

Photofinishing Paper for Digital Presses

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Abstract

Explosive growth of Digital Photography has led to the development of new service concepts for consumer printouts with digital cameras. In the near future the majority of those owners of digital cameras will not want to spend their time printing photos at home with a slow inkjet printer. Estimated 85% of amateur photographers will hand their memory devices to a service organisation, which will provide them with printouts in a matter of days or even hours.

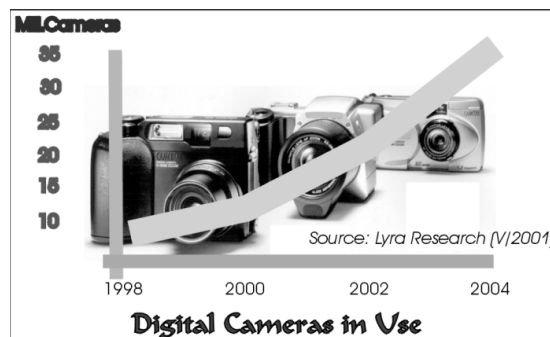
Digital Printing is a perfect setup for such services as it is designed for VIP (variable information printing), provides high quality color and operates on an on demand basis.

Convergence of Digital Photography and Digital Printing happens at the right time and at a stage, where there is plenty of room for mutual synergism and improvement as both technologies are still in early evolution.

In order to ease the transfer from traditional analog wet photofinishing to digital printing, customers must experience the same look and feel of their photos, to which they have been used to over the past decades. True photo-paper with special top coats for the new digital inks and toners can provide those accustomed properties.

This paper gives an overview of the design and properties of such photo-papers, developed for trouble-free operation on digital photo-presses (especially the Xeikon D2F2).

The World Imaging Market



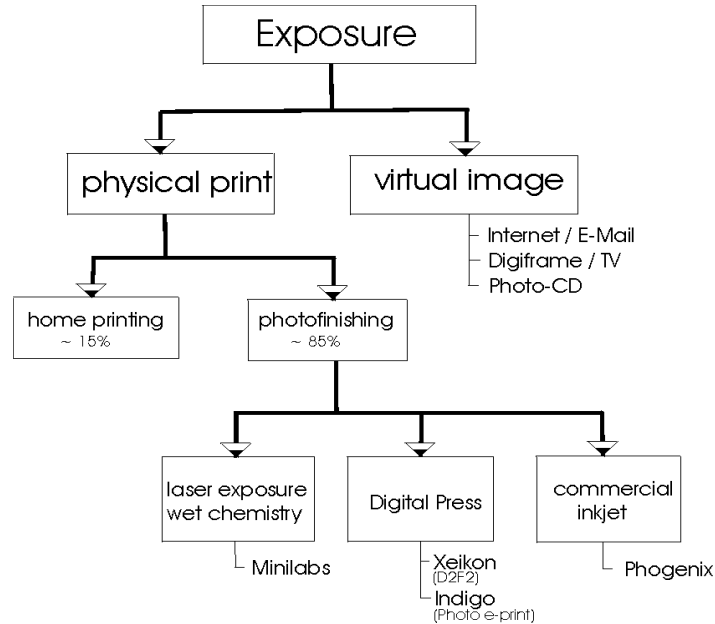
While in 2000 conventional cameras still dominated the market with 72 Million or 87% of all camera sales, their growth from the year before was only 7% compared with a 100% growth of digital cameras (11 Mill. units, almost 40% in the US, 33% in Japan and 21% in Europe). It is expected, that around 2005 sales of digital cameras will match those of analog ones. There are already close to 100 manufacturers of digital cameras with 300 different models on the market.

Sales of consumer film – according to Kodak – fell 5% worldwide and digital products and services rose 7% from a year ago. The trend toward digital photography is already filtering down to the retail level.

Camera dealers now routinely sell printers. Print and copy shops such as Kinko's are installing photo kiosks, while photo processors are offering digital services.

Currently almost 50% of the early adopters of digital phototechnology are printing their images now at home on inkjet or laser printers. As the digital camera population rises and the technology becomes mature and even mainstream, this number will drop dramatically to a mere 15% and service organisations with adequate reproduction technology will be required for the needs of photographers, less prone to cope with tedious software and slow printers.

The Future of Photoimaging



Use of Internet as a transport vehicle does not exclude the making of prints, whether at home or delivering the data to an on line service organisation. At present Internet penetration is only strong in the US with other countries lagging behind.

USA	> 60%
UK	35%
Japan	30%
France	25%
Germany	20%

The emerging market for digital photofinishing has already led to joint ventures and strategic alliances between large players within the photo- and printer industry:

Phogenix is a joint venture between Kodak and HP. The new company is expected to offer photofinishing service based on ink jet technology and with proprietary media, where substrates and (dye based) inks are – as Phogenix terms it – cooptimised. The ready prints will then be protection laminated before delivery.

Gretag Imaging and *Seiko Epson Corp.* have announced a strategic alliance for the development and manufacture of digital photo-systems, which are accessible through the Internet and which might open up new marketing channels in the photo business.

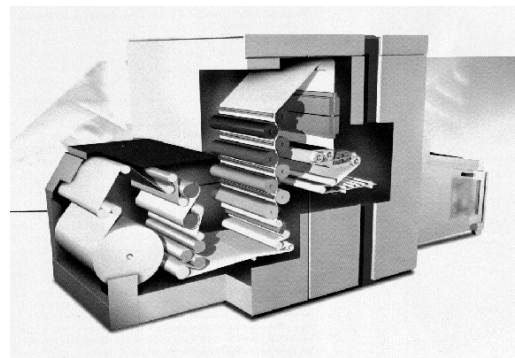
Digital Press manufacturer have been involved in photoreproduction right from the beginning.

Adaptation of their machines and liquid or dry toners to the specific needs of photofinishing seems to be a natural diversification on their part.

Indigo is currently working on an assortment of 5 machines (Photo-E-Print ProLab, MetroLab, CentroLab 5K, 10K, 20K), all roll-fed 6 color presses and a final lamination process for protection of the prints.

Xeikon's D2F2 focuses on central labs with a capacity of 8.600 prints per hour and emphasises the flexibility via Internet portals.

It is also roll-fed, based on the DCP-32 with specific adaptations and a special microtoner with particles as small as 7µm. A final coating station from Nilpeter provides 20µm gloss and protection for the finished print.



Substrates and Their Design for Dry Digital Photofinishing

Digital presses use electrophotographic technology and therefore offer benefits over conventional photochemistry:

- more environmentally friendly (no disposal of wet chemistry, no silver recovery)
- all-digital workflow (image management provides image optimization and job customization, i.e. sizes, type of final printout, surface gloss etc.)
- high speed (depending on the front end RIP and the attached machine a single printing unit may produce up to almost 22.000 prints 4x6“ p.h.)
- high quality (since there is no film original, film dependent artefacts do not exist. High resolution, comparable to a 9 bit continuous imaging system with 576 grey levels per color.)
- high durability/permanence (toner pigments are encapsulated in polyester resin [Xeikon] or the ElectroInk polymer [Indigo] and therefore are superior in light- fastness compared with dye based silver prints. The subsequent coating/laminating process provides additional protection against abrasion, wetting, solvents, ozone and fingerprints.)
- superior economy (due to the great flexibility, the absence of silver-chemistry and recovery.)

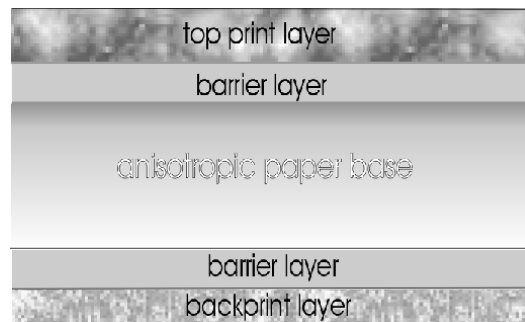
Design of substrates has to recognise and include the special requirements of this specific market segment. As a consequence this leads to a multilayered, tightly controlled substrate base, where additional functions such as adhesive laminates, transparent or modified plastics may be added or substituted according to the final purpose of the print.

Requirements for base substrates for electrophotographic photofinishing are:

- ⇒ good toner acceptance and anchoring
- ⇒ melting/integration of toner into the top layer. Built up of toner particles creates a kind of 3D-effect, which can be reduced if the toner sinks sufficiently into the top layer.
- ⇒ proper static balance to prevent voids and artefacts.

- ⇒ printability on both sides of paper.
- ⇒ good acceptance of coatings/laminates
- ⇒ moisture barriers to guarantee excellent flatness and good runability within the press.
- ⇒ good stiffness, whiteness and surface gloss of base material.

A proper electrophotographic paper would have the following structure:



The top coating has to meet all the requirements for toner acceptance, adhesion, integration, static balance and compatibility to protection laminates or coatings. In addition it has to be completely transparent for the human eye in order not to diminish the contrast and whiteness of the paper base. A similar requirement is put on barrier layers. The back layer, apart from counteracting to curl, has to provide printability and grip for runability within the transport system of the press.

Biography

Dieter Reichel studied chemistry and received his PhD at the University of Graz, Austria. He started his professional career with Ciba-Geigy in dyestuff research. For more than 30 years he has been with Folex/Celfa as a board member and VP for corporate projects, recently mainly in digital printing and imaging applications.