What's so great about my UV printer?

It is no surprise that UV printers are the fastest growing printer sector in the wide format digital printing market despite their cost compared to printers of other digital printing technologies. An entry level industrial UV printer price can start at €50,000 and can go up to €250,000 and more for the high speed printers. But do UV printers justify the investment?

Wide format digital printing has dissipated into every aspect of our lives within just 2 decades. Much of traditional printing on paper shifted to printing on new materials and new printing channels opened when wide format digital printing became commercialized.

New printing technologies not only improved the speed and the quality of printing but also expanded direct printing options. Traditional digital printing technologies such as solvent and water based prevailed and is thriving with new printers, higher speed and environmentally friendlier inks all provided at reasonable prices making water based and solvent based printers an excellent choices in terms of quality and price even over traditional offset printing, especially in shorter runs.

However, digital printing is a broad technology. Within digital printing there are different printing methods, all using digital technology but whose differences shape the target applications. Although some digital technologies did not survive, many prevailed, improved and thrive today. Among the technologies that stretched digital printing capabilities is definitely UV curable technology.

UV curable printing and specifically UV flatbed printers enabled direct printing on new types of media for the first time and multiplied the application possibilities. However, in order to understand the potential of UV, one must first understand how it works, its unique characteristics and advantages.

UV inks are different from any other inks used in wide format printing from almost every aspect. The difference is in the raw materials used in manufacturing these inks, drying method, functionality and in their printhead compatibility.

Most inkjet inks are composed of a carrier, usually a liquid and a colorant which are forced out from the nozzles in the printhead and onto the substrate. The liquid could be either water or solvent(s). However UV inks don't abide

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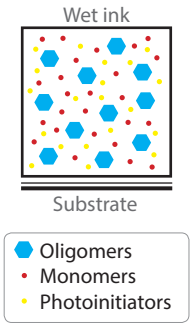
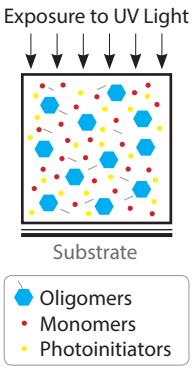
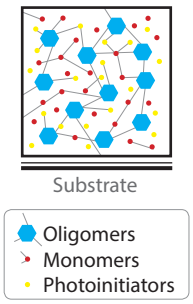
to these constraints. UV inks are the only ink type that are not composed of a liquid carrier but of monomers and oligomers, which are chemicals that by a cross linking chemical reaction cause the colorant to remain as a dry film on the surface of the substrate. The monomers and oligomers, in

UV ink reaction to UV radiation





When exposed to UV light, the photoinitiators excite the monomers and oligomers causing them to bind together.



The photoinitiators remain as free radicals continuing the reaction until all the components are used up. This process is instant.

When all of the components are used up, you are left with a cured or polymerized film

liquid form, transform to a solid dry surface. The transformation process in which the ink solidifies on the media surface is referred to as curing rather than drying as in other ink types. The curing process is a chain reaction initiated by photo-initiators which are materials that initiate this process once exposed to UV light source.

The curing is one of UV's greatest advantage since there is no need to wait for the media to dry or evaporate before it is rolled or coated as is required for water or solvent based inks. In addition, the ink does not penetrate the media but creates a thin colored film which adheres to the surface of the media.

The revolution of UV printers is the ability to print on almost any type of material with very little compliance concerns. Since UV cures instantly and does not penetrate the surface or requires drying or evaporation, both porous and non-porous materials can be used. Solvent based inks in contrast are more suited for uncoated substrates since the solvent is later evaporated and leaves the colorant on the surface, water based ink are usually used for coated materials since they tend to penetrate into the media. These constraints are not found with UV inks.

Furthermore, the development of UV flatbed printers enabled printing on rigid surfaces too. Instead of the media rolling and the printhead moving from right to left, flatbeds introduced printheads that move on both axis, including up and down, while the media is stagnant.

Additional advantage of UV is the ink which is regarded as environmentally safe to use even in home applications since once the ink is cured is emits no Hazardous Air Pollutants (HAP) which are the toxic solvent fumes emitted by solvent based inks.

UV printers not only provides an alternative to solvent and water based printers but also opened new industrial applications which were never done in digital printing and are now open for applications where printing with solvent based ink is regulated for health and safety issues.

An example of an industrial printing revolution which could only be possible with UV printing technology is Coca Cola's "Share a Coke" marketing campaign which encompassed 32 countries in 15 languages and 5 different alphabets and included 150 most popular first names in each country. The campaign included printing of over 800 million personalized name labels. Although the static label printing was done

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in traditional offset, the actual personalization of the labels could only be done with UV digital printers dedicated to the campaign printing 24 hours across 3 months.

One digital printing commercial application worth noting is the

rotating UV printer which prints on a non-flatbed but a rotating bed for cylindrical products. The rotating rollers are an add-on and can be mounted on the flatbed and removed after printing. The rotating rollers enable 360° direct printing with UV inkjet. The rotating rollers printing option is also supported by the RIP software. The direct printing on bottles and other cylindrical items exhibits excellent print quality which is scratch and abrasion resistant.

As revealed by some of Bordeaux customers, the applications are constantly diversified and currently include: wood plaques, metal panels, expanded PVC sheets and extruded PVC sheets used mainly for thermoforming applications and other nonconventional materials such as cork board, stone and glass. Glass, like some of these surfaces may require a primer in order to increase adhesion but the possibilities to print are far beyond the inconvenience involved in applying a primer. It also very efficient for direct printing on foam boards eliminating the need to print on vinyl first and then stick to the foam board.

UV flatbed is also a solution for printing on 3D items such as smart phone/ tablet cases, bottles and other 3D items which can be secured to the UV flatbed surface.

"In every trade show, we meet entrepreneurs that consult with us on solutions for digital printing on non-traditional substrates. We have had customers approach us concerning printing on anodized aluminum items, toys, perfume bottles and even on Velcro." Says Ruth Zach, Marketing coordinator at Bordeaux Digital PrintInk, a well- known wide format UV inks, primers and coatings manufacturer.

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UV technology changed digital printing process and shifted digital printing to new and exciting fields. Triggered by flatbed industrial printers and complemented by the unique UV ink, the UV technology has driven the industry forward and assisted in the trickling of digital printing to traditional printing while lowering the price and increasing the print quality.