**Basics about Inkjet Ink**

As in all types of printing, inks is distinctly important to the creation of a print with reliable and accurate colour, durability and longevity. In todays digital ink markets, the following type of ink systems have gained prominence, and represent nearly 100% of inkjet graphics created worldwide.

1) Water-Based Dyes and Pigments: An ink that is primarily made of water but may contain small quantities of organic solvents, such as alcohols or glycols, to help the ink penetrate the print surface, keep the dyes in the solution and the pigments dispersed during ink storage. Dye based and pigment based ink systems are aqueous, meaning they are waterbased. Unprotected, these ink systems can be used to print for indoor use. For outdoor uses, or to increase the durability of the print, the print should be laminated. This type of printer is still good

2) Solvent Inks: Solvent-based ink also offers high durability. However, when purchasing a printer that uses a solvent based ink system, it is important to consider that the use of solvents can lead to significant air emissions, triggering the need to comply with air quality regulations. Without proper ventilation, the fumes from these systems may also be a concern for worker safety and health. Solvent inks for inkjet printing come in two types currently. Inks that contain a more aggressive solvent tend to have a wider range of substrate compatibility. Eco-solvent inks, which contain a less aggressive solvent, require a compatible media.

Perhaps the most important distinction among solvent formulations is the volatile organic compound level of the solvent used. High VOC solvent inks usually contain 2-butoxyethyl acetate and cyclohexanone. In conjunction with other pigments and chemicals, they combine to produce the correct ink chemistry for the specified inkjet heads. Eco-solvent inks use a less aggressive solvent like dipropylene glycol mono methyl ether, and are still considered hazardous chemicals.

3) "Bio" Vegetable Based Inks: Another recent addition to the inks available for inkjet application is "bio" or vegetable based ink. Performance-wise, these inks should be seen as comparable to conventional solvent-based inks, and used for similar applications. While these inks are marketed as an alternative to solvent based inks, it is important to remember that they

also contain solvents. The difference is that instead of being derived from petroleum, the solvents in bio vegetable based inks are derived usually from corn, which is a renewable resource. When using these inks, it is important to remember that they hold less inherent environmental hazard than conventional solvents but still must be used with care.

4) Latex Printing Technologies: Pigmented, waterbased latex inks - a new ink technology for wide format imaging - was introduced for a small number of printers in the summer of 2008. A key point for water based latex ink is that it doesn't present the environmental problems such as noxious smells and toxic fumes often associated with solvent based outdoor inks. The latex ink produces extremely low levels of VOC's, requires no special handling, and is non-toxic, non flammable and non combustible.

5) Dye Sublimation: In the dye-sublimation process, solid dye particles are changed into gas using heat and pressure, then bond with any polymers present, and change back into a solid. Digitally printing dye-sublimation inks onto paper is only the initial step. A final step involves using a heat press to transfer the inks from the paper onto a substrate such as ceramic, wood, glass, metal, fabric or plastic. Because sublimation inks are water-based dye inks, outdoor print life is limited, and they are best used for creating event-specific, short-term graphics. Banners, flags, advertising specialties, synthetic athletic wear, tradeshow graphics and POP displays are among the applications production oriented users can create by printing sublimation transfers from a wide-format inkjet platform.

6) UV Curable Inks: Once cured, the finished UV print offers high durability, even outdoors, without the need for lamination or other protective measures. Currently, the UV ink is also the ink system that allows for printing on the widest variety of substrates.
Taking a very broad look, we can say that these inks are generally composed of synthetic resin, into which coloured pigments are mixed. Curing is a chemical reaction that includes polymerization (formation of molecular chains), and fusion with the substrate (e.g, enamels for glass or ceramics), or by absorption (in textile printing with dyes).
UV inks consist of oligomers; very liquid monomers that act as dilution agents to reduce viscosity; pigments that act as colour; various additives and photoinitiators. The last element is

very important because it produces the actually change of condition; in other words, the transformation of the liquid oligomers and monomers into solid polymers.
UV curable inks have been used in traditional printing sectors of offset, screen, flexography and gravure for nearly 20 years. In all of these processes UV inks continue to win market share from other ink types, often accounting for 20% or more of the ink market, Feature such as low environmental impact, process stability, and rapid drying even on non-absorbent substrates (media) have been important drivers. By contrast, the introduction of UV inks into inkjet has come very late in the day. They are here however to stay.
Over the last few , equipment manufacturers have introduced UV curable, opaque white ink, Opaque white can be used as an undercoat, allowingcolor0correct5 printing on non-white or transparent substrates, It can also be used to add highlights to printed images, Other interesting add-ons include UV-curable clear lacquer.

7) Phase Change Inks: These are also known as hotmelt, are distrivbuted in solid form and, when introducted into a compativle system, are melted before being inkjet printed. Advantages of phase change inks include that they are fast drying, environmentally friendly, and exhibit good qualitity of the print because they do not tend to spread due to their rapid solidification. Their primary disadvantages are the lack of durability and poor abrasion resistance. Phase change inks are currently used in applications such as printing of barcodes or non-porous substrates.