a safe threshold. For example, European directive EU 2003/10/EC states machinery must operate under 80dBA to be considered safe and above 85dBA ear protection is required. The United States OSHA standards are 85dBA and 90dBA respectively.

The second challenge is product size. While a large, slowly rotating fan is ideal, it is not a practical alternative given the physical size constraints users demand from their LED curing systems. Additionally, if a 300mm long unit measures 75dBA, then two 300mm units would measure 78dBA. Each equivalent addition of a similar product size increases the output by 3dBA.

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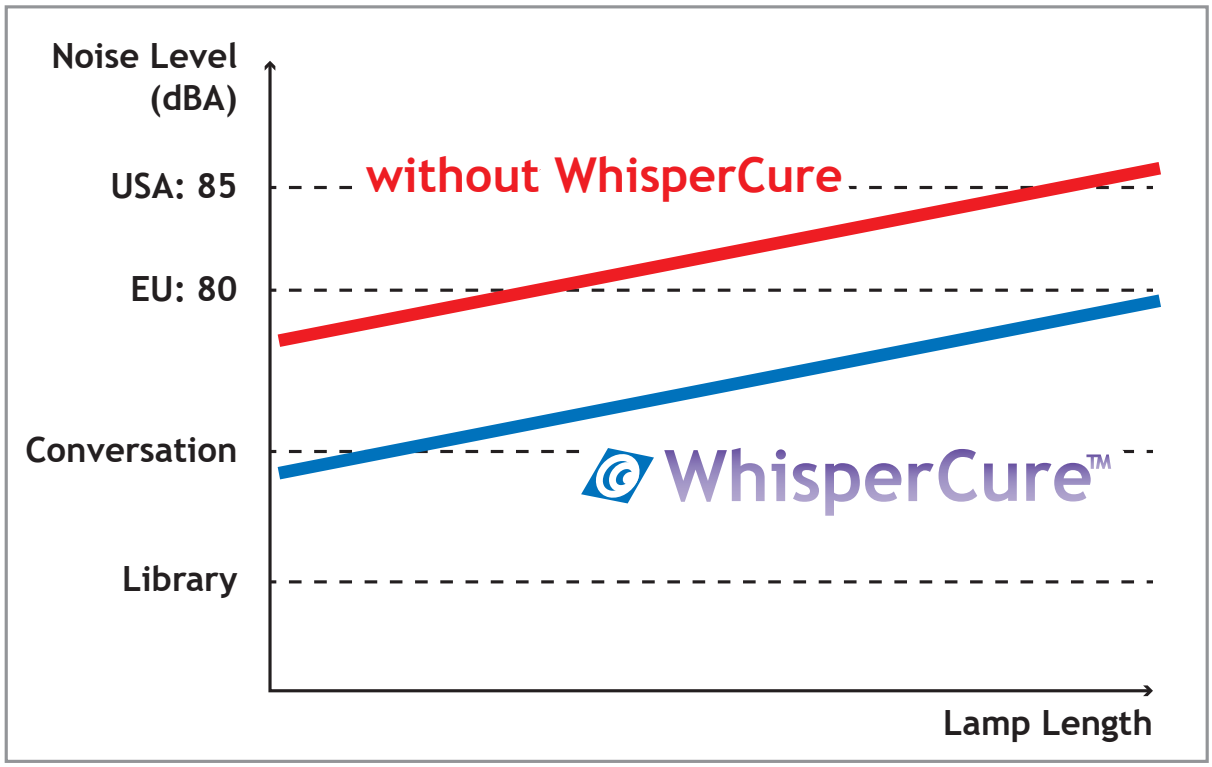
Excelitas used a holistic, system's architecture approach to attack and solve the air-cooled challenges previously outlined. By combining 15+ years of SLM™ LED array experience, advanced thermal management, Computational Fluid Dynamic (CFD), and electronic control, the Labs developed WhisperCure technology. (see chart below)

WhisperCure technology contributes to a safe workplace environment by providing high power air-cooled lamps at a fraction of the sound level previously required. Operators of those machines will experience a safer environment as the sound will be below designated operating conditions. The reduced sound encourages normal voice communication and may allow removal of ear protection, which may also indirectly improve worker morale.

Secondly, WhisperCure technology allowed Excelitas to increase the UV output power while maintaining the same unit size. Machine builders can now build wider, higher-power air-cooled systems that previously required water-cooling, enabling an overall lower-priced solution without the need for additional cooling equipment.



Summary

WhisperCure technology uses proprietary and patented innovations to provide a unique, compelling solution. This solution translates directly to higher productivity, thereby improving profitability.

The summary benefits are as follows:

- High-performance applications enabled from maximum peak irradiance
- Regulatory compliance as the LED curing system will be below required thresholds
- Improved productivity and profitability as operators improve communication

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