

## LED UV

ADVANCED UV SOLUTIONS WITH  
CONTEMPORARY PATENTED DESIGN  
FOR WATER, INDUSTRY, MEDICAL  
AND BIOSCIENCE



UV LED PRODUCT SERIES  
CURING, PRINTING AND LITHOGRAPHY

- ⇒ CONSULTING
- ⇒ DESIGN
- ⇒ MANUFACTURE
- ⇒ QUALITY
- ⇒ SALES
- ⇒ SERVICE SUPPORT



## TruSpectra

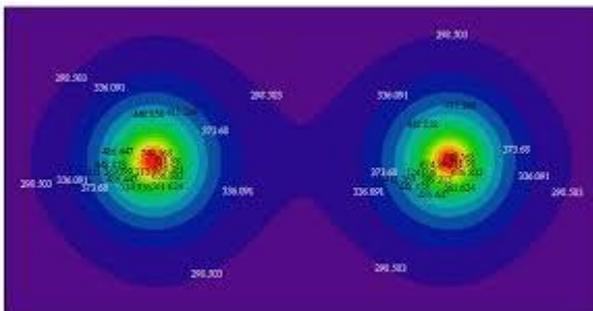
ADVANCED UV LED SOLUTIONS WITH CONTEMPORARY DESIGN

### INNOVATION & QUALITY

Verentia relies on high-quality materials and precise workmanship to produce high quality UV systems be it for Bio Science, Curing, printing or Disinfection market. Verentia has developed an innovative UV LED dryer for curing all types of UV coating and adhesives. Depending on the material requirement, the system is available with UV LED curing lamps. Thanks to its compact design, the system can be adapted to suit any production environment



### HIGH STANDARDS IN DESIGN, MANUFACTURING AND QUALITY



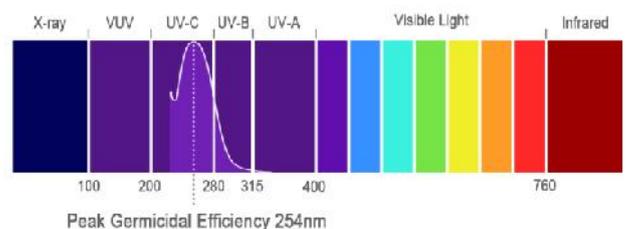
Industrial and medical fraternity at hospitals encounter various tasks, surgeries, examinations and treatments. Hygiene in the workplace is almost constantly challenged. Disinfection Performance and reliability of medical equipment is therefore especially paramount., at the same time, the subject of economic efficiency gains in importance. Intelligent and high quality disinfection solutions help to reduce ongoing operational costs significantly at the

### PROUCT DESIGN AND FLEXIBILITY

The use of UV LED technology permits high Irradiance, optimized thermal design allows low heat build-up, a maintenance free service life, high efficiency, high Fluence and thus maximum economic viability. We do more than just design, develop, manufacture and supply electronic power supplies and UV lamps, we specializes in tailoring our UV/LED equipment to our customers' unique technology needs and business environments

### HIGH IRRADIATION, DIFFERENT WAVELENGTH & COMPACT DESIGN

TruspectraUV comes with inbuilt high performance LED with high Irradiance factor to suit individual needs of the customer from 230nm to 405nm. TruspectraUV offers unparalled ease in controlling different wavelength through specially designed electronics which is integrated inside the compact and aesthetic housing at the same time thermal engineering support long life and ease in maintenance.



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ADVANCED UV LED SOLUTIONS WITH CONTEMPORARY DESIGN

## CHALLENGING APPLICATIONS

For the most challenging applications, off-the-shelf lighting solutions cannot deliver the performance you need to optimize your system. Often designed for a wide range of applications, these off-the-shelf products simply cannot deliver the same results as a custom LED solution that is designed specifically to meet your requirements

## CHIP ON BOARD TECHNOLOGY

At Verentia, we utilize Chip-on-Board technology to create compact, high intensity and uniform LED light sources. We design and manufacture products, from intricate LED arrays to complex turnkey solutions, integrating custom optics, electronics, mechanics and software to provide the best possible solution.

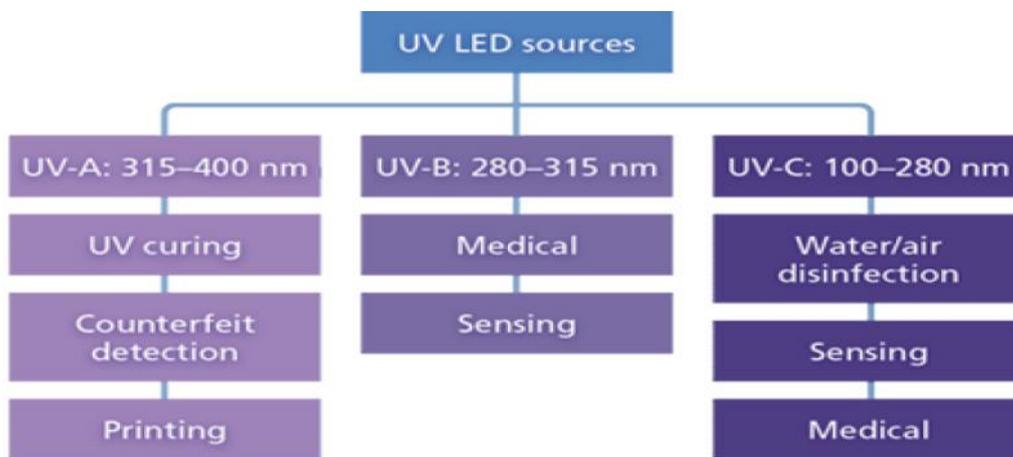
## CUSTOM SOLUTIONS

Verentia strengths in LED engineering and related technology allow us to offer the widest range of wavelengths available on the market. We specialize in creating custom LED solutions that utilize multiple wavelengths or non-visible wavelengths such as UV & IR solutions. The strength of our relationships with LED suppliers means that we are always up-to-date with the latest in LED technology.



APPLICATIONS

Visible-spectrum LEDs have penetrated into TV and mobile backlighting, automotive, general lighting, signage, and other markets, ultraviolet (UV) LEDs are just beginning to replace incumbent UV sources in diverse applications, including curing, counterfeit detection, medical, sensing, printing, and water/air disinfection.



- 230 to 400 nm: optical sensors and instrumentation
- 230 to 280 nm: UV ID verification, barcodes
- 240 to 280 nm: sterilization of surface areas and water
- 250 to 405 nm: forensic and bodily fluid detection and analysis
- 270 to 300 nm: protein analysis, drug discovery
- 300 to 320 nm: medical light therapy
- 300 to 365 nm: polymer and ink printing
- 375 to 395 nm: counterfeit detection
- 390 to 410 nm: superficial / cosmetic sterilization



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### UV CURING PRINTING SYSTEMS SALIENT FEATURES

- ◇ High Performance UV LED **Peak Irradiance** 27W/cm<sup>2</sup> (365nm) and 34W/cm<sup>2</sup> (405nm)
- ◇ Industry is preferring over traditional drying methods as the results are much better, rejection rates are low, superior bonding and the entire process improves the solvency and scratch resistance of the product.
- ◇ UVA led is especially used in paper and wood coating industry as it is more energy efficient, losses very little heat and can be manufactured with much smaller foot print with far better optical design then traditional UV lamps.
- ◇ The **Truspectra UV** has an electronic with an option for modulation of power supply for effective UV discharge with a maximum power output of 0.1KW to 7.5KW.
- ◇ **Advanced thermal solutions** provides long land maintenance free life of UV led module.
- ◇ Precise control allows the system to modulate the performance in accordance with customer product curing and printing requirements.
- ◇ **Small and compact environmentally friendly (no mercury) solutions** with reduced footprint is ideal for space constraints
- ◇ Flexible and scalable to suit process and production requirements.
- ◇ Continuously variable power/Irradiance control. Service-friendly due to pluggable connections
- ◇ Applications in curing of Adhesive, coatings, inks, wood curing applications, UVA flexographic printing, counterfeit detection, forensics applications, fluorescence, sterilization





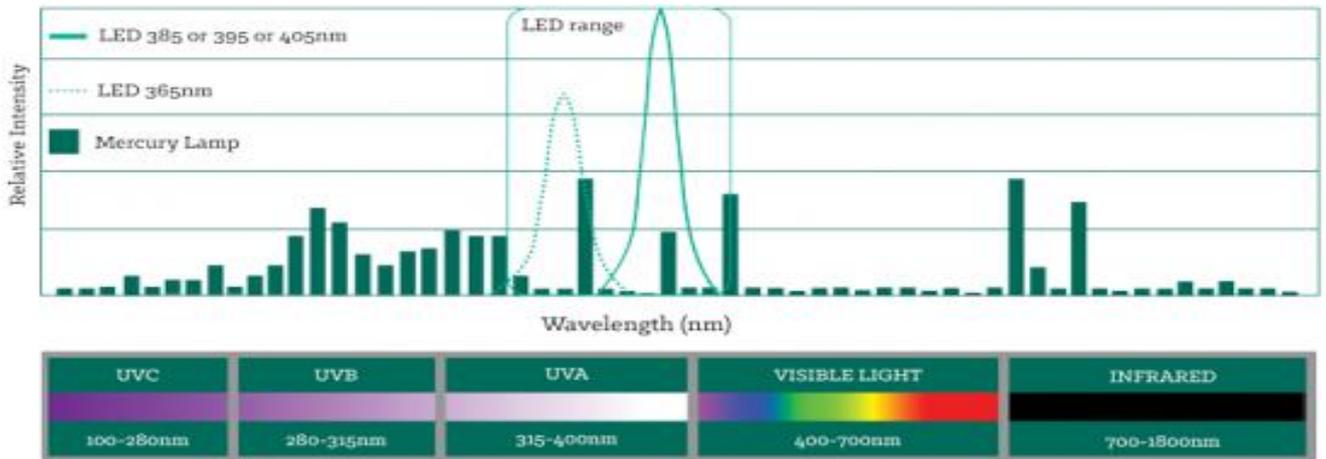
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**EXPERIENCE THE FUTURE OF UVA LED CURING, PRINTING AND LITHOGRAPHY**

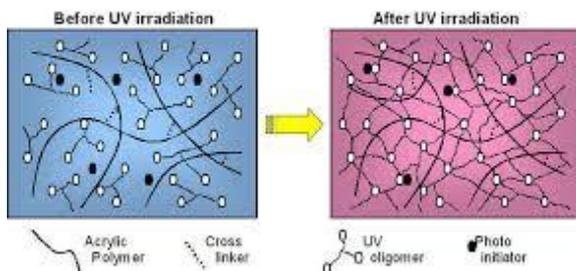
Verentia is leading manufacturer of UV and LED based solutions. With solid core strength in designing custom solutions, we understand that our customer need tailor made solutions suiting their process with quality, performance and timely delivery. Our expertise and experience means that we can rapidly deliver the most precise, efficient and cost effective solution, ensuring that our customer gets maximum performance and value from our systems.



**UV curing** is a process in which ultraviolet light and visible light is used to initiate a photochemical reaction that generates a cross-linked network of polymers. UV Curing is adaptable to printing, coating, decorating, stereo lithography and assembling of a variety of products and materials owing to some of its key attributes, it is: a low temperature process, a high speed process, and a solvent less process. Cure is by polymerization rather than by evaporation.



UV curable adhesive = ( acrylic polymer + crosslinker ) + ( UV oligomer + photo initiator )  
 ※ Non-UV adhesive = acrylic polymer + crosslinker.



The typical light source spectrum wavelength ranges from Ultraviolet Light (UVC 200-280nm, UVB: 280-315nm, UVA 315-400nm) to Visible Light (400-760nm) and Infrared Light (760-3000nm).

UV LED sources have a concentrated narrow spectral emission. LED sources are typically described by their peak emitting wavelength, but in practice UV LED sources emit in a distribution that is typically +/-20nm from the specified

peak. For example a “395nm” LED source typically emits 96% of its energy between 380nm and 420nm with the distribution being essentially Gaussian.



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### UV CURING SYSTEM—VARIED APPLICATIONS FOR PRINTING

#### UV CURING OPENS UP DOOR TO NEW MARKETS

The world of UV curing opens up many doors to new markets and provides converters with green alternatives when using UV curing technology. UV cured inks, coatings, adhesives, silicones and specialty coatings provide outstanding physical and chemical properties which are paramount in the success of most UV curing applications. Medium pressure mercury vapor and metal halide UV lamp chemistries are ideal for use in UV cured print applications including UV flexo, UV offset, UV screen, UV coating & UV inkjet applications. UV curing technology promotes outstanding environmental and waste saving benefits which most governments recognize as "Green" due to the fact that they dramatically reduce the emission of harmful Volatile Organic Compounds (VOC's).

#### UV Flexo Printing

Ultraviolet Curing has been employed successfully for over ten years in the flexographic printing industry, as it offers outstanding print quality compared to solvent or water-based ink systems. UV flexo printing uses 100% solid ink systems which include monomers, oligomers and photo-initiators that when exposed to intense ultraviolet light provide outstanding durability, chemical resistance and graphic brilliance well beyond that of water or solvent ink systems.

#### UV Offset Printing

Offset printing has largely been used in commercial applications with high volume print runs that require high quality graphics. In recent years, many commercial web and sheet fed offset printers have chosen to utilize UV curing technology as a means to improve production throughput and print quality. Standard offset ink technology typically takes more than 24 hours to dry prior to being converted or die cut to prevent ink smearing and ink transfer on to the opposing side of the substrate. UV offset ink systems are similar to that of UV flexo ink systems in that they employ the same three

#### UV Cold Foil Decorating

For many years, converters have been utilizing rotary hot foil stamping to decorate labels, cartons and flexible packaging. This process requires an investment in expensive etched and engraved rotary hot stamp dies to transfer the foil image to the substrate.

Today, many printers employ UV cold foil transfer as a means of decorating the substrate with colored foils. This process involves the following steps:

- Printing an adhesive in a flexo print station on the base substrate using a photopolymer printing plate that has the desired foil design.
- The adhesive coated substrate is brought into contact with the colored foil or holographic film through a nip roll assembly.
- The laminated substrates are directed through a UV curing system to cure the adhesive permanently bonding the two substrates together in the areas where the adhesive was printed.
- Finally, the two substrates are separated leaving the foil image adhered to the base substrate while the foil waste is re-wound.

There are significant cost savings to this method of foil decorating as there is no expensive "Tooling" to purchase. A converter only needs a flexo plate, adhesive, cold foil film, a laminating unwind, a nip assembly, a UV unit and a foil rewind. Since most flexo equipment already includes the auxiliary unwinds, rewinds and UV, the balance of the costs are nominal.



## TruSpectra

### UV CURING SYSTEM—VARIED APPLICATIONS FOR PRINTING

#### UV CURING OPENS UP DOOR TO NEW MARKETS

##### UV Lamination

Ultraviolet Curing has many benefits to converters that desire to improve overall product quality as well as reduce material and manufacturing costs. Many converters must laminate the printed or converted product to protect it and enhance the image. Traditional lamination involves unwinding a laminating film that has pressure sensitive adhesive on the back side of it so that it will adhere to the base substrate when nip roll pressure is applied. Pressure sensitive laminating film can be quite expensive and is typically supplied as self-wound or with a liner.

UV Lamination offers significant cost savings as the processes uses only wound film and a UV laminating adhesive. This process involves the following steps:

- Flood coating a UV adhesive to the base substrate using a flexo print station and a rubber tint sleeve.
- Unwinding the laminating film and bringing it in contact with the base substrate using nip roll pressure.
- Directing the laminated materials through a UV curing system which cures the laminating adhesive through the film creating a permanent bond

This process allows converters to save significant material costs while creating a more permanent chemical bond between the two substrates.

##### UV Rotary & Flatbed Screen Printing

Rotary screen printing has improved the quality and aesthetic appearance of many printed products we see in the consumer market today. Rotary screen printing is typically used in-line with flexo or web offset printing to apply brilliant colors, opaque whites or specialty coatings for printing and security applications. Rotary screen printing is similar to flat screen in that a viscous ink is forced through the openings in the screen mesh where the emulsion is not present. The main difference is that the screen material is made into a cylinder by seaming the leading and trailing edges together and attaching it to a precise set of end rings and gears. The squeegee is then placed on an adjustable bar inside the screen cylinder on the same access as the impression roll to force ink through the screen and transfer it to the substrate. In-line applications are best suited for UV cured ink systems due to higher line speeds and the requirement of 100% cured ink so that water based or UV inks can be printed over them. Typically, in-line presses utilize special screen printing UV lights at 600 WPI or metal halide UV bulb chemistry to achieve optimum results.

##### UV Coating (Varnish, Adhesive, Silicone)

Most high quality printed products are either laminated or overprint varnished to protect the printed product from harsh chemicals or abrasive elements, while providing outstanding shine and brilliance for higher aesthetic properties.

##### Digital UV Inkjet Printing

Inkjet printing is a primary source for printing variable information on almost any substrate such as consecutive numbering, lot numbers, batch codes, personalized information and many others. This technology has largely used solvent based ink chemistries over the years which provide lower ink density resulting in relatively dull colors.



## TruSpectra

### ADVANTAGES OF UVA LED FOR PRINTING AND LITHOGRAPHIC INDUSTRY

#### CONNECTING YOUR BUSINESS TO THE TECHNOLOGY RESOURCE YOU NEED FOR YOUR CURING AND PRINTING APPLICATIONS

**LED is reliable and mature technology**, LED lamps reliably provide reduced downtime, long lifetimes, and low costs of ownership. **Flexible form factors**, LED technology is fundamentally a more compact technology than traditional lamps due to the LED packaging densities. Chip-on-Board (“COB”) LED technology describes the mounting of bare LED chips in direct contact with a substrate to produce LED arrays

**Multi wavelength capability**, LED sources provide users with greater opportunity to optimize their curing system by designing a multi-wavelength system that closely matches the absorption spectrum of the media being cured leading to greater production efficiencies

**Precise control** each of the LED in circuit can be individually controlled by dedicated driver circuitry. This localized control of LEDs allows for more precise adjustment of the LEDs to improve overall stability and uniformity. **Stability and efficient**, electronic control allows the light-output & intensity of the LEDs to be kept stable for a long time. further this level of control is scalable from a couple of LEDs to thousands of LEDs.

**Reduced downtime**: the UV LED lamps windows are routinely cleaned to remove the cured material. Apparently Verentia UV LED can be specified with a removable window where the window can be quickly exchanged for a new one reducing downtime

**Heat Sensitive substrates**, Very little heat is generated from the LED output onto the substrate being cured. This characteristic of LEDs is important for applications where heat sensitive substrates are utilized

**Instant switch on**, LEDs are instant-on, and can be configured to output light in continuous, flashed or pulsed modes across a wide dynamic intensity range while maintaining the desired spectral distribution.

**Real time monitoring**, To ensure stability across the lifetime of the lamp, various monitoring functions can be built-in to the lamp such as thermal monitoring of the LED substrate temperatures, short circuit monitoring, or in-rush voltage protection.

**Environmental friendly**, LEDs are more environmentally friendly than traditional technologies because they emit no harmful UVC or contain toxic heavy metals, such as mercury. LEDs can also tolerate higher ambient operating conditions than traditional lamp technology.

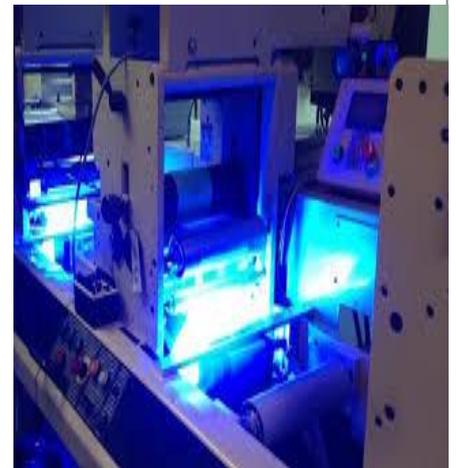
**Ease of installation & cost benefit**, LED systems offer significant benefits over the life of the lamp. Mercury lamps have short lifetimes and require frequent replacement. LEDs do not require ancillary components such as filters and venting system. Operating costs of LED based systems is also lower due to instant-on/off. Thus supports extended lifetime of the LED over mercury UV lamps..



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### UVA LED PRODUCT VARIANTS FOR PRINTING AND LITHOGRAPHIC INDUSTRY APPLICATIONS

<b>Irradiance values</b>	1 - 7 W/cm <sup>2</sup>
	8-17 W/cm <sup>2</sup>
	18-26 W/cm <sup>2</sup>
	27-35 W/cm <sup>2</sup>
	36-50 W/cm <sup>2</sup>
<b>Emitting window length</b>	25 - 100mm
	125 - 225mm
	225 - 350mm
	350mm - above
<b>Cooling Method</b>	Heat Sink
	Heat Sink with cooling fan
	Heat Pipes
	Heat Pipes with fan
	Water cooling
<b>Wavelength</b>	365nm
	385nm
	395nm
	405nm
<b>Applications</b>	Adhesive curing, Wood Curing
	Counterfeit, Fluorescence
	Lithography
	Printing (Ink)





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TYPICAL PRODUCT SPECIFICATIONS FOR CURING, PRINTING AND LITHOGRAPHY INDUSTRY APPLICATIONS



<b>Wavelength</b>	<b>365</b>	<b>385 / 395</b>	<b>405</b>
Peak Intensity	27 W/cm <sup>2</sup>	27 W/cm <sup>2</sup>	34 W/cm <sup>2</sup>
Irradiance window	25 x 15	25 x 15	25 x 15
System Power	15.4W	15.4W	14.2W
Estimated head life expectancy			
Operating Ambient time	35 °C	35 °C	35 °C
Operating Ambient humidity	75%	75%	75%
Cooling method	Heat Sink / Heat Pipe / Chiller		
Chiller Capacity	250W to 550W		
Chiller Flow rate	1.5LPM—5 LPM		
Pressure Drop	0.0018-0.0022 Bar		
Connections	8" NPT		
Warranty	1 year		
Voltage and frequency			
Potential free error signal	Earth Fault, Total Error, Lamp Error, Phase Loss, Over Temperature, Output Signal UV Ready, Phase Loss, UV ON		
Finish	Matte black		



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