

UV LED System Monitoring: Ensuring Reliability and Quality in Industrial Processes

In the world of industrialised processes, precision, and quality control are paramount at every step of production. This meticulous approach extends to the curing process, where the reliability of UV LED systems is crucial. A failure in the UV unit not only results in a defective part or print but also poses the challenge of disposing of wet chemistry, further emphasizing the significance of robust UV LED system monitoring.

Understanding UV LED Systems

UV LED systems are meticulously crafted, with single LED dies attached to a substrate, often grouped into segments, arrays, or modules. These modules are then combined to create a UV LED head tailored to specific production requirements, ensuring the right size and power output.

Output Monitoring or System Monitoring: The Pros and Cons

The monitoring of UV LED systems can take two primary forms: online output monitoring and external output monitoring using an independent radiometer. Each approach offers unique advantages and challenges.

Online output monitoring involves placing a sensor within the UV system to continuously measure the UV head's output. While this method offers real-time monitoring and the potential for closed-loop feedback systems to adjust the UV system output automatically, it faces challenges. The sensor operates in a harsh environment, which, if poorly positioned, can yield inaccurate readings and degrade over time. Calibrating the sensor accurately remains a significant challenge.

External output monitoring using an independent radiometer provides an alternative approach that is easier to keep calibrated. However, achieving accurate and repeatable readings can be challenging, especially in high-speed web-type production lines where the radiometer's positioning becomes problematic.

Other UV System Health Monitoring Approaches

Apart from output monitoring, UV LED systems can be monitored for health using various techniques:

- **Control System Monitoring:** UV systems often incorporate control systems that can monitor and report on the system's overall health.
- **Self-Compensating Modules:** Some advanced UV LED systems with **eCureTECH™** employ self-compensating modules. If a single die fails, the remaining dies increase power output to compensate, ensuring continued operation even in the presence of minor failures.
- **Constant Temperature Monitoring:** Monitoring the temperature of individual modules and other critical electronic components allows the control system to alert operators to issues before they necessitate a system shutdown, safeguarding the UV LED head.
- **Self-Diagnosing Systems:** Superior control systems, such as the **SCR control system**, can actively monitor and report UV LED module failures, enhancing the system's reliability and maintainability.

The Ultimate Solution: Self-Healing/Diagnosing Systems with Calibrated Radiometers

The pinnacle of UV LED system monitoring lies in self-healing and self-diagnosing systems, complemented by a calibrated independent radiometer. This comprehensive approach ensures not only real-time monitoring and early detection of issues but also the ability to maintain accurate UV output measurements, minimizing the risk of production defects and waste.

In an industrial landscape where precision and reliability are paramount, IST INTECH's commitment to advancing UV LED system monitoring solutions stands as a testament to its dedication to excellence. As technologies evolve, these innovations continue to empower businesses across industries to achieve the highest standards of quality in their processes