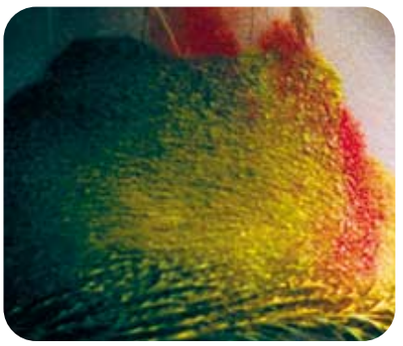





the designer's guide

making the most
of **hp** indigo
digital presses



invent

the authors:

Nick Loh

Nick has been working with digital print since 1995 and prior to that he was involved with the development and design of pre-press systems. A graduate in Photographic and Electronic Imaging he is a consultant working for HP.

Tony Brown

Tony started his career in print production and sales before making the switch to writing about the industry. He is the former editor of Printing World magazine and now works as a senior writer at the Bespoke Agency in Banstead, Surrey.

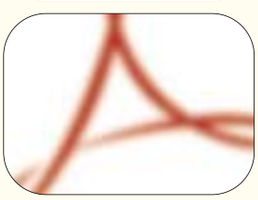
Based on an original concept by Hervé Bernard and Erwin Busselot. Many thanks to Guy Thompson, Emmanuel Folliot-Bisser and Maarten Strack for their ideas and feedback.
Maastricht , May 2003

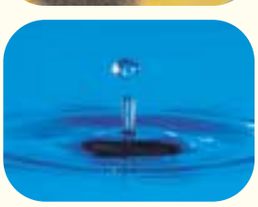
contents





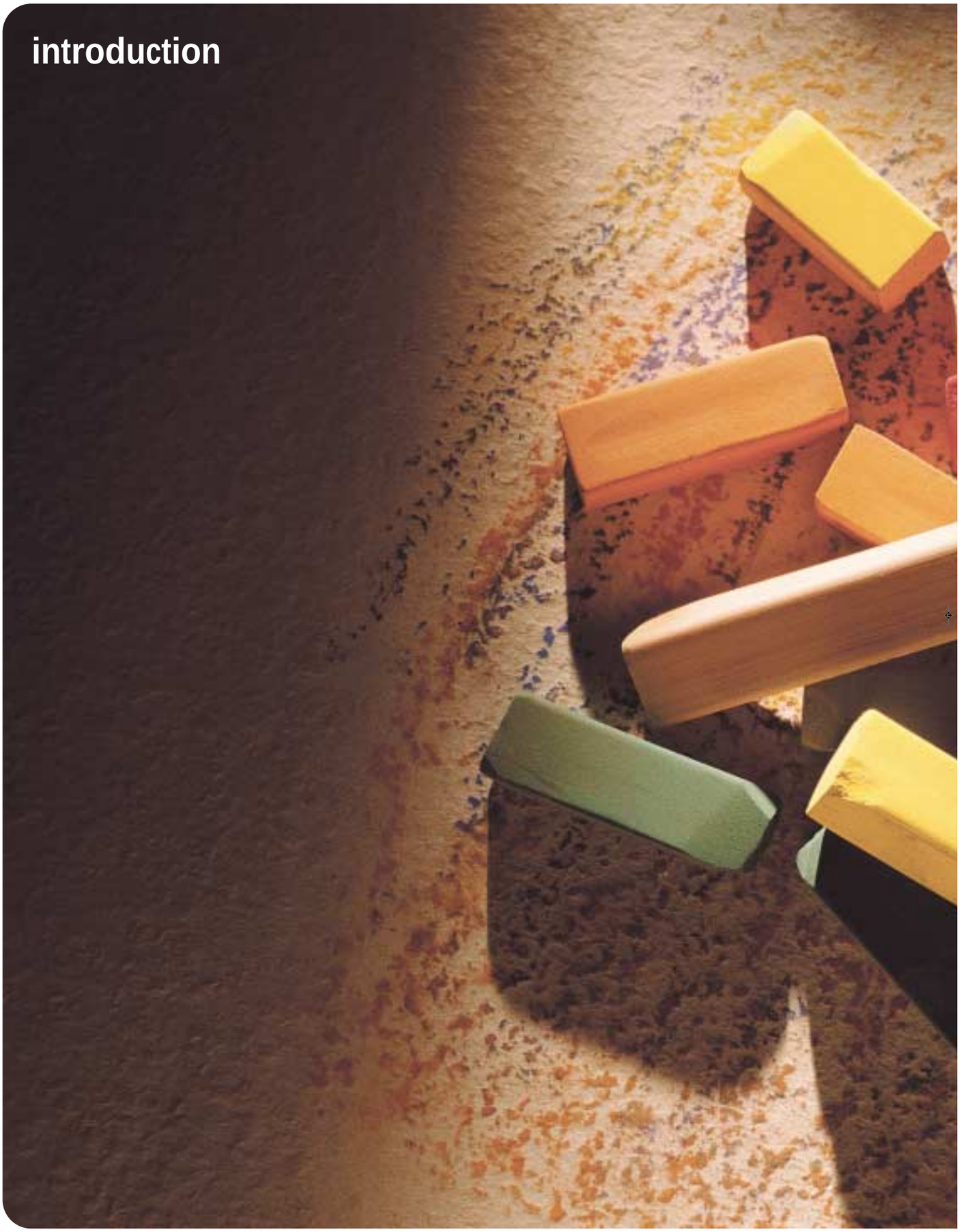






* the information contained in this guide covers the general range of HP Indigo presses.
Check with your Print Service Provider to ascertain the exact configuration, capabilities and services that they provide.

introduction



The role of the designer has changed radically in the last few years. With the advent of digital communications the designer is no longer just an artworker, but has had to combine a myriad of functions into the one role.

Today, the designer has to be an expert in typography, layout, imposition, colour, and be technically literate enough to be able to operate any number of software applications.

But all this talent can be compromised if a designer does not have an appreciation of the printing process or the press they are creating a job for.

This guide bridges the gap between you and your Print Service Provider (PSP) by examining the power and potential of HP Indigo presses. It starts with an explanation of what makes the HP Indigo press unique in the world of printing, providing the shortest possible workflow route from concept design to print.

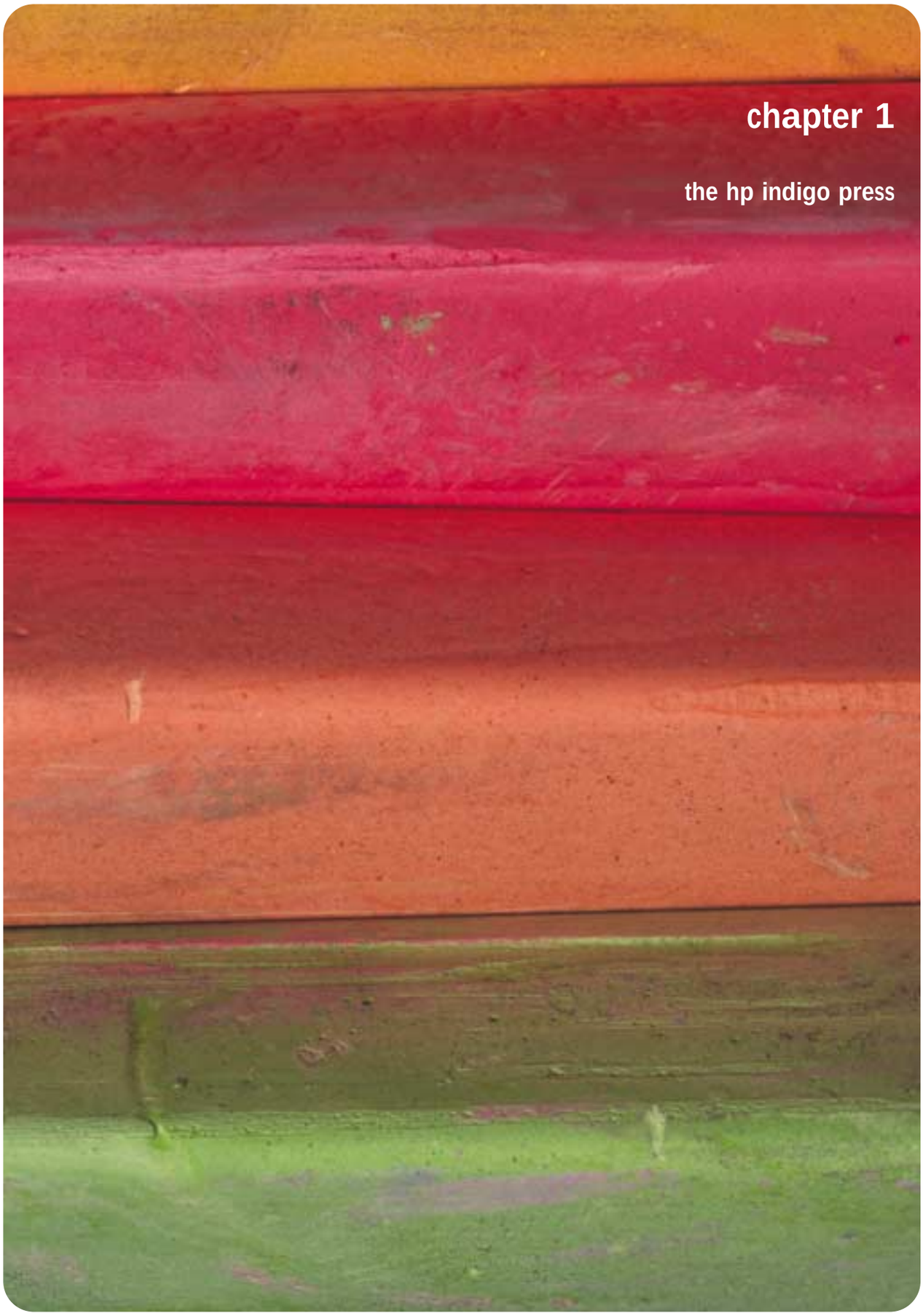
It will explain what file formats are best suited to HP Indigo presses, how to use PDFs to send information to the Print Service Provider, and how to prepare a layout for printing.

This guide covers how to tap into the unique features of the HP Indigo press in terms of the ability to personalise, to make each item of print that comes off the press different from the next, and how to maximise the use of colour by printing with special inks and spot colours. It will also help you get the best out of different substrates as the need dictates.

By reading this guide we hope that you will gain a greater appreciation of the HP Indigo press and that you can translate that understanding into more effective and powerful designs for your clients.

Happy designing!


invent



chapter 1

the hp indigo press

hp indigo

The HP Indigo press has many unique features that are unmatched by many other digital presses including:

- uses a true digital workflow and can change images on-the-fly.
- the ability to print on a wide variety of substrates
- 7-colour capability
- extended gamut 6-colour printing processes
- spot & highlight colours
- "offset" look and feel to the printing
- SNAP® personalisation
- collation

the web-fed HP Indigo Press w3200

the hp indigo press - transforming the print industry.

What is so special about an HP Indigo press? Why is it so different to conventional printing? What techniques are needed to design for one?

These are some of the questions that may be asked by designers when they come to design for digital printing?

The first answer is that the HP Indigo press is unique. There is nothing on the market that can match its versatility and adaptability. But designers need not worry. Many of the design considerations for the HP Indigo press are exactly the same as those you would apply when designing a job for conventional print.

The following pages of this designer's guide are intended to give some handy hints and tips to harness the power of the HP Indigo press to its maximum potential.

about hp indigo

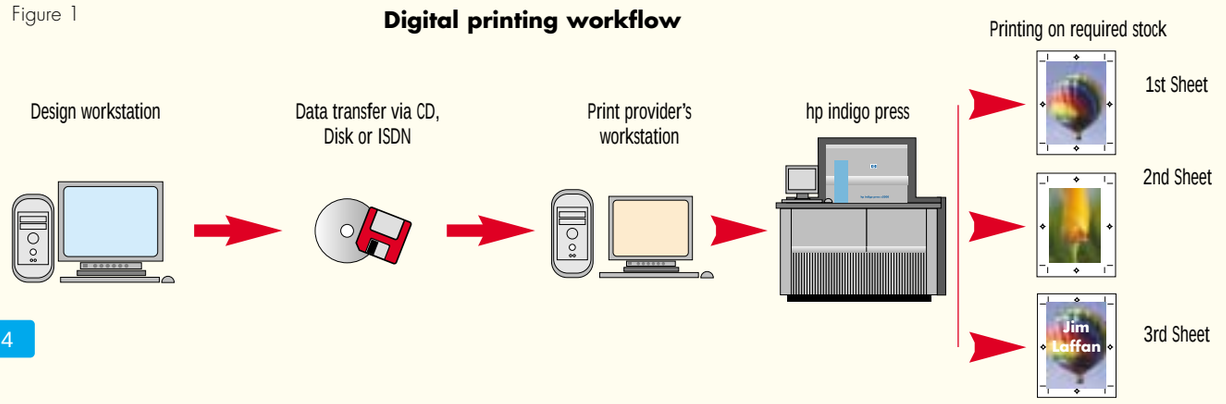
HP Indigo has more than 25 years experience in designing, building and running digital presses. In 1993 HP Indigo launched the worlds first digital colour press. Overnight it triggered a transformation in the printing industry, enabling the production of short run, personalised, high quality colour print direct from the desktop.

Today, over a decade on, the technologies involved have been further refined and developed to meet the needs of the evolving market. HP Indigo now supply a range of sheet-fed and web-fed presses suited for both the industrial and commercial printing and publishing markets.

Unlike conventional printing processes, there are no intermediate pre-press steps between the digital document file and the final print, so there is no need for film (i.e. no imagesetters), no plates (no plate-setters) and no photo-chemicals (no waste) (Figure 1).

Figure 1

Digital printing workflow



This also means that there is no press make-ready needed, no plate mounting, no registration adjustments, and no ink keys. HP's workflow is fully digital from creation to print and since it is fully digital, every image can be a new one, enabling information to be completely varied as required.

offset printing

Digital printing is different to analogue or conventional methods but HP Indigo presses still retain some familiar elements.

HP Indigo presses, like conventional presses, use liquid ink to print an image. The major difference here however is that the HP Indigo press uses its patented HP ElectroInk® technology, to enable the ink to be directed electrically using charged particles in the ink.

The HP Indigo press uses a light sensitive plate that will attract ink. However, unlike conventional printing that uses a fixed (etched) plate that cannot change, the HP Indigo Photo Imaging Plate (PIP) is a dynamic light sensitive plate that can be re-imaged with different information on every revolution of the cylinder. The ink is attracted to the PIP by an electrical charge, rather than a physical transfer from ink tray to cylinder.

Likewise it is then attracted from the PIP to the blanket. This has a number of advantages including the elimination of the incomplete transfer of ink (ink splitting) that is a characteristic of conventional offset litho. HP Indigo press technology uses a blanket to transfer the ink as in conventional offset printing. The blanket acts as a shock absorber and pressure pad to ensure even ink transfer to the substrate. This enables the HP Indigo press to use a wide range of substrates of different surface texture and thickness, just like conventional printing.

The difference is that unlike conventional offset printing the HP Indigo blanket transfers 100% of the ink to the substrate. The total transfer of ink from the blanket allows the same set of cylinders to be used to print the complete sheet ensuring precise colour-to-colour registration and colour consistency throughout.

An entire new separation, in a different colour, can be created for every rotation of the cylinder. This is called "on-the-fly colour switching" and is the technology that enables the HP Indigo press to print fully collated, duplexed and individually personalised sheets.

the printing cycle

For a better understanding of the HP Indigo Liquid Elecro-photographic (LEP) printing process it is useful to follow the sequence of events in the printing process. (Figure 2)

1. The PIP is charged to provide a "blank canvas" on which to write the image.

2. The image is "drawn" on the PIP using a laser which is controlled by the raster image processor (RIP) that converts instructions from a digital file into "on/off" signals. Through exposure to the laser the imaged areas of the PIP are discharged leaving a difference in charge between the image and non-image areas.

3. Binary Ink Development (BID) units deliver the appropriate colour ink to the imaged areas of the PIP. Any excess ink is returned to the ink tanks for reuse.

4. The PIP is then neutralised (erased of charge) and transfer of the ink image from the PIP to the blanket takes place.

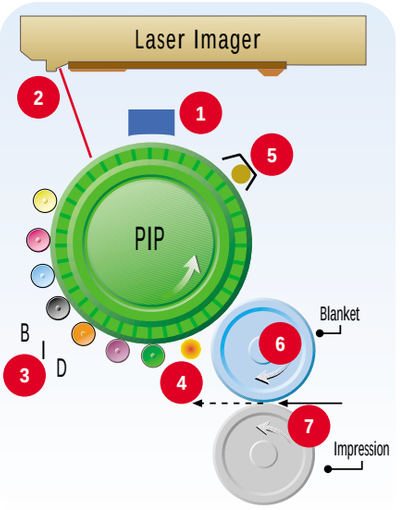


Figure 2

5. Any residual ink on the PIP is removed to ensure it is clean, ready for the next separation to be imaged.

6. Heat applied to the blanket dries the ink image and makes it "sticky".

7. The ink image is then transferred under pressure to the substrate which is gripped and held on the impression cylinder. Once all the colours have been delivered the sheet is released.

hp indigo

HINTS AND TIPS

You can ask your Print Service Provider (PSP) to match the dot gain characteristics of the HP Indigo press to another printing device. This is especially useful if you are mixing conventional and digital printing methods in the same print job.

why is the hp indigo press unique?

Digital printing is a term often misunderstood and used to generalise what is a diverse range of output devices. Your desktop inkjet is a digital printer. For ease of definition a digital printer can be considered as any device that has the ability to change, 100%, the content from sheet to sheet without stopping.

There is a class of press which is often mistakenly referred to as digital, the DI presses. Direct Imaging presses use on-press imaging technologies to create an image onto a lithographic printing plate. As such, they do not have collating, duplexing or variable imaging capabilities like the HP Indigo press. In other words, once the plates are imaged the process is conventional, with all the conventional limitations.

The only other main digital colour press technology is the xerographic (dry toner) process, commonly found in laser printers and colour copiers.

This process however is typically characterised by a lack of print quality. Dry toner particles are between 7 to 9 microns in size and struggle to reproduce fine details and acceptable colours. With dry toners it is difficult to match the surface gloss of a substrate, usually giving the image a glossy appearance on a matt paper and an ultra-glossy appearance on a glossy paper. The process also attracts a lot of static that is transferred to the paper and can cause significant problems and wastage in the finishing process.

This limits your choice and creativity as a designer in terms of the print quality, paper quality and finishing techniques that you can use.

The HP Indigo press is the only digital printing technology that can equal or exceed the quality, colour range and substrate compatibility of conventional offset printing. It is also the only digital technology that can print up to seven colours - including extended gamut printing or spot colours - for use in your designs to produce eye-catching images or to maintain your clients' corporate brands.

All this is what makes the HP Indigo press unique.

A cross section of the HP Indigo Press 3000

the benefits of hp ElectroInk

HP has developed and patented its own special set of inks for use on its presses called HP ElectroInk. A liquid ink, it has a number of advantages over both dry-powder xerographic toner and standard conventional ink.

For a start, the consumption of HP ElectroInk has little dependence on the substrate properties, unlike conventional printing or dry-powder xerography.

In conventional offset printing, different inks are needed for papers or non-absorbent films, and the viscosity of the ink needed is different for each type of paper stock used. Particularly absorbent papers can increase offset ink consumption by up to 50%.

Dry-toner xerography is heavily dependent on the electrostatic properties of the substrate and small changes in the relative environmental humidity can result in large changes in print quality. The high fusing temperature that is needed for the process also limits the choice of paper available for the process.

HP ElectroInk suffers from none of these drawbacks.

edge sharpness

Viewed at high magnification, you can see that HP ElectroInk forms much sharper images than xerographic dry toners (Figure 3) and is even superior to offset lithographic dots (Figure 4). When transferred from the blanket to the final substrate (paper or plastic), the HP ElectroInk cools to form a thin film layer on the substrate surface. When printing on paper, the cooled HP ElectroInk does not soak (or wick) into the paper fibres. Thus, printed dots, linework and text, stay sharp and well defined. A designer can use almost any paper stock and quality without a huge deterioration in image quality.

Figure 3. Xerography (powder toner)

hp ElectroInk

dot gain and colour consistency

HP Indigo presses have the ability to vary the dot gain allowing precise control of the exposed dot size and optical density. This ensures that dots of the desired size are printed time and time again. The LEP process means that the HP Indigo press does not have to compensate for fluctuating ink and water temperatures, ink/water balance, plate and blanket wear, and atmospheric humidity.

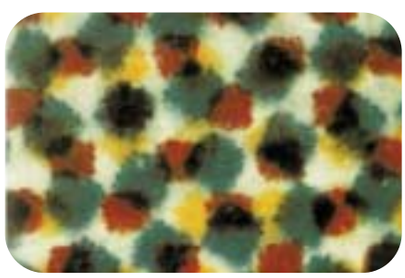
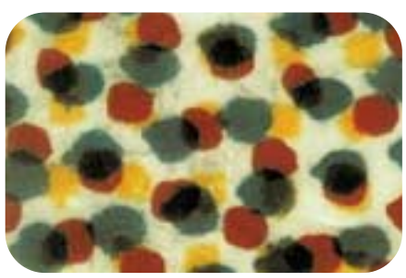


Figure 4. Conventional offset



hp ElectroInk

image gloss

Just like conventional offset inks HP ElectroInk images match the gloss of the underlying substrate, from rough to dull to high gloss. Paper stocks have a typical surface roughness ranging from about 1 to 10 microns in height. The HP ElectroInk layer is only about one micron thick, and therefore follows the "hills and valleys" of the substrate surface rather than filling them in. This combined with the translucency of HP ElectroInk allows the papers' character to show through.

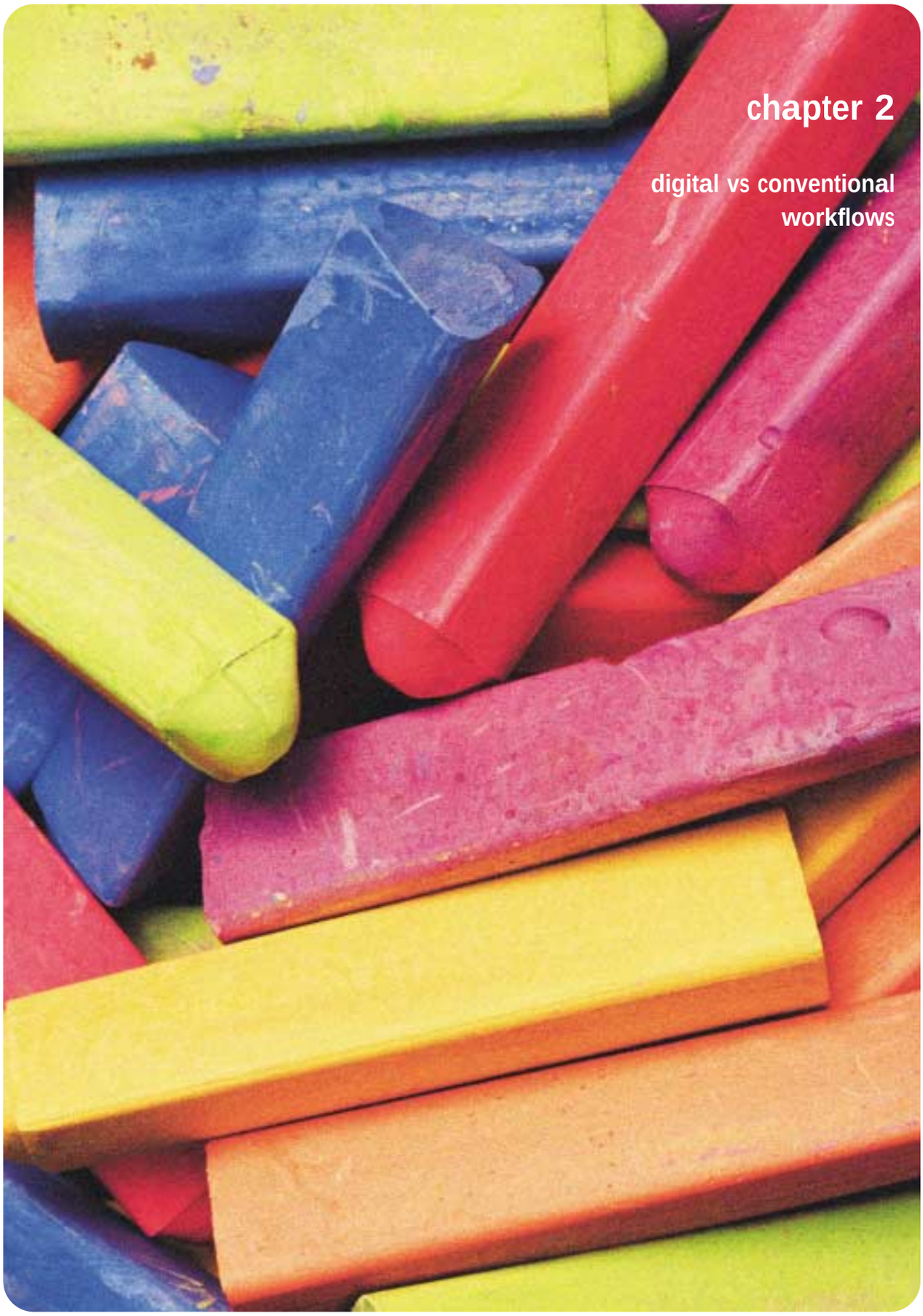
instantaneous image drying

Because HP ElectroInk solidifies as soon as it transfers to the substrate, the finished print emerges dry from the press allowing it to be finished immediately. This means that print jobs can be turned around quickly as the ink dries rapidly even on special substrates such as plastic or acetate. Further image hardness is acquired in the few hours after printing.

light fastness

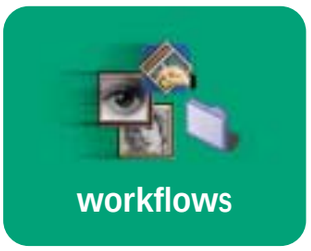
The encapsulation of the pigment sub-particles within the HP ElectroInk resin helps to preserve the chemical properties of the pigments against oxidisation and the effects of relative humidity. Colour durability of the printed images, either in the form of fading or deepening, is as good as, if not better than, conventional offset inks.


invent



chapter 2

digital vs conventional workflows



digital vs. conventional workflows

Using the HP Indigo press is the fastest, easiest way for a designer to see his artwork appear in print. The image you have created on your Apple Mac™ or PC can be digitally relayed to an HP Indigo press and output within minutes if you have the right connections with your Print Service Provider (PSP). That is because the HP Indigo press cuts out many of the stages involved in conventional printing.(Figure 1)

In the "old days", the designer's job was much more limited than it is today. A designer would prepare the artwork and design on flat copy boards. A host of specialists were on hand to complete other jobs. Typography was handled by skilled typographic operators whose only role was to layout text. Scanner operators were responsible for scanning images. Reprographics specialists were there to strip the text and images to films. All this had to be done for each colour section on *flats* before platemaking.

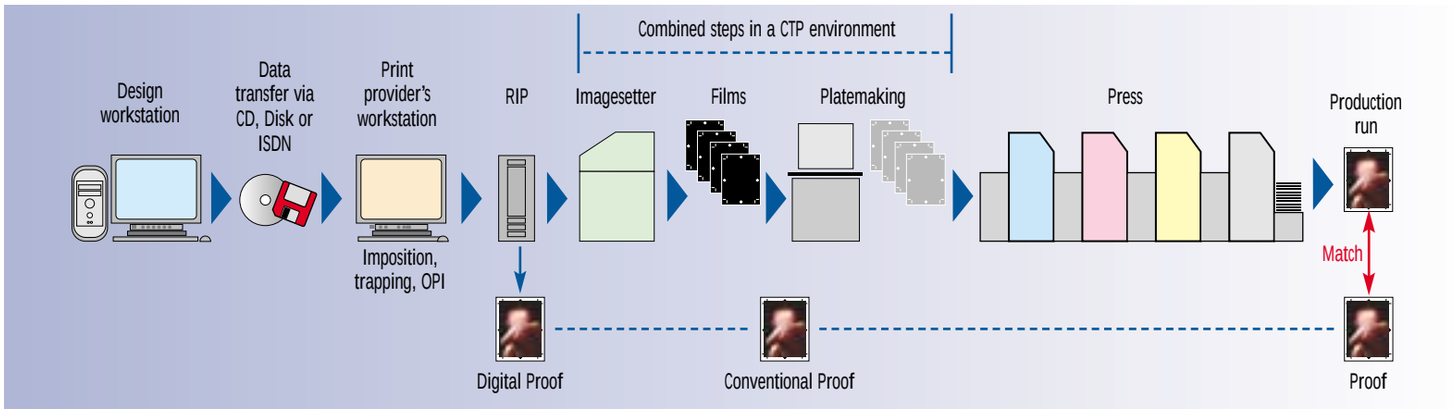
Today, the designer's job combines all these roles. The computer age means the designer has to be artworker, typographer, computer expert, scanner operator and layout pro all in one.

But even with the aid of computers, lithographic printing still needs to go through a complicated series of tasks before a design can be turned into a print.

pre-flighting

Once you, as a designer, have finished the artwork you can send it to a PSP on disk, via ISDN, or broadband links in a number of file formats. The first thing your PSP will probably do is pre-flight your job as this will tell him if he has all the files he needs to output it, e.g. fonts, logos and images. This check will also verify other parameters, things like: are all the pictures at the correct resolution and in the right colour space? You can help yourself and

Conventional workflow



HP Indigo workflow

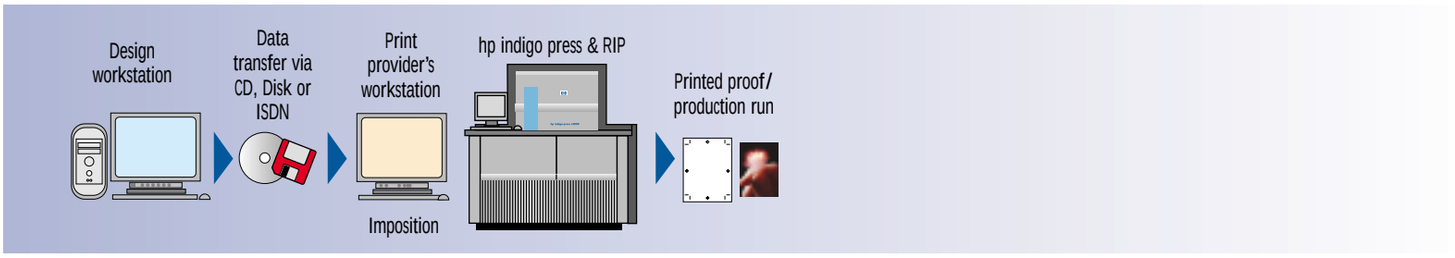
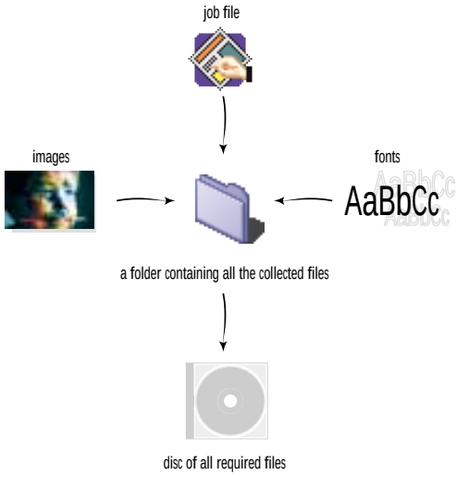


Figure 1



Before sending the job file to your Print Service Provider ensure that all the necessary files are also supplied (job file, fonts and images).

your PSP by doing some of these checks before you send the job. This will help to avoid any delays or additional rework costs. After that, it is usual for your PSP to supply you with a proof, so that you will know what to expect from the press.

Conventional printing requires an imagesetter to create the films which are then used to create plates.

imagesetting

Typically the next stage of the conventional print process is to send the file for imagesetting or platesetting. An *imagesetter* is a device that will transfer the digital file onto film that can then be used to create a plate. A *platesetter* images the file directly onto a plate, cutting out the film step, hence the term Computer-to-Plate (CTP). In either case an individual film or plate has to be created for each colour separation, so potentially you will have four films and four plates for each signature of a CMYK job.

If a PSP uses an imagesetter, then he still needs to expose the film onto a plate before printing. It begs the question as to why printers still use computer to film if they can directly expose a plate? The answer mainly comes down to cost, in that computer-to-film is a lot cheaper than computer-to-plate, even with the associated costs of film and plate processing and chemical disposal.

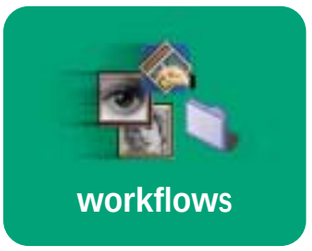
Some printing presses have the laser imaging heads incorporated into the printing press. This technology is known as Direct Imaging (DI). Whilst it has the advantages of having a CTP system effectively built into the press with automated plate changes, once imaged the plates and the press perform in a way similar to that of conventional offset printing.

On an HP Indigo press all the "imagesetting" functions are done on the press. The job is RIPped and imaged in real time onto the Photo Imaging Plate (PIP) (see chapter 1). Unlike a DI press, which once the plate is made has a fixed image, the HP Indigo press can vary the image with each revolution of the PIP, creating fully collated or even personalised documents.

the proof

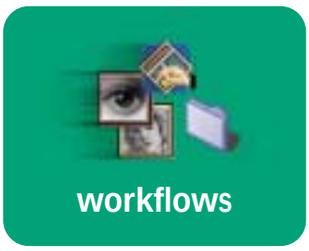
It is very expensive to provide a *press proof*, i.e. to produce a limited number of prints using the same printing method and substrate as the final job.

In order to reduce costs, alternative methods of proofing a job have been developed. Proofs that are of



HINTS AND TIPS:

A common mistake is to supply an incomplete document or file to your Print Service Provider. It is always best to check your files using a dedicated flight-checking program that will pick up on any errors, or make sure that your PSP pre-flights your files before sending them to the press. This precaution prevents disappointment after a job is printed and it is too late to do anything about it. If you have any doubts about how to set your job up or what files to supply consult your PSP before submitting the job.



the quality to pass a job on press are known as *contract proofs*, and many of the following methods are good enough for contract proofing purposes.

A flatbed proofing press has the advantage of producing what are termed *wet proofs* on the same stock and using the same inks as standard litho printing. However, it has drawbacks in that the ink layers are produced one at a time, i.e. the yellow is applied and then left to dry; then the cyan is applied and left to dry, etc. This makes it labour intensive, time consuming and expensive.

Proofing is simple, cost-effective and extremely quick on an HP Indigo press.

An *analogue proof* can be made using the final films on a specially designed proofing machine, from manufacturers like DuPont®, Kodak Polychrome Graphics®, etc. These systems mainly utilise the same method of image transfer, using toner based dyes rather than inks.

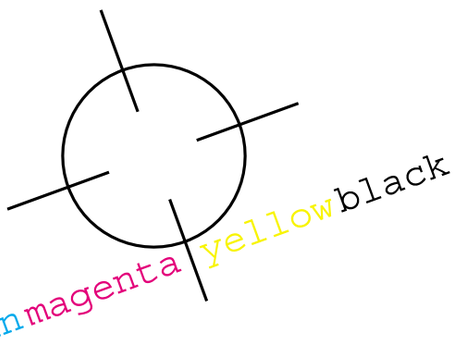
The use of colour matching standards, like the Eurostandard®, enables analogue proofing devices to accurately reproduce the desired colour. However, these processes tend to only work with a specialised base stock that may or may not exactly match the substrate that the final job will be printed on.

Analogue proofs have now largely given way to *digital proofs*, with a variety of manufacturers producing machines that can generate a proof from digital data. However, many digital proofing devices are ink-jet machines that produce continuous tone images rather than screened images as used by litho presses. Again, they don't always use the stock that you want the final image to be printed on.

However, your Print Service Provider can use the HP Indigo press to supply you with proofs very quickly, using Eurostandard inks and on the intended final stock. This can be especially useful for test marketing purposes or for instances where the trimmed and finished product will have more impact than a collection of flat single sided proofs.

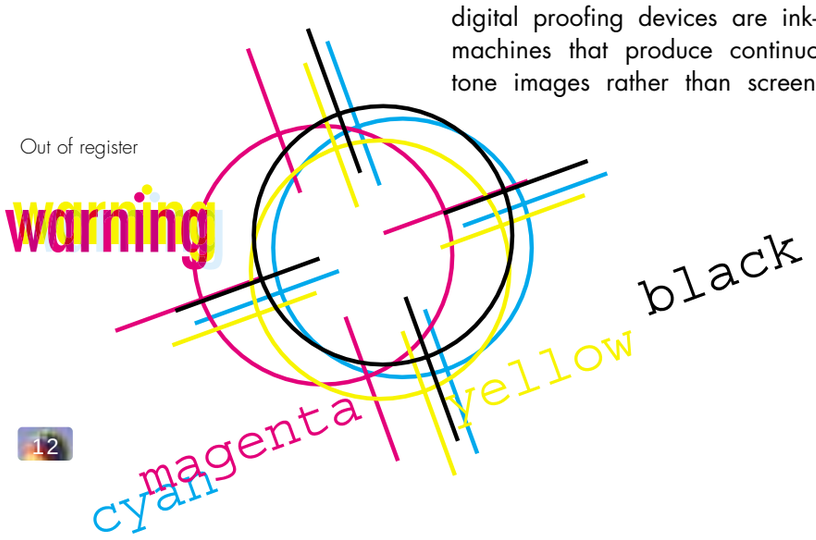
Remember that whilst the HP Indigo press can be used for proofing jobs that may eventually be printed using a different method, if the job is destined for printing on an HP Indigo press then the proof is an exact rendition of the final job.

An additional benefit is that your PSP will also be able to provide you with multiple copies of the proofs should you need them, at a relatively low cost, which you can use to distribute to your clients.



In register

Out of register



the printing process

In conventional printing, once plates have been imaged, they are fitted to

the printing press. The plates have to be carefully aligned so that all the colours register properly. To check this, the press has to be run and adjusted before it is correct. The operator also has to manage the ink-water balance. This is critical to the performance of the press. Too much water and the image will be washed out. Too much ink, and it is saturated. Again, it takes time to get this balance correct. This set-up, termed *make-ready*, generates a significant amount of paper wastage, something you will be paying for in your final bill!

The process of press make-ready is one of the most time consuming and costly elements of a printing job. It is especially inefficient on short-run jobs where the press is running for very short periods of time between make-readies.

Using conventional printing methods all personalisation must be done off-line as a separate process. This usually consists of laser overprinting that is restricted to a few lines of black text in an address box or name panel.

Once the job has been printed then the plates have to be removed and the press *washed-up*, ready for the next job. The completed job is then ready to be finished, by folding, trimming, creasing and packaging.

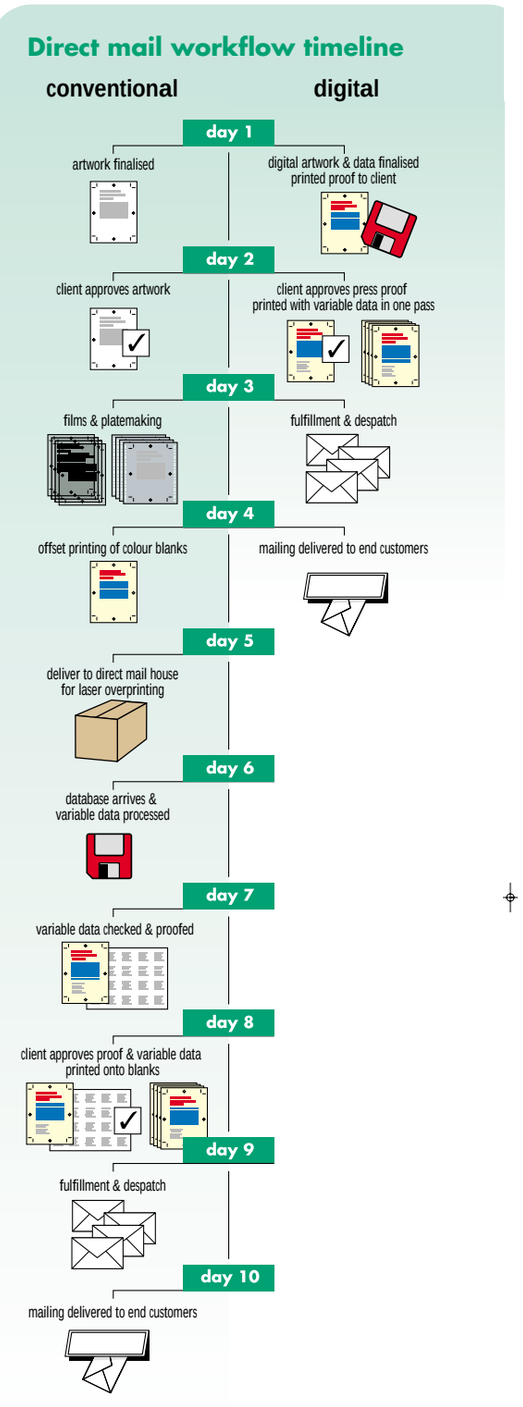
Allow for drying time when printing on a conventional press

This is very different on an HP Indigo press that needs virtually no make-ready as the press is completely digital. The next job can be prepared whilst the current one is being printed and there is no need for a wash-up in-between jobs. There is also no need for any delicate ink-water balance adjustments on the press, as the density and delivery of the ink is automatically controlled. This means that from the first sheet the print is up to ink weight and in register, which dramatically reduces wastage. The HP Indigo press can personalise every single printed sheet, whether it is for an individual, a company or even a sequential number or barcode - everything in the design can be varied, including text, images and illustrations.

finishing

Unless special techniques and processes are used in conventional printing the ink image is still relatively wet and tacky when it comes off the press. This means that there is usually a period after printing when the sheets are left to dry before either being printed on the other side or finished.

On the HP Indigo press, the ink dries instantaneously and the job can be finished as soon as it comes off the press. A document can be *collated* (printed in sequence), in either *simplex* (single sided) or *duplex* modes (both sides of the sheet). Once printed the sheets can be trimmed, folded and stitched so that within minutes you can be holding the finished article. Some HP Indigo presses can even be configured with in-line finishing to fully automate the finishing process.



Using digital printing for direct mail can save you time and, just as importantly, money.


invent

chapter 3

design software, making the right choice

design software

HINTS AND TIPS:

the bitmap mode

In the world of the digital image there are two methods of defining images: bitmap (or pixel) mode, and the vector mode.

Bitmaps store graphical data represented as a set of pixels. With this method an image is composed of a series of points determined by their x and y coordinates and their colour. This data storage system can produce very large files directly related to how much colour information it contains. Hence an 8-bit colour image will be smaller than a 24-bit image.

Typically bitmap images can be considered photographic images where each pixel is defined independently. Thus, bitmaps are edited by manipulating individual or groups of pixels. Because each pixel is defined at creation or capture, bitmaps are sensitive to scaling and can suffer loss of detail and appear jagged if enlarged too much (Figure 1a). They are resolution dependant.

The bitmap method represents the only way of digitally storing a photograph, a watercolour, or a painting in digital form.

Common Bitmap formats include: TIFF, BMP, JPEG, PhotoShop EPS.

design software, making the right choice

Choosing and using the right design software in the first place can make your life a whole lot easier. There are hundreds of different applications and add-ons in the form of plug-ins or XTensions that you can buy, but where do you start?

Generally the applications for graphic design can be grouped into different categories: Image Creation & Manipulation; Illustration; and Page Layout software.

For example:
Image Creation & Manipulation
Adobe® PhotoShop®, Corel® Painter™

Illustration
Adobe® Illustrator®, Macromedia® FreeHand®

Page Layout
QuarkXPress™, Adobe® InDesign®

These days the line between these categories is becoming fuzzier with most of the mainstream applications expanding their feature set with each release. But the way in which each application approaches tasks tends to extend from its original heritage. Some people will find one application easier to work with than another, probably because it follows a similar logic or working practices that they can relate to. So one aim should be to find an application you are comfortable with. However, in business there are some industry leaders and your choice may be made more from a compatibility standpoint.

It is worth pointing out at this stage that whilst you may be able to print your document or presentation to your desktop printer it does not necessarily mean that the application you are using is the most suitable for printing to a conventional or digital press.

For example, text editors and word processing software often have some basic page layout abilities, and for printing out on a relatively low-resolution printer they are fine. However, when sending your document for printing on an HP Indigo press the abilities of these applications may fall short in terms of quality and the ease with which your PSP can output them.

Firstly, most of these types of application use the RGB colour space because very often they are intended for display rather than print. The HP Indigo press is a CMYK

Figure 1a. A bitmap image shown at 100%

..the bitmap image shown at 350% enlargement

device and in converting from the larger RGB colour space to the smaller CMYK colour space the colours may not appear as vivid and bright as you see on your screen. It is always better to design your document in CMYK if you are going to print it using a CMYK device as the results will be far more predictable.

Secondly, remember that the HP Indigo press is capable of printing at a much higher resolution than the average desktop printer and therefore benefits from higher resolution and quality images to get the best results.

Thirdly, on the whole these applications expect only a single page to be printed at a time and they usually do not provide any facility to add crop marks that are used by the PSP to cut the page down to finished size when printed on a larger sheet of paper. Neither do they usually take into account different imposition schemes to cater for your finishing requirements. For example, a saddle-stitched booklet will need a different imposition scheme to a perfect bound report.

On the whole it is not advisable to perform page layout in Image Creation & Manipulation applications. These software programs generally have very basic typographical features and because they use bitmap-based images the file sizes can be large and the quality of the text poor compared to vector based applications. Also, importantly, they have no concept of a document with more than one page. They are however excellent at getting the best out of your images and preparing them for printing. They are the best place to perform RGB to CMYK conversions, image retouching, image cut-outs, image composition and format conversion.

Conversely, even if the functionality is there, Page Layout applications are not the best place to perform image retouching or colour adjustments.

Increasingly the difference between Illustration and Page Layout applications is becoming more difficult to distinguish. Both tend to have good typographic control but an Illustration application will typically have more control over the vector based graphical elements (Figure 2). Again, these applications tend to only allow the creation of a one page document.

The professional Page Layout applications are capable of pulling together all the elements needed to construct the page; the copy from word processors, the images, and

Figure 1b. A Vector version of the same image shown at 100%

...the Vector image shown at 350% enlargement

design software

HINTS AND TIPS:

the vector mode.

The vector mode is a way of saving an illustration that uses curves or shapes that can be defined by mathematical equations. In a vector file, each shape is stored according to its geometric properties. Instead of storing the image point by point (like in a bitmap), this shape is associated to one or several mathematical formulae that connect simple geometric properties such as a rectangle or a circle - to mathematical equations that represent these vectors.

This way, images of a greatly reduced file size when compared to a similar bitmap file can be created. Vector graphics are ideal for logo designs, typography and similar objects that require a high degree of precision and where using mathematical definition allows for easy editing of whole elements. This also means that the image can be infinitely scaled without loss in quality (Figure 1b). They are resolution independent.

Ironically, to print a vector page, it must be converted into pixels. This is done by the Raster Image Processor (RIP) which transforms the vector information into a pixel based bitmap image suitable for printing on the associated printer. RIPs are usually closely integrated with, and specific to, an output device and cannot be used to drive other non-similar output devices. Because of differences in RIPs there can be variation in the quality and appearance of the image resulting from this conversion. Hence, it's worth being aware that output from different RIPs (shouldn't but) could be different.

Vector based format: Illustrator/Freehand EPS.

Figure 2.

Vector based images are used for the creation of curves or shapes that can be defined as mathematical equations.

the illustrations. It allows the creation of entire multi-page documents with good typographic, word editing and document control.

It is the place where many different elements come together (Figure 3) so it should have good version control to track any changes that may have been made to the elements that make up the page.

The functionality of these applications can often be extended by the addition of a suitable plug-in or XTension that can either make common tasks easier or bespoke tasks possible.

Finally, it should also have good control over the output by allowing the definition of printer's marks and the application of imposition schemes to the document to keep your PSP happy.

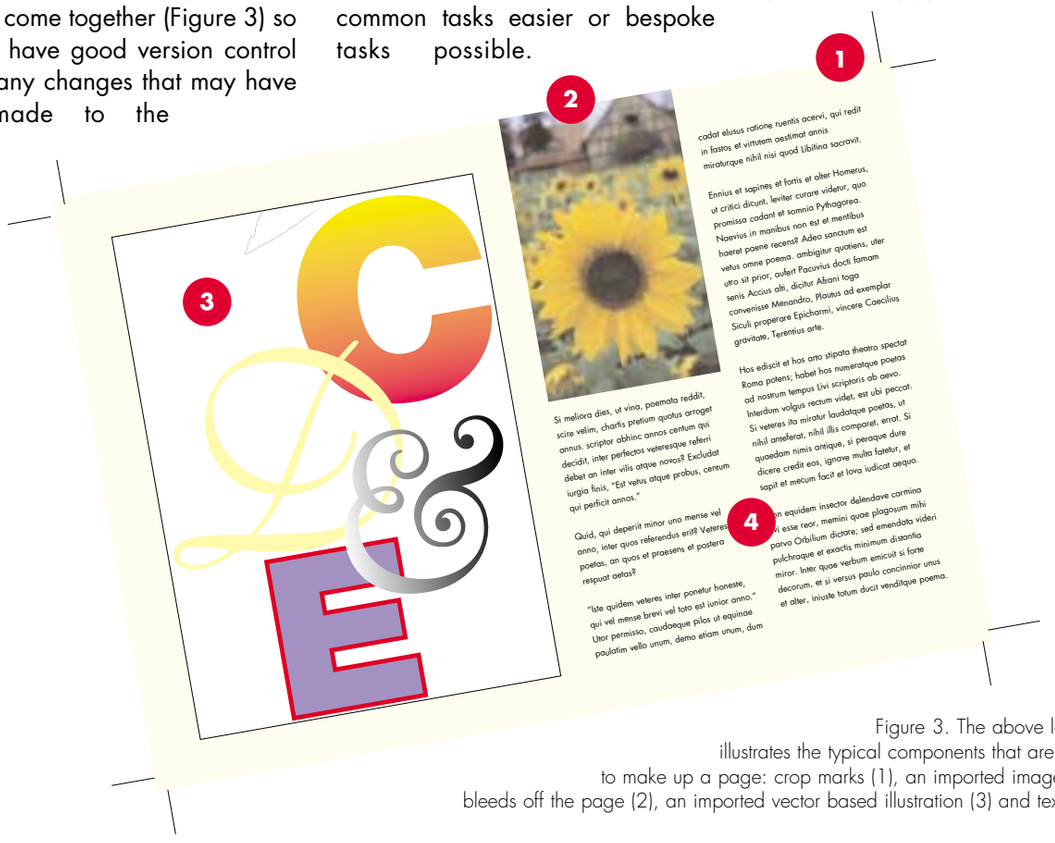


Figure 3. The above layout illustrates the typical components that are used to make up a page: crop marks (1), an imported image that bleeds off the page (2), an imported vector based illustration (3) and text (4).

chapter 4

getting the best results from your design

getting the best results from your design

On the whole designing a document for printing on an HP Indigo press is no different from any other printer. However, as with all devices, by understanding the process and its limitations better results can be obtained. Indeed, by gaining a greater appreciation for the capabilities of the device you may find even more inspiration for your designs.

Figure 1.

72 dpi

150 dpi

300 dpi

a question of resolution

If the image resolution is too high for the printer, the file size, transfer time and RIP times will be unnecessarily long; if the resolution is too low then the quality of the printed image will be poor. You can see the effect of resolution in the printed example on this page (Figure 1). As a rough rule of thumb the resolution of the image should be twice the screen ruling used to print the image.

Ideally, images should be at a resolution of 300dpi for printing on the HP Indigo press. However, you will find that at resolutions between 250dpi and 300dpi, there is little appreciable difference in the quality of the resultant printed image. The amount of detail in an image (resolution) is defined not only by the number of pixels but also by the dimensions of the file, hence the unit of measure is dots per inch (dpi).

For example, a typical image may start off with 1600x1200 pixels, which at 72dpi produces an image with the physical dimensions of 56x42cm (Figure 2a). But this image can be otherwise converted to a 300dpi 13x10cm image (Figure 2b) without any loss in detail, i.e. it still has 1600x1200 pixels. So if we were to create a 13x10cm picture box in our page layout and either import the 300dpi image at 100% or scale the 72dpi image to fit we should get the same quality image produced.

In practice it is always better to convert the image to the correct resolution first and then import it. It is also good practice to also create the image at the size you intend to use it since scaling images adds significantly to processing times and can give poor results. On the whole you will see a loss in quality of the image if it is scaled up by more than 200% unless you have compensated for it in the resolution.

Figure 2a. 72 dpi original image

Figure 2b. 300 dpi changed image

If necessary, resolution can be "invented" by using re-sampling or interpolation of the image. Interpolation is the process of multiplying the number of pixels contained in an image using different algorithms to increase its resolution or to prepare it for printing at a larger size, whilst maintaining the same resolution. Interpolation is particularly useful to compensate for insufficient sampling. In other words, it can help to compensate for too low a density of dots in relation to the print size.

Linework should be scanned at a minimum of 812dpi for output on an HP Indigo press.

how to obtain the best tints and gradients (vignettes / blends)

There is a tendency for banding (changes in density) on all electronic devices and this can give rise to undesirable artifacts in blends or areas of tint. It will very much depend on the colour and its density since your eye is particularly sensitive to these changes in some

The right hand side of the above picture with added Gaussian Noise (10%).

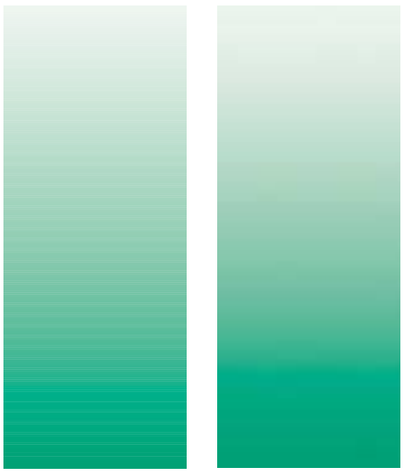


Figure 4. QuarkXPress blend (left) Photoshop blend with 5% noise (right)

colours. For example, you cannot easily detect changes in density in yellow or red but you can quite easily see changes in blue or green.

There is no magic formula to tell you if a colour will be problematic but your PSP should be able to advise you on this. As a guide colours that are difficult to print conventionally out of four-colour process inks will also be difficult to print on an HP Indigo press.

There are however some guidelines and tips that you can use to minimise the appearance of banding should you need to do so.

If you can, try to avoid using large areas of that particular colour. Smaller patches will look better than large areas. Lighter tints tend to look better than heavier tints, but try to avoid specifying tints lighter than 5%.

If you have a large area of a colour that is proving difficult then either consider printing it as spot colour (check with your PSP to see if this could be an option) or introduce some granularity into it. This can be done with most professional image editing software. Create an image with the actual physical size you need and fill it with the colour you require and then add some noise (5-10%), a pattern, or a texture to it. This will help to smooth its appearance whilst maintaining the original colour (Figure 3).

The same tactics can be applied to blends. Blends can show banding and again it will depend on the colours in the blend. Best results are achieved when the tonal range is less than 50%. Shorter blends tend to be better than longer blends since the change in tone is less subtle. Similar to tints you could also generate the blend using an image editing software package and then add some noise (Figure 4).

any colour you like as long as it's black

Large areas of solid black benefit from a "shiner" like in conventional printing so add 40% cyan to deepen it and make it richer (Figure 5).

Figure 3. A corporate colour can be enhanced by introducing background textures such as...

A corporate colour can be enhanced by introducing background textures such as...

an image...

a pattern...

or noise (10%)

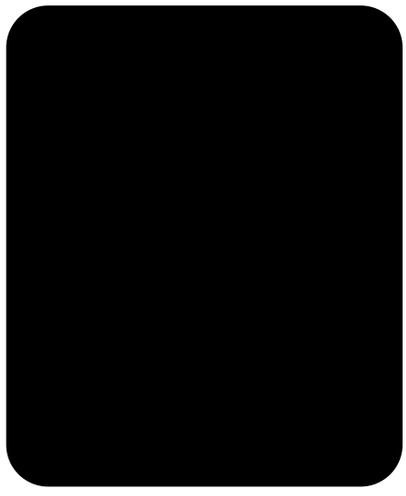


Figure 5. Deeper blacks using 40% cyan.

size matters

The HP Indigo press has a maximum image area of 308x450 mm and can accept a physical sheet size from 210x297mm to 320x464 mm. This allows for a single A3+5mm bleed or two A4+2.5mm full bleed documents placed side-by-side on the sheet to be imaged. In most cases you would be wise to let your PSP handle the imposition of your document since they have specialist software to do it. However, you should design any bleeds you require into your document.

Remember that by designing to make the most effective use of the image area you can reduce your print costs. Even if you do not actually impose the document yourself keep in mind the imposition scheme your PSP will use. If the document will fit 4-up on the sheet then it will be cheaper to print than if it were slightly larger and could only be printed as a 3-up imposition.

trap and overprint

The HP Indigo press is capable of very accurate colour-to-colour registration and in most cases it should not be necessary to specify any trapping. However, if you want to specify specific traps then this should be done in the originating software application, but also let your PSP know so that they can process the file accordingly. The HP Indigo press RIP will automatically set 100% Black to overprint. If you require any other specific overprints then these too should be defined in the application and your PSP made aware.

digitally captured images

Digital photography is rapidly becoming accepted as an alternative means of capturing images for both professional and domestic use. At the professional end of the scale, digital cameras now capture images with a higher resolution than film and with a colour depth and accuracy that is superior to the photographic transparency.

Professional digital cameras do not pose major problems in CMYK conversion. Increasingly modern cameras come equipped with software that converts files directly to the CMYK print format. However, if you are presented with an RGB image refer to the following section for guidance on making the RGB to CMYK conversion.

RGB-CMYK conversion

The HP Indigo press uses CMYK (Cyan/Magenta/Yellow/Black) inks as it base set. They conform to the Eurostandard® ink specification and in addition there is the ability to add up to 3 additional inks to the ink set. Predictable colour output can only really be achieved if you also work in the same CMYK colour space. All data that you send the HP Indigo press should be converted to CMYK too.

Many images start off their life being digitally captured, whether by camera or scanner, in the RGB (Red/Blue/Green) colour space. The RGB colour space is much larger than the CMYK colour space and this means it is able to display a much wider gamut of colours than can be achieved using CMYK. The colours tend to be more subtle and brighter. How often have you noticed that your images look better on screen than when you print them out? This is because your monitor is an RGB screen and your printer is probably CMYK. Because of its colour gamut it is advisable to work for as long as possible with an RGB image. This has several advantages:

1. It enables the maximum number of colour hues to be digitised for the production of the highest quality prints and images. Always save a copy of your RGB image, it may be useful later for including in a Web page or for six-colour printing (see chapter 8).

2. You will find that RGB images are faster to work with in image manipulation applications than CMYK and also take up less disk space.

3. You can control the RGB to CMYK conversion more accurately if you need to. But remember, once you have converted your RGB image to CMYK you cannot regain the same gamut of colour by converting it back. Once the conversion has taken place all the "extra" colour attributed to the RGB gamut is lost, and whilst you can convert a CMYK image into an RGB image you cannot regenerate that lost colour.

However, before you use your image in a design that is to be printed on an HP Indigo press you should convert it to CMYK. This way you will see in advance the appearance of the image. In particular you may notice that the greens and oranges may not be as bright but this unfortunately is the world of CMYK. If you don't convert it then the RIP will perform a default conversion that may give you unexpected results.

One of the elements essential to a good CMYK conversion is the control of the black layer, whether in traditional offset or digital print. HP Indigo presses do not escape this rule.

Typical parameters you can use to perform the conversion are as follows:

- Eurostandard Coated or Uncoated
- dot gain: 14%
- GCR black generation: medium
- black ink limit: 100 %
- total ink limit: 300 %

Check with your PSP if you have any doubts.

file formats: the good, the bad, and the ugly

An individual collection of data is often referred to as a file. There are many different formats and they will normally fall into one of three categories: application document or data formats; interchangeable file formats; and output file formats.

The application document formats tend to be specific to the original application that created it and typically cannot be used by another application e.g. a QuarkXPress™ document can only be opened in QuarkXPress.

Interchangeable formats are generally used to transfer data between different applications. They usually can only contain a single "page" worth of data. Very often they can also be used directly for printing but usually they lack any specific control over how the file is to be output, e.g. EPS, TIFF, BMP, GIF.

Output file formats are usually page description language formats that can contain all the page elements and production requests required to print the whole document. Some are proprietary, e.g. IBM AFP, HP JLT, but others are open industry standard formats e.g. PostScript®(PS), Portable Document Format (PDF)

The interchangeable and output formats all have their pluses and minuses and the decision about which one to use can sometimes be tricky. But if the file is created with the correct settings for its purpose then the end result should be the same. Very often the decision is based on a balance of file size, editability and RIP time.

TIFF / .tif (Tagged Image File Format)
The Tiff format is the preferred and oldest standard format in the graphic arts sector. It is a very versatile editable format based around a single "page" of bitmap data. You cannot include vector information in this file format so it is used exclusively for images.

JPEG / .JPG (low, medium, high compression)
An editable single "page" bitmap orientated image file format with the ability to significantly reduce the file size using specialised data compression techniques with little loss in quality. The terms low, medium and high compression denote the amounts by which the data making up an image has been squeezed to save on file size. The more an image has been compressed, the lower the quality of the image and therefore for printing on an HP Indigo press you should only use either the low or medium compression settings. (Figure 6)

A word of caution however. Applications do not always use the same version of the compression algorithm and therefore not all graphics and imaging applications give the same result.

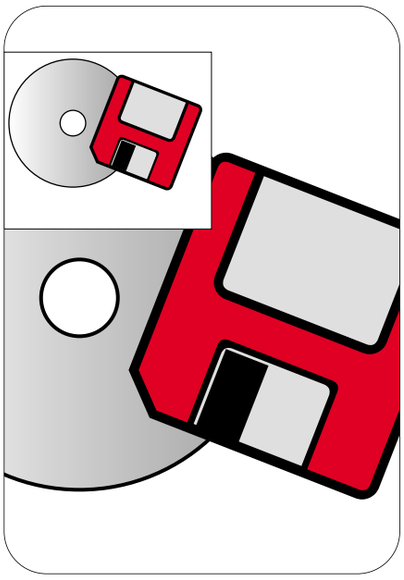
Figure 6. The same JPEG image saved with low, medium and high quality compression.

low quality/high compression (297k)

medium (615k)

high quality/low compression (1005k)

Illustrator® / FreeHand® EPS
EPS stands for Encapsulated PostScript. Illustrator or FreeHand EPS is an editable, single "page" vector based data format. Because it is essentially PostScript it is especially suitable for use with PostScript RIPs, and because it is vector based it is suited to the types of graphics that these applications typically produce.



A vector based eps image at 100% (inset) appears equally sharp and pixel free at a 300% enlargement

Photoshop® EPS
An editable single "page" bitmap based data format suited for use through PostScript RIPs. It can be used in conjunction with JPEG compression. Vector information cannot be included in this file format so it is used exclusively for images. However, clipping path information can be included in it.

DCS 1.0 / 2.0
DCS is the Desktop Colour Separation file format based on the bitmap EPS file format. In this case the separation of the image into plates is done at the image creation stage rather than in the RIP, which in theory saves time in the RIP. It is a multi-file format with each plate having its own separate file that is referenced by a master file. All files must be present to successfully print the image and they must be presented to the RIP in a pre-separated PostScript file. DCS 1.0 only supports process colour images and DCS 2.0 supports additional plate colours e.g. six-colour images. Whilst you can use this format for printing to a HP Indigo press, unless you have good reason it is better to use the standard EPS format.

.BMP (Bitmap)
The BMP format cannot save CMYK plate information. Consequently, in order to print a BMP file, it is necessary first to open it in an application such as Photoshop, then convert it and save it in TIFF or EPS format. Therefore, when designing for the HP Indigo press you should avoid this format or convert it.

.GIF
Similarly, in principle to BMP, the GIF format is not really intended for printing but is more suited to the Web. The number of colours in its palette is too low and zone effects sometimes appear, particularly in graduated fills. Also, the GIF format does not work in the CMYK colour space, therefore requiring a conversion before layout. Like the BMP, this format is not practical to use for printing to a HP Indigo press.

PostScript® (PS)
PostScript is the original industry standard page description language that revolutionised pre-press to bring us to where we are today. This format is able to precisely define

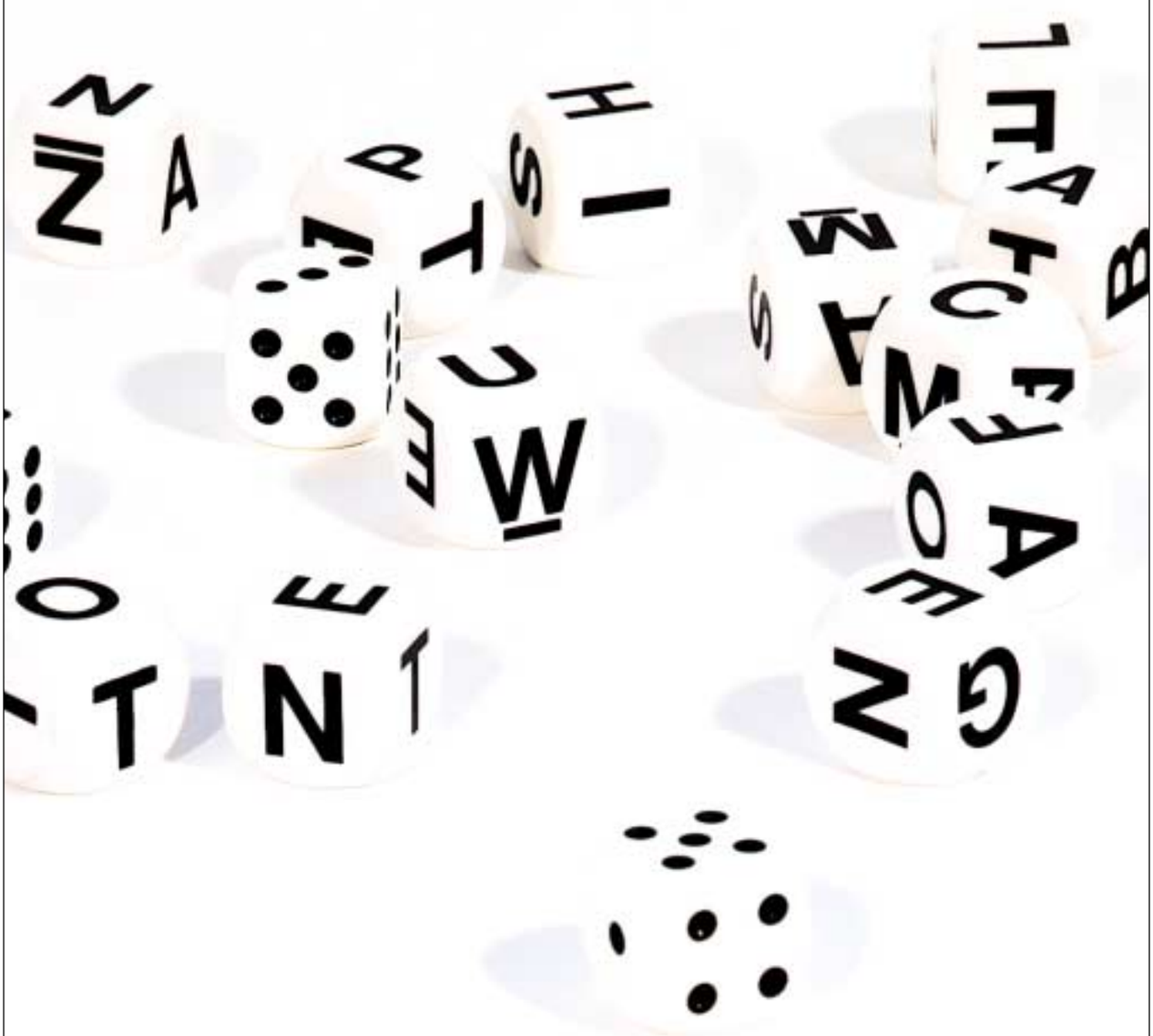
GIF & BMP are not practical for printing, both use indexed colour. They are mainly used for web images.

every element and page in a complete multi-page document so that a RIP can rasterise it for output. It also contains job data such as imposition, cropmarks, quantity and control settings for the RIP.

PDF (Portable Document Format)
PDF is the newest page description language to become an industry standard. Due to its initial success it has developed into a powerful and flexible format. Its main strengths originated in its ability to be viewed and printed from different platforms/operating systems whilst ensuring the integrity and consistency of what was displayed to the viewer. The data is also optimised so that the file sizes are usually significantly smaller than comparable PostScript files. Another main benefit is that it maintains page independence that can give significant advantages further down the line in the production of the document. PDF is covered in more detail in Chapter 6.

chapter 5

designing with character



typography

HINTS & TIPS

When choosing a colour for a typeface, it is advisable to work with a CMYK printed colour chart, and if possible with the HP colour chart (provided on the CD with this brochure). This allows you to obtain the most predictable results during printing. Once you have chosen the colour, enter the CMYK values in percentage terms into the software application you are using to create your layouts.

Be aware that by default coloured text is screened, i.e. made up of dots and not solid unless the colour is defined and printed as a spot colour.

If you are using a very fine typeface or very small point size choose your colour carefully since it could cause the type to appear "broken-up" or make it illegible.

designing with character

a warning about fonts

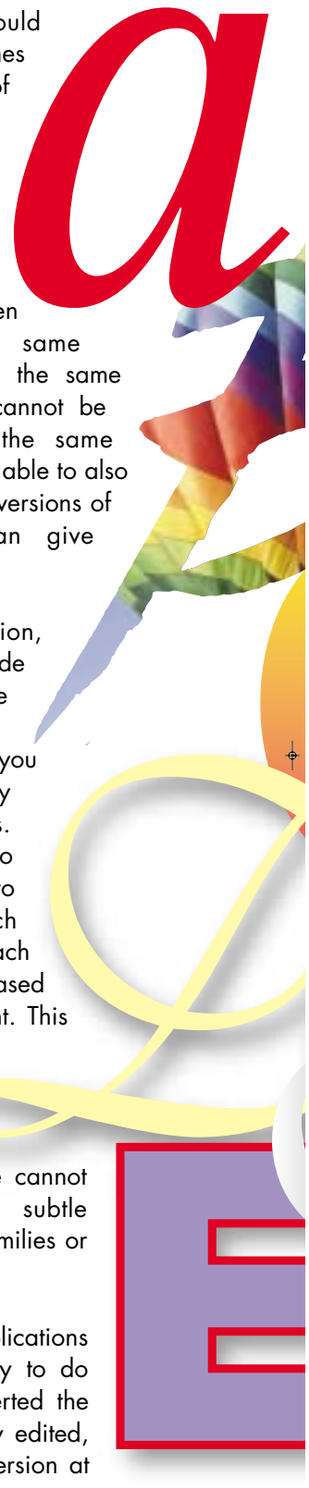
It is very important that you own or have access to the copyright of a typeface under license before using it. If you supply your PSP with a font, you could well be infringing the law if they do not have the rights to use the typeface.

Typefaces and fonts are very closely protected under copyright laws and users are allowed access to them by purchasing a user license, usually defined by the number of "seats" or by buying a software package that will give you access to the fonts.

Any infringement of these rules could lead to a fine and a payment for the loss of earnings to the copyright holder. Special file formats, such as PDFs, get around this problem by using embedded fonts as part of the program that will allow you, and the PSP, to use them. However, certain fonts aren't able to be embedded in PDF files because of copyright restrictions. If in doubt, check carefully with your PSP first.

Different operating systems, e.g. MacOS™ or Microsoft® Windows®, use different fonts. Whilst one may be suitable for use on one platform the same font will probably not work on another. This means that you will need two versions of the same font if you move your document from one platform to the other. Very often there can be subtle differences in the font on different platforms which can lead to typographical inconsistencies between the same document displayed on different platforms.

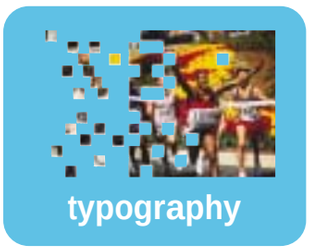
Furthermore, fonts with the same name will not necessarily be identical even when using the same platform. For example, an Adobe® Times font may not have exactly the same characteristics as a Berthold® Times font. Features such as kerning, interline spacing or width may be different which, for a text of several pages, could alter the number of lines or even the number of pages. Computer codes for accented characters and particularly special characters such as © are not always identical. In fact, even if you have the same Helvetica font using the same program, you still cannot be certain that it is the same version. As users are able to also modify kerning, two versions of the same font can give different results.



The simplest solution, therefore, is to provide the fonts with the design, whilst of course making sure you are not infringing any copyright issues. Another useful tip is to convert the text to "outlines" which essentially makes each character a vector based object and not a font. This means it can be freely distributed, easily scaled and the appearance cannot be changed by subtle differences in font families or computer platforms.

However, not all applications have the functionality to do this and once converted the text cannot be easily edited, so only do the conversion at the very last minute.

As a general rule, it is better to avoid using false bold, italic or condensed fonts. From a typographical point of



view, these fonts are not considered to be true bold or italics because they have not been designed as such. In this case, it is actually the software application itself that makes the character bold or puts it into italics. This can make certain letters illegible, particularly in small text. It is also worth noting that some of these "special effects" are often not accurately or reliably reproduced when they are rasterised for output.

The smallest size text that the HP Indigo press can image is normally around 1-2 points but this will depend on the font used and its colour.

some notes on PostScript®, TrueType® and OpenType® fonts

PostScript

This is the leading standard in the field of typography, but there are three generations of PostScript font. It is important to remember that PostScript Type 1 fonts correspond to the latest generation of PostScript fonts, whereas Type 3 fonts correspond to the first generation.

The first generation (Type 3) were created from bitmap fonts, and give inferior results when compared to the newer Type 1 fonts that are vector based. PostScript fonts are the most suitable fonts to use when outputting to a PostScript device like the HP Indigo press.

A PostScript font on a Macintosh consists of two parts: a screen font and a printer font. The two should always accompany each other. The screen font is used as the name suggests for the on-screen preview and the printer font is used to render the font for output. It is therefore important that if you supply a PostScript font to your PSP that you make sure you include the printer font since without it the document cannot be printed, even though it can be displayed.

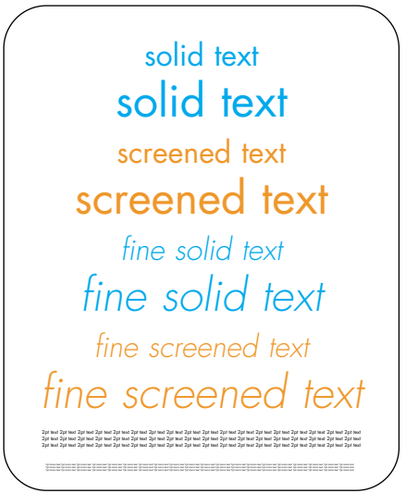
TrueType

TrueType was originally intended for office use to output to non-PostScript and PostScript devices. TrueType fonts contain display (screen) and print data in a single file. This makes them easier to manage and handle but the downside is that before printing to a PostScript device they must internally be converted to a PostScript outline. The quality of this conversion has a direct influence on the quality of the font when output.

Whilst HP Indigo presses should have no problem outputting a TrueType font, where possible PostScript Type 1 fonts should be used.

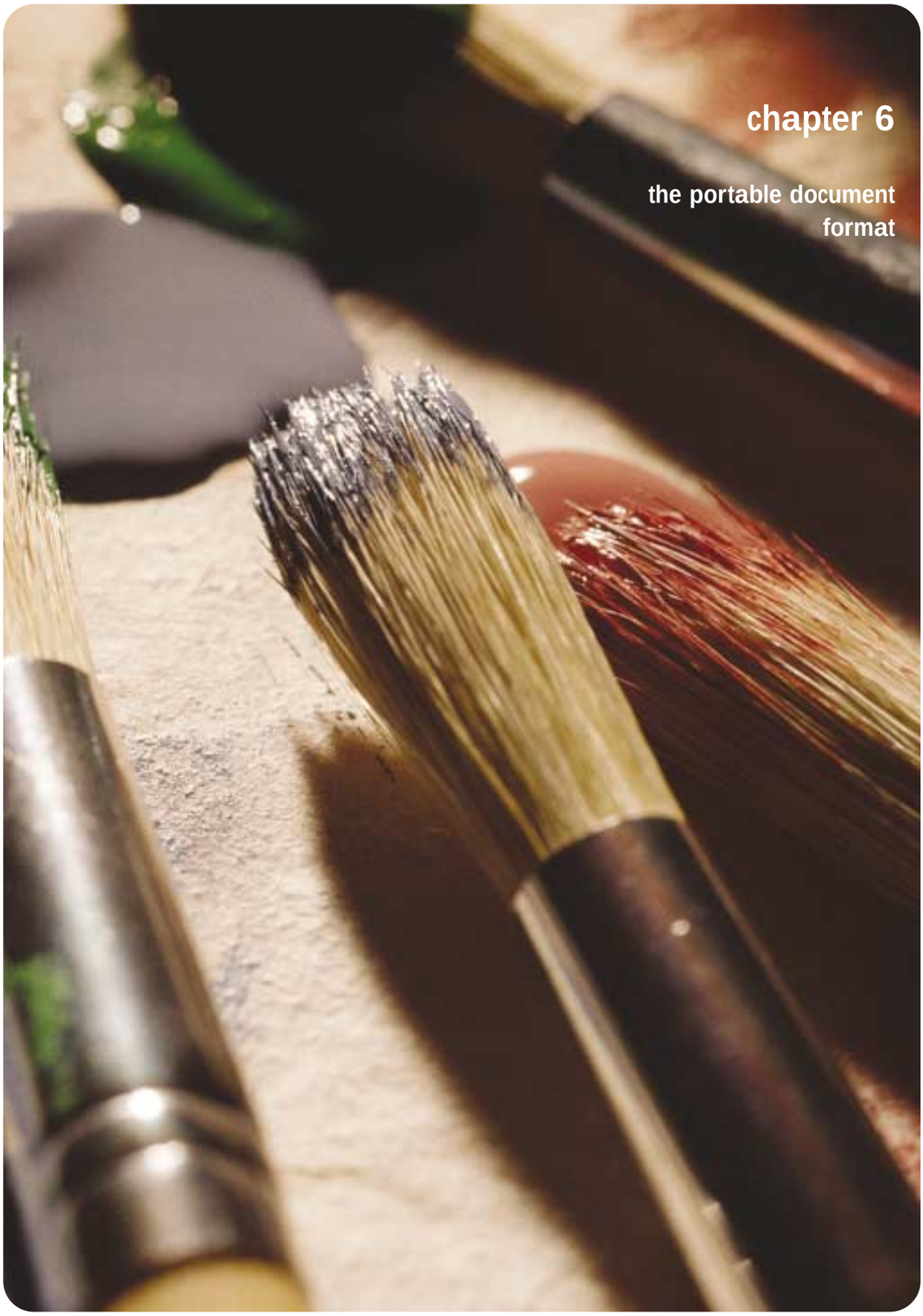
OpenType™

The aim of OpenType is to provide standard printable fonts for both Mac and Windows environments without any compatibility problems. This format simplifies font installation, whether the fonts are PostScript or TrueType, since OpenType is a combination of both. A further advantage in a combined (Mac and Windows) environment is that this removes the need to install several types of font. In fact, an OpenType font can contain a TrueType font or a PostScript Type 1 font. However, at the time of writing this font format is not prevalent and it is likely that it will take time before it is commonplace.



Care should be used when tinting text to avoid it breaking up when it is screened. Look at the micro text under a loupe.


invent



chapter 6

the portable document format

PDFs

COMMON PROBLEMS – ADOBE PDF SOLUTIONS

problem. Recipients can't open files because they don't have the applications used to create the documents

solution. Anyone, anywhere can open a PDF file. All you need is the free Acrobat Reader supplied on the cd-rom with this guide.

problem. Formatting, fonts and graphics are lost because of platform, software, and version incompatibilities

solution. PDF files always display exactly as created, regardless of fonts, software and operating system

problem. Documents don't print correctly because of software and printer limitations.

solution. PDF files always print correctly on any compatible printing device.

supplied by Adobe®

the portable document format

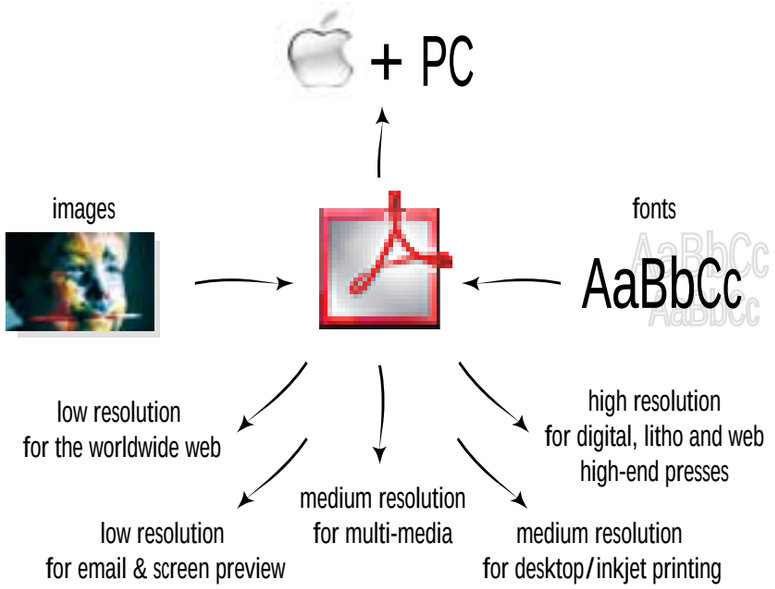
The Portable Document Format, or PDF, is rapidly becoming the de facto standard for file transfer. It is not a "device dependent" software application but a completely open system that can be used on a multitude of output devices and media. For instance, it can be used to convey information to the Internet, in printed format, on cd-rom, or via e-mail, without losing image quality or the layout, style, etc. of the document.

Its strength lies in, as the name suggests, the portability of the document it produces. What this means is that a PDF document can be transferred between systems, i.e. Macintosh® to Windows® PC, PC to printer, without being altered. So what you see on the computer screen in front of you is exactly the same as everyone else has seen on their computers. In this way it can be sent anywhere for remote proof reading and this consistency is also conveyed to the final printed image.

Adobe® Systems is the company that developed the PDF file format, and all PDF files can be opened and viewed using an Adobe Acrobat® Reader®, which can be downloaded free of charge from Adobe's site on the Internet. www.adobe.com

PDF is a direct development of Adobe's own PostScript® page description language that has been, and continues to be, the printing industry's standard output format. The main difference is that PDF addresses the needs of the overall multi-media market whereas PostScript is really focused only on the printing market and cannot be easily viewed without specialist software. For this reason PDF is fast catching up in popularity within the printing sector mainly because it has the following advantages:

- simplified PostScript code - PDF files reduce the complexities of the graphic constraints found in PostScript files that need to be rasterised in RIP devices.
- embedded fonts - the type characters and instructions for kerning and manipulating Type 1 and TrueType® fonts are placed inside the file so the user does not need the font to view, process or edit the document.



- compressed graphics - file compression can be dramatic with no loss of quality of the image. Vector graphic files can be reduced to 25% of their original size, while bitmap graphics can be reduced by up to 75% of their original size. All PDF files are scalable (to 800%) and printable on PostScript and non-PostScript printers.

- forms and indexing features - enables PDF to serve as a complete Integrated Document Management System.

- sound and QuickTime® files insertion - enables PDF to become a complete multimedia tool. But remember these types of files are not printable!

- hypertext-linking - allows dynamic visual interaction between pages and documents

- page independence - individual pages can be sent for RIPping, rather than the whole document, giving significant workflow benefits in the production process.

It is important to point out that Adobe Acrobat and the PDF format are not intended to be a replacement for Page Layout, Illustration or Image Creation applications. You still need to create the original design using these applications since Acrobat itself has limited layout and editing facilities. It is only once you have designed your document using the appropriate application software that you convert it to PDF. Then, you can start to use the benefits of the PDF format.

But using PDF files is not necessarily better than using PostScript files. The final stage of printing from either a PDF or the original application file will make no difference to your PSP as long as all the accompanying fonts and images are available.

If you choose to use PDF files, one thing you must take into account when creating the document is the output device and format. The HP Indigo press is a high resolution CMYK printer and therefore the images and design should take this into account.

Careful attention must be paid to the set-up parameters for creating the PDF since these directly determine the print quality. These settings are commonly overlooked and very often the result is a PDF that only contains low resolution images. This may be fine for on-screen previews but no good for printing.

You should also be aware that if your design requires bleed you must include it in the PDF, it cannot be invented later.

From a PSP's point of view it can cause more problems than it solves if you provide a PDf file that has not been created properly.

For example, if you make a mistake in QuarkXPress™ it is quite easy for the PSP to correct the file. If however, you convert the file into a PDF with an embedded fault, it is very difficult for your PSP to correct it. This makes flight-checking even more important before sending a job for printing. Consult with your PSP if you want to know more.

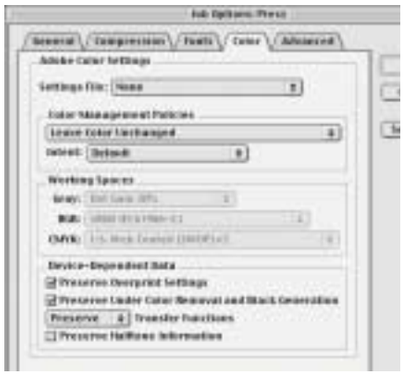
On the CD accompanying this guide you will find a profile that can be used with Adobe Acrobat Distiller® to automatically provide the correct settings for generating suitable PDFs for an HP Indigo press. Alternatively refer to the accompanying screen shots in this section.

The 'Job Options' settings allow you to alter the way Acrobat Distiller creates PDFs.For example, compatibility...

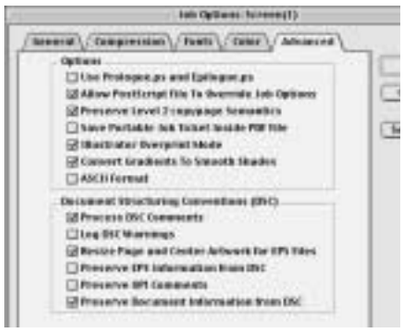
image compression...

font embedding (Remember to set your font locations if you wish to embed your fonts)...

continued overleaf.



colour control...



and a range of various advanced settings. You can save these settings as a profile which can be distributed and used by others.

plugging in to PDFs

It is extremely important that you and your PSP can exchange files that can be read and printed without any problems. To aid this process, a number of software companies have developed applications that work with Acrobat to enable you, as the designer, to take greater control of the PDF creation process. These are referred to as Acrobat *plug-ins*.

Many of these packages allow you to edit and pre-flight PDF documents before you send them to your PSP, to ensure that there are no errors or hiccups in the production process.

The following is a brief summary of a few key plug-ins that have proven to be especially useful to HP Indigo press designers in the past. It is by no means an exhaustive list and you are encouraged to look at the current range of solutions before making any purchasing decisions.

Enfocus Software® www.enfocus.com

Enfocus Instant PDF®. Instant PDF allows you to create PDFs according to a preset quality standard from within your design application. You will provide your PSP with a Certified PDF and therefore be confident that they will be able to output it correctly. Instant PDF also allows you to create soft proofs for your clients. Setting up a different print queue and creating "thin", web-ready PDFs becomes just as easy as making "fat" print-ready ones.

Enfocus PitStop Professional™ / Server™
As an advertising agency or a graphic designer you will use Enfocus PitStop Professional to repurpose your PDFs. Once you have made a high quality PDF for press, you can downsample images or change their colour space, subset fonts and more, making the file compatible for Web or e-mail applications. At the same time you are secure in knowing that the content of the file remains the same.

You may also want to use PitStop Professional to perform last minute corrections before the PDF is sent out for production, or to correct errors that are reported by the pre-flight process. Pre-flighting software is very important as it checks the quality of your file before it is relayed to your PSP. For instance, if there are missing fonts, RGB images, low-res files, or imposition problems, they will normally be picked up at this stage.

Quite Software www.quite.com.

Quite Imposing Plus™. An easy to use imposition plug-in for creating booklets or arranging complex impositions.

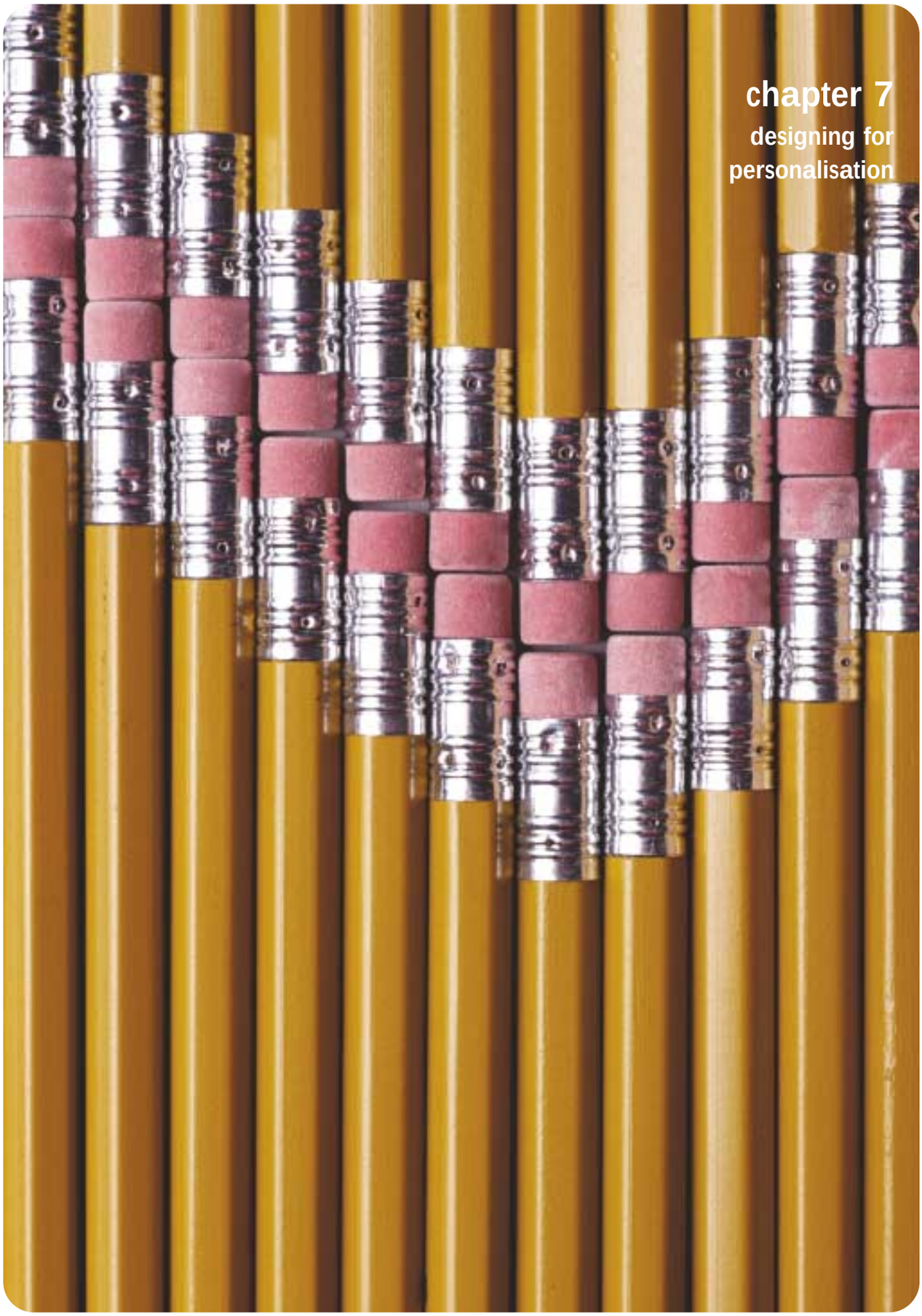
Quite a Box of Tricks™. A useful collection of tools whose features include; conversion to CMYK or greyscale including support for ICC profiles, shrinking images to reduce PDF file size, thickening "hairlines", transformations, integrating form fields with documents, all text to black, and detailed info on text and images.

PPA Pass4Press. www.ppa.co.uk.

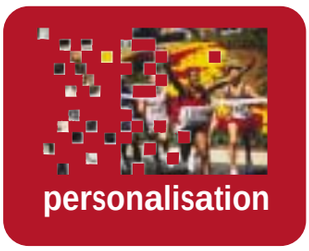
The search for a common file standard so designers, printers and publishing houses all talk the same language has been going on for many years. By far the most effective solution is the Pass4Press system developed by the Periodical Publishers Association, based around PDF files.

The standards have been trialled by a number of publishing houses in the UK with their suppliers including Emap, Reed Business Information, IPC, BBC Worldwide, Condé Nast and the National Magazine Company.

Pass4Press aims to lay down the rules for effective file transfer, so that all of the files that are handled in the production of magazines and journals can be processed in the same manner.



chapter 7
designing for personalisation



HINTS AND TIPS:

Digital presses are an ideal tool to complement other forms of digital media, such as the Internet or email.

For example, a car company could ask customers visiting their showrooms or website to specify which make and model of car they are interested in. This could include the particular colour, finish and extras that they would choose. Using this information, a personalised direct mail piece can be printed so that the recipient receives their own personal brochure with pictures of the vehicle, in their personal colours, inviting them for a test drive.

This is what is meant by one-to-one marketing. But personalisation can also be used to great effect in Customer Relationship Management (CRM).

For example, bills and statements, nobody likes them but you have to look at them. They are the perfect way for a company to communicate with their customers. "Morphing" the usual accompanying inserts into the bill or statement with offers personalised to and chosen for the recipient, means the customer cannot avoid them. If the right profiling decisions are made they may even be pleased to receive them!

designing for personalisation

Many years ago direct mail used to consist of a standard generic letter that was sent to the "occupier" of an address. But for a long time now direct mail has used personalisation in a very basic form, using the recipients' name and text based data to try and increase response rates.

With advances in digital technology it is now possible to start addressing customers not only by using variable text but also by using variable images and graphics.

The day of the digital press has arrived. It is a new era where marketeers are able to communicate with the recipients on a one-to-one level. Direct mail has become a science, with very closely monitored response rates signalling the success or failure of a campaign.

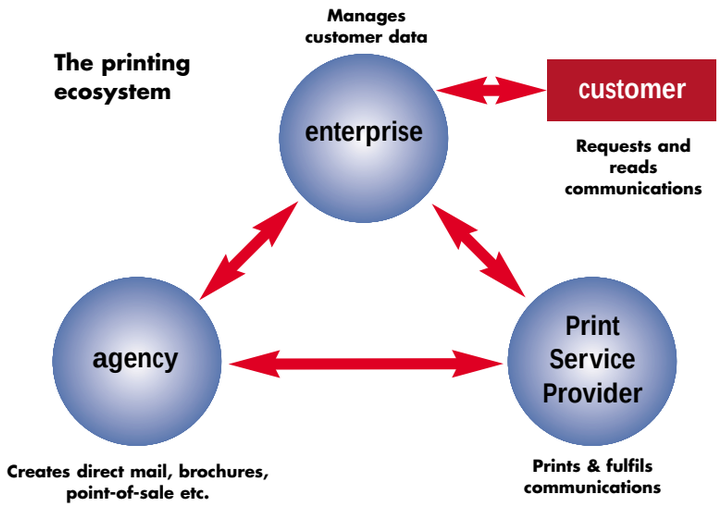
Personalisation is an important tool in generating new business. Companies can build up profiles of customers by gathering information about their buying patterns and habits from existing digital information such as credit card transactions or customer loyalty schemes. Direct mail can then be used to complement their spending patterns and interests.

However, direct mail is not just about recruiting new customers. Surveys have conclusively shown that it is much cheaper and easier to keep existing customers than to find new ones. This has stimulated a huge focus on Customer Relationship Management (CRM). Delivering accurately targeted personalised communications means that your clients' customers will feel individually valued and are more likely to remain loyal. One of the best ways of doing this is by using the HP Indigo press.

it starts with an idea

HP is able to offer a unique approach to high-speed variable colour printing. Its digital presses can change the entire contents of every page. By connecting a database to the page design you can produce jobs where each copy is created for, and tailored to, a specific recipient.

Alternatively, you can print multiple short runs of nearly identical copies, where the content varies for different



target groups. They could be for different branches or outlets, different geographical locations or even different languages. This is called *versioning* or *zoning*. While this requires extra work at the design stage, there is no need for additional preparation work once the job reaches the press.

The market for full variable personalisation is still fairly new, and imaginative applications are being invented all the time as marketeers, designers and printers learn to use the technology. Typical applications include:

- direct mail
- personalised brochures
- invitations
- conference and seminar material
- follow-up mailers
- CRM material
- security or financial documents
- labels
- point of sale materials

planning is key

It is vitally important for the designer to work with the marketing department to find out what they want to achieve with a mailing. It is also important to talk to a database specialist to make sure that what needs to be achieved can be derived from the available data. Also, speak to your Print Service Provider, who can advise you on what can be produced using the technology they have. It is important to appreciate that a successful mailing depends on a team approach with the designer working closely with the marketing department, database/IT specialists, and the Print Service Provider.

The response rates of a mailing piece vary depending on the market you are serving. The financial services market, for example, may be happy with a response rate of 1% for their mass-market mailings. But personalisation would improve the response rate by appealing directly to the recipient.

Significantly higher response rates can be achieved on carefully targeted mailings. However, it is important to remember that personalisation is only as effective as the decisions that you are making at the planning stage of a campaign. The success of a campaign still depends on getting the right message in front of the right recipient at the right time. With reward based mailings it will also often depend on the attractiveness of the offer.

a note on the technology

First of all it is worth looking at Chapter 1 to find out how the HP Indigo press works.

HP has developed its own optimised personalisation software for driving the press with personalised data called Yours Truly Designer® (YTD), which incorporates SNAP® (Swift Native Accelerated Personalisation). This enables the press to prepare at very high speed the variable data for printing.

the basics

There are three parts to a variable data job: a *template*, *variable data*, and a *database*.

The template is the building block of your page design. This will define the static (non-variable) elements on the page, the position and format of the variable data and other job related functions like imposition.

Variable data can be broken down into two types; *reusable* and *disposable*. The reusable data can be text or images or a combination of text and image. The idea is that this data is not specific to any one

HINTS AND TIPS:

The HP Indigo Yours Truly® Designer™ (YTD) software application is the same software that your Print Service Provider uses and provides all the elements for setting up a variable data document. It is a QuarkXpress™ XTension for the Apple® Macintosh®. If you want to have a go at setting up your own variable data documents, copies of Yours Truly Designer can be freely obtained directly from your Print Service Provider.

HP YTD software works on the basis of a fixed template, i.e. one where the variable text and images appear in pre-defined locations on the page. For documents whose layout or length dynamically change with each cycle then HP can offer a range of Partner Solutions which utilise the PS, PDF and PPML output standards. Please consult with your Print Service Provider for advice.

personalisation

HINTS AND TIPS:

You don't have to have the final "live" database before you start preparing the template. All you need to know is the structure of the database i.e. the field order, and what all of the reusable variable data options are. However, it is often useful to also have some "dummy" data so that you can test your design visually on-screen before you send it to the press.

It is always better to use TIFF or JPEG formatted images for reusable or disposable images since the HP Indigo press software has a special optimised way of processing these files without the need to put them through the PostScript RIP. However, remember that these are bitmap based formats and if you need to preserve vector-based detail then EPS should be your choice.

Remember that any fonts used in personalisation channels must be available to download to the HP Indigo press RIP.

individual recipient but is instead relative to a group of individuals. For example, a number of people will be interested in a certain model or colour of car and therefore they would all receive the same image. Reusable data is usually product related. Disposable data is only relative to a single recipient (for example, your name and address or your picture. It is data that is usually unique or private). Reusable data is useful to keep because it will be used many times but the disposable data is transient and can be thrown away once it has been used - but both are variable and personal (Figure 2).

A good database is the most important part of any personalised campaign, no matter what media it uses. It contains the information that will drive the project, many of the decisions that are made will be based on its content and therefore it must be of high quality. A good "clean" database will contain up-to-date, relative and accurate information.

Your database/IT specialists should typically check the entries in a database for things like; duplication, postcode and address verification, false names and offensive language.

They should work in conjunction with the marketing team to implement the choices that are to be made in the database. As a crude example, all males over 35 will be offered the sports channel whilst all females over 30 will be offered the lifestyle channel. This is called *data-mining* where the original data is used in conjunction with external data and decisions to calculate an outcome.

Even if the final database has not been prepared the groundwork and planning that determines the final structure and range of outcomes should have been defined before you, as the designer, can begin to work on the template or variable data.

database structure

Database and spreadsheet software, like most other applications, have their own internal document format but the most common way to export the data they contain is as an ASCII *delimited* file. This is a basic raw text file format where different information is separated or delimited by a defined character. You can think of a database as a grid of information, each row of the database contains information relating to a single individual or item which is called a *record*. Each individual group of information within the record is called a *field* e.g. forename and surname usually appear in separate fields (Figure 1). In the ASCII delimited file the records

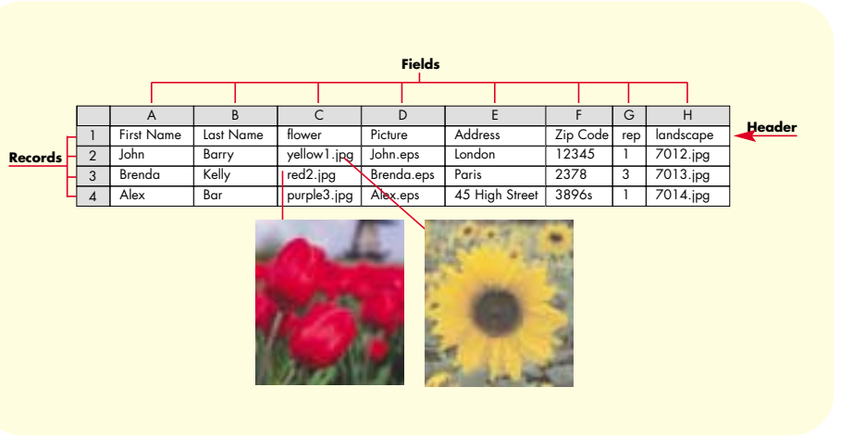
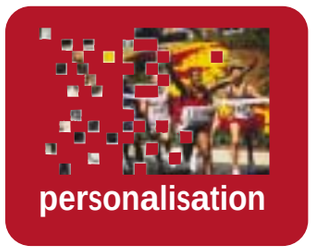


Figure 1. Database structure



are separated by a hard-return character and the fields are delimited by one of a range of characters, typically a comma or tab. These types of file are often referred to as *comma delimited* (.csv) or *tab delimited* (.txt) text files. It is common practice to label each field in the first record with a descriptive name defining that field's contents, e.g. street, city, postcode, and this is called the *header*.

Ultimately the print sequence is defined by the order of the records and each complete document that is produced is defined as a *cycle* as opposed to a *copy* which is the term that is given to a complete non-personalised document.

how it all works (the design phase)

During the template creation you define static elements as you would for any other normal document. These are elements of the page that will not change, everyone in the database will get them by default. You will also define elements in the page that will contain either reusable or disposable variable data, and these are called *personalisation channels*.

Personalisation channels can contain variable text, images or a mixture of both. You are able to define the format of the data, e.g. font, point size, alignment, colour, image scaling and positioning, etc. How these personalisation channels are populated will be driven by the data supplied by the database. At this point is it unlikely that you will have the final database, all you need is a file containing the header information since this defines the field order. However, it is often useful to have some dummy data in the database so that you can test out your design before committing it to print. Ask your database specialist to include some "worst case" data so that you can see how your layout handles very long names or addresses for example.

By assigning the header information to the template you can now link individual personalisation channels to a certain field of information that will define the contents of the personalisation channel. If it is a text based personalisation channel then the field will provide the text data that can either be embedded in a predefined paragraph or used on its own. In the case of an image based

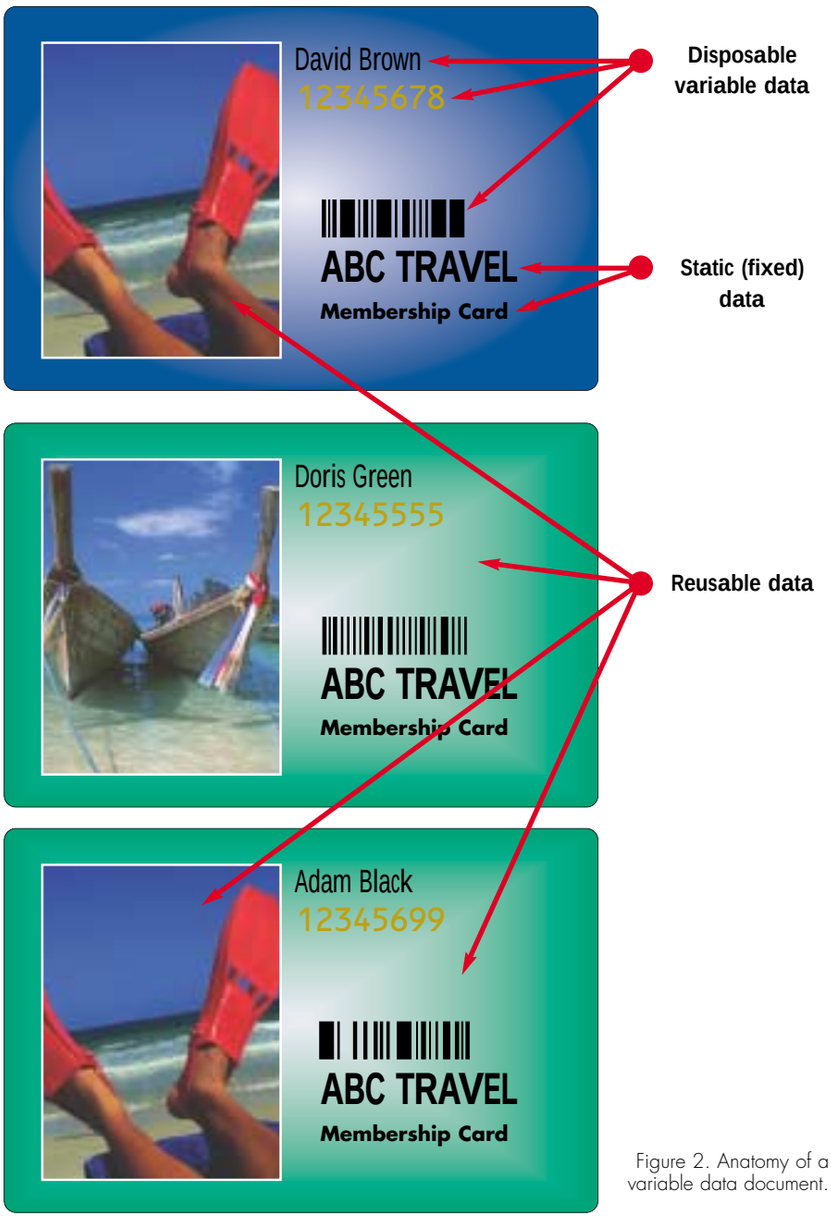
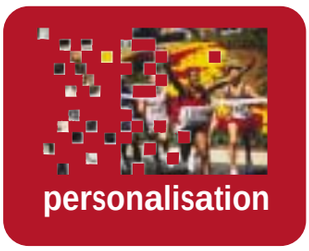


Figure 2. Anatomy of a variable data document.



HINTS AND TIPS:

using variable barcodes

Variable barcodes can be generated by using downloadable barcode fonts, in which case the database must contain the right character string to generate the right barcode. However, not all barcodes are available as fonts in which case they must be generated and saved as reusable or disposable images that are referenced in the database.

personalisation channel the field will reference a reusable or disposable image by its unique filename. These referenced images can be TIFF, JPEG, EPS, PDF, or PS format dependant on your preference or the content (see Chapter 4, file formats and the hints and tips on page 36).

Remember that if you subsequently change the field order in your database you will have to update the template with a new header file and reassign the fields to update the links to the database.

The reusable and disposable images must also be designed at this stage. Make sure that they "fit" your personalisation channel. Even though the image can be scaled-to-fit it is always better to generate it at final size since this will save time in the RIP. Remember that it is possible to combine both text and images into a single reusable or disposable image.

There is one case when a personalisation channel does not need to be linked to a database field and this is when you want to sequentially number the template. This can be done using the built in number generator in the Yours Truly Designer software.

Once you have finished the design of the layout you can then use the YTD software to define the imposition of the job and then create the template although you may prefer to leave this to your PSP. On reaching this stage you will have completed the *design phase*.

the production phase

The template will be saved as a *job layout file* (.JLT). This is a special HP Indigo press format that contains all the static elements in the document, the formatting and links of the variable content and other job control parameters such as imposition.

Once created, the template, any reusable or disposable images and the live database are made available to the HP Indigo press. The job can then be imported into the press *job manager* at which point the variable content is collated and formatted according to the instructions in the template and the data in the database file. Using SNAP technology this can all happen very quickly and an additional benefit is that you can import the same template many times using different databases without having to do any redesign or occupy time on the pre-press or design workstation.

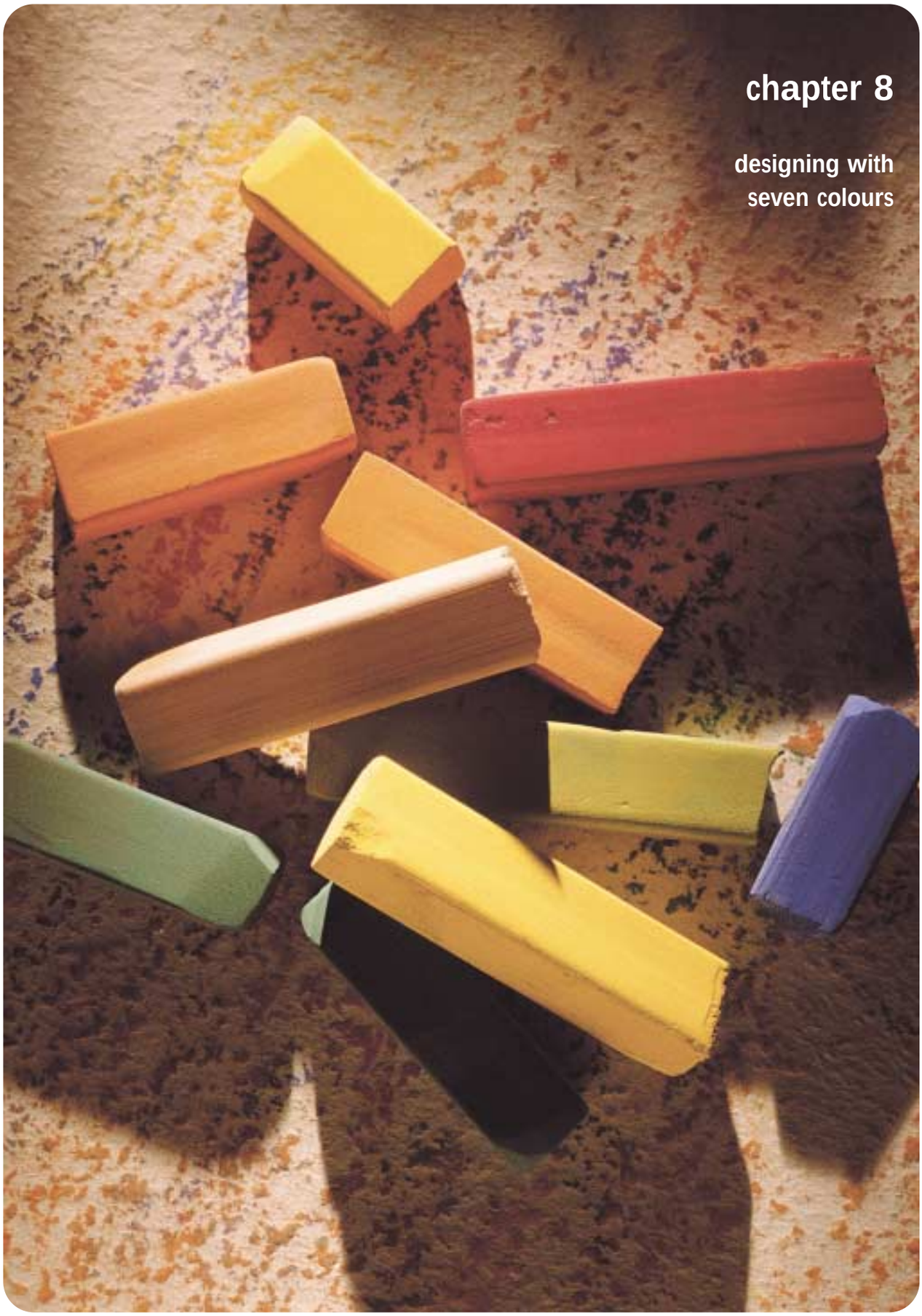
So to generate the print data for subsequent mailings it couldn't be simpler, all you need is a new database file and any new disposable images that are referenced by it. Once the job is imported it can be printed straight away. This is called the *production phase*.

Finally, it is worth just repeating that a good database is key to a successful mailing. If the data is inaccurate or if it calls up the wrong personalised image for example, the effect it can have on the recipient can be worse than not personalising at all.

PPML - the future of personalised print

As an executive member of PODi (the Print On Demand initiative www.podi.org) HP is actively involved in the definition, development and promotion of Personalised Print Markup Language (PPML).

PPML is a XML based industry standard print language developed by some of the world's leading manufacturers of print technology for the high-speed production of reusable page content. PPML is an open, interoperable, device-independent standard that enables the widespread use of personalised print applications. It is a standard developed with commercial intent, to create commercial impact - to genuinely change the economics of personalised printing. It allows personalised print to be more flexible, easier to use and more affordable to produce.



chapter 8

designing with seven colours

hp IndiChrome

HINTS AND TIPS:

The use of special colours can both increase and decrease the cost of a job depending on how you design the job.

For example, if you designed a two-colour job but used the CMYK four-colour process to print it, it might (depending on the colour) require four colours to be laid down to produce the job. If you used the HP IndiChrome on-press system you would get a better match but it still may require four colours to produce the job.

If you used the HP IndiChrome off-press system the two spot colours could be mixed to match the colours you have chosen, and the print could be produced as a true two-colour job. Not only would this speed up production, but it could save you money in terms of consumables. However, the extra labour and consumable costs involved in mixing the inks could mean that it was not cost effective if the run length was not long enough.

continued opposite...

designing with seven colours

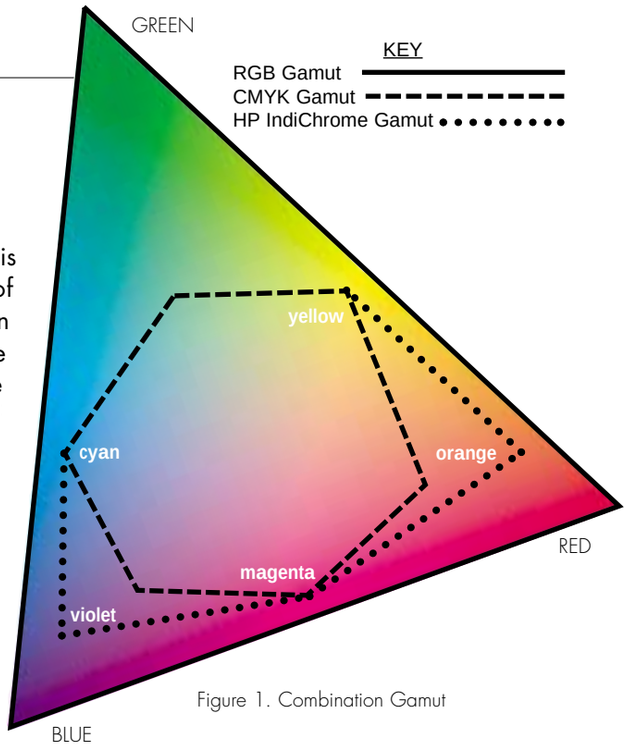


Figure 1. Combination Gamut

Colour as we know it is made up from light of varying wavelengths in the visible part of the spectrum. Colour can be "generated" in one of two ways. When we look around us what we usually see is reflected light where the colour is determined by the way different objects absorb different wavelengths of radiation. The reflected wavelengths are interpreted by our brain into different colours. This is called the subtractive colour system and relates to the way we perceive a printed image where the inks used actually absorb some wavelengths of light and reflect others.

Alternatively colour can be formed by the direct emission of visible radiation of different wavelengths. This is called the additive colour system and can be used to describe the light emitted by an LED (laser) or monitor (phosphorescence) where red, green and blue phosphors or LEDs are used to emit light (hence the term RGB monitor).

But colour, no matter from what source, is always a very personal experience. It is unlikely that any two people see it in exactly the same way. However, between each other we are able to relate to it through learned terminology. Attempts have been made to quantify colour scientifically and several systems exist today.

It has been estimated that the human eye can see around 16 million different colours. However, what can be seen and what can be printed is vastly different. Every device that produces colour, whether it is a monitor or a printer has what is termed a *gamut* which is the entire range of colours it is capable of rendering. Typically the gamut of an RGB monitor is quite large, certainly much larger than that of the standard four colour (CMYK) printing process (Figure 1). It is for this reason the colours you see when you create a design on your computer does not always look the same when it is printed. Steps can be taken to minimise this discrepancy by calibrating your monitor and implementing some form of colour management but because the two systems are fundamentally different it is unlikely they will ever match entirely.

The standard CMYK printing process has become the established norm for colour printing and in most cases the gamut of colours it renders is acceptable to many people. In reality, the gamut is made up of the three process colours, Cyan, Magenta, and Yellow, while Black (also known as the Key colour represented as K) is used to supplement deficiencies in the other inks which make it difficult to achieve a good black when they are all mixed together. It also makes good economic sense since why use

three inks to make black when you can use just one?

However, occasionally a wider gamut of colours is needed. *Special colours* may be needed to match a corporate colour swatch, or bright eye-catching colours are often required for label and packaging applications. These special colours are often referred to as *house, spot, or corporate colours*.

If the colours you wish to achieve lie within the gamut of the standard four-colour CMYK process then with few exceptions (see HP IndiChrome off-press later in this chapter) there is no reason to look any further. However, if your colour lies outside the gamut it will be impossible to achieve. By introducing extra inks into the standard four-colour set you can substantially extend the gamut of colours that can be produced. This is the basis for a recent trend to start using a six-colour printing process.

Uniquely in the digital press market HP Indigo presses come with a fifth, sixth and seventh colour capability, collectively termed HP IndiChrome®.

extending the gamut using hp IndiChrome

In order to understand how to best utilise HP IndiChrome we must first examine the different ways in which the fifth, sixth and seventh colours can be used.

There are two different methods, the HP IndiChrome *on-press* and the HP IndiChrome *off-press* solutions.

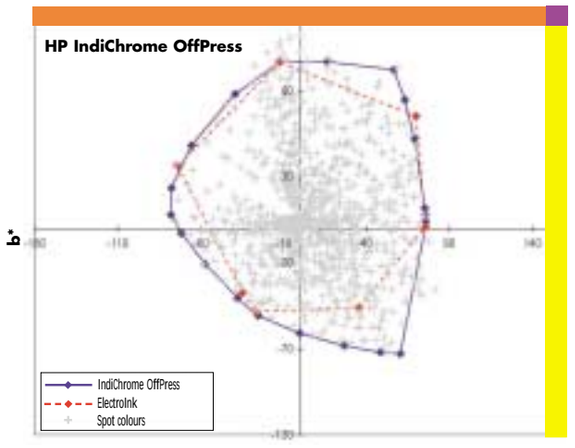


Figure 2.

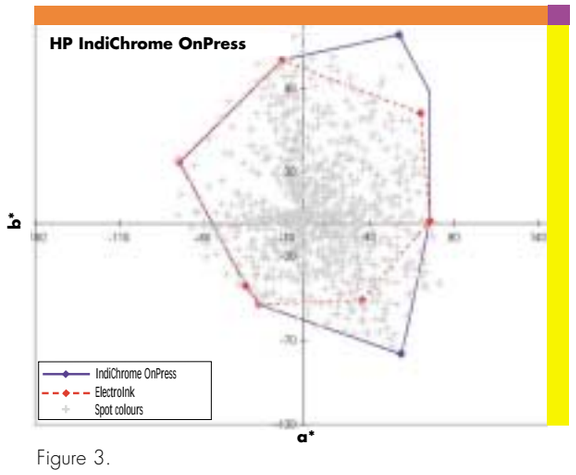


Figure 3.

... On the other hand, if you use more than four colours in your job, whether using HP IndiChrome on-press or off-press this is likely to increase the cost of the job because of the extra colours being laid down and the increased time taken for production.

The timings on a job are also very important. If a PSP has the HP IndiChrome Ink Mixing System on-site they will be able to mix the inks much faster than if they have to be ordered from HP.

hp IndiChrome on-press

The HP IndiChrome on-press system introduces two further colours into the standard CMYK ink set which has the effect of extending the gamut of colours you can achieve. Subsequently all tints and half-tone images are mixed from these six basic colours. The HP IndiChrome system is similar in theory to PANTONE® Hexachrome® printing.

The difference is that the HP IndiChrome on-press system uses the standard CMYK inks plus additional orange and violet inks, as opposed to Hexachrome® which uses non-standard CMY inks plus orange and green inks. The major benefit here is that by using the standard CMYK ink set in HP IndiChrome on-press, the HP Indigo press can be quickly switched from standard four-colour work to six-colour printing even if it is mixed within the same document, without the need for any ink changes.

The use of the HP IndiChrome on-press six-colour process extends the available printing gamut and provides a better matching of a much wider variety of colours and the production of much more vivid images. It allows you to use a wide range of special colours in your designs which will be rendered more accurately than with the four-colour process. However, if the colour still lies outside the gamut of the six-colour process, then whilst you will get a closer match than with CMYK it may still not be perfect.

Typically this can happen with colours in the green part of the spectrum. Here, the gamut is not

HINTS AND TIPS:

The HP Indigo presses are the only digital presses that have fifth, sixth or seventh colour capability. By utilising this ability you can bring a striking new dimension to any job.

HP also produces a range of speciality spot colours which include white ink, fluorescent pink and fluorescent yellow inks and UV sensitive security ink.

Check on their availability with your PSP before starting the job.

extended at all by using the HP IndiChrome on-press system. Also, one of the key things you have to accept when using the six-colour process is that all the colours have to be screened since they will probably be composed of more that one base ink and therefore spot colours will not be solid. In both these cases the alternative use of the HP IndiChrome off-press system should be used.

hp IndiChrome off-press

The HP IndiChrome off-press method enables your PSP to make pre-mixed special colours for loading into the fifth, sixth and seventh ink tanks on the HP Indigo press. This method is much more akin to the handling of spot colours in conventional printing where a special colour separation is defined in the page layout by the designer.

The HP IndiChrome off-press system makes use of special equipment that utilises eleven base inks; cyan, magenta, yellow, black, green, orange, violet, bright yellow, reflex blue, rhodamine red and a transparent ink. By using a spectro-photometer and specialised software to measure and calculate the composition of a colour, the correct mix can be determined to match your colour.

This method means that the ink can be treated as a true spot colour ink and as such can be printed as a solid (i.e. not screened). This can be especially useful for jobs that contain fine detail, e.g. linework, logos and fine small point text. But it can also be used to improve the appearance of solids that may otherwise be prone to banding (see chapter 4). However, the major benefit of HP IndiChrome off-press is that it gives you a precise match to the colour you have chosen.

which method to use?

It is important to know in advance which method of HP IndiChrome to use for a job before starting the design or artwork. If you have any doubts about the colour you are trying to achieve, consult your PSP at the earliest opportunity.

It is worth noting that HP Indigo presses come in several different configurations and models. It is worth checking with your PSP what configuration they have; four- , five- , six- or seven-colours? Do this before designing or commissioning the job. If your design needs three or more spot colours then consider using HP IndiChrome on-press, this will give you a better overall match. In this case all the spot colours should be defined in the pre-press using their PANTONE® references.

If your design uses one, two or three spot colours then you could print it using HP IndiChrome off-press. In this case make sure that the spot colour name is defined consistently throughout your entire document including any linked files, e.g. EPS logos or graphics. The reason for this is that if the spot colour is given a different name, in say an imported graphic, relative to the name it is given in the document, then they will generate separate plates on output instead of both being included on the same plate.

when to use hp indiChrome

To summarise, HP IndiChrome is useful for a variety of different reasons. The following is a list of some, but not all, of its possible applications.

HP IndiChrome Off-press:

- special colour inks to match corporate colours precisely
- production of bright colours that cannot be accurately reproduced by the four-colour process
- special colours that can be printed as solids (especially useful for small point type)
- economy - by allowing you to print two or three colour jobs without the extra charge for a third or fourth colour.

HP IndiChrome On-press

- production of more vivid life-like images.
- print a larger range of special colours more accurately than with the four-colour process.

PANTONE® approved

The HP IndiChrome system is PANTONE® approved. PANTONE® colour conversion tables provide you with simulations of 942 different PANTONE® colours. For more information, see the HP IndiChrome on-press user guide or check with your Print Service Provider.

chapter 9

substrates
- feel the quality

substrates

HINTS AND TIPS:

Use specialised substrates for that feel good factor...

Teslin® - waterproof applications e.g. outdoor labels, cookery books, security labels.

DuPont® Tyvek - tear resistant applications, e.g. workshop manuals, maps.

Plastic film (transparent & opaque) - membrane switches, OHPs, shelf wobblers and other point of sale materials.

Watercolour papers - for fine art reproduction, greetings cards.

Lenticular sheets - create motion or 3-D effects, e.g. mousemats, childrens stickers, novelty items.

substrates - feel the quality

As a designer you will appreciate the important role often played by the substrate to achieve the overall impact of the piece. Colour, whiteness, thickness, texture, durability, all these aspects can contribute to the design and functionality of the product. With the HP Indigo press your substrate options are hugely expanded when compared to xerographic printers and in some cases even conventional presses.

Xerographic papers are often characterised by their "dry" and "crackly" feel and this is attributed to the process which requires a paper with very low moisture content for successful fusing. For this reason you usually are restricted to using laser approved papers which not only limits your choice of substrate but on the whole costs more as well.

Conventional printing is very accommodating when it comes to substrates with thousands of different materials, not just paper, at your disposal. Even so, depending on the press and substrate combination there can be problems. Typically non-absorbent substrates will take a long time to dry which makes fast turnaround impossible since to print the duplex side or carry out the finishing you need a dry image. There can also be problems with very absorbent papers, e.g. watercolour papers, which soak up the ink and suffer from dot gain which can make the image lose its sharpness.

The HP Liquid Electro-Photographic (LEP) process uses HP ElectroInk which dries instantaneously on contact with the substrate. This also means that it does not get absorbed to any great extent and is able to maintain very well defined and sharp dots. This enables superb results to be obtained on either non-absorbent or highly absorbent materials. In most cases the printed sheets can be handled and finished straight away.

However, as with all printing processes there will always be exceptions and it is worth checking your requirements with your PSP.

coated and uncoated papers

There is a classification of paper type that is commonly referred to as *coated*, where the paper surface is pigmented or coated with a special mixture of clay or chalk and other additives and agents. Papers that do not have this coating are classified as *uncoated*.

Coating formulations and the amount of coating vary according to the paper type. Generally four different categories of coating weight are referred to; pigmented, medium coated, fully coated, and art papers. Properties such as smoothness, gloss, printability and opacity improve with increasing coat weight. The degree of calendering that is applied in the paper manufacturing process will also determine these properties.

substrates

Coated papers are typically used for applications where a higher quality look and feel are required, for example, "coffee table" books and brochures. Uncoated papers are usually used for single colour (e.g. black only) books and forms where its higher absorption makes it more suitable for writing on.

approved and optimised substrates

To provide assurance around a substrates suitability for printing on an HP Indigo press there is a process of independent approval. First and foremost a substrate must have a surface that is receptive to the HP ElectroInk in order to provide the ink with a good degree of adhesion. In addition the substrate must perform well in both handling and production. A range of stringent tests are performed on a substrate which it must pass before it can be approved. A full listing of approved substrates can be found at www.digitalacademy.com.

However, it is worth remembering that not all substrates are submitted for approval but this does not mean that they are not suitable for use on an HP Indigo press. In most cases your PSP will be able to advise you on the range of papers they stock and the availability of any specialised substrates that you may require.

Many substrates will print well but in the cases when they don't, all is not lost. When an alternative cannot be found a top-coating can be applied to the paper which alters the surface characteristics of the substrate to provide a suitable key for the ink. This is often referred to as optimisation or treatment and should not be confused with the term "coated paper" (see coated and uncoated papers above). Visually the substrate will look the same in appearance as the original sheet but an *optimised* or *treated* substrate will give better results.

There is usually a small additional cost for this treatment so if an alternative substrate can be found then so much the better.

the rules of engagement

- must be stable at temperatures up to 130°C (plastic and synthetic substrates).
- maximum physical sheet size: 320 x 464mm.
- maximum physical roll size: 1.3m diameter 330mm width.
- approximate weight range: Sheetfed: 80-350gsm. Webfed: 50-250gsm.

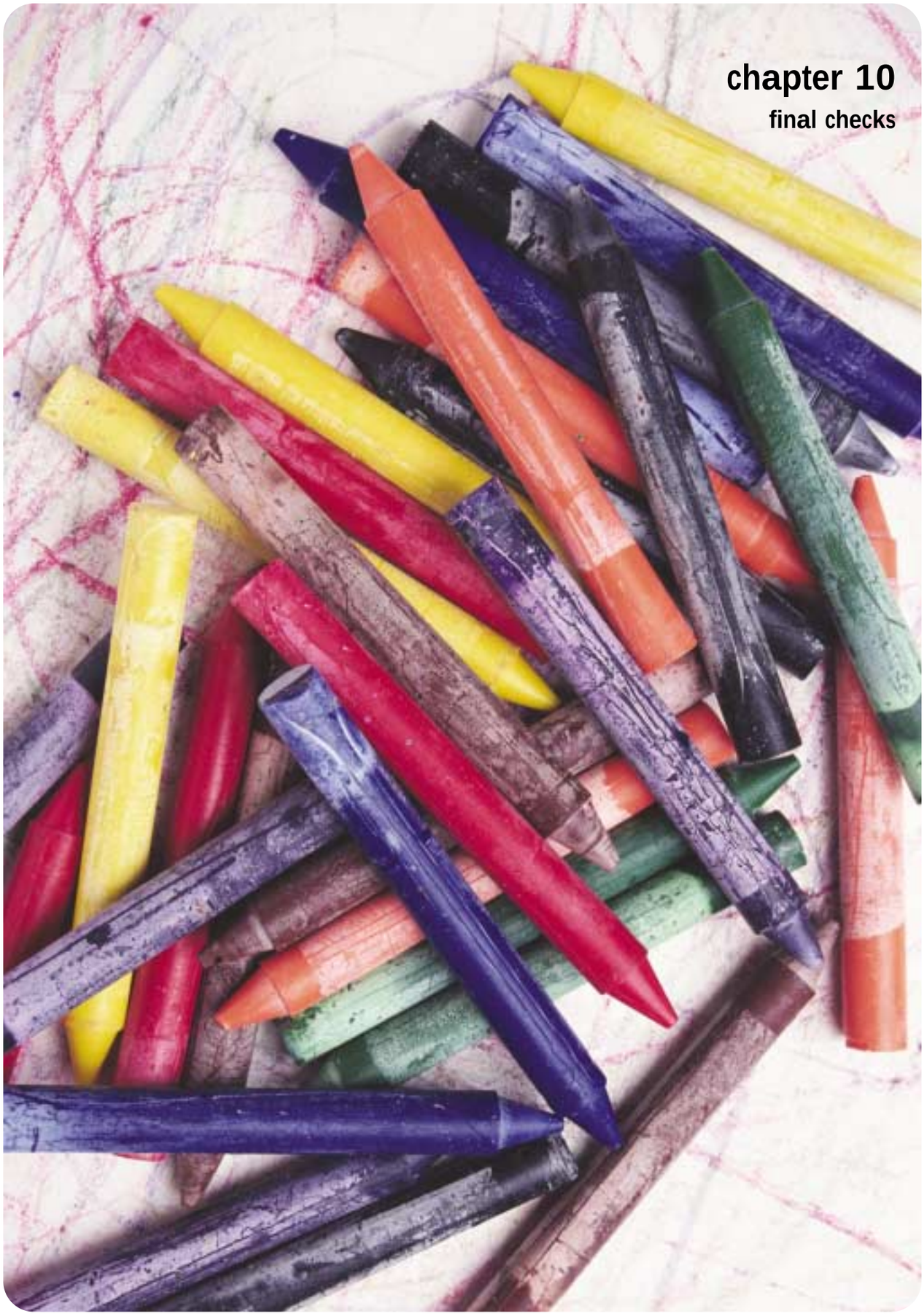
(Remember that weight is not a true indication of the bulk and it is the thickness in combination with the grain direction that will often determine the suitability of the substrate).

- grain direction:

less than 170gsm= long grain.
greater than170gsm= short grain.

if in any doubt consult your PSP.


invent



chapter 10
final checks

final checks

HINTS AND TIPS:

Try printing your document from the disc that you will send to your PSP. This will highlight if anything is missing. It is best to do this on a different workstation to the one you used to design your original document.

Pay particular attention to missing fonts.

final checks

checks to make with your PSP

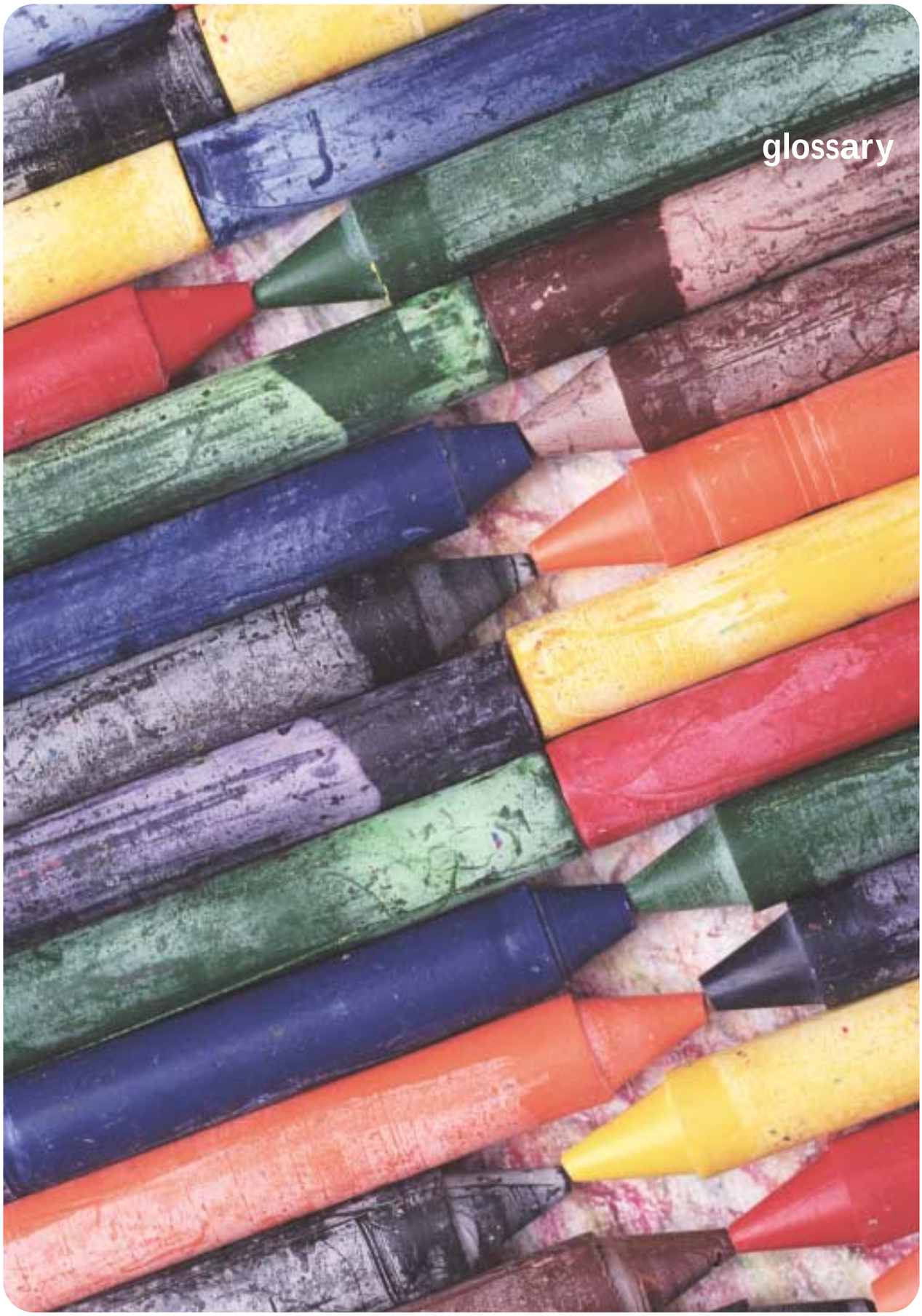
- ☐ can they handle the applications you have created your documents in? (Chapter 3)
- ☐ what format media can they accept for delivery of the data e.g. CD, Zip, DVD, ISDN?
- ☐ confirm the configuration of their press, e.g. 6-colours?, spot colour mixing? (Chapter 8)
- ☐ check that they can print the substrates you require. (Chapter 9)

checks to make in your design

- ☐ does the design fit the format of the output device? (Chapter 4)
- ☐ are all the images CMYK? (Chapter 4)
- ☐ are all the images at a suitable resolution? (Chapter 4)
- ☐ are there any potentially problematic tints or blends? (Chapter 4)
- ☐ have you put a shiner behind large areas of solid black? (Chapter 4)
- ☐ have you included bleed in your design where needed? (Chapter 4)
- ☐ have you set-up any specific overprints or trapping? (Chapter 4)
- ☐ does the document contain fine coloured type? If so consider using a spot colour to give you a clearer sharper result. (Chapter's 5&8)
- ☐ if your design is personalised have you taken into account "worst case" data? (Chapter 7)
- ☐ does your document need five, six or seven colour printing? If so make sure it is set up correctly for HP IndiChrome on-press or off-press depending on your choice. (Chapter 8)

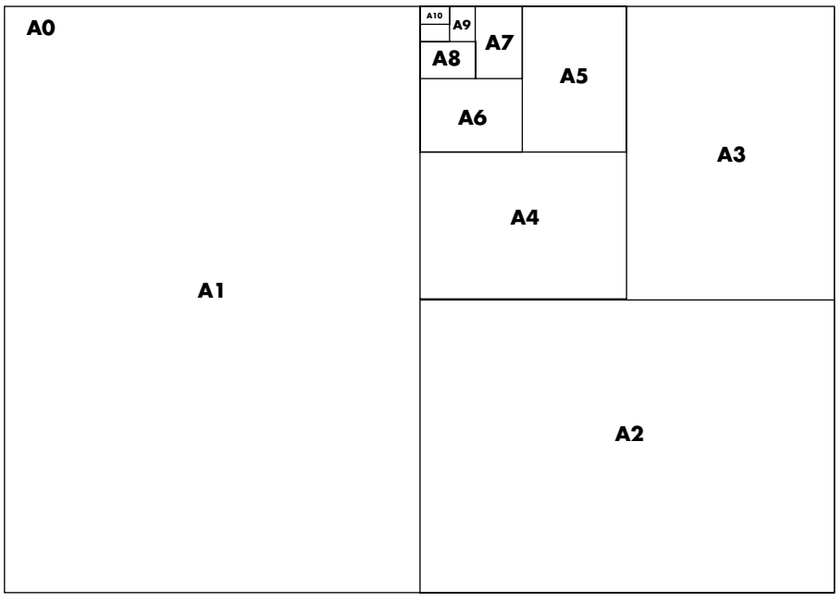
checks to make before sending the files to your PSP

- ☐ are all the associated images, graphics and fonts used in the document present? Remember both screen & printer fonts are needed for Type 1 PostScript® fonts. (Chapter 5)
- ☐ if you have made a PDF, is it saved at a resolution suitable for printing? (Chapter 6)
- ☐ if you have made a PDF, does it contain all the bleeds you need? (Chapter 6)
- ☐ if you are sending a personalised design for printing make sure that the associated variable data files and database are also supplied. (Chapter 7)
- ☐ provide your PSP with the final printed proof of the document for clarity.


glossary

A: 'DIN-A' (Deutsche Industrie Norm) sizes start at size A0 which measures 840 x 1188mm. The series of sizes is obtained by taking the previous size, dividing its larger dimension by two and keeping the smaller dimension the same.

A0: 840 x 1188mm.
A1: 594 x 840mm.
A2: 420 x 594mm.
A3: 297 x 420mm.
A4: 210 x 297mm.
A5: 148 x 210mm.
A6: 105 x 148mm.
A7: 74 x 105mm.
A8: 52 x 74mm.
A9: 37 x 52mm.
A10: 26 x 37mm.



Additive synthesis: the additive system stems from three beams of light in the primary colours red, green and blue. By superimposing these beams it is possible to obtain practically all the visible colours. The sum of these three colours, at their maximum intensity, produces white. This method is based on the trichromatic sensitivity of the human eye. This method is used particularly for video screens and computer monitors.

Aliasing: in digital graphics, a physical phenomenon caused by the rectangular structure of the pixel. Aliasing shows up in jagged edges on slanting lines and curves. The lower the resolution of an image, the greater the occurrence of this phenomenon. Aliasing can be minimised by using a smoothing algorithm, termed *anti-aliasing*.

Alignment: text is right aligned when its right hand edge forms a vertical straight line. The terms used are right aligned, left aligned or centred. In the last of these cases, the text is aligned about a central axis.

Example of right-justified text:

Si meliora dies, ut vina, poemata reddit,
chartis pretium quotus arroget annus. scriptor
abhinc annos qui decidit,novos?

and centred text:

Si meliora dies, ut vina, poemata reddit,
scire velim, chartis pretium quotus arroget
inter perfectos veteresque referri debet an
inter vilis atque novos?

Alpha mask or 8-bit mask: in digital graphics, a type of mask ensuring customisable protection of the image located below it, from a 100% level to a 0% level, with 254 intermediate levels, giving a total of 256 values. These masks make it possible, in particular, to insert one image into another with a fading level of transparency or to make graduated masks.

Analogue: a method of encoding information using analogy. This method is called analogue because the relation between the copy and the original is recorded. So there is a correspondence between the most dense parts of the image and the most dense parts of the real object. This equivalence may be identical (in the case of the positive), or inverted (in the case of the negative).

B: 'B' sizes start at size B0 that measures 1m x 1.4m. The series of sizes is obtained by taking the previous size, dividing its larger dimension by two and keeping the smaller dimension the same.

B0: 1000 x 1414mm.
B1: 707 x 1000mm.
B2: 500 x 707mm.
B3: 353 x 500mm.
B4: 250 x 353mm.
B5: 176 x 250mm.
B6: 125 x 176mm.
B7: 88 x 125mm.
B8: 62 x 88mm.
B9: 44 x 62mm.
B10: 31 x 44mm.

Bit (Binary digit): the smallest unit of information in computing. The bit is used to encode all information in the form of 0s and 1s. Eight bits form a byte. The number of bits used has particular importance in determining the quality of a signal (audio or visual) during digitisation. *See bits per pixel.*

Bitmap: a method of storing graphical data represented in the form of a group of pixels. The bitmap remains the only format for digital storage of photographic images.

Bits per pixel: The number of bits used to define a pixel is one of the factors in determining the quality of an image, as essentially it indicates the number of shades of a colour that can be represented digitally. A bitmap file is stored in the form of a succession of pixels determined by their x and y co-ordinates in the orthonormal space

constituted by the image. These two coordinates are added to by three values: one for red, one for green and one for blue. The three RGB values can be replaced by hue, saturation and luminance or brightness, or by the four CMYK values, depending on the colour space chosen.

• a one bit image is the equivalent of an image that is composed of only black or white pixels without any shade of grey. Sometimes referred to as a bi-level image.

• an 8 bit image is the equivalent of a greyscale image. It is a monochrome image with 256 levels of grey between white and black.

• a 24 bit RGB image is able to define the full range of colour, approximately 16.7 million (256 levels for each primary colour 256=16.7m), often called a true colour image.

• a 32 bit CMYK image is also a true colour image. It has, however, a few less shades because the CMYK colour space contains fewer colours than the RGB space.

BITS	HUES
6	64
8	256
10	1024
12	4096

The chart shows the equivalence between the number of bits per primary colour and the number of hues per primary colour.

Black: In the additive system black is generated by the complete absence of any colour. In the subtractive system it is the presence of all colour at their maximum intensities. It is denoted in the printing process by the letter K, a historic relationship which stands for Key (not blacK as commonly supposed).

Blanket: in offset printing, the rubber cylinder covering that transfers the ink from the plate to the media to be printed (paper, plastic, etc).

©: symbol for the word 'copyright', more generally used to indicate that the publication of a picture or a text is subject to legal rights of reproduction.

CMY (Cyan, Magenta, Yellow): basic colours for subtractive synthesis. The sum of these three colours, at their maximum intensity, produces black. Also referred to as the Complementary or Secondary Colours.

CMYK (Cyan, Magenta, Yellow, Black): four basic colours for printing, giving rise to the term 'four-colour printing process'. The CMY combination makes it possible, theoretically, to reconstitute the majority of visible colours, including black. However, in practice, due to problems with ink purity, pure black can not be obtained by superimposing 100% of cyan, magenta and yellow. This is why it is necessary to add black. This method also enables less ink to be used and therefore saves money and reduces drying time.

Colorimetry: the science of colour measurement.

Colour: The visual experience perceived by the cones of the retina which are stimulated by the different wavelengths of light perceived by the eye. The colour therefore varies in relation to the physical properties of the reflected light of an illuminated object or the light emitted from a source. When we reproduce a colour it is generally impossible or too complex to recreate its original spectrum. So we use a mixture of either the three primary colours or three complementary colours in order to produce an equivalent sensation in the eye. *See additive synthesis and subtractive synthesis.*

Colour balancing: the neutralisation of dominant colours in an image.

Colour cast: a colour that dominates all the shades of an image. The cast may be due to ambient lighting, the base material used to make the analogue recording (e.g. film) or caused by a fault or characteristic response of the digitising device.

Colour conversion: transformation from one colour space to another. This process can sometimes lead to the loss of colour when the subsequent colour space has a smaller or different gamut to the original.

Colouring agent: an organic or chemical compound that absorbs various wavelengths of visible light which gives it the ability to change the colour of a solid or a liquid.

Colour space: a range of colours grouped by a property. So, the colour space of the visible spectrum designates all the colours that a person with average sight is able to perceive. Other examples include the RGB colour space and the CMYK colour space.

Colour Management: *see ICC*

Colour synthesis: reconstitution of the colours of the whole of the visible spectrum from a limited number of base colours. Colour synthesis takes either an additive or a subtractive form.

Complementary colour: a colour which, when added to another, produces white in additive synthesis and black in subtractive synthesis.

Condensed type: typographical function designed to reduce the width of a character. It is best to use this function with caution. As far as possible, it is recommended that a font that has actually been designed at a narrower width should be used. These fonts very often have the term 'condensed' in their name.

Contract proof: the last check before printing, it refers to any document that is used to give approval before production. The contract proof is signed by the client and is used as a legal check in the event of a dispute over the work of the printer or provider.

Contrast: observable differences between the different tones and colours of an image. The concept of contrast is subjective, depending on the viewers' perception, because it contains several context-dependent concepts.

Cyan: one of the four colours used in printing. This is the complementary colour to red because it is made up of blue and green in an additive system. In a subtractive system cyan absorbs red wavelengths of light, as a consequence, it reflects green and blue.

Data Compression: various techniques whereby using mathematical algorithms to represent or store the data in a different way the amount of data in a file can be reduced, leading to smaller files sizes. Different compression techniques give rise to different rates of compression. Some compression techniques are termed "lossless" or non-destructive where there is no loss of detail in the data, others are termed "lossey" or destructive where there is loss of detail of varying degrees. Generally the smaller the resultant file the greater the loss of detail.

Density: in the graphic arts, specifies whether an area of an image is dark (high density, shadows), or light (low density, highlights). Density ranges are measured with a densitometer. In computing, density indicates the quantity of data contained per unit of surface area for a given media (tape, disk, etc). A density of 300 dpi (dots per inch) indicates therefore that a surface area of one square inch has 300 x 300 dots, i.e., 90,000 points.

Digital coding: a basic concept in computing, digital coding of information uses a two state system; on/off, yes/no, which is represented in binary by either 0 or 1. The information is then encoded in a binary script. The benefit of this system is to prevent the weakening of an electronic signal during processing and therefore to eliminate loss of information. A 0 always remains a 0 and a 1 always remains a 1.

Digitisation: the process that transforms an analogue signal into a digital signal.

DPI (dots per inch): a unit of measure of resolution, this unit indicates the density of dots either recorded or imaged per inch.

HP ElectroInk®: liquid ink technology developed specifically by HP for its unique LEP process. Its colour reproduction is similar to that of offset printing and is available in both SWOP®, Eurostandard® and HP IndiChrome® ink sets and as a range of PANTONE® approved spot colours including white. Unlike xerography, it preserves the appearance of the paper due to the fineness of the HP ElectroInk layer (1 to 2 microns). Other characteristics include; sharp dots which give rise to images with well-defined edges and minimal dot gain, instantaneous drying which allows for immediate finishing and handling and conventional light fastness. *See Chapter 1 for more information.*

Eurostandard®: a European standard for digital or analogue systems to control the colour quality of photoengraving films, photoengraving proofs, digital printing and digital plates in the case of direct plate output, and of the printed document.

Fixed spacing: in typography, equal spacing between two letters, whatever the characters that are used. This type of spacing is inherited from old typewriters that, for mechanical reasons, were unable to vary this distance *(see Kerning)*.

Fluorescent colour: fluorescent colours reflect more light than they receive, because they transform, among other things, the wavelengths of ultraviolet light into visible light.

Font: a set of characters (letters, figures, punctuation marks, etc.) of the same type (Times, Helvetica, etc), of the same style (bold, italic, etc.).

Font size: the size of a character in a font, usually measured units of points.

The — Futura Book

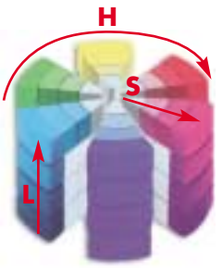
The — Futura Condensed

Gamut (or colour gamut): a range of colours that can be produced using a certain process or device. For example, a wider range of colours can be created on an RGB monitor than using the CMYK process, and by printing on gloss paper compared to matt.

GCR (Grey Component replacement): *See UCR*

HDI (High Definition Imaging): printing screens developed by HP for increasing the rendered detail in the printed image from HP Indigo presses. This is achieved by using a combination of increasing the screen ruling (number of lines per inch of dots), reducing the dot size, using super-pixels to alter the dot shape according to the density, and data interpolation to increase the effective resolution. Available screens include 144 (Sequin), 160, 175, 180, 195 & 230 lpi dependant on machine configuration.

HLS: hue, luminance and saturation, three dimensional colour space used in many graphics applications to define a colour. Sometimes also termed as HSB, hue, saturation and brightness.



ICC (International Colour Consortium): It makes no sense to specify a colour in CMYK if you don't know how the different devices used in a workflow, e.g. cameras, scanners, monitors and printers, will interpret those values. The ICC is an industry body that exists to define a set of "device dependant values" that can be used to determine the different characteristics for each machine e.g. brightness, colour balance, colour shifts etc. This information is then contained in an ICC profile for that device. This profile can be used in a Colour Management System (CMS). The aim is that by understanding the relative colour performance of each device through its ICC profile it should in theory be possible to manipulate the colour information in a file to give predictable colour as long as it is within the capabilities of the device.

Imposition: the ordered placement of pages on a sheet (signature) for printing, to accommodate different finishing and binding styles.

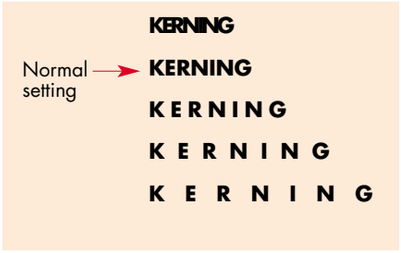
Indexed colour: a "paint by numbers" system for saving colour information in an image. In order to keep the file size low the image references a restricted and defined colour palette (generally 256 colours).

HP IndiChrome®: The term given to five, six, or seven colour printing on HP Indigo presses. Incorporates on-press (six colour process) and off-press (spot colour) techniques. *See Chapter 8 for more information.*

JPEG (Joint Photographic Expert Group): a compression method that cuts an image into small tiles or zones to calculate an average colour that it will attribute to the whole set of pixels in this area. It is the size of these zones in particular that will determine the rate of compression of the image and therefore the quality of the image produced.

Justification: in typography, a text composition mode where the spacing between words is adjusted to align both the left and right edges of the paragraph.

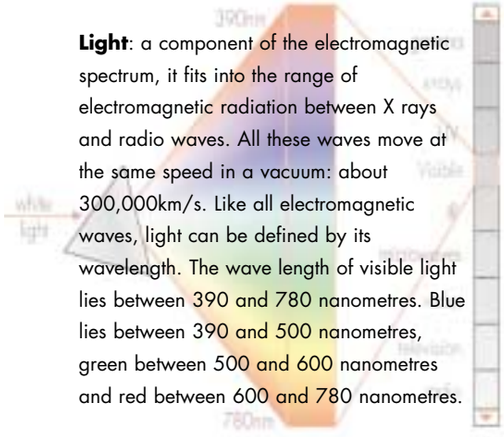
Kerning: typographic function used to control the space between characters



Knock-out: *See Overprint*

Landscape: a printing format with the paper laid horizontally (or the long edge on the top of the paper). Opposite to Portrait.

Liquid Electro-Photography® (LEP): HP's unique printing technology that gives traditional ink-on-paper quality via a true digital colour printing press. Key to the process is HP ElectroInk which can be directed using electrical charges enabling a different image to be digitally formed.



Light: a component of the electromagnetic spectrum, it fits into the range of electromagnetic radiation between X rays and radio waves. All these waves move at the same speed in a vacuum: about 300,000km/s. Like all electromagnetic waves, light can be defined by its wavelength. The wave length of visible light lies between 390 and 780 nanometres. Blue lies between 390 and 500 nanometres, green between 500 and 600 nanometres and red between 600 and 780 nanometres.

Luminance: in physics, the quantity of light per unit of surface area, luminance is measured in candela/m^2. Often used to denote the brightness of a colour.

Magenta: one of the four colours used in printing. This is the complementary colour to green because it is made up of blue and red in an additive system. In a subtractive system magenta absorbs green wavelengths of light, as a consequence, it reflects red and blue.

Mask: in silver halide processing the mask refers to an inactinic film, generally red, that protects the photosensitive surface from any reaction to a light source. By extension, in a graphics application, a mask is a layer created to protect the underlying data of an image from the operator's actions. Masks are coded in either 1-bit or 8- bit. In the first case, like photoengraving coated film, they protect either completely or not at all. In the second case, their protection varies from 0 to 100% depending on the users' specifications *(see alpha mask)*.

Offset: a monochrome or colour printing technique developed to improve earlier forms of lithography. In this process, the ink is applied to the areas of the image engraved on a plate, then it is transferred (offset) onto the substrate via a rubber cylinder, called a blanket. This technique offered a number of benefits including better transfer of the ink image to the substrate. It is now the most common form of printing used in the commercial market. HP Indigo presses also use an offset process. By combining the advantages of the offset process with a unique "digital" plate the HP Indigo press is able to offer the quality of conventional printing with the flexibility of digital printing.

Optical resolution: in digital graphics, the real resolution of a scanner or a camera. Optical resolution therefore indicates the number of pixels contained in the larger axis and the smaller axis of a CCD array. For a strip device, it gives the number of pixels contained in the strip and the number of steps by which this strip moves.

Overprint: When a page element is instructed to overlay another element without knocking-out the data in the underlying element it is said to overprint. This technique can be either used for visual effect in the design or to eliminate the effects of misregistration between colours caused by inaccuracies in printing. For example, black text should usually overprint any underlying tint or image. The HP Indigo press RIP will automatically do this if requested, otherwise you can usually set it up in the original design application.

PANTONE®: a colour reference system developed by Letraset. This system comprises more than a thousand defined colours that can be created by mixing seventeen pigments. The system also makes reference to the same colours on different substrates; coated & uncoated. It is impossible to produce all of these colours in CMYK. The Eurostandard CMYK gamut only makes it possible to simulate approximately 50% of these colours whilst the HP IndiChrome on-press six-colour process can reproduce approximately 85% of them. *See Chapter 8*.

PDF (Portable Document Format): unique format based on PostScript, created by Adobe® and originally released with the Acrobat® application. This format describes a document containing any combination of text, graphics and images, independently of its environment. *See Chapter 6*.

Pigment: used in the composition of inks, enamels and paints to give it its colour.

Pixel, acronym of "picture element": the basic building block of a digital image, the pixel is the smallest element of an image. Only when presented in a group can it define an image. The higher the number of pixels or points in the group, the better the quality of the image.

Portrait: a print format with a vertical print orientation or the short edge on the top of the paper. Opposite to *Landscape*.

PostScript®: an industry standard language format for describing a page. Used for driving a printer or an imagesetter. This term is also used to denote the fonts compatible with this language (PostScript Fonts).

Primary colour: a pure colour in the visible spectrum that is impossible to obtain by mixing together any other colours.

Print Service Provider (PSP): the company supplying the printing capability.

Proportional spacing: in typography, spacing between two letters that varies in relation to the shape and size of the letters.

Resolution: the resolution of a device is a measure of its ability to physically define two individual points as separate entities. The common unit of measurement used is dots per inch (dpi). For example a device with a resolution of 812dpi can independently image two points that are 1/812th of an inch apart without them appearing as one point.

RGB: abbreviation of red, green, blue. An additive colour system using the three primary colours. The sum of these three colours, at their maximum intensity, produces white. *See additive synthesis.*

RIP (Raster Image Processor): Software or hardware based interpreters that can translate input file formats such as PostScript or PDF into output bitmap formats that can be used to image the file on a designated device. Generally RIP's are specific to the output device since their bitmap formats vary.

ROOM (RIP Once, Output Many): a concept where the output bitmap file from the RIP can be used for imaging on a range of output devices. In reality this is seldom achievable especially between output devices from different manufacturers.

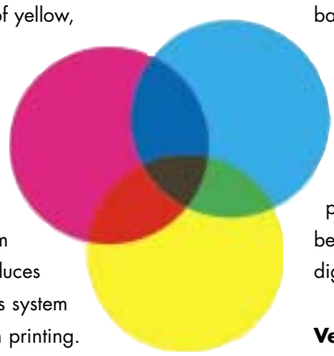
Scaling: mathematical transformation (enlargement or reduction), of an image in proportion to its original dimensions.

Secondary colour: mixture of two primary colours.

SNAP® (Swift Native Accelerated Personalisation): HP Indigo press technology used for the production of variable data documents at very high speed. *See Chapter 7.*

Spot colour: Special separately defined colours that are printed using an individual ink rather than being composed using the standard CMYK inks. Typically used in a design to catch the eye or related to a brand (house colours) but also for economy. *See Chapter 8.*

Subtractive synthesis: extracts the blue, green and red components from white light with the aid of yellow, magenta and cyan filters respectively. The sum of these three colours, at their maximum intensity, produces black. It is this system that is used in printing.



SWOP (Standard Web Offset Press): one of the offset colour range standards used as a reference (the word web has nothing to do with the Internet). This standard is more commonly used in the United States.

Trapping: During printing slight movements of the paper when going through the press can lead to misregistration between the colour plates. An area of trap is sometimes needed around a page element to prevent the substrate showing through in these areas of misregistration. Depending on the relationship between the colour and type (text or graphic) of the overlying element to the underlying element the edge of the overlying element may be effectively grown, known as spread, or the area underlying it may be shrunk, known as choke. When no trapping is used and the images need to align exactly they are said to need a "kiss-fit". Trapping is not normally required when printing using an HP Indigo press.

UCR (Under Colour Removal): compensation for the addition of the three primary colours by black only in neutral tones. In theory, using the additive theory of colour, the combination of magenta, cyan and yellow will produce black. In practice, imperfections in the printing inks usually mean that a dark tone of brown is produced. UCR reduces the amount of C, Y, M needed in shadow areas and neutral colours and replaces it with black ink (K). Its benefits include cutting down on the amount of ink needed to produce an image and the drying time needed for the print. GCR (Grey Component Replacement) is similar except that it affects all neutral areas using black and only the minimum amount of CMY needed. Care needs to be taken when using GCR since it can adversely affect the colour balance in the image when printed.

Variable Data Printing (VDP): a printing technique that enables unique variation of a part of the printed data, also called customised or personalised printing. Variable data printing has only been made possible by the development of digital printing techniques, especially by HP.

Vector graphics: an efficient data storage method normally used for graphics and text, based on mathematical definition of objects. Each shape contained in an image is stored in accordance with its geometrical properties instead of storing the image pixel by pixel. These files are typically much smaller than their pixel based equivalent and their scalability maintains the image quality at all levels. However, depending on the complexity of the mathematical calculations the RIP has to make, it is not always the quickest to RIP even though it will be the smallest in file size.

White: In additive synthesis, white is produced by the sum effect of red, green and blue, and is the result of the presence of all colours in equal quantities. In subtractive synthesis it is the absence of any colour whatsoever.

WYSIWYG: 'what you see is what you get', i.e. what you see on the screen is what will be printed.

Yellow: one of the four colours used in printing. This is the complementary colour to blue because it is made up of red and green in an additive system. In a subtractive system yellow absorbs blue wavelengths of light, as a consequence, it reflects green and red.

using the files on the cd-rom

this cd-rom contains:

• this guide in ready to print HP .JLT format. Just import it into the job manager on any HP Indigo press and print.

You may print and distribute this guide freely in its original form on condition that no edits or changes are made to it.

• You can however customise the front cover to include your company details or personalise it for your clients. To help you with this the cd also contains the cover design in a QuarkXpress™ document.

• the files to print a CMY colourbook that can be used as a colour reference when discussing colours.

• the files to print an HP IndiChrome® on-press colourbook that can be used as a colour reference when discussing colours.

• an Adobe® Acrobat® Distiller® profile for creating PDFs suitable for HP Indigo presses.

• MacOS™ and Windows® HP Indigo print drivers

The Designer's Guide
Authors: Nick Loh and Tony Brown

www.hp.com/go/indigo

Printed on an HP Indigo press

Copywriting design & artwork by the Bespoke Agency, Banstead, Surrey
Based on an original by Hervé Bernard

DG05/03EU

just imagine

North America
Hewlett-Packard Company
Indigo Division
400 Unicorn Park Drive
Woburn, MA 01801
USA
Tel: +1 781 937 8800
Fax: +1 781 937 8810

Europe
Hewlett-Packard Company
Indigo Division
Limburglaan 5
6221 SH Maastricht
The Netherlands
Tel: +31 43 356 5656
Fax: +31 43 356 5600

Israel, Asia Pacific
Hewlett-Packard Company
Indigo Division
Kiryat Weizmann
P.O. Box 150
Rehovot 76101, Israel
Tel: +972 (8) 938 1818
Fax: +972 (8) 938 1338

The Designer's Guide
Authors: Nick Loh and Tony Brown

www.hp.com/go/indigo

Printed on an HP Indigo press

Copywriting design & artwork by the Bespoke Agency, Banstead, Surrey
Based on an original by Hervé Bernard

DG05/03EU

invent