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A UV Lamp Power Supply and Method for Improved UV Lamp Performance in Vertical Applications BRETT SKINNER, DARRIN LEONHARDT, CHARLES WOOD, Heraeus Noblelight America — UV Lamps are ubiquitous in the curing of industrial coatings, inks, and adhesives. Most applications, such as printing, require the lamps to be oriented horizontally. Yet many applications like optical fiber require the lamp to be vertical. First-generation, ferroresonant power supplies, with their aggressive ripple, allowed lamps to be operated both vertically and horizontally. Then, DC power supplies were implemented into horizontal applications due to their numerous advantages over their precursor: higher efficiency, lighter weight, lower risk of slot arcing and magnetron internal moding, and more. However, the lack of turbulence in the plasma yielded an unsymmetrical distribution of the bulb fill along the bulb length in additive bulbs when not horizontal. As a result, significantly decreased overall UV output occurs along with increased peak temperatures that can reduce the lifetime of the bulb, precluding the use of DC power supplies in vertical applications. In order to study the effects that the waveform driving both engines in the power supply has on the bulb, a special power supply was built which allows all aspects of the waveform to be controlled: duty cycle, fall time, rise time, frequency, phase delay, and peak current. Years of testing these parameters have produced a waveform that provides the benefits of both DC and ferroresonant power supplies without the drawbacks inherent in both. This paper examines the impact that each waveform parameter has on vertical bulb performance.

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