



UV CURING SYSTEMS FOR DIGITAL PRINTING APPLICATIONS

The industries adopting Integration Technology UV and UV LED technology are wide ranging and varied, however the core markets that we serve can be defined in the Digital and Industrial sectors.

Digital Printing stems back decades with the original Daisy Wheel Printers, but in essence the area we are interested in, Ink Jet, started around 1970 and was predominant either Continuous Ink Jet or Thermal Inkjet which had no requirement for UV curing as it was used mainly for low quality high volume Addressing and Marking of printed materials. However with all these things progress demanded higher quality and colours and this led to the development of DOD (Drop on Demand) Printheads with larger Ink droplets and higher quality images (photo type), the images were built up by placing the droplets next to each other and convincing the eye that a Cyan and Yellow dot next to each other was in fact Green. These droplets needed to be 'dried' to prevent them running into the next droplet that maybe of a different colour and so destroying the resolution.

In 2000 Integration Technology developed a purpose-built UV system, the VZero, that could cure (dry) these droplets if a UV curable ink was used. The VZero overcame the difficulties of integrating a UV system onto the moving carriage of an Ink Jet DOD printer, by being air-cooled, but not requiring an extraction system, by being relatively low mass, and it cured the ink in the same swathe as the ink was printed, so overcoming the ink 'bleed' issue. However, it was still relatively large and only suitable for the large size Ink Jet DOD Printers known as Grand Format.

As with all of these things new demands on the specification of UV system came from the Printer manufacturers, they wanted smaller, lighter, with a shutter that could be operated at the end of each swathe..... twice (one close and one open) and in response to this market requirement Integration Technology released the SubZero 085 UV lamphead in 2003. It was considerably lighter, incorporated a very fast and extremely reliable shutter system to stop light emitting from the lamp head when required, at the end of each swathe and when in the 'park station', required only one cable per lamphead to power and had low vibration. Maintenance in the field was minimal, with no planned maintenance required apart from cleaning and lamp replacement and even that was simplified to a single screw 'cassette' system (similar to an Ink Jet Cartridge change

The SubZero system was very successful, having sold over 20,000 units, it has evolved into a range of products with Lamp lengths from 55mm to 280mm and there is even a higher power version available in some lengths. It can be purchased as a Single or Twin system with a single power supply, can be stripped down to an OEM version and is available without a shutter for reduced costs.

Although the SubZero was a very successful UV system it still constrained the Printer Manufacturer to some extent, for instance the lamp cannot be started instantaneously and must be allowed to cool before it can be restarted, the lamps have a limited life around 1000 hours, it requires a specialist power supply and runs at several hundred volts.

Light Emitting Diodes LED were making inroads into the traditional visible light with Flashlights, Domestic and Automotive markets all taking a keen interest so it seemed logical that if an LED could emit light in the UV wavelengths it could offer significant advantages in the Digital Print arena and as early as 2003 Integration Technology started a Research and Development project to bring on this technology. However there were a number of hurdles that needed to be overcome before this could become widely used Technology, the first being that early development UV LED dies were only able to emit very limited power, typically 200 milli watts per square centimetre and that they had an almost monochromatic output, typically 385 or 395 nanometres. This meant that the normal UV Ink Jet inks would not react with the UV LED's, because there was not enough energy to start the reaction, furthermore the initiators in the ink were not suited to a monochromatic output from the UV source, indeed this was to remain an issue for several years.

However in 2008, outputs from the UV LED's had increased by about 20 times to about 4 watts per square centimetre and inks were starting to be modified to suit the narrow band output of an LED system, therefore Integration Technology displayed a Technology concept at DRUPA 2008 and after a favourable response started to ship UV LED systems commercially. By DRUPA 2012 UV LEDs systems were being displayed all over the show as an alternative to traditional UV light sources particularly in the wide Format Digital, however not all of the chemistry issues had been resolved for all Printing applications and that remains the same today, although more and more of

those barriers are being removed as time goes on and the Technology becomes more and more established.

The Product range from Integration Technology is applicable to most Print Applications, particularly Digital Print applications. We have low power discreet Pinning systems used to freeze the droplets and prevent dot gain between printheads on single pass Digital Printers where light scatter is an issue. We have the high power SCX system for the full cure of the ink at the end of these Printers where a full LED solution is desired. The SZ and VZ air cooled range of UV LED heads are designed with Wide Format moving head applications in mind and are used on the Brand Leader in the Grand Format. However, we try to design a product that although aimed at a particular market can be utilised in other areas, for instance we have applications that use similar products for industrial processes such as the manufacture of Flat Panel Displays, OLED's (Organic Light Emitting Diodes), Automotive Repair and Solar Panel Production. Indeed we are able to help our clients to get the most from the UV system and if necessary can develop a Bespoke solution to suit most process requirements.

WE HAVE THE CURE

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