

UV Curing of Ink Jet Printing

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Abstract

The physical properties of UV cured materials are substantially affected by the lamp systems used to cure them. The development of the intended physical properties, whether an ink-jet printed process colors or solid colors can depend on how well these lamp systems are designed and managed.

A number of variables of a UV curing lamp system, which can be designed or selected to produce the most efficient result, are discussed. Variables include power, irradiance, spectral radiance, infra-red irradiance, and dichroic treatment of radiation and lamp geometry. The interaction with the optical and physical characteristics of materials such as spectral absorptivity, optical thickness, and diffusivity, result in limitations of the cure "window." Typically, this cure "window" is limited by loss of key physical properties, including adhesion, solvent resistance and scratch resistance.

The four key factors of UV lamps are: UV irradiance (or intensity), spectral distribution (wavelengths) of UV, total UV energy, and infra-red radiation. The ability to manage the various lamp characteristics and match them to the optical properties of the curable materials, widens the

range in which UV curing is a faster, more efficient production process. Practical keys are suggested which will facilitate an analytical approach to process optimization and monitoring. UV curing systems for moving-head printers and stationary-head printers are discussed.

The ability to match all of these lamp characteristics to the optical and physical properties of a UV curable material widens the range of tools available to the process designer, and yields more efficient and stable UV curing processes in production.

Biography

Mr. Stowe is Director of Technical Communications for Fusion UV Systems. He has more than 20 years of substantial experience with the design and engineering of UV curing systems, custom-designed UV curing equipment for various commercial and industrial processes, and development of new applications of UV curing systems. He has published more than 90 technical papers and articles.

Mr. Stowe has several patents in UV energy sensing, electronics, and radiometry. He has a BS in Physics from the American University.