

PRINTERS' GUIDE

Training Information & News in Printing and Paper Converting Technology

Digital printing

by Birgit Cholewa (azp Chemnitz)

1. Overview and distinctive features in comparison with conventional printing methods
2. Electrophotography
3. Inkjet printing
4. Marketing in digital printing, applications, future prospects of digital printing



Photos: azp, samples of the machine manufacturers

Figure 1: Examples of personalised printed products

The digital printing technology offers completely new possibilities for the printing industry:

There is no need to produce a printing forme, which saves time and cost. Therefore, digital printing impresses with very short production times and the possibility to produce very short runs up to just "1" copy efficiently.

As a result, printed products with variable contents, like texts, graphs, images, that vary from page to page, i.e. which are personalised and customised, can be produced economically. In addition, it is possible to print sequentially, which means that complete leaflets, brochures or books can be printed one after the other and then bound without any time-consuming

collecting or collating processes. This saves the high amount of time and cost otherwise needed for the post-print processes and makes especially runs with a low and extremely low number of copies attractive. (See Fig. 1)

There is a large variety of printing substrates and printing inks for digital printing so that digital printing companies can cover a huge range of offers.

By now, digital printing not only enables to print special colours like light cyan, light magenta, etc., Pantone colours and spot colours, but also with special inks like metallic, Neon or pearlescent inks (e.g., HP Indigo, Kodak Nexpress, Xerox).

Even inline finishing up to haptic special effects can be produced in digital printing. In the Kodak-Nexpress-SX series, for instance, the 5th printing unit, equipped with a so-called Dry Ink, can produce relief-like surfaces (see Figures 2 and 3).

Other manufacturers, too, offer a coating option: Xerox with the 800 and 1000 series, Ricoh or Canon with the Imagepress c1+, to name just a few.

New technologies require new strategies for marketing. In contrast to the conventional methods that are largely known among the customers, digital printing opens up the possibility for completely new products.

Therefore, print services providers must inform their customers more strongly about the large variety of products offered by digital printing. This can be done in the form of seminars, open house events, consultation meetings or print samples. And it's not only necessary to care for the needs the customer has already expressed, but rather to arouse new needs for printed products – which were impossible to produce with conventional printing methods. It is important to analyse the business fields of the print customers in order to offer new products and their marketing. The printing company must more and more become a service provider, must identify the wishes of the customer and make creative additional offers. In this connection, the so-called iceberg model (in the style of the HP Indigo) is helpful: A special order of



Figures 2 and 3: Even special haptic effects can be created.



the customer (e.g., invitation cards) – “the tip of the iceberg” – is used to design and offer other related printed products – e.g., a flyer for the event, name cards, programme sheets and/or booklets.

One topic that is closely linked to digital printing is web-to-print. This always means more than simply receiving the customer data via the Internet. It is also a matter of offering the production of personalised printed products (in most cases, template-based), as well as, in the background, a matter of processing the data correctly for the order and production concerned, up to invoicing.

Therefore, web-to-print is a combination of sales channel, customer retention tool, marketing, business model and automated business processes. It is crucial to focus on the automated process – because especially for low numbers of copies the administrative processes may well become more time and cost consuming than the printing process itself.

Where a digital printing machine shall be integrated into a media company, a wide range of considerations is important in advance.

In general, the following aspects must be examined:

1. The technical conditions in the company The majority of the digital printing machines are not as big and do not require as much space as the conventional printing machines, but there are important technical peripheral aspects that must be considered before it is installed. A check list of the necessary technical conditions is given below.

A parameter of special importance is the IT environment of the machines. For many short runs and variable data, suitable servers with sufficient memory capacity are required. Often large volumes of data must be processed in parallel so that sufficient computer capacity must be available,

as a rule, the hard disk capacity and RAM must at least be twice as big as the file size. In addition, the data exchange should run at high speed since otherwise the speed advantage of digital printing gets lost. Where it is planned to print variable data, databases must be available or created and/or it must be known how address data and image databases are handled.

2. Investment/financial aspects

The operating cost of a digital printing machine consist of three key factors:

- Investment cost
- Maintenance cost
- Cost of consumables

Compared with conventional printing machines, the investment cost are mostly manageable, however, it must be expected that the service life is shorter and the loss in value is quicker due to the very fast technological development in the IT segment.

Considering the sensitivity of the digital printing technology, it is reasonable to conclude a maintenance contract. Then, the user can be sure of continued maintenance and repair as well as clarity as to the cost of spare parts that must be replaced regularly in digital printing, as, e.g., photo semi-conductor drums.

As is the case with the supply of spare parts, the dependence on the system manufacturer as far as consumables are concerned is very high as well. Often, the use of materials other than the originals constitutes the loss of warranty conditions. In addition, the cost of toners and/or inks have a much larger impact on the total calculation than in conventional printing methods.

In many cases, maintenance contracts and contracts for consumables are combined in so-called click cost contracts or flat rate contracts.

3. Qualification of the staff

The know-how that a digital printer must

have covers more than the total production process. Conventional prepress knowledge is required: Knowledge of the prepress software programmes, data checks, data handling, knowledge of databases, etc.

On the other hand, technical knowledge, knowledge of the substrates and printing inks, measurement instrumentation and colour management, is indispensable – i.e., the competences a printer has. Besides that, interdisciplinary key qualifications like organizational skills, flexibility, problem solving skills and the ability to work in a team are important.

Therefore, it must be examined who will operate the digital printer, staff members from prepress or printing, and/or whether further training, perhaps directly by the manufacturers shall be attended.

Last, but not least, a few remarks about the environmental compatibility of the digital printing process.

One important aspect is the deinkability of digitally printed paper. Suitability can be checked by means of the INGEDE method 11. According to that, parameters like luminosity, colour coefficients, ink elimination as well as filtrate darkening/dirt particles of the recycled paper are of importance. (www.ingede.org)

Paper on which dry toner has been used can be deinked without any problem. The toner can be removed easily and the mostly high-quality paper grades even contribute to the high quality of the recycling material.

The situation is not as easy for the deinking of paper printed electrophotographically with liquid toner (Elektro Ink). During the dissolution of the pulp in the pulper, residues of particles of the liquid toner slide through the slots of the strainers and even cannot be removed in the flotation process. The result is that these papers have big dirt specks which are unacceptable. Such papers can only be used for corrugated board and / or carton production. InkJet ink may also pose a problem. On the one hand, water-soluble ink colours the water and therefore penetrates the fibres. The diameter of the pigments of pigment inks is, however, in the nanometre range. These particles can be removed with strainers.

Since, in this case, there is the risk that paper recycling is impeded, the manufacturers and the paper industry cooperate and develop optimised inks, papers and technologies.

Fogra, too, is doing research in this field and offers deinkability assessments for paper / ink-combinations (www.fogra.org).

Summing up, it can be said that digital printing has arrived in the graphic arts industry, with all its advantages and challenges that the system providers and users must face.

Check list – Technical requirements for digital printing:

1. Sufficient size of the room, also consider peripheral equipment and storage capacity for paper and consumables
2. Possibility for ventilation, especially where electrophotographic devices are used (ozone pollution)
3. Climatic conditions at the place of use, temperature 20-22° C, 55-65% humidity, no significant fluctuations, optimal: air-conditioned room
4. For large-size printing with solvent-based inks, exhaust ventilation required
5. Good lighting conditions, standardized lighting booth for matching should be available in the printing company
6. Decision: Installation in the prepress area or the pressroom
7. Server with sufficient memory space and computer capacity, efficient network for fast data exchange
8. Software for colour management, imposing, variable data printing
9. Measuring instruments (spectrophotometer) for calibration, partly integrated in the machine