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Introduction

A new way to look at documents

One of the greatest advantages of digital colour applications and systems is that they allow high-quality colour process printing to be produced in smaller quantities at a higher frequency, as well as personally tailored printing to optimise customer interaction. Digital printing technology changes the way we think about and create documents. Limitless possibilities are now accessible for full-colour, near-offset quality printing at a reasonable price.

Until recently, highly trained imaging experts working on expensive proprietary systems typically performed most imaging tasks such as colour enhancement and image manipulation. New technologies and desktop publishing applications have changed all that, enabling designers to complete many of these tasks from their desktop computers.

The more knowledgeable you are about the imaging process from document creation to output, the easier it will be to maximise your results. This guide offers suggestions that will help you get the most out of your imaging applications when preparing files to print on a Xerox DocuColor 2045 or 2060 digital colour press.

An overview of the DocuColor 2000 Series Design Guide

The DocuColor 2000 Series Design Guide has been written to provide you with all the information you need to ensure you get the highest quality printed documents from the DocuColor 2045 and 2060 with the minimum of fuss – every time. It is divided into sections for easy reference.

- Section 1 covers the topic of digital print, describing what it is, the workflow, and the key benefits digital print offers designers and customers. Use this section to learn more about digital print and what it offers.

- Section 2 details the key attributes of the DocuColor 2000 Series. It examines some of the technology used and details performance and printing characteristics. Use this section to learn more about the capabilities of the DocuColor 2045 and 2060.

- Section 3 provides guidance on how to design your documents to get the best possible results from the DocuColor 2045 and 2060 and avoid design elements that may cause problems. Use this section as a guide to ensure you design documents that will result in perfectly printed documents every time.

- Section 4 includes information on how to submit jobs to a DocuColor solution, directly from software applications on Windows or Macintosh personal computers, over the web, using removable media, or other means. Use this section to make sure you get the job to the printer trouble-free every time.

- Section 5 describes how to select the right paper to get optimum results from the DocuColor 2045 and 2060. It includes a guide to all paper grades available in the market today. Use this section to learn more about paper and to choose the best paper for the job.

- Section 6 provides information on binding and finishing – the final steps to ensure a perfect, finished piece. Use this section as a guide to various binding and finishing options available from your printer.

- Section 7 examines different industry segments and identifies key applications, the department or person responsible for that application, and the key benefits of using digital colour print for that application. Use this section as a guide to finding digital colour applications in different market segments.

- Appendix 1 includes charts of Microsoft Office colours. Use this section as a guide to how Microsoft Office colours are reproduced on the DocuColor 2045 and 2060.

- Appendix 2 includes charts of RGB colours. Use this section as a guide to see how RGB colours are reproduced on the DocuColor 2045 and 2060.

- Appendix 3 includes charts of CMYK colours. Use this section as a guide to select CMYK colours as they are reproduced on the DocuColor 2045 and 2060.

- Appendix 4 includes charts of Pantone colours. Use this section as a guide to see how Pantone colours are reproduced on the DocuColor 2045 and 2060.

- The Reference section includes references to other documents and material. Use this section as a reference to find more information on particular topics and issues.

- The Glossary section includes definitions of digital printing terms. Use this section to check words or abbreviations that may be unfamiliar to you.

If you have any suggestions on how this Design Guide can be improved, please send your comments to DocuColor.2060@aus.xerox.com.

1 Digital print

Digital technology has changed many facets of business and industry today. Computing and communications technology has allowed companies to revolutionise the manufacturing process – from producing goods and then hoping to sell them, to just-in-time production, where products are sold first and then manufactured to order, reducing waste, inventory and cost. It has also allowed them to produce products more in tune with individual customer's needs, moving from mass production to mass customisation.

Computing and communications technology has also allowed companies to gain access to new markets. No longer are they tied to local markets, but instead can compete in a global market.

Countless examples exist of how digital technology has changed the face of business across all industries, from agriculture to information technology. Banks, for instance, still provide banking and lending services, but have closed branches in favour of ATMs, and internet and phone banking. The music and entertainment industry has seen the appearance of CDs, DVDs and game boxes, and the disappearance of LPs and cassettes. Still photography, video and television broadcasting is transitioning to digital. The way people communicate now is by mobile phone, facsimile and e-mail – instant communications to anyone anywhere on the planet.

Digital technology has also dramatically changed the nature of the document – a document today can still be a sheet of paper or book, but is more likely to be an electronic file, a spreadsheet, presentation, scanned image, or a clip with video and music. Computers, desktop publishing applications, digital imaging and printers have allowed millions of people to create documents on their desktop that used to take a team of people weeks to develop.

Consumers today are more demanding. They know what they want and they're not prepared to wait. It's no different in their demands for print: high quality, cost effective, and now!

What is digital print?

In simple terms, digital print is where information to be printed is submitted electronically (ie, in digital form) to the printer, where it is imaged and the printed material produced.

There are numerous digital printing technologies available, including inkjet, electro-photography with dry or liquid toner, thermal transfer, ionography and magnetography. Even traditional offset presses with direct imaging (or DI) are promoted as "digital presses".

What truly distinguishes digital printing from traditional printing is the ability to print every page differently. This is something that offset presses – including DI presses – cannot do. Offset presses can only print exact replicas of the same sheet, again and again.

The digital colour presses that dominate the market now – and for the foreseeable future – are all toner based. They utilise electrophotography, either with liquid toners (Indigo), or dry toners (IBM, Kodak-Heidelberg, MAN Roland, Xeikon and Xerox).

The market for colour print can be split into segments defined by run length and specific applications. The suitability of different printing technologies to these segments is as follows:

Segment/application	Digital colour printing	Direct imaging (or DI) offset presses	Conventional offset printing
One-off and one-at-a-time publications	Yes	No	No
Customised/personalised documents	Yes	No	No
Vert short runs (<500)	Yes	No	No
Short runs (501-2,000)	Yes	Yes	No
Moderate runs (2,001-5,000)	No	Yes	Yes
Long runs (5,001-50,000)	No	No	Yes
Very long runs (50,001+)	No	No	Yes

With the many benefits of digital colour printing (described later in this section), we are seeing a strong swing toward shorter runs. The table below shows that in 1998, 28% of all print volume in the US was short run, but in less than 20 years it is expected to account for almost half of all print volume.

	1998	2000	2010	2020
Ultra Short Run (1)	8%	10%	13%	14%
Very Short Run (2-500)	10%	13%	15%	16%
Short Run (501-2,000)	10%	13%	15%	17%
Moderate Short Run (2,001-5,000)	17%	15%	16%	16%
Moderate Run (5,001-10,000)	14%	13%	11%	11%
Average Run (10,001-50,000)	12%	9%	8%	7%
Moderate Long Run (50,001-250,000)	11%	11%	9%	8%
Long Run (250,001-750,000)	9%	7%	6%	5%
Very Long Run (750,000+)	9%	9%	7%	6%
	100%	100%	100%	100%

Source: Professor Frank Romano, Graphic Media Briefing, 29 March 2001.

Digital print workflow

The entire process for the production of a printed document can be broken-down into three phases: prepress (which includes all steps after the design is completed up to the point where the job is printing), press or printing (the printing phase), and postpress or finishing (all the steps required to finish the job after printing and before distribution). Digital printing has greatly simplified two of these phases: prepress and press.

For an understanding of how digital printing has streamlined the production of printed documents, it's useful to compare it with the workflow associated with traditional offset printing. The following discussion greatly simplifies the entire production process, but is sufficient to highlight the major steps involved in each workflow. (See diagram page 1-4)

Document creation

The first step in the production of a printed document requires the creation of a design. A concept is developed into a layout, followed by the preparation of text (writing, editing, font selection and typesetting) and artwork and images (which can include electronic illustrations, scanned photographs, digital camera shots or stock library images). The document is then ready to be created, generally using a page assembly program to combine the text and image elements.

Computers, software and digital technologies have already revolutionised the creation of documents. Typesetting (the assembly of type into words and lines) used to be done by hand. Illustrations were created by hand and photographs were always film-based. The assembly of these text and image elements was a manual process, called pasteup, with the end result being a camera-ready copy. Today, almost all documents are created electronically, totally eliminating the need for these time-consuming and error-prone manual processes.

Prepress

Once a document is created, it can be proofed (proofing is a simulation of how the job will look when it is printed).

If you are having your job printed on a DocuColor 2045 or 2060, you can also run a proof on the press which will show you how the job will look when it is run. This is called a "press proof" (because it is proofed on the actual press) and will show you exactly how the job will look when it's printed.

If you are printing on a traditional offset press, a proof at this stage will only approximate what the final result will look like. Fonts may look different (because

DIGITAL PRINT WORKFLOW

different RIPs are used) and colours will not match exactly. A proof can be produced on a digital device (like a DocuColor printer or inkjet or dye sublimation system) or using a photomechanical system (like Cromalin). The advantage of digital systems is that they have a lower cost and quicker turnaround, and they better fit the digital workflow most use today. However, photomechanical systems are still used where film is an important part of the workflow.

If everything is acceptable with the proof, you can then approve the job and have it printed. If, on the other hand, changes are required, the design needs to be edited and the steps above repeated.

If the job is ready and is to be printed on a DocuColor 2045 or 2060, there's no more to do – the job can be RIPped and printed.

If the job is to be printed on an offset press, plates need to be produced for the printing process. Traditionally, this involves the production of film from which the plates are made. Prior to the introduction of digital solutions, this involved producing photographic negatives or positives (film) of the camera-ready copy. Today, imagesetters are used to produce film directly from electronic files. The film is then assembled and light-sensitive plates (or image carriers) are exposed to visible light, UV radiation or lasers in a photomechanical process to make the plates.

Newer technologies today allow printers to produce plates or image carriers directly from electronic files. Called CTP (short for Computer-to-Plate) or DI (short for Direct Imaging on a press), these technologies are designed to streamline the prepress requirements of offset presses.
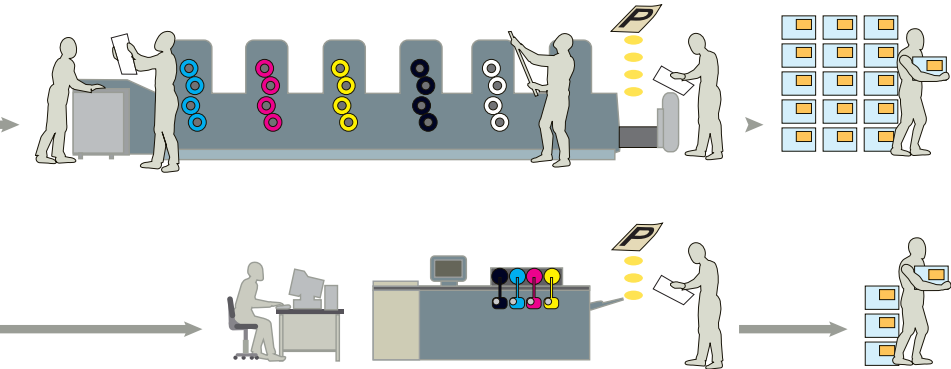
Press

The job is now at the stage where it's ready to be printed.

If the job is being printed on a DocuColor 2045 or 2060, the operator will have calibrated the press earlier in the day and loaded the right paper. The job is then RIPped (using the appropriate settings) and printed. It doesn't matter whether you want 1 copy or a thousand, the process is the same.

On an offset press, the operator needs to set the press to make it ready for printing (called makeready). This process can take anywhere from 10 minutes to an hour and requires the use of a skilled operator. It can involve steps such as inking, dampening, cleaning and loading plates. Once the press starts printing, it will take several prints (sometimes hundreds of prints) for the press to settle and be adjusted correctly so that it is matches the proof as closely as possible. These prints are called waste and are thrown-away or recylced. Once the press is set and printing correctly, it will print exact copies of the same image again and again.

Postpress

Once printing is completed, the job is ready to be finished. This can include tasks such as trimming, folding, binding, packing and delivery to the customer.

Correction required?

If you've received your job and noticed that something's not right (for example, the address is wrong), you'll need to reprint the job.

With the DocuColor 2045 and 2060, you'll make the change to the file and re-submit the job. The printer will re-RIP the job and print it. Done.

With the traditional offset process, you would also change the file and re-submit the job. Now the printer will have to create a new set of film, new plates, set the press up again, and then start printing. More steps for something to go wrong and more waste produced.

What does digital print mean to you?

New opportunities: added document value combining technology with your creativity.

New solutions: improved customer satisfaction and loyalty.

Cost reductions: elimination of print storage and distribution costs.

Speed: getting mission-critical information where it needs to be faster.

Focus: documents customised to your audience one-to-one.

Management: creative revisions and/ or reprints whenever and wherever needed.

Digital print is about you, the designer, combining your creativity with new print technology to deliver more effective communication between business and customers.

Digital print is about getting improved response rates on direct mail, faster turnaround for brochures, and minimising outdated material. It's about time to market, reacting quickly to changing market dynamics and capturing market opportunities – without blowing the budget.

Benefits of digital print

There are four main areas where digital colour print can deliver real benefits: cost effective short run printing, printing on demand, just-in-time, distributing documents electronically and printing them locally, and targeting customers with personalised content utilising variable information printing.

Short runs

The key strength of traditional offset printing is that once the press is set, it prints long runs cost effectively. Recent developments with offset presses have been aimed at reducing the set-up (or make-ready) time in order to make the presses more cost effective at shorter runs. However, anybody wanting short runs of high quality colour work has until recently had few choices – either pay a very high unit price, print many more copies than required (most of which would be wasted), or accept that the work can't be done economically.

The DocuColor 2045 and 2060 now allow consumers of print to have high quality colour work printed cost effectively on short runs – anywhere from a one-off up to 2,000 copies. You no longer have to buy long print runs to drive unit costs down.

Because a digital press prints each page differently, you can even print one book at-a-time in a single print run.

Examples of applications now possible with digital printing include:

• Short run books
• Limited run video covers and CD labels and jewel case inserts
• Business cards
• Conference, trade show or seminar publications
• Test marketing material
• Brochures
• Newsletters
• Annual reports for small companies or review copies for the board
• Proposals
• Market research reports, survey reports, environmental impact reports
• Menus, invitations and greeting cards

With digital colour printing you can now print exactly the quantity you require, not the quantity your printer wants you to buy.

Just-in-time printing

The just-in-time manufacturing process has revolutionised many industries, such as the personal computer, whitegoods, brown goods and car industries. It reduces inventory and eliminates wastage, leading to cost savings and improvements in productivity. Print buyers want to share the same advantages, and digital printing delivers on these benefits.

The DocuColor 2045 and 2060 have markedly reduced prepress requirements, especially in comparison with both DI and traditional offset presses (which require lengthy make-ready work) as well as most other digital colour presses. This means that work can be turned around very quickly – within the day, hours or even minutes. No other printing technology can match the turnaround time of a digital press.

Combine the quick turnaround time with the short run economics of digital print means that you can print on demand only what you require. Files can be stored electronically, eliminating the need to store and retrieve paper documents. This significantly reduces non-print costs associated with the storage, wastage and distribution of out-of-date documents. Studies show that 30-50% of all printed material is thrown out unused.

As the life cycle of products gets shorter and shorter, it means that with digital print you will always have the latest, most up-to-date, accurate and relevant support material and publications. It allows you to frequently update the content of your printed material and print small batches of the latest version, avoiding the distribution of incorrect or out-of-date material.

Examples of applications suited to the just-in-time advantages of digital printing include:

- Manuals
- Catalogues
- Presentations
- Conference and trade show material
- Brochures
- Financial reports
- Books

With digital colour print you will no longer print material just in case you need it, you'll print it when you need it, on demand, just in time.

Distribute and print

Traditionally, print buyers would order ample quantities of print to meet all foreseeable needs, print it in one run, and then ship it to all those locations that required copies of the publication. This process is time consuming, costly, and prone to delay, as documents are shipped around the country or around the world.

With digital printing and the power of the internet, documents can be sent electronically anywhere around the world and printed locally on a digital press at the point of delivery. An editor can sign-off on a document in Sydney and have it printing in minutes in Melbourne, London, Paris and New York. This eliminates delays in the production process, reduces shipping costs, and ensures that up-to-date publications are in the hands on consumers in a timely manner.

You can even version your documents to tailor them for regional readers

Examples of documents ideally suited to the distribute and print model include:

- Newspapers
- New product brochures
- Newsletters
- Financial reports
- Limited edition books

No longer do you need to print first and wait for it to be distributed, you can now distribute your document instantly world-wide and have it printed locally without delay.

Variable information printing

A unique characteristic of digital print is the ability to print every page differently. Not only does this mean you can print a multi-page document (like a book) in a single print run, but you can also personalise each sheet or page to an individual. It is achieved by changing certain text (like name and address) and/or images on the page. This new capability is called variable information printing (or variable data printing), which people may also call personalisation, customisation or versioning.

Although this capability is not new (it's been used for many years to produce bills and statements), what's exciting is that this capability is now available in full colour, including graphics and images.

Personalised refers to a document that has been tailored to a specific individual. Although it could be a simple mail merge, a personalised document may often have unique combinations of paragraphs, pictures, and other information directly targeting the individual.

Customised is used to describe any document that has been altered, in a sense customised, to its audience. It is derived from a common document template with different messages and content based on stated customer preferences.

Versioned or targeted lots is used to describe documents based on data-mining techniques. Several versions of a document are created based on selection of target criteria, such as broad demographics, psychographics or purchase history data. The document appears personalised but is identical to that produced for other recipients with the same profile. Catalogues, newspapers and manuals are good candidates for versioning.

Variable information printing has allowed marketeers to target customers with specific products and services, tailored to their individual needs. Companies can today leverage the vast amount of information they possess about their customers with this capability.

It also allows companies to protect their most valuable strategic asset – their customers. Communicating with each customer individually allows organisations to solidify a direct, one-to-one relationship with their clients.

Marketeers can improve the investment value of mailings by utilising variable information printing. Even by adding the simplest personalisation to a direct mail piece – name and address – response rates can increase by 36% (1997 CAP Ventures report).

This is especially important in these days where marketeers are wanting to get closer to their customers, have fewer dollars to spend, and are demanding measurable results. Variable information printing is perfectly placed to meet these goals.

Use of colour

Colour attracts attention, increases impact, stimulates emotions, and touches us where pure reason and intellect do not. Use of colour in documents improves understanding and comprehension, helps organise data, and aids the reader in decision-making, learning, retention and recall.

Numerous studies back the power of colour. Ronald E Green (The Persuasive Properties of Color, October 1984) showed that colour sells products and services better by up to 85% and provides savings in time taken to read of 70%. D Hoadley et al (Investigating the effects of Colour, Fonts and Bold in Text Documents, January 1996) demonstrated that colour increases understanding by up to 74% and recollection rates by up to 77%, and reduces error counts by up to 55%. And Case and Company (Grasp Facts Fast with Color Copying, July 1974) showed that colour increase reader motivation by up to 80%.

The benefits of colour apply to all documents. Add impact to presentations and proposals, improve response times and response rates with direct mail and bills, increase readability of statements and reports, and improve learning and recollection of training material and manuals. Colour improves your company's professional image and enhances all types of documents.

Until recently, colour was too expensive to use in everyday applications. With the introduction of Xerox solutions like the DocuColor 1250, 2045 and 2060, everyone now has the ability to produce high quality full colour documents at an affordable price – no matter whether you need one copy or a thousand.

Wrap-up

Economical short runs	Quick turnaround
Rapid response to market changes	Cost effective publications
High quality print for professional image	Reduced print inventory
Eliminate print wastage	Reduce print costs
Distribute and print	Print what you need, when you need
Documents always up-to-date	Personalised documents
Reprints on demand	One book at a time
Communicate with each customer individually	Affordable colour

2 Image reproduction process

The DocuColor 2045 and 2060 are digital colour presses with the ability to produce superb print quality on a broad range of paper stocks. This section includes a description of the technology that's built into the presses that allows them to deliver on their promise as well as providing information on some of the capabilities of the DocuColor 2000 Series that will help you in designing documents for the press. This includes topics such as size considerations, print speeds, available colours, print resolution and screens available.

DocuColor 2000 Series technology

The DocuColor 2045 and 2060 were developed to meet the demands of customers for extremely high quality print, production-oriented feeding and finishing, paper versatility, and cost-efficiency.

Never before has a digital colour press come so close to offset quality so easily. The 600 x 600 x 8 dpi print resolution consistently provides users with sharp, clear text and vibrant, true-to-life images. The untrained eye will find it difficult to tell the difference between jobs output from the DocuColor 2045 or 2060 and those produced on offset presses.

The print engine houses the brains, heart and muscle that drive the DocuColor 2045 and 2060. It uses state-of-the-art, patented technology that ensures high image quality and productive, reliable output.

Printing stations

Inside the DocuColor 2045 and 2060 there are four printing stations – one for each process colour, cyan (C), magenta (M), yellow (Y), and black (K). Each station houses extra-large cartridges that hold a mixture of dry ink and developer. A Xerox process called Trickle Charge Development (the mixture of dry ink and developer) constantly replenishes the print stations with fresh dry ink and developer, which ensures a more consistent image quality over longer periods of time and through longer runs.

Xerox engineers found that with xerography, full-colour images come out looking truer when the dry ink/developer is laid down on the blanket in an atypical order: yellow, magenta, cyan, black. Placing the process colours on the blanket in this order, rather than in the standard cyan, magenta, yellow, black used with offset presses, improves the integrity and vibrancy of greens whilst maintaining that of the other colours, including yellows, reds and blues.

Process colour
printing stations

TRACS

Digital Blanket

Dry ink
cartridges

Precise Registration System

BeltNip
fuser

Decurling stations
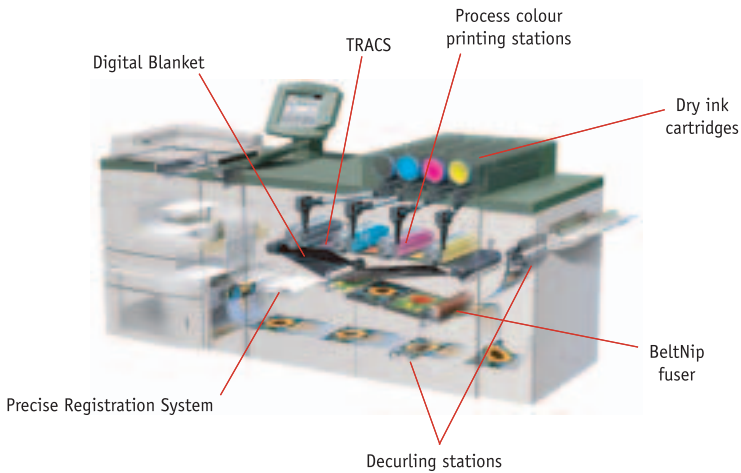
Digital Blanket

Significant improvements in image quality can be attributed to the Digital Blanket used in the DocuColor 2000 Series. The Digital Blanket passes under the four printing stations where the image is transferred to the blanket. The four colours of the image are assembled on the blanket – one on top of another in perfect register – and then transferred to the paper in a single pass when the blanket passes under a pressure roller. The uniform, flat surface of the Digital Blanket reduces image quality defects and extends the range of stock that can be reliably supported.

BeltNip fuser

The imaged paper then travels toward the BeltNip fuser, crossing two vacuum transports which keep stocks moving along smoothly. The BeltNip fuser is another technological innovation that ensures each image is fused properly to the stock. It consists of a roller and a belt that ensures stocks stay against the heated roller for the longest possible time for a complete fix of the image. A long dwell time is especially important for heavy stocks and jobs with heavy area coverage to fuse well, and to compensate for the increased speed of printing of the press.

The BeltNip fuser also uses LOFT (Low Oil Fusing Technology), which reduces oil usage to a fraction of previous generation printers. This enhances the appearance of final output and reduces operating costs.

TRACS

To ensure consistency from first print to last, the DocuColor 2000 Series utilises a technology called TRACS (Toner Reproduction Auto Correction System). TRACS automatically measures 16 levels of density and colour, and makes adjustments on the fly. TRACS works by placing CMYK density patches directly on the Digital Blanket between pages as they circulate through the machine. These patches are then read by built-in auto density control sensors, and any quality adjustments are made on the fly. The result is consistent and reliable colour from start to finish.

Precise Registration System

Important to total high quality output is image to page registration. On the DocuColor 2045 and 2060, stock is passed over three aligner transport rolls which de-skew the stock by applying the appropriate amount of pressure based on the substrate's weight and size. A registration roll then centres the stock to the image on the Digital Blanket. Centring the stock cuts down on sheet-to-sheet and front-to-back registration errors by half. Two timing registration sensors also regulate the speed of the Digital Blanket (which regulates the speed of the stock) for more accurate, more consistent image-to-blanket registration and image-to-page registration.

Decurling devices

When dry ink is fused to paper, especially with heavy coverage, there is a natural tendency for the paper to curl.

To eliminate curling, the stock passes through two of three decurling devices. The devices look at the weight of the stock, the print coverage, and whether the job is simplex or duplex (when the stock is duplexed, it passes through all three decurling devices). The devices remove curl and produce flat, uniform output that runs smoothly through the press.

Print speeds/productivity

With very heavy or very light substrates, print speed must decrease to ensure quality. With the DocuColor 2045 and 2060, the machine will always print at optimum speed in accordance with the stock being used. The most popular stock weights are printed at the maximum speed available.

Print speeds of the DocuColor 2060 are as follows (in images per minute):

	A4	A3	SRA3
64 – 80 gsm:	45 ipm	30 ipm	22.5 ipm
81 – 135 gsm:	60 ipm	30 ipm	30 ipm
136 – 220 gsm:	30 ipm	15 ipm	15 ipm
221 – 280 gsm:	22.5 ipm	15 ipm	7.5 ipm

The DocuColor 2045 prints slower than the 2060. Print speeds are as follows (in images per minute):

	A4	A3	SRA3
64 – 80 gsm:	45 ipm	30 ipm	22.5 ipm
81 – 105 gsm:	45 ipm	30 ipm	30 ipm
106 – 150 gsm:	30 ipm	15 ipm	15 ipm
151 – 280 gsm:	22.5 ipm	15 ipm	7.5 ipm

The production speed of the DocuColor 2060, in single-sided sheets per hour, is follows:

	A4	A3	SRA3
64 – 80 gsm:	2,700	1,800	1,350
81 – 135 gsm:	3,600	1,800	1,800
136 – 220 gsm:	1,800	900	900
221 – 280 gsm:	1,350	900	450

The production speed of the DocuColor 2045, in single-sided sheets per hour, is follows:

	A4	A3	SRA3
64 – 80 gsm:	2,700	1,800	1,350
81 – 105 gsm:	2,700	1,800	1,800
106 – 150 gsm:	1,800	900	900
151 – 280 gsm:	1,350	900	450

Image size/paper size

The DocuColor 2045 and 2060 accept standard paper sizes of A4, A3 and SRA3. They will also accept non-standard paper sizes, from 182 mm to 320 mm in height, and 182 mm to 488 mm in width.

The DocuColor 2045 and 2060 will print to within 4 mm of each paper edge. The following table provides the imageable area for different paper sizes.

Paper size name	Paper size	Image area
Minimum paper size	182 x 182 mm	174 x 174 mm
A4	210 x 297 mm	202 x 289 mm
A3	297 x 420 mm	289 x 412 mm
SRA3	320 x 450 mm	312 x 442 mm
Maximum paper size	320 x 488 mm	312 x 480 mm

Screens

Screen ruling is a measurement of lines per inch (lpi) or number of lines (or rows) of halftone dots printed per inch on the page. When an image has a high screen ruling, the dots are printed close together, resulting in sharp colours and images. Low screen rulings print dots farther apart, resulting in a coarser effect. High screen rulings are typically used for higher quality output on less porous surfaces (eg, gloss coated stock), while low screen rulings are used for more porous surfaces that are prone to dot gain (eg, newsprint).

When you print in colour, the rows of CMYK dots are printed in individual screens. One layer is used for each base colour (ie, one cyan, one magenta, one yellow, and one black). These screens are then overlapped and printed to create the illusion of multiple colours. Screens are angled, forming a symmetrical pattern called a rosette so that the dots don't print on top of each other. Your eye easily merges these patterns into smooth colour gradations.
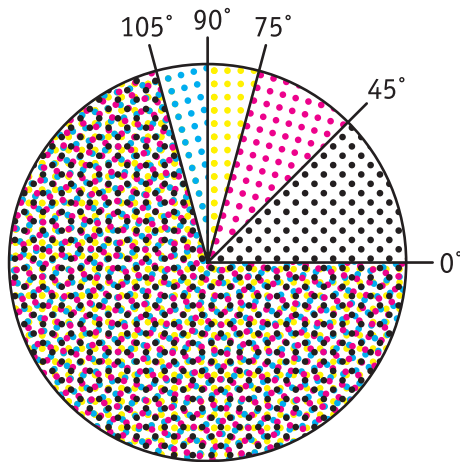
The DocuColor 2045 and 2060 use a calibrated 200 cluster dot screen, as default, to achieve their crisp image quality. Four other screens are available (600 fixed line, 300 fixed line, 200 rotated line and 150 cluster dot) for specific customer effects. For example, the 600 screen could be used for pages containing only text, the 150 cluster dot could be used to 'soften' a greyscale image.

A highly magnified picture of the 200 cluster dot screen is shown below for three input density levels.

PLEASE SUPPLY ORIGINAL PIC

The next section, Designing documents, provides examples of the different screens available on the DocuColor 2045 and 2060, and recommendations for their use.

Gamut

The gamut (or range of colours) that the human eye can see is much larger than the range of colours that can be reproduced in a photograph, on a television or computer display, or in print. Also, every device capable of reproducing colour has a different gamut. The gamut of an RGB computer display is larger than the CMYK gamut of a DocuColor 2000 Series system, which in turn is larger than the CMYK gamut of an offset press.
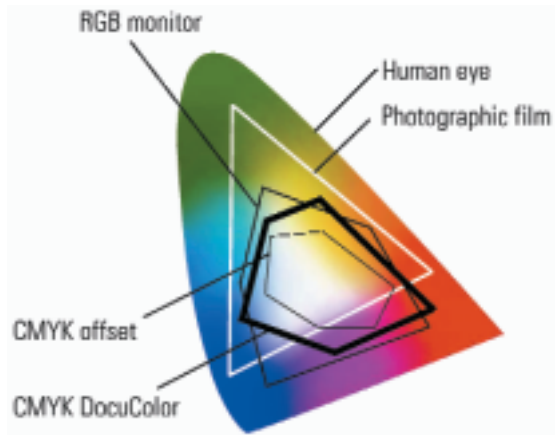
The primary reason the gamut of a DocuColor 2045 or 2060 is broader than the CMYK gamut of an offset press is due to the purity and vibrancy of the dry ink used in the DocuColor.

Process colours

Process colours are produced by printing overlapping screens of cyan, magenta, yellow and black. Since the DocuColor 2045 and 2060 do not print "spot" colour like an offset press, you have the ability to mix and blend variations of CMYK to create virtually limitless colour palettes. Refer to Appendix 3 for examples of some of the CMYK colours the DocuColor 2045 and 2060 can produce.
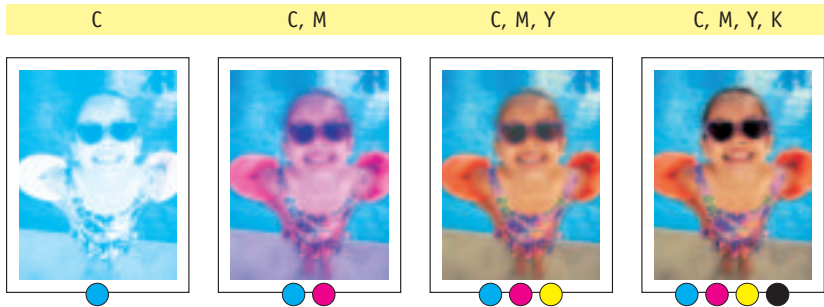
C	C, M	C, M, Y	C, M, Y, K

Even though the DocuColor 2045 and 2060 cannot run spot colours, they can convert Pantone colours into CMYK process colours on the fly during the RIP stage. Both the Fiery and Creo RIPs will convert Pantone colours into process colours, but their conversion techniques are slightly different. Please refer to Appendix 4 for examples of how the Pantone colours are reproduced on the DocuColor 2045 and 2060.

The DocuColor 2045 and 2060 can match about 75% of all Pantone colours to within a Delta-E (DE) of 5. DE is a scientific measurement of colour difference with a DE of 0 being a perfect match. For colour matching, a DE of 5 is acceptable, but anything greater than 5 is usually rejected as being an unsatisfactory match. Offset presses using process colours can generally match no more than 50% of Pantone colours.

3   Designing documents

Graphic designers today have a broad choice of mediums they can use to communicate ideas and designs, including traditional print technologies – like litho, gravure or flexo – or newer technologies, like the web, multi-media CD, or digital colour presses.

Every medium presents its own set of challenges for the design community. For example, with offset presses you need to consider issues like sheet size, screening used, ink density and dot gain. With the web, you'll need to conform to recognised standards, ensure links and anchors work, and that your fonts and images work. The more you know about your medium, the better you are able to design for it.

This section will help you design smarter, sexier-looking documents without having to endure the steep learning curve normally associated with new technologies and mediums.

Knowing what design elements work best on a DocuColor 2045 or 2060 will make it easier for you to set up your files for optimum printing, streamlining the print process and avoiding any last minute corrections. You should consider the issues discussed below to ensure a smooth, trouble-free print run of the highest quality available from digital printing today.

Design elements to discuss with your printer

Elements that need forward consideration with your printer

Paper stock

With printing, paper quality has a direct relationship to print quality. Therefore it's important you review Section 5, Selecting paper stock, before committing to a job.

The DocuColor 2045 and 2060 will print on a broad range of stocks: coated and uncoated stocks, specialty stocks and transparencies. Paper weight can range from 64 gsm to 280 gsm and size can vary from 182 x 182 mm to 320 x 488 mm.

The most versatile stock for the DocuColor 2000 Series is the Xerox Colotech+ uncoated range of stocks. They offer more forgiveness than coated stocks, which more readily display any print artifacts such as oil streaking. Coated stocks are also more prone to paper stretch when passing through the heated fuser roll, so bleed and design will need to be carefully considered when using coated stocks. Due to paper stretch, it is recommended to include at least 3 mm of bleed on all documents.

Image considerations

Whether your original image is a transparency, photographic print or digital file, the image characteristics you start with will have a major impact on the end results. As with any other high quality print medium, the lower the quality of your source image, the poorer the quality of your reproduction. There is simply no substitute for quality images.

Most common layout programs (QuarkXPress, InDesign, PageMaker) can be used to supply artwork for the DocuColor 2045 and 2060. They will work with all popular, standard image file formats, such as EPS, TIFF, JPEG, BMP, etc. You can use CMYK or RGB files – the colour management software in the Creo and Fiery RIPs will convert RGB images into the CMYK mix required for the press.

In terms of image resolution, the same 300 dpi images used for offset are equally suitable for printing on the DocuColor 2045 and 2060. As with any offset print run, images of lower resolution can be used, with a compromise in ultimate image quality. On the other hand, images with resolution greater than 600 dpi (the print resolution of the DocuColor 2000 series) will only waste processing time and will not give you better results.

The images on the opposite page will allow you to make your own judgement on image quality, with images ranging from 300 dpi down to 72 dpi. If high image quality is not your prime requirement, then using lower image resolutions will result in faster processing time.

300dpi

225dpi

150dpi

72dpi

Where offset has a total ink limit of around 350%, digital printing has a lower limit of around 280%. This requires images to have UCR or GCR applied either at the time of scanning, or when they are RIPped. If you scan images with UCR, do so with a maximum ink limit of 280%. The Creo and Fiery RIPs used with the DocuColor 2000 Series will automatically apply ink reductions to jobs when RIPping and limit ink to 280% (or any other amount with the Creo). This ink reduction does not affect image quality.

Note that the total ink limit refers to the maximum amount of ink or toner in any given area on the paper, such as in a black area. To calculate, add together the CMYK dot percentage values in the darkest area in the image, eg, C96, M88, Y88 and K75 = 96+88+88+75 = 347%. The theoretical maximum is 400% (100% each of C, M, Y and K).

Image area, bleeds and folds

The maximum sheet size the DocuColor 2045 and 2060 will accept is 320 x 488 mm, however this is a non-standard sheet size and not readily available (it must be cut to order). SRA3 – 320 x 450 mm – is the most commonly used sheet with a maximum image area of 312 x 442 mm.

A3 size
297 x 420 mm

Maximum image size
312 x 442 mm

SRA3 paper size
320 x 450 mm
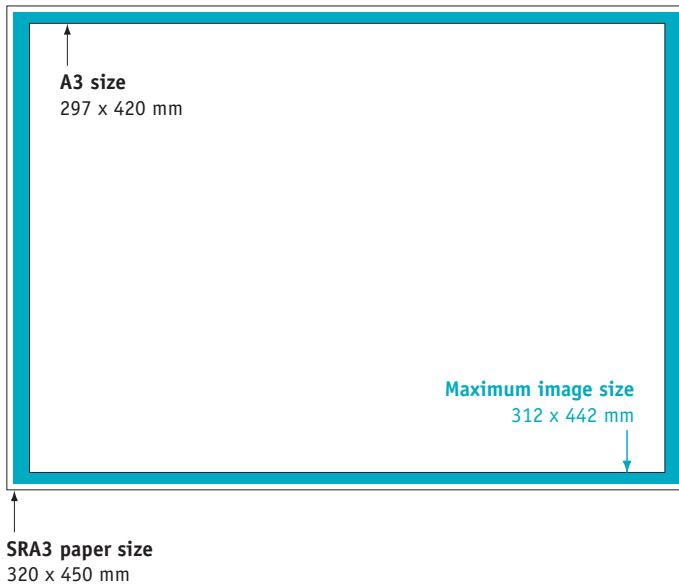
The DocuColor 2000 Series presses will accept standard paper sizes of A4, A3 and SRA3, as well as non-standard paper sizes from 182 mm to 320 mm in height and 182 mm to 488 mm in width. They will print to within 4 mm of each paper edge. The following illustrations highlight the image area for different paper sizes.

Minimum paper size
182 x 182mm

Image area
174 x 174mm

A4 paper size
210 x 297mm

Image area
202 x 289mm

A3 paper size
297 x 210mm

Image area
289 x 412mm
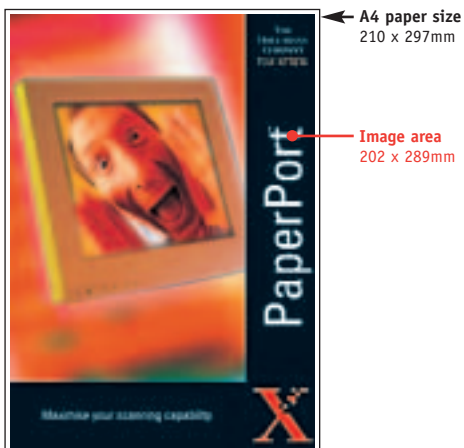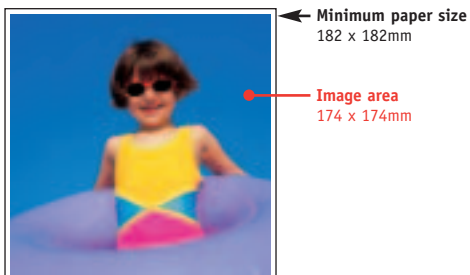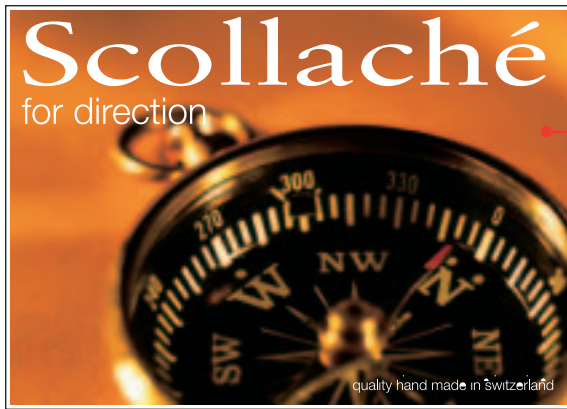
SRA3 paper size
320 x 450mm

Image area
312 x 442mm
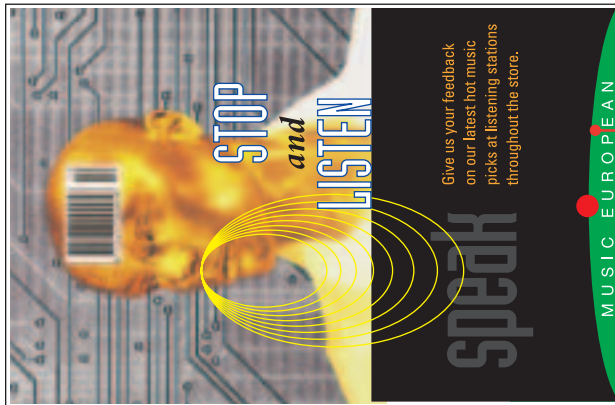
Maximum paper size
320 x 488mm

Image area
312 x 480mm

Bleed is recommended to be at least 3 mm all around to allow for any front to back image skew on the DocuColor 2045 and 2060 (which has tolerance of 1 to 1.5 mm).

Folding any stock can result in paper cracking on the spine, therefore it is recommended that for best results, all sheets that are to be folded be run through a scoring unit. This is especially important when printing areas of dark colour across folds (if the stock is not scored, the paper cracks will show as white lines through the colour). See Section 6, Binding and finishing, for more information.

Specifying colours

The DocuColor 2045 and 2060 print using process colours, ie, a mix of cyan, magenta, yellow and black. You have the ability to mix and blend variations of CMYK to create virtually limitless colour palettes. Refer to Appendix 3, CMYK colour charts, for examples of some of the combinations you can choose.

Even though the DocuColor 2045 and 2060 cannot run spot colours, they can convert Pantone colours into CMYK process colours on the fly during the RIP stage. Both the Creo and Fiery RIPs will convert Pantone colours into process colours, but their conversion techniques are slightly different. Please refer to Appendix 4, Pantone colour charts, for examples of how Pantone colours are reproduced on the DocuColor 2045 and 2060. The DocuColor 2045 and 2060 can closely match about 75% of the Pantone range of colours. Offset can generally only simulate around 50%.

It is always recommended to proof your jobs before printing and this would be a great check of the colour reproduction. Because you are proofing on the same device as the final output will be printed on, then you can be assured that the colours on the proof will be accurate.

If total colour consistency is required from monitors to final output, it is recommended that a colour management system like ICC profiles are used. The Creo and Fiery RIPs on the DocuColor 2045 and 2060 support the ICC colour management workflow.

Choice of screens

The DocuColor 2045 and 2060 can use a variety of printing methods to screen your job when printing. The main choice is between a 150 and 200 clustered dot screen, which is like the rosette dot used in offset printing. Also available is a 200 rotated line screen, and 300 and 600 line screen.

It has been shown that use of a clustered dot screen, either 150 or 200, can help reduce any banding in solid areas. However this screen is then applied to the entire job and may cause some cause some loss of fine detail in graphic or text areas.

When using graphics with fine detail, a 600 line screen can be used to great effect but it will cause the appearance of pictures and flat tints to degenerate, making them look unsmooth with possible banding.

Su

DESCRIPT
round, e

Sugar

DESCRIPTION: Medium-small,
round, ear oval. Head and bo

Sugar Glide

DESCRIPTION: Medium-small, squirrel-like. Head sh
round, ear oval. Head and body ash-grey, belly pa

Sugar Glider

DESCRIPTION: Medium-small, squirrel-like. Head short and round, ear oval. Head and body ash-grey, belly pale grey.
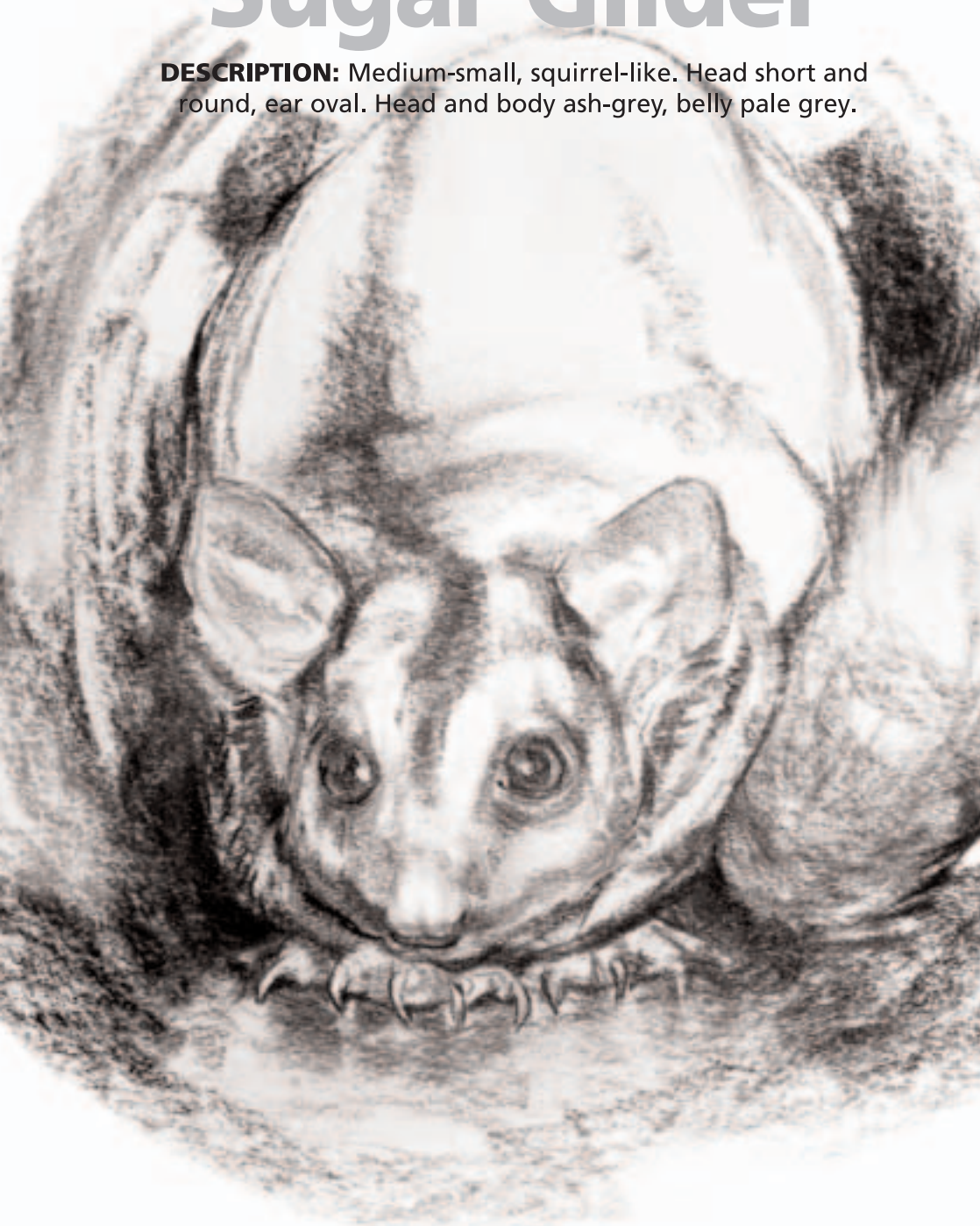
Vignettes

Vignettes, blends, and gradients (all essentially the same – basically one colour blending into another) are often seen in documents these days. That's because it's so easy to create them – simply click on the appropriate dialog box in your application, specify your colours, and go. Blends may print poorly on some digital presses which are prone to banding. (Banding can occur because electronic charges or toner particles may not always be evenly distributed.)

By taking the following items into consideration, you can be assured that the blend you want comes out smoothly when it prints on the DocuColor 2045 or 2060.

Blends will print much more easily if they are made from process (CMYK), not Pantone colours. If you want to use a Pantone colour, select it and convert it to process.

When you create a blend, make sure that the lightest area is no lighter than 5% of the colour. If you try to blend down to 0%, the blend won't be as smooth and may show banding.

By increasing the percentage change in the blend (for example, blending from 5% to 80% of a colour rather than 30% to 50%), you will increase the number of available shades that can be used to print the blend. A narrow range forces the use of larger bands of tints, while a broader range enhances the blend's smoothness.

Poor example of vignette (created in a Microsoft Office application)

Good example of vignette (created in Adobe Photoshop)

Try restricting vignettes to smaller areas (less than 180 mm) rather than full page vignettes.

Try adding "noise" to a raster vignette (eg, use the "Add Noise" filter in Photoshop).

Create vignettes in Photoshop rather than Quark Xpress for better quality blends.

Text

With the DocuColor 2045 and 2060, you can use both PostScript and True Type fonts. You'll notice that all text will appear sharp, even when using small point sizes.

Sans serif fonts will reproduce better than fonts with delicate serifs, especially when reverse out white text is used. Below are some examples of composition size text using a sans serif and a serif typeface.

11 point text on white background, 4 point line

11 point text on black background, 4 point line

10 point text on white background, 3 point line

10 point text on black background, 3 point line

9 point text on white background, 2 point line

9 point text on black background, 2 point line

8 point text on white background, 1 point line

8 point text on black background, 1 point line

7 point text on white background, 0.75 point line

7 point text on black background, 0.75 point line

6 point text on white background, 0.5 point line

6 point text on black background, 0.5 point line

5 point text on white background, 0.25 point line

5 point text on black background, 0.25 point line

4 point text on white background, 0.125 point line

4 point text on black background, 0.125 point line

11 point text on white background, 4 point line ━━━━━━

11 point text on black background, 4 point line ━━━━━

10 point text on white background, 3 point line ━━━━━━

10 point text on black background, 3 point line ━━━━━

9 point text on white background, 2 point line ━━━━━━

9 point text on black background, 2 point line ━━━━━━

8 point text on white background, 1 point line ━━━━━━

8 point text on black background, 1 point line ━━━━━━

7 point text on white background, 0.75 point line ━━━━━━

7 point text on black background, 0.75 point line ━━━━━━

6 point text on white background, 0.5 point line ━━━━━━

6 point text on black background, 0.5 point line ━━━━━━

5 point text on white background, 0.25 point line ━━━━━━

5 point text on black background, 0.25 point line ━━━━━━

4 point text on white background, 0.125 point line ━━━━━

4 point text on black background, 0.125 point line ━━━━━

Remember to always include full font families with your artwork as missing fonts will be substituted.
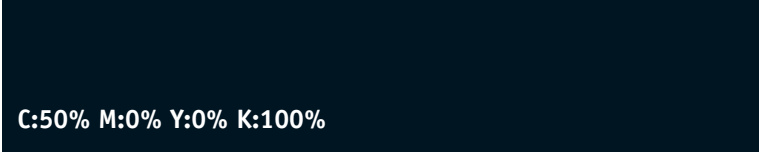
Solid blacks

Large areas of solid black can often appear washed out, whether printed on an offset or digital press. Also, when overprinting text, underlying colours and patterns can show through. To avoid these issues, use a black that has been mixed with other colours for added punch. When designing your document, use a 'super black' (or 'rich black') such as K100, C50, M40, Y40. Below are some 'super black' examples.
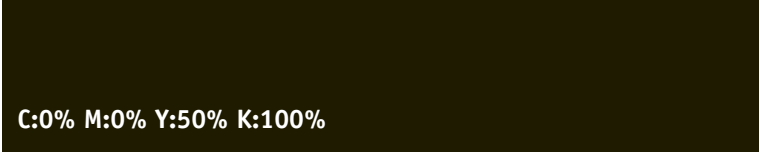
C:0% M:0% Y:0% K:100%

C:50% M:0% Y:0% K:100%

C:0% M:50% Y:0% K:100%

C:0% M:0% Y:50% K:100%

C:50% M:50% Y:50% K:100%

Image mottle

Uneven spotty ink or toner coverage, called mottling, can occur when printing large solid areas of flat mid tone colours, especially one colour black. Paper choice can be critical in avoiding this problem. For the DocuColor press, a good, smooth paper stock should be used. See Section 5, Selecting paper stock, for more information. Avoiding mid brown and green colours can help reduce this artifact along with the use of different screens available with the DocuColor 2045 and 2060. If in doubt, please see your print provider for further information.

Knockout, overprint and trapping

When printing shapes or type in colour, it is necessary to specify how the ink or toner will be applied to the paper. When knockout is specified, the shape is printed by eliminating all background colours, resulting in a pure colour against the paper. When overprint is specified, the shape prints over whatever colours have already been printed. This can result in a shift of colour due to overlapping ink or toner.
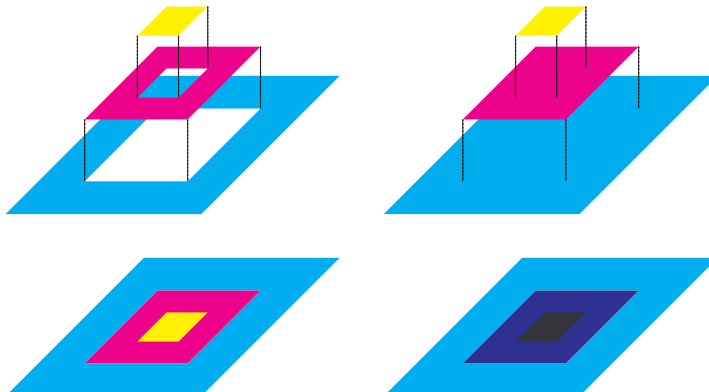
Trapping is a technique in which adjacent colours slightly overprint each other to help minimise the effects of possible misregistration.
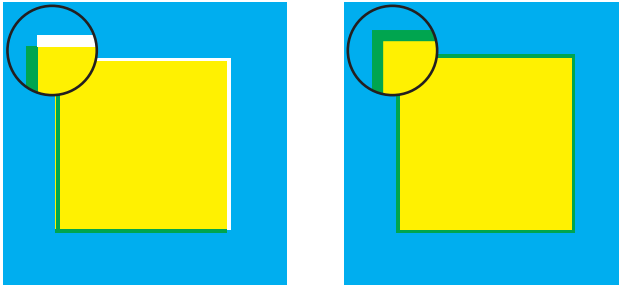
The DocuColor 2000 Series presses have excellent plate to plate registration. For many layouts, it is unnecessary to design for separations. However, if 'separations' are specified, the Creo and Fiery RIPs will process individual plates, together with all 'knockout', 'overprint' and 'trapping' selections in your original file, and combine them for the printing process.

If no 'trapping' has been selected, the Creo has a trapping function that takes place during RIPping of a file. Please check with your print provider.

File formats

The Creo and Fiery RIPs of the DocuColor 2045 and 2060 accept PostScript, EPS and PDF file formats for output. PostScript files should be created using a print driver supplied by your print provider (a print driver specifically created for the DocuColor 2000 Series with Creo or Fiery RIP). PDF files should be created at print or press quality. If you try to use a screen quality PDF file, it will not contain enough resolution to print out at high quality on the DocuColor 2045 or 2060 and images will appear pixilated.

Resource collection

Before submitting your artwork to print, make sure you have included all of the necessary files, fonts and associated images (including fonts and placed images used within an EPS file).

Creating PDF files can be a way of assuring all elements are included in a ready to print file.

Creating PDFs

Acrobat PDF can be a very convenient format for delivering files to print – you simply hand off the file without having to worry about including fonts, linked images, etc. However, you have to make sure the PDF is made with the correct settings in 'Distiller' and that it is set up to run correctly from 'Reader' to the DocuColor 2045 or 2060.

Make sure to:
• Embed all fonts
• Leave colours unchanged
• Save the PDF as high resolution (minimum downsampling of 300dpi)
• Leave the file uncompressed
• Embed the profile for your output provider's DocuColor 2045 or 2060, if available.

INCLUDE SCREEN GRAB OF ACROBAT WITH APPROPRIATE SELECTIONS

(PLEASE SUPPLY)

Dot gain

Dot gain is the tendency for halftone dots to become larger and appear darker because of wet ink spreading when it comes into contact with paper. It is a real issue with offset presses and inkjet printers, but is not a problem with the DocuColor 2045 and 2060.

Design elements to avoid

The following are elements you should avoid in your designs for the DocuColor 2045 and 2060.

Straight design elements close to the edge of the page

Skew can be experienced of up to 1 mm in 420 mm (A3) on the DocuColor 2045 and 2060. When printing on the second side, this skew can grow to up to 2 mm in 420 mm (A3) front to back. This is not the amount of skew you would normally expect, just the maximum that can be expected. Keep this in mind when designing elements with straight lines close to, and parallel to, the edge of a page – they could appear slightly off line.

Large areas of solid colour

Large areas of solid colour

Large areas of solid colour

Large areas of solid colour

Large solid areas of colour will always present a challenge for a press, whether it is offset or digital. The DocuColor 2045 and 2060 are capable of producing great results when it comes to flat tints, however, particular colours – like C100, M70 – can show up with banding in the solid area. Rather than avoid solid areas, a designer can add other elements to the design, like text or graphics or even pictures, to 'break the colour up', thereby minimising the amount of flat, solid area. Alternatively, you could introduce noise, a background pattern or texture to the solid area, or use lighter colours. These techniques will help disguise any banding that can occur on some colours.

The DocuColor 2045 and 2060 have proven to be very capable of handling large solid areas of solid black, however faint oil streaking from the fusing process is more readily visible in these areas. As with solids of other colours, designing to avoid large areas of solid black on its own is a priority to achieve the best result possible. Use 'super black' for added punch (refer to the earlier topic Solid blacks for examples).

Long runs (say 1,000 sheets) of large solid only areas should be avoided as this can be draining on the engine. Instead, break up the run with other work.

Heading Headi

Heading

Coated stock and large white text on heavy background

When printing white text on a heavy background on gloss or coated stock, faint ghosting may occur. What causes this is the BeltNip fuser maintaining an oil coating when white non image areas are put through the fuser. On second side printing, this non image area can be coated with extra oil causing a ghost image to become evident. To avoid this, care should be taken when designing solid colour or black areas not to use reversed (white) text. By putting in a coloured text, even of a light shade, can help the fuser avoid the ghost image occurring.

Avoid large text on dark background. Instead, lightly tint or colour the text.

5   Selecting paper stock

With any print job, it's important to understand that paper quality has a direct relationship to print quality. No matter whether you're printing offset, on a digital press, or at home on an inkjet, this is, and always will be, the case.

Also, paper represents a significant proportion of the cost of a job, and can account for between one-third and one-half of the final cost of the printed work.

You should therefore carefully select the paper that will give you the best results in terms of quality, runnability and cost-effectiveness.

Stock considerations

When deciding on the type of stock to use for a job, the first, most obvious rule to remember is that the better the stock, the better the results. Both productivity and print quality suffer when flimsy, inexpensive paper is used. Using smooth papers with good formation (uniform fibre distribution) will help you attain the best image quality. Well cut papers with no ragged edges are recommended to maintain a dust-free DocuColor 2060 system. Contamination in the system over time can cause imaging problems.

It is also important to consider the application and how it will be used. Many internal communications in the general office have fairly light ink coverage, so a lighter weight paper will suffice. The graphic arts industry, on the other hand, produces a wide variety of documents, including two-sided jobs with heavy ink coverage, which means a heavier, more opaque media is needed to prevent show-through. Fortunately, the DocuColor 2060 handles a full range of stock types reliably and consistently.

Digital printing process

Every printing technology has its own set of issues when it comes to paper. With digital printing, paper manufacturers must take into account issues like the interaction of toner with paper, the need for paper to hold a charge as part of the electrostatic process, and the heat and pressure the paper is subjected to during the fusing stage.

All digital printers today utilise an electrostatic process, where dry or liquid toner is transferred using an electric charge. In printers that use dry toner, the toner used in the xerographic process is heat-fused onto paper fibres. Fusing permanently adheres the toner so that it won't flake, scratch or peel. Rough paper stocks may be less desirable for xerographic use as their texture may prevent toner from adhering to the paper's surface.
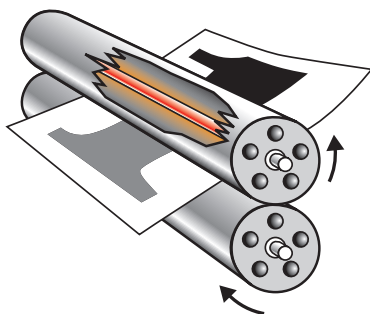
Paper influences on print quality

Variables in the papermaking process can influence the quality and performance of the finished paper. While some variables are controlled to create specific stocks, other may result in imperfections.

Formation

Formation is how fibres are distributed on a sheet. Poor fibre formation can cause mottle or uneven, spotty ink/toner distribution in images with high solid area coverage. To gain insight into the formation of paper, hold a sample sheet up to a light. If the paper has good formation, it looks even and consistent. If it has poor formation, it will appear splotchy and uneven.

Well-formed, premium papers also feel better to the hand, and help create professional quality results. Good fibre formation is especially important when documents include photographs or have high ink coverage.

Grain direction

Grain direction is the orientation of fibres with respect to the long edge of the paper and is a product of the papermaking process. For example, in an A4 sheet, the fibres of a long grain sheet are parallel to the 297 mm dimension of the paper. The fibres of a short grain sheet are parallel to the 210 mm dimension.

Heavy stocks fold most smoothly parallel to the grain. Folds against the grain may cause paper to crack and appear lumpy and ragged. This is why printers prefer to fold jobs with the grain.

Weight

This is a measure of the weight of paper or stock, in grams per square metre (gsm), and is another important consideration in paper selection. Most office papers are around 80 or 90 gsm, and are normally used for correspondence.

Heavier sheets, used for covers and business cards, are often thicker because they contain more fibres. These papers may sometimes be too thick or rigid to pass through the paper path of the DocuColor 2060. They may also crack or blister when folded (even when scored).

The DocuColor 2060 accepts paper between 64 and 280 gsm. This covers the vast majority of requirements, from office applications to covers, postcards and business cards.

Finish

Finish is the smoothness or roughness of a paper's surface. Finish may be controlled by the surface pattern used as part of the basic papermaking process, by adding coatings, and through the calendaring process which smooths and polishes the paper surface.

Paper is available in a variety of uncoated and coated finishes. Uncoated finishes range from rough to smooth, where rough textures add dimension, while smooth finishes enhance print quality. Coated finishes range from premium highly polished, high gloss cast coated to a gloss, matte, and dull coated.

Why paper doesn't always work the way it should

Although many papers are now designed for digital printing, most fine printing papers were originally designed for offset presses. The following sections take a look at the influence coating, moisture content and texture have on results.

Coated paper and offset

The high gloss papers used in magazines, brochures, and direct mail have long been the choice of graphic designers and offset presses because the smooth, glossy finish has reflective qualities which provide an optimum surface for photographs, colour illustrations and text.

Coated paper and digital printing

Because many of today's applications have moved from offset to digital, users are beginning to demand fine papers for their digital prints. Although many offset papers

may be used in digital printing equipment, there are some limitations to the performance of coated stocks with this technology. Coating materials used in the manufacture of these papers can impact performance and reliability (ie, smearing, blurring, stretching and flaking).

Moisture and offset

Offset printing is essentially a wet process where papers run at approximately 6% moisture content. Although too little or too much moisture may affect image quality, offset printing tends to be less sensitive to moisture.

Moisture and digital printing

Xerography used in digital printers is a dry process where papers run at about 4.5% moisture content. If too much moisture is present, the heat of the fuser will draw out the moisture, causing curl. If there is not enough moisture, static electricity becomes a problem.

Textured stock and offset

With offset printing on textured stock, photographic images may appear dark or muddy.

Textured stock and digital printing

In order to duplicate or print fine lines and detailed images on digital printers, the paper surface must come in close contact with the imaging drum for the toner particles to adhere. If the paper texture is too rough, some particles may never come in contact with the paper, and parts of your image won't print. The result will be uneven printing and loss of detail.
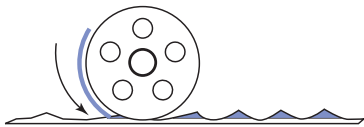
Imaging drum on rough surface
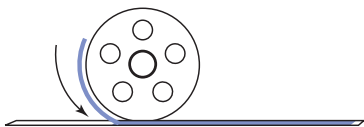
Imaging drum on smooth surface

Thick paper stocks

Image quality on recommended heavy weight stocks is often excellent, but cannot always be expected to match the image quality on 100 gsm Colotech+ paper. Degradation in image quality is more likely to occur as paper weight increases. The rough formation of heavy weight papers increases the possibility of mottle with some images, particularly those with uniform halftone areas (ie, flat tints). As humidity and the moisture content of paper rises, the likelihood of mottle will also increase.

Coated papers

Coated papers have binders, adhesives, and pigments applied to their surfaces on one or both sides. As compared to the benchmark 100 gsm Colotech+ paper, coated papers provide improved image gloss, but will generally cause an increased likelihood of issues like paper stretch, offsetting and mottle.

Coated papers are very susceptible to humidity. Image mottle is more likely to occur when coated stocks are used, especially on side two of a two-sided job.

Ink coverage on electronic originals should be limited to a total of 280% (70% for each colour). Higher toner coverage can result in poorly fused prints on coated stocks, and is more likely on side two of a two-sided job.

Coated stocks – especially when duplexed – are best suited to shorter run lengths.

If using a coated paper that has not been recommended, first try a small quantity to test its performance before committing to the job.

Paper stretch

When running two-sided printing applications, side to side registration may be affected by the inherent paper stretch that occurs as the paper is heated through the fusing stage of the printing process. Typical paper stretch for light, uncoated paper is between 0.2% and 0.6% of the paper size in the print feed direction. For coated materials, the affect is as high as 0.9% of the paper size in the print feed direction. The higher the weight of the paper the lower the resulting stretch. Cover materials, therefore, show low stretch tendencies.

The DocuColor 2060 operator can make some minor compensation for paper stretch, but thinner coated stocks are best avoided if image size or front to back alignment are critical factors in a particular job.

Optical paper qualities that influence image quality

The performance of toner and ink are affected by the following paper characteristics: shade, opacity, brightness, and reflectivity.

Shade

Paper shades may change the appearance of colour images because toner and ink are applied in dot patterns (or screens) which allow a certain amount of the paper colour to show through. Paper shade can also vary significantly among brands.

For example, while some white papers may be a true white, others may be more blue- or yellow-white in appearance. Switching from a true white to a blue- or yellow-white affects the colours and overall hues in the finished piece.

Select a true white paper for truer colours and more natural looking skin tones.

Opacity

Two-sided (or duplex) printing requires paper that is more opaque so that show-through of images and text from one side of the sheet to the other isn't a problem. A paper with low opacity allows show through of images and text from one side of the sheet to the other (eg newsprint). Opacity affects legibility, attractiveness, and quality.

For better results on documents with large amounts of toner or ink coverage, use papers with higher opacity.

Brightness

When toner or ink is applied to brighter papers, images have higher contrast which improves printability and quality.

Use brighter papers for best results with documents that contain complex graphics or photos.

Reflectivity

When toner or ink is applied to a smooth surface, the resulting image is sharper because the image is reflected back in a straightforward direction. Images resulting from toner or ink applied to a rough surface are not as sharp because the image reflection is scattered in several directions.

Select smoother, more reflective surfaces for sharper images.

Light/Image

Light/Image
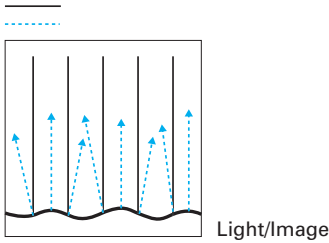
How an image reflects on
a smooth paper surface
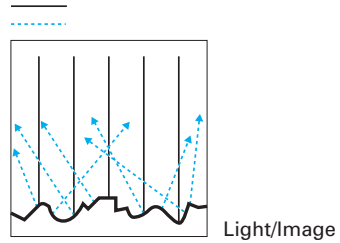
How an image reflects on
a rough paper surface

Paper grades

When you order paper, it's important to know the differences between papers so that you'll know what to ask for. Professionals divide papers into large categories or grades according to their end use, method of printing, and pulp content. The following tables summarise the major grades available, as well as providing a digital comparison.

BOND	
Type	**Forms or register bond**
Definition	• Business forms and computer paper. Designed for a forms press or continuous feed pin hole fed printing system. • Typically used by forms converters.
Weights	60 – 90 gsm
Standard sizes	Usually web rolls
Finish	Smooth, often with high bulk
Application	Pre-printed forms, invoices, statements.

Xerox equivalent	Blue Wrap 80 gsm 635 x 880 mm S/G
	                     650 x 910 mm L/G
	                     A4, A3
	Blue Wrap 90 gsm 650 x 910 mm L/G

Comment	Surface best suited to simple forms work. Not suitable for halftone reproduction.
Type	**Xerographic, multi-purpose, laser, inkjet**
Definition	• Engineered for use in xerographic equipment. • Marketed for xerography, laser, inkjet, plain paper fax and press. • Smoother, brighter, sometimes heavier weights for laser printing. • Surface treated for xerography or inkjet printing. • Well balanced moisture content.
Weights	70 – 90 gsm
Standard sizes	Folio sheets 430 x 610, 450 x 650, 635 x 880, 650 x 910 mm Cut sizes A4, A3
Finish	Smooth writing type surface. Sometimes treated for inkjet printing. Tinted.
Application	General office communications, letterheads, forms, statements, newsletters, reports, manuals, flyers, directories and leaflets.

BOND *(continued)*

Xerox equivalent	Blue Wrap 80 gsm	635 x 880 mm S/G
		650 x 910 mm L/G
		A4, A3
	Blue Wrap 90 gsm	650 x 910 mm L/G
	Purple Wrap 80 gsm	A4
	Business 80 gsm	A4
	Performer 80 gsm	A4, A3
	Symphony Tints 80 gsm	A4, A3
Comment	Surface not suited to high resolution image reproduction. Ideal for spot colours.	

UNCOATED OFFSET

Type	**Book publishing**	
Definition	• Manufactured to a thickness (caliper) and selected when finished document thickness must be controlled. Typically available in a wide range of weights, finishes and shades. Engineered for offset printing.	
Weights	60 – 135 gsm	
Standard sizes	Web rolls	
	Folio sheets	650 x 910, 640 x 900 mm
		Some special sizes
Finish	Extra bulky, antique rough, smooth, machine, eggshell	
Application	Books, manuals, some annual reports and look-alike newspapers.	
Xerox equivalent	None available	
Type	**Offset opaque**	
Definition	• High grade papers with an opacity level that minimises show-through, usually with smooth surface for halftone reproduction. Traditionaly designed for offset printing.	
	• Re-engineered for xerography and digital printing.	
Weights	80 – 135 gsm	
Standard sizes	Web rolls	
	Folio sheets	635 x 880, 650 x 910, 640 x 900, 700 x 1000 mm
	Cut sizes	A4, A3

Finish	Regular printing, smooth, vellum
Application	Books, brochures, calendars, catalogues, flyers, direct mail pieces, manuals, newsletters, programs, annual reports, posters, technical drawings, self-mailers, reply paid, speaker sheets, inserts, packing slips, notices.
Xerox equivalent	XPrint 80, 90, 100 and 120 gsm A4, A3
Comment	Xerox grades developed for finer resolution image output. Well suited to drawings and spot colour. 90 gsm and up recommended for double sided printing to maximise opacity. Offset grades will often suffer image deletions due to higher moisture contents.

Type	**Commodity offset**
Definition	• An economical paper typically with a lower brightness and opacity designed for offset printing presses. Sometimes called budget offset.
Weights	80 – 135 gsm
Standard sizes	Web rolls
Folio sheets	430 x 610, 450 x 640, 635 x 880, 640 x 900, 650 x 910 mm Cut sizes A4, A3
Finish	Wove, smooth, bond style, linen embossed, laid, felt
Application	Annual reports, announcements, books, brochures, calendars, catalogues, flyers, invitations.
Xerox equivalent	Quick Pack 80 gsm A4, A4 4 hole Performer 80 gsm A4, A3 Purple Wrap 80 gsm A4
Comment	Offset grades likely to suffer from high moisture content causing deletions and post image curl. Not suited to finer resolution graphics, but meets a price need for longer runs with simple text applications. Papers with controlled moisture content and quality finishing are recommended.

Type	**Recycled paper**
Definition	• Designed to meet environmental standards. Usually lower brightness. Sometimes surface treated for inkjet printing.
Weights	80 – 90 gsm
Standard sizes	Folio sheets 615 x 870, 650 x 910 mm Cut sizes A4, A3

UNCOATED OFFSET *(continued)*

Finish	Wove, smooth, antique rough
Application	Annual reports, announcements, brochures, books, flyers, leaflets, mailers, general office communications, letterheads
Xerox equivalent	Green Wrap 80 gsm 615 x 870 mm S/G, A4, A3 Green Wrap 90 gsm 615 x 870 mm S/G Revive 80 gsm A4
Comment	Xerox stocks developed to overcome traditional roughness and dusting problems. Some grades could contaminate printing equipment and increase wear that would degrade image quality.
Type	**Cardstocks (boards)**
Definition	• Heavier weight versions of the uncoated offset grades of papers.
Weights	140 – 350 gsm
Standard sizes	Folio sheets 450 x 640, 640 x 900, 650 x 910, 760 x 1020 mm Cut sizes A4, A3
Finish	Smooth, machine, ivory, wove type, white and tinted
Application	Covers, menus, tabs, dividers, business cards, calendar headers, showcards, point of sale cards, post cards, reply paid cards, folders.
Xerox equivalent	Green Wrap Cardstock 150, 200 gsm A4 Symphony Cardstock Tints 120, 160 gsm A4 Pastel Cardstock 150, 200 gsm A4
Comment	Grain direction should always be considered before selecting any cardstock. Scoring is recommended for all work over 150 gsm. Low moisture content of stock can affect finished scoring ability.

TEXT AND COVERS

Definition	• Premium priced paper and covers typically with characteristics of higher brightness, excellent formation, cotton content or textured surfaces. Wide range of colours are often available and are a favourite with designers looking for unique end results.
Weights	100 – 350 gsm
Standard sizes	Web rolls
Folio sheets	450 x 640, 640 x 900, 430 x 610, 635 x 880, 650 x 910, 635 x 965, 660 x 1016 mm
Finish	Linen embossed, laid, felt, wove, vellum, parchment, antique rough

TEXT AND COVERS *(continued)*	
Application	Annual reports, announcements, art reproductions, books, brochures, calendars, posters, labels, invitations, greeting cards, quality apparel enclosures, menus, high quality advertising.
Xerox equivalent	None available
Comment	Often have textured surfaces that are difficult for toner to adhere to evenly, resulting in a breakup of digital images. Offset grades nearly always hold too much moisture, causing deletions, post image curl and difficulty in double-siding with even print quality.

COATED OFFSET	
Definition	• Surface is coated with a formulation of pigments and binders to enhance surface quality and printing. They are chosen when high quality printing and fine detail resolution are required. • Typically specified for brightness and gloss level. • Re-engineered for xerographic and digital printing.
Weights	90 – 160 gsm
Standard sizes	Web rolls Folio sheets 430 x 610, 450 x 640, 635 x 880, 640 x 900, 650 x 910, 700 x 1000 mm Cut sizes A4, A3, SRA3
Finish	Gloss, matt, dull, satin, silk, cast, embossed
Application	Annual reports, art reproductions, brochures, calendars, catalogues, directories, advertisements, direct mail pieces, manuals, financial prospectuses, magazines, posters, display sheets, newspaper inserts, labels.
Xerox equivalent	Colotech Imaging Matt 135,160 gsm A4, A3, SRA3 Colotech Imaging Gloss 135,160 gsm A4, A3, SRA3 Colotech Imaging Super Gloss 135,160 gsm A4, A3, SRA3
Comment	Prone to highlighting oil streaks. Lighter weights – 135 gsm and below – may suffer either stretching or creasing. Offset papers, with their higher moisture content, are more prone to these issues. Feeding and paper transport may be difficult if papers are too smooth. Poor base formation will induce image mottle in some images.

UNCOATED DIGITAL	
Type	**Xerographic, digital, laser, colour copy**
Definition	• Especially enhanced uncoated surfaces for digital and laser reproduction. Particularly suited to jobs with high colour image quality needs. • Very even, smooth surfaces to lift image gloss on the page. • Strictly controlled moisture content and surface conductivity. • Usually very high sheet formation characteristics.
Weights	90 – 280 gsm
Standard sizes	Cut sizes A4, A3, SRA3
Finish	Smooth, gloss, matt
Application	Books, manuals, annual reports, leaflets, mailers, annual reports, posters, labels, calendars, menus, greeting cards, quality apparel enclosures, presentations, advertising, covers, post cards, directories, catalogues.
Xerox equivalent	Colotech+ 90, 100, 120, 160, 200, 220, 250, 280 gsm A4, A3, SRA3 Colotech+ Gloss 140 gsm A4, A3
Comment	Specifically designed to ensure the smooth matt type surface will lift toner gloss. Very high resolution output possible. Score stock 160 gsm or above before folding. Gloss version is an adapted surface to offer similar output qualities.

COVER	
Type	**Uncoated**
Definition	• Uncoated cover to match bond papers, uncoated offset and text grades.
Weights	150 – 350 gsm
Standard sizes	Web rolls
Folio sheets	430 x 610, 450 x 640, 510 x 635, 640 x 900, 650 x 910, 700 x 1000 mm Cut sizes A4, A3, SRA3
Finish	Smooth, machine, regular printing
Application	Folders, covers, menus, tabs, post cards, point of sale cards, tags, tickets, labels.

COVER *(continued)*	

Xerox equivalent	Green Wrap Cardstock 150, 200 gsm	A4
	Symphony Cardstock Tints 120, 160 gsm	A4
	Pastel Cardstock 150, 200 gsm	A4
	Colotech+ 160, 200, 220, 250, 280 gsm	A4, A3, SRA3
Comment	Surface type and grain direction must be considered before selecting. Moisture content in offset grades may cause deletions to second side.	

Type	**Coated 2 sided**	
Definition	• Designed to match coated offset papers.	
Weights	150 – 350 gsm	
Standard sizes	Web rolls	
Folio sheets	430 x 610, 450 x 640, 510 x 635, 640 x 900, 650 x 910, 700 x 1000 mm	
	Cut sizes	A4, A3, SRA3
Finish	Gloss, matt, dull, satin, silk	
Application	Folders, covers, menus, tabs, post cards, point of sale cards, tags, tickets, labels	
Xerox equivalent	Colotech Imaging Matt 135, 160, 210 gsm	A4, A3, SRA3
	Colotech Imaging Matt 250, 275 gsm	SRA3
	Colotech Imaging Gloss 135, 160, 210 gsm	A4, A3, SRA3
	Colotech Imaging Gloss 250, 275 gsm	SRA3
Comment	Oil streaks can be highlighted with these stocks. Edge quality is important in order to avoid contamination within machine and cross contamination to high coverage image areas. Scoring required for stock 160 gsm and above.	

Type	**Cast coated 1 sided**	
Definition	• Super premium gloss cover. Mirror finish is made by pressing paper against a polished, hot metal drum. • Surface tends to be hard and non absorbent.	
Weights	150 – 350 gsm	
Standard sizes	Web rolls	
Folio sheets	430 x 610, 450 x 640, 510 x 635, 640 x 900, 650 x 910, 700 x 1000 mm	
	Cut sizes	A4, A3, SRA3
Finish	Very smooth, high gloss, mirror-like	

COVER *(continued)*

Application	High quality covers, greeting cards, point of sale, posters, postcards, business cards, menus, high quality advertising
Xerox equivalent	Colotech Imaging Supergloss 135, 160 gsm A4, A3 Colotech Imaging Supergloss 210 gsm A4, A3, SRA3 Colotech Imaging Supergloss 250, 275 gsm SRA3
Comment	Oil streaks can be highlighted with these stocks. Edge quality is important in order to avoid contamination within machine and cross contamination to high coverage image areas. Scoring required for stock 160 gsm and above.

INDEX OR BRISTOL

Definition	• Lower priced uncoated heavyweight stock.
Weights	150 – 350 gsm
Standard sizes	Folio sheets 450 x 640, 640 x 900, 510 x 635, 650 x 910 mm Cut sizes A4, A3
Finish	Smooth, matt, ivory
Application	Reply paid cards, business cards, postcards, folders, covers, menus, tabs, tags, tickets.
Xerox equivalent	Green Wrap Cardstock 150, 200 gsm A4 Symphony Cardstock Tints 120, 160 gsm A4 Pastel Cardstock 150, 200 gsm A4
Comment	Offset index grades not ideal for digital printing because they're usually too thick for the equipment to handle. Always consider scoring. Poor formation likely to cause mottle and poor lightweight tones. Toner adhesion on offset grades can be an issue.

Paper handling and storage

Papers for digital printing are manufactured with a lower moisture content than offset papers. For optimum printing, this controlled moisture content of paper needs to be maintained.

Because paper absorbs or sheds moisture rapidly, it's important to keep paper wrapped in its moisture-proof packaging for as long as possible before use. Avoid opening a new ream of paper until you are ready to use it.

Paper should be stored in a room that enjoys constant a temperature and humidity as variations will induce changes in the paper. Ideally, paper should be kept in an air-conditioned room maintained between 20°C and 23°C, and between 45% and 55% relative humidity.

Always allow paper to acclimatise to the print room conditions at least 24 hours prior to use for best results.

Paper should not have any paper dust that can contaminate the DocuColor 2060 and cause artifacts in print work. Specify ream-sealed, mill-cut papers for optimum results. If cutting paper before printing, ensure the paper is cut clean and free of paper dust.

Paper should always be handled carefully, with clean hands and only enough fanning of reams to avoid sticking edges. Reseal open reams with tape and keep in a moisture-proof container.

Always run paper in accordance with directions on the wrapper that state "Print side first". This is important to minimise curl in the printing process.

Wrap-up

Paper has a direct relationship to print quality – the better the paper, the better the results.

Specify paper that has been designed for digital printing.

Select paper that has good formation.

Use smooth or coated finishes for documents that have fine detail, shaded areas or halftone images.

Select a true white paper for truer colours and more natural looking skin tones.

For documents with large amounts of toner or ink coverage, use papers with higher opacity.

Select paper between 64 and 280 gsm.

Design jobs to fold with the grain.

Limit ink coverage to 280%.

Specify ream-sealed, mill-cut paper.

Keep paper sealed in wrapper until required.

Store paper in temperature and humidity controlled room.

Put paper is the same room as the DocuColor 2060 at least 24 hours prior to use.

Reseal open reams and keep in moisture-proof container.

Always handle paper carefully.

6 Binding and finishing

Outside of the commercial print world, a vital part of a document's lifecycle is often overlooked. Many people believe a document is completed once the pages leave the printer, disregarding the finishing process altogether.

Yet advancements in binding and finishing processes are just as revolutionary as those found in the rest of the printing marketplace. Documents are put together faster and with more precision than ever before, keeping pace with the rate at which they are produced by new digital technology.

Postpress operations generally follow a basic sequential order for finishing. Documents are first collated, then folded, then bound and finally trimmed. After trimming, there are other finishing options that can be performed for document protection or aesthetics.

Collating

Just after printing, postpress operators must ensure that all final pieces, including text pages, tabs, inserts, etc. are placed in the appropriate position within the final document.

Collating a job refers to gathering signatures together in the correct sequence. Put simply, it means ensuring that page 1 is followed by page 2, page 3, and so on.

Folding and scoring

There are many contributing factors to successful folding. Sheet size, for example, has a bearing on the type of folding to be performed. Paper thickness or weight is another important consideration. Some papers may be too thick or rigid to pass through the paper path of the DocuColor 2060. They may also crack or blister when folded or scored.

The grain of the paper is another factor that affects the folding process. A paper's grain refers to the direction of the fibres with respect to the long edge of the paper. Paper can be long grain (the grain runs parallel to the 297 mm dimension of an A4 sheet) or short grain (the grain runs parallel to the 210 mm dimension of an A4 sheet). Paper folds most smoothly parallel to the grain, while folds against the grain may cause paper to crack and appear lumpy and ragged.
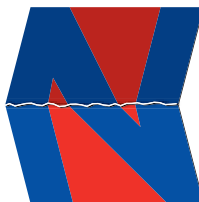
Scoring

Scoring is generally used when a fold needs to be made against the paper grain, or when jobs are printed on middle to heavy weight stocks that require folding. Scoring involves a long blunt edged rule that presses firmly down on a document, causing a crease in the paper. The paper is folded over the crease, reducing the chances of cracking.
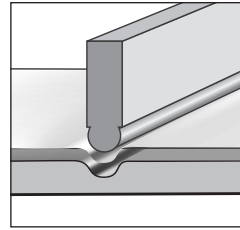
If possible, avoid placing an image where a fold is to take place, and try to design the document so that the fold occurs in the direction of the paper grain.

Types of folds

A parallel fold means that the paper is folded parallel to the paper's edge, no matter if the fold is made parallel to the long edge or the short edge of the paper.
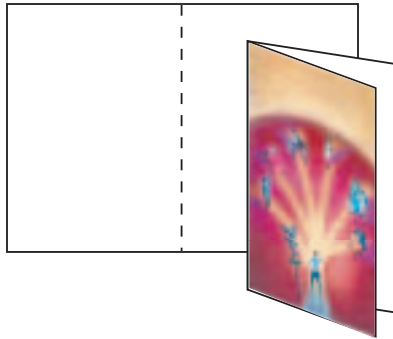
A right angle fold takes the parallel fold one step further. It simply means that a fold falls at a right angle to the previous fold.
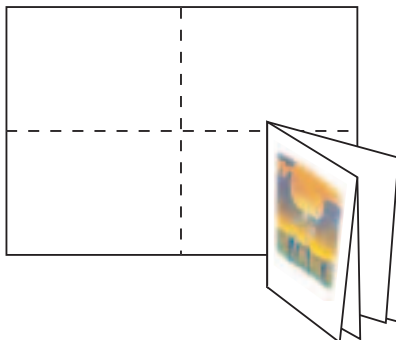
An accordion fold is when two or more parallel folds are made in reversing directions.
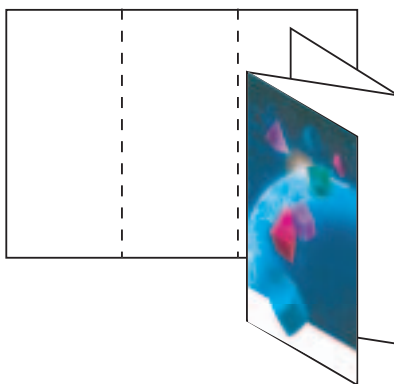
Gate folds are useful for brochures and book covers because they create a pair of foldouts.
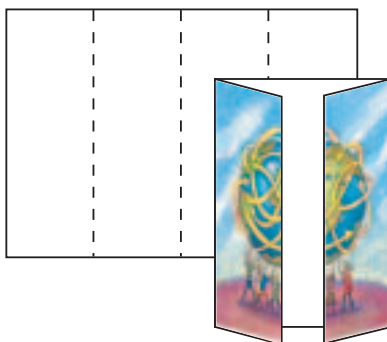
Binding

Saddle stitching

Saddle stitching is the most common and least expensive binding and is best suited to low page count publications. In a saddle stitched publication, the signatures are opened and straddled across a metal right angle plate called a saddle. In small quantities, saddle stitching can be performed with a stapler, however it is most commonly accomplished on high speed automated binding equipment. In this automated process, wire is inserted into the paper, then bent and cut to length, leaving the document looking like it has been stapled.

Side stitching

Side stitching is used when the bulk is too great for saddle stitching. The sections are collated, placed flat under a stitching head, and the stitches (or staples) inserted about 8 mm from the edge. Side stitched books cannot be opened completely flat.

Edition binding

The conventional method of bookbinding, producing "hardback" books. Signatures are collated in sequence, endleaves pasted on the first and last signature, and then sewn together. The book is then trimmed on three edges, the spine (or backbone) roughed up and rounded (to lay flat when opened), and glue applied. At the same time, the covers (or cases) are prepared separately. The book is then put into its case and pasted together. After drying, a dust jacket may be added.
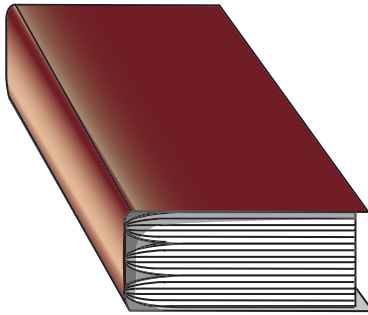
Perfect binding

Perfect binding is used to produce books without the expense of sewing and case-binding. The process begins with placing signatures in sequence. The spine is then lightly ground to rough up the edges for better adhesion. An adhesive is applied to the spine, the cover attached and the publication is three-edge trimmed. Examples of perfect bound books include paperbacks, manuals and thicker magazines.
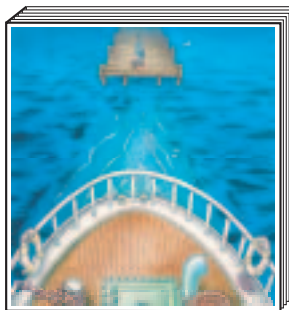
Mechanical binding

Mechanical binding includes an array of devices that can be used to hold a final document together, including spiral binding, plastic binding, and coil binding. Holes or slots are drilled or cut along one gutter edge and wire or plastic binding is inserted. When opened, these bindings allow pages to lie flat. Some even allow for a full 360 degree rotation of the pages. Mechanical binding is often used for training manuals, notebooks, calendars, and technical manuals.

Looseleaf binding

Looseleaf bindings include screw and post bindings and ring binders. They allow for unlimited use of inserts and are ideal for manuals that undergo frequent updates. Pages can be inserted and removed easily.
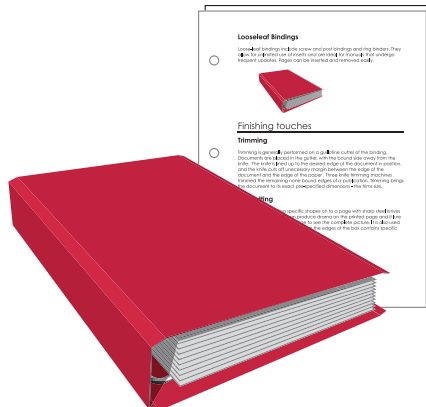
Finishing touches

Trimming

Trimming is generally performed on a guillotine cutter after binding. Documents are placed in the gutter, with the bound side away from the knife. The knife is lined up to the desired edge of the document in position, and the knife cuts off the unnecessary margin between the edge of the document and the edge of the paper. Three-knife trimming machines trim the remaining non-bound edges of a publication. Trimming brings the document to its exact pre-specified dimensions – the trim size.

Die cutting

The process of cutting specific shapes onto a page with sharp steel knives is called die cutting. It can produce drama on the printed page and lure the reader onto the next page to see the complete picture. It is also used for packaging applications where the edges of the box contain specific angles for folding and gluing.
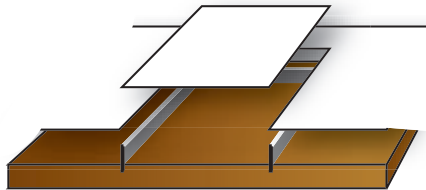
Lamination

Lamination is the process of covering a sheet with a thin layer of polyester (laminate) to yield a strong and washable surface. Restaurant menus, for example, are laminated for protection and washability. It is important, however, to make sure the document's paper and toner are compatible with the laminator. In some cases, the lamination attracts the toner, so it looks like the text and images adhere to the laminate rather than the paper.
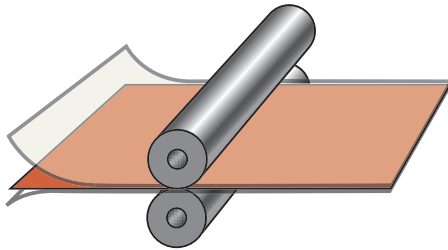
Varnish

Another tool that can be used to protect documents from abrasion is varnishing. It can also be used as a design tool to enhance a document's appearance. Depending on the desired effect, gloss or matte (dull) varnish can be applied to an entire document (flood coverage) to give it a smooth overall finish, or specific portions of a page (spot coverage) to highlight some parts of the document while de-emphasising others. Whichever method is chosen, varnished documents are characterised by their depth of colour, clarity of graphics, and crispness of text.

Embossing

Embossing creates a three dimensional image on the printed page. In this process, the paper is pressed between two dies to raise a portion of the printed image. Embossing is frequently found on greeting cards.
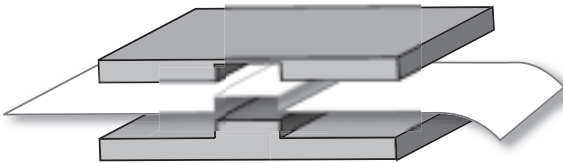
Shrink wrapping

The very final finishing option before documents are delivered is shrink-wrapping. This process involves wrapping small quantities of the finished documents in a thin plastic material using a heated shrink-wrapping machine. This is a simple way of keeping items together and protecting them for shipping or storage.

Double-sided printing

The DocuColor 2060 is capable of automatically duplex printing on up to 220 gsm media. During automatic duplex printing mode the machine will make printing process control changes during the side 2 pass, in an attempt to closely match the image on side 1. These make printing process control changes are necessary because the paper will be drier and hotter than it was during the first pass and therefore have different electrostatic properties. Some gloss differential may still be visible, especially when using heavy weight coated stocks

Use standard sizes: Design your printed pieces to take maximum advantage of common sheet sizes. For example, think A4 or A3.

Use paper specifically designed for the equipment you're using: For example, paper designed specifically to optimise the performance of digital printing equipment may significantly reduce waste due to jamming and offer a better surface for dry ink adhesion.

Reduce basis weight: Heavier basis weight sheets cost more per sheet than lighter ones. Lighter weight stocks will also reduce mailing costs.

Select the right paper for the job: Choosing the right paper is key. Consider factors such as image quality, brightness, equipment choice, and end use (is folding required?). Then select a paper that will ensure the best results.

7 Applications by Industry

Financial services

Banking, finance, securities, funds management, insurance, brokers, credit unions

Business graphics

Typical vertical application name	• "Red herring" draft prospectus • Pitch book • Deal book
Decision making role	• Investment banking • Global finance • Capital markets • Private placements • Corporate finance • Public finance
Key benefits of digital colour printing	• Speed up turnaround time • Improve quality • Retain control

Presentations/proposals/reports

Typical vertical application name	• Proposals • Customised proposals • Board packages • Outcome reports • Institutional daily equity reports • Private daily equity reports • Research reports • Market reports • Fund fact sheets • Fund reallocation projections • Claims analysis • Budgets • Overheads • Handouts • Inserts • Cover/spine

Decision making role	• Marketing
	• Retail sales
	• CEO
	• Managing director
	• Research
	• Annuities marketing
	• Underwriting
	• Commercial lines marketing
	• Managed care
	• Finance
	• Treasury
Key benefits of digital colour printing	• Improve sales conversion rate
	• Tailor document to an individual using personalisation
	• Ensure impact
	• Enhance professional image
	• Improve comprehension and action
	• Build brand identity/recognition
	• Increase security
	• Speed up turnaround time
	• Develop rapid response to regulations
	• Reduce costs/contain costs
	• Improve quality

Manuals

Typical vertical application name	• Training
	• Agent training
	• Operations and procedure
	• Product and services marketing
Decision making role	• Marketing
	• Retail sales
	• Training
	• IT
	• Managing director

Key benefits of digital colour printing
- Speed up turnaround time
- Target based on needs/features/services
- Ensure consistency
- Provide multi-lingual documentation to improve understanding
- Reduce inventory/obsolescence
- Enable JIT delivery of print

Promotional materials

Typical vertical application name
- Flyers
- Danglers
- Brochures
- CD jewel case inserts
- Video case inserts
- Direct mail campaign
- Counter cards/tent cards
- Notices
- Customer enrolment kits
- Directories
- Benefit booklets
- Signage, posters, banners
- Event notices
- Tickets and passes to events
- Invitation to fund raisers and events
- Seminar/trade show material
- Covers/spine
- Postcards
- Business cards
- Customised internet response

Decision making role
- Marketing
- Relationship manager
- Graphic arts
- Public relations
- Managed care
- Underwriting
- Corporate communications
- Consumer relations

Key benefits of digital colour printing	• Increase sales
	• Grow business, revenue and profits
	• Gain competitive advantage
	• Build brand identity/recognition
	• Improve response with targeted marketing based on season, ethnic, demographic, economic, geographic areas
	• Improve subscriber compliance and wellness
	• Improve response with targeted marketing based on buying preferences
	• Facilitate micro-marketing
	• Build customer loyalty
	• Accelerate competitive response
	• Reduce inventory/obsolescence
	• Enable JIT delivery of print
	• Reduce costs/contain costs
	• Lower short run costs
	• Provide multi-lingual material to improve response
	• Ease registration requirements

Newsletters

Typical vertical application name	• Departmental
	• Human resource
	• Board of directors
	• Subscriber

Decision making role	• Marketing communications
	• Corporate communications
	• Human resources
	• Consumer relations
	• Graphic arts

Key benefits of digital colour printing	• Organise and classify information
	• Accelerate competitive response
	• Foster consumer education and awareness
	• Develop rapid response to regulations
	• Reduce costs/contain costs
	• Improve quality

Compensation and benefit booklets/directories

Typical vertical application name
- Cover/spine
- Booklet
- Entitlements and benefits booklets

Decision making role
- Human resources
- Employee services
- Member services
- Marketing

Key benefits of digital colour printing
- Improve comprehension and recall
- Improve customer satisfaction
- Improve employee satisfaction
- Speed up turnaround time

Notifications

Typical vertical application name
- Regulatory
- Treasury/interest/rate change

Decision making role
- Managing director

Key benefits of digital colour printing
- Speed up turnaround time
- Improve comprehension and action
- Reduce fines

Statements

Typical vertical application name
- Asset
- Portfolio
- Confirmation

Decision making role
- Asset management
- Investment banking

Key benefits of digital colour printing
- Tailor document to high net worth individuals using personalisation
- Improve customer satisfaction
- Build customer loyalty
- Improve comprehension and retention

Consumer products

Manufacturing, industrial, retail, wholesale, consumer electronics

Catalogues

Typical vertical application name	• Product
	• Parts
	• Channel
Decision making role	• Marketing
	• Catalogue sales
	• Advertising
Key benefits of digital colour printing	• Speed up turnaround time
	• Reduce inventory/obsolescence
	• Improve response with targeted marketing based on buying preferences

Promotional materials

Typical vertical application name	• Point of sale
	• Flyers
	• Sell sheets
	• Danglers
	• Specifications
	• Brochures
	• Plan-o-grams
	• Price sheets
	• CD jewel case inserts
	• Video case inserts
	• Sale campaigns
	• Coupons
	• Notices
	• Counter cards
	• Event notices
	• Mock up packaging
	• Test marketing
	• Labels
	• Postcards
	• Exhibition brochures

Decision making role	• Marketing
	• Advertising
	• Graphic arts/creative services
	• Public relations
Key benefits of digital colour printing	• Increase sales
	• Grow profits
	• Build brand identity/recognition
	• Provide ability to change to demographic and economic markets
	• Improve response with targeted marketing based on buying preferences
	• Facilitate micro-marketing
	• Build customer loyalty
	• Accelerate competitive response
	• Reduce inventory/obsolescence
	• Lower short run costs
	• Provide multi-lingual material to improve response
	• Provide stock flexibility
	• Ease registration requirements

Newsletters

Typical vertical application name	• Direct sales channel
	• Human resource
	• Distributor/OEM
	• Shareholder
	• Technical bulletins
Decision making role	• Marketing
	• Human resources
	• Employee services
	• CEO
	• Engineering
Key benefits of digital colour printing	• Organise and classify information
	• Accelerate competitive response
	• Reduce costs/contain costs
	• Improve quality

Manuals

Typical vertical application name

- Training
- Operations and procedure
- Product marketing
- Service/repair
- Distribution
- Consumer (i.e. phone/internet banking)

Decision making role

- Marketing
- Training
- Sales
- IT
- Service
- Improve quality
- Distribution/traffic

Key benefits of digital colour printing

- Improve print turnaround time
- Target based on needs/features/services
- Provide multi-lingual documentation to improve understanding
- Ensure consistency
- Reduce inventory/obsolescence
- Enable JIT delivery of print
- Provide no-tear paper for service engineers

Notifications

Typical vertical application name

- Change notice
- Schematics
- Technical bulletins
- Tariffs
- Consumer bulletins

Decision making role

- Engineering
- Distribution/traffic
- Customer service

Key benefits of digital colour printing

- Speed up turnaround time
- Improve comprehension and action
- Provide colour-coding of diagrams

Presentations/proposals/reports

Typical vertical application name
- Proposals
- Overheads
- Handouts
- Inserts
- Cover/spine

Decision making role
- CEO/executives
- Marketing/sales
- Training

Key benefits of digital colour printing
- Ensure impact
- Enhance professional image
- Improve comprehension and action
- Build brand identity/recognition

Compensation and benefit booklets

Typical vertical application name
- Cover/spine
- Booklet

Decision making role
- Human resources
- Employee services

Key benefits of digital colour printing
- Improve comprehension and recall
- Improve employee satisfaction+

Hospitality

Restaurants, hotels, convention centres, travel agencies, advertising agencies, cruise lines, tour operators

Promotional materials

Typical vertical application name	• Conference materials
	• Flyers
	• Danglers
	• Brochures
	• Price sheets
	• CD jewel case inserts
	• Video case inserts
	• Sale campaigns
	• Coupons
	• Notices
	• Counter cards
	• Event notices
	• Labels
	• Postcards
	• Menus, placemats
	• Signage, posters, banners
	• Maps/directions
	• Business cards
	• Program of events
	• Customised internet response
	• Calendars
Decision making role	• Marketing
	• Advertising
	• Promotions
	• Event planning
	• Graphic arts
Key benefits of digital colour printing	• Increase sales
	• Grow profits
	• Build brand identity/recognition
	• Provide ability to change to demographic and economic markets
	• Improve response with targeted marketing

based on buying preferences
- Facilitate micro-marketing
- Build customer loyalty
- Accelerate competitive response
- Reduce inventory/obsolescence
- Lower short run costs
- Provide multi-lingual material to improve response
- Provide stock flexibility
- Ease registration requirements

Compensation and benefit booklets

Typical vertical application name	• Cover/spine • Booklet
Decision making role	• Human resources • Employee services
Key benefits of digital colour printing	• Improve comprehension and recall • Improve employee satisfaction

Presentations/proposals/reports

Typical vertical application name	• Proposals • Research reports • Market reports • Overheads • Handouts • Inserts • Cover/spine
Decision making role	• Marketing • Retail sales • CEO • Managing director • Research
Key benefits of digital colour printing	• Ensure impact • Enhance professional image • Improve comprehension and action • Build brand identity/recognition

Manuals

Typical vertical application name
- Training
- Operations and procedures
- Product and services marketing
- Seminars

Decision making role
- Marketing
- Retail sales
- Training
- IT

Key benefits of digital colour printing
- Improve print turnaround time
- Target based on needs/features/services
- Ensure consistency
- Reduce inventory/obsolescence
- Enable JIT delivery of print

Newsletters

Typical vertical application name
- Human resource
- Consumer

Decision making role
- Marketing communications
- Human resources
- Distribution

Key benefits of digital colour printing
- Organise and classify information
- Accelerate competitive response
- Reduce costs/contain costs
- Improve quality

Professional services

Legal firms, accountancy firms, real estate, travel, consulting firms, IT, peak bodies

Presentations/proposals/reports

Typical vertical application name
- Proposals
- Research reports
- Market reports
- Overheads
- Handouts
- Inserts
- Cover/spine

Decision making role
- Managing partner
- Marketing
- Sales
- Research
- Business operations manager

Key benefits of digital colour printing
- Ensure impact
- Enhance professional image
- Improve comprehension and action
- Build brand identity/recognition
- Facilitate last minute changes

Newsletters

Typical vertical application name
- Human resource
- Client
- Contempories

Decision making role
- Marketing communications
- Human resources

Key benefits of digital colour printing
- Organise and classify information
- Accelerate competitive response
- Reduce costs/contain costs
- Improve quality

Manuals

Typical vertical application name	• Training
	• Operations and procedures
	• Product and services marketing
	• Seminars
Decision making role	• Marketing
	• Sales
	• Training
	• IT
Key benefits of digital colour printing	• Improve print turnaround time
	• Target based on needs/features/services
	• Ensure consistency
	• Reduce inventory/obsolescence
	• Enable JIT delivery of print

Compensation and benefit booklets

Typical vertical application name	• Cover/spine
	• Booklet
Decision making role	• Human resources
	• Employee services
Key benefits of digital colour printing	• Improve comprehension and recall
	• Improve employee satisfaction

Promotional materials

Typical vertical application name	• Flyers
	• Brochures
	• Company profile
	• Professional profiles
	• Briefs
	• Client newsletters
	• Compliance updates
	• CD jewel case inserts
	• Video case inserts
	• Notices
	• Event notices
	• Postcards

- Signage, posters, banners
- Directories
- Direct mail campaigns
- Business cards
- Trade show materials

Decision making role
- Managing partner
- Marketing
- Graphic arts

Key benefits of digital colour printing
- Increase sales
- Grow profits
- Build brand identity/recognition
- Disseminate information
- Provide ability to change to demographic and economic markets
- Improve response with targeted marketing based on buying preferences
- Facilitate micro-marketing
- Build customer loyalty
- Accelerate competitive response
- Reduce inventory/obsolescence
- Lower short run costs
- Provide multi-lingual material to improve response
- Provide stock flexibility
- Ease registration requirements

Education

Primary, secondary, higher education

Course packs/manuals/booklets

Typical vertical application name
- Training
- Operations and procedures
- Services
- Promotional
- Certificate of achievement

Decision making role	• Vice-chancellors
	• School principals
	• Department heads

Key benefits of digital colour printing	• Reduce costs/contain costs
	• Reduce inventory/obsolescence
	• Enable JIT delivery of print
	• Accelerate learning, retention and recall
	• Improve print turnaround time
	• Target based on needs/features/services

Presentations/proposals/reports

Typical vertical application name	• Council agendas
	• Research reports
	• Budgets
	• Handouts
	• Inserts
	• Cover/spine

Decision making role	• Vice-chancellors
	• School principals
	• Department heads

Key benefits of digital colour printing	• Ensure impact
	• Improve comprehension and action
	• Facilitate last minute changes

Newsletters/mailers

Typical vertical application name	• School to home
	• Alumni
	• Employee
	• Community

Decision making role	• Student administration
	• School principals
	• Vice-chancellors
	• Human resources
	• Alumni association

Key benefits of digital colour printing
- Reduce costs/contain costs
- Improve quality
- Improve parent satisfaction
- Improve student satisfaction
- Improve employee satisfaction

Promotional materials

Typical vertical application name
- Flyers
- Brochures
- CD jewel case inserts
- Video case inserts
- Event/program notices
- Postcards
- Signage, posters, banners
- Directories
- Direct mail campaigns
- Memory booklets
- Yearbooks
- Tickets and passes to events
- Alumni solicitations
- Invitations to fund raisers and events
- Student catalogues
- Athletic player cards
- Covers
- Calendars

Decision making role
- Marketing department/corporate
- School principals
- Human resources
- Vice-chancellors
- Alumni association

Key benefits of digital colour printing
- Attract new students
- Lower short run costs
- Reduce inventory/obsolescence
- Provide stock flexibility
- Ease registration requirements
- Provide multi-lingual material to improve response

Other

Typical vertical application name
- Student ID cards
- Phone cards
- Certificates
- Diploma
- Academic publications

Decision making role
- Registrar
- Vice-chancellors
- School principals
- Department heads

Key benefits of digital colour printing
- Lower short run costs
- Ease registration requirements
- Speed up turnaround time

Health care

Hospitals, medical practices, clinics, health funds

Course packs/manuals/booklets

Typical vertical application name
- Training
- Operations and procedures
- Services
- Promotional

Decision making role
- Administrator
- Public relations
- IT

Key benefits of digital colour printing
- Improve print turnaround time
- Accelerate learning retention and recall
- Foster community education and awareness
- Reduce costs/contain costs

Promotional materials

Typical vertical application name
- Flyers
- Brochures
- Catalogues
- CD jewel case inserts
- Video case inserts

- Event/program notices
- Postcards
- Signage, posters, banners
- Directories
- Direct mail campaigns
- Tickets and passes to events
- Invitations to fund raisers and events
- Covers
- Calendars

Decision making role
- Public relations
- Administrator
- Graphic arts

Key benefits of digital colour printing
- Organise and classify information
- Accelerate competitive response
- Foster consumer education and awareness
- Develop rapid response to regulations
- Reduce costs/contain costs
- Improve quality

Presentations/proposals/reports

Typical vertical application name
- Board packets
- Research reports
- Budgets
- Overheads
- Handouts
- Inserts
- Cover/spine

Decision making role
- Administrator
- Department chief

Key benefits of digital colour printing
- Ensure impact
- Improve funding
- Improve comprehension and action
- Facilitate last minute changes

Compensation and benefit booklets

Typical vertical application name	• Cover/spine
	• Booklet
Decision making role	• Human resources
	• Employee services
Key benefits of digital colour printing	• Improve comprehension and recall
	• Improve employee satisfaction

Newsletters/mailers

Typical vertical application name	• Employee
	• Patient
	• Community
Decision making role	• Human resources
	• Administrator
	• Department chief
Key benefits of digital colour printing	• Organise and classify information
	• Improve employee satisfaction
	• Improve patient satisfaction
	• Reduce costs/contain costs
	• Improve quality

Other

Typical vertical application name	• ID cards
	• Business cards
	• Menus
	• Pre-op booklets
	• Home care booklets
	• Dietary booklets
Decision making role	• Human resources
	• Print shop
Key benefits of digital colour printing	• Lower short run costs
	• Enable JIT delivery of print
	• Provide most accurate, up-to-date information
	• Ease registration requirements
	• Speed up turnaround time

Public sector

Federal Government – Armed forces

Key applications
- Pamphlets
- Versions of recruitment pamphlets/booklets

Key benefits of digital colour printing
- Reduce inventory/obsolescence
- Speed up turnaround time
- Foster community education and awareness

Local Council - General services

Key applications
- Marketing flyers
- Environmental brochures
- Drug prevention brochures
- Covers/spines
- Polyester stock for repair manuals
- Proofs/mock-ups

Key benefits of digital colour printing
- Organise and classify information
- Foster community education and awareness
- Target based on needs/features/services
- Reduce costs/contain costs
- Improve quality

State Government - Department of Health

Key applications
- Brochures
- Child abuse pamphlets
- Health in restaurant brochures
- Aids brochures
- Signage, posters, banners
- Tent cards/counter cards
- Public health notices
- Pamphlets on disease control
- Grants

Key benefits of digital colour printing
- Organise and classify information
- Foster community education and awareness
- Develop rapid response to regulations
- Reduce costs/contain costs
- Improve quality

Federal/State/Local Government – Graphics reproduction print shops

Key applications

- Colour covers for technical documentation
- Colour covers for training materials
- Signage, posters, banners
- CD jewel case inserts
- Video case inserts
- Multi-lingual brochures
- Newsletters
- Public officials presentations
- Business cards
- Programs/events
- Certificates
- Constituent mailings
- Postcards
- City landmark books
- Budget books
- PC output applications
- Covers and inserts for black and white jobs

Key benefits of digital colour printing

- Enable JIT delivery of print
- Organise and classify information
- Accelerate competitive response to commercial offset
- Lower short run costs
- Reduce costs/contain costs
- Reduce inventory/obsolescence
- Provide multi-lingual material to improve response
- Provide stock flexibility
- Ease registration requirements
- Improve quality
- Develop rapid response to regulations

State Government - Department of Labor

Key applications

- Newsletters
- Brochures
- Training materials (tests, overheads, certificates, covers, video inserts, etc)

Key benefits of digital colour printing
- Enable JIT delivery of print
- Organise and classify information
- Reduce inventory/obsolescence

Federal/State/Local Government - Department of Roads

Key applications
- Engineering change notification
- Maps
- Bid specs
- Schematics
- Litigation documentation
- Expenditure reports
- Project status reports

Key benefits of digital colour printing
- Organise and classify information
- Reduce inventory/obsolescence
- Increase retention/recall/action
- Enable JIT delivery of print

Federal/State Government - Department of Welfare

Key applications
- Forms
- Covers
- Pamphlets
- Multi-lingual materials
- Workforce demographics reports
- Job listings
- Workbooks
- Legislative and budget reports

Key benefits of digital colour printing
- Organise and classify information
- Reduce inventory/obsolescence
- Increase retention/recall/action
- Enable JIT delivery of print

Federal/State/Local Government - Department of Parks

Key applications

- Brochures
- Flyers
- Postcards (including souvenir)
- Maps
- Events
- Invitations/programs
- Fund raising campaigns
- Certificates
- Newsletters
- Signage, posters, banners
- Tickets (security)
- House rules and regulations
- Seasonal information

Key benefits of digital colour printing

- Increase sales
- Foster community education and awareness
- Build park identity/recognition
- Provide ability to change to seasons
- Improve response with targeted marketing based on audience
- Reduce inventory/obsolescence
- Lower short run costs
- Provide multi-lingual material to improve response
- Provide stock flexibility
- Ease registration requirements

Microsoft Office colour charts

All Microsoft Office applications (Word, Excel, PowerPoint, Access, etc.) work in the RGB colour space. The RGB gamut is much broader than the gamut of a process colour printer or press. Consequently, many colours available in Microsoft Office applications cannot be reproduced on a process colour device.

A common area of discontent with customers who use Microsoft Office applications is the issue of colours looking different on their display and on the printed page, ie, the conversion from RGB colours to CMYK colours. They usually do not understand colour and how it is produced and/or reproduced.. A typical complaint is: "My PowerPoint background is blue – why is it printing as purple?"

Microsoft Office applications utilise a common colour palette across all applications. It consists of a basic standard palette of 40 colours and an extended standard palette of 143 colours (including a range of greys). Custom colours are also available (use the charts in Appendix 2 – RGB colour charts – for examples of the custom colours available).

These palettes are shown below and can be used as a guide to how the Microsoft Office colours are reproduced on the DocuColor 2060. Due to differences between RIPs and their colour conversion algorithms, individual DocuColor 2060 digital colour presses, machine set-up (eg screening), RIP options, calibration used, environment, and papers used and their condition, these charts should be used as a guide only. The following charts may differ somewhat from the printed results you get on your DocuColor 2060.

Therefore it's important that you make sure you print these charts on your DocuColor 2060, utilising your RIP, settings, calibration and paper to give to clients for colour selection and matching.

Encourage your customers to have a copy of these charts near their computer so that they can see how the colours they select in their application will be reproduced on the DocuColor 2060.

The first chart below shows the basic standard palette of 40 colours available in Microsoft Office applications. It also includes the additional standard colours used in Microsoft Excel and Microsoft Chart for chart fills and chart lines.
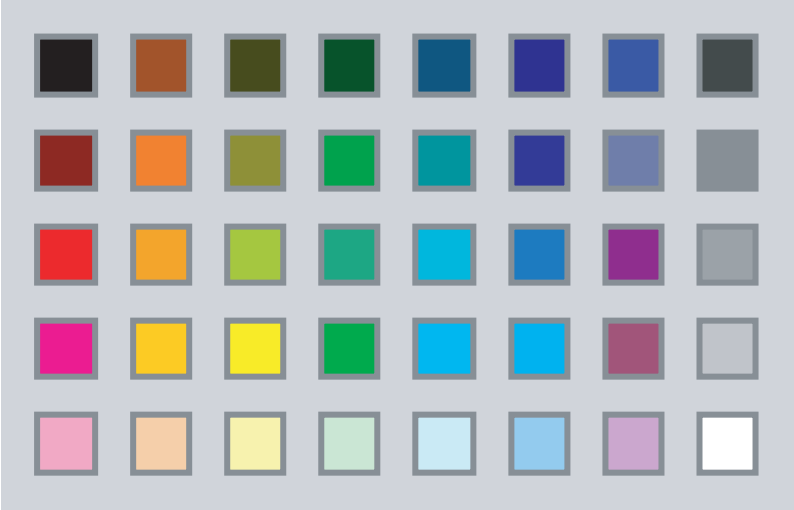
Microsoft Excel standard "Chart fills" and "Chart lines" colours
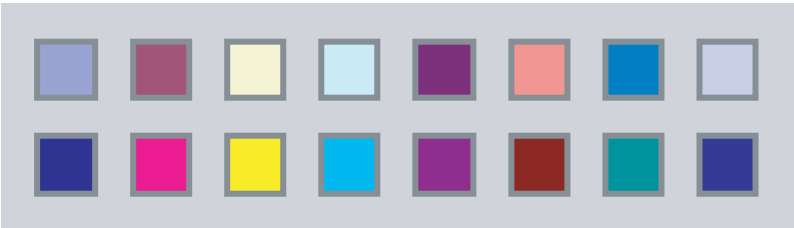
Microsoft Chart standard "Chart fills" and "Chart lines" colours
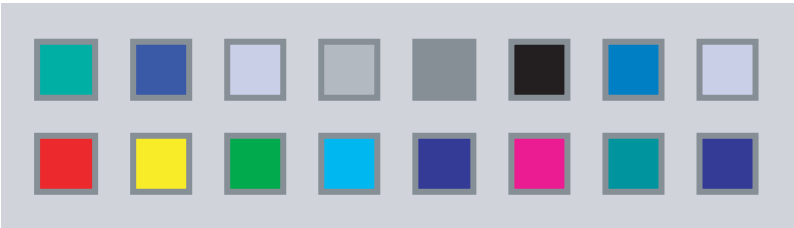
The next chart shows the same colours with the name Microsoft uses for each colour.

Black	Brown	Olive Green	Dark Green	Dark Teal	Dark Blue	Indigo	Gray-80%
Dark Red	Orange	Dark Yellow	Green	Teal	Blue	Blue-Gray	Gray-50%
Red	Light Orange	Lime	Sea Green	Aqua	Light Blue	Violet	Gray-40%
Pink	Gold	Yellow	Bright Green	Turquoise	Sky Blue	Plum	Gray-25%
Rose	Tan	Light Yellow	Light Green	Light Turquoise	Pale Blue	Lavender	White

Microsoft Excel standard "Chart fills" and "Chart lines" colours

	Plum		Light Turquoise				
Dark Blue	Pink	Yellow	Turquoise	Violet	Dark Red	Teal	Blue

Microsoft Chart standard "Chart fills" and "Chart lines" colours

				Gray-50%	Black		
Red	Yellow	Bright Green	Turquoise	Blue	Pink	Teal	Blue

The next chart shows which of these standard Microsoft Office colours are out of gamut, ie, those that cannot be reproduced on a DocuColor 2060. Because there are many variables associated with colour reproduction, it is not possible to absolutely determine whether a Microsoft Office colour will or will not reproduce accurately. Therefore the following chart also highlights those colours where acceptable results may be achieved. (Note that not all of these colours may be reproduced simultaneously.)

Black	Brown	Olive Green	Dark Green	Dark Teal	Dark Blue	Indigo	Gray-80%
Dark Red	Orange	Dark Yellow	Green	Teal	Blue	Blue-Gray	Gray-50%
Red	Light Orange	Lime	Sea Green	Aqua	Light Blue	Violet	Gray-40%
Pink	Gold	Yellow	Bright Green	Turquoise	Sky Blue	Plum	Gray-25%
Rose	Tan	Light Yellow	Light Green	Light Turquoise	Pale Blue	Lavender	White

Microsoft Excel standard "Chart fills" and "Chart lines" colours

| | Plum | | Light Turquoise | | | | |
| Dark Blue | Pink | Yellow | Turquoise | Violet | Dark Red | Teal | Blue |

Microsoft Chart standard "Chart fills" and "Chart lines" colours

| | | | | Gray-50% | Black | | |
| Red | Yellow | Bright Green | Turquoise | Blue | Pink | Teal | Blue |

Out of gamut colour - no close match possible

Close to out of gamut - acceptable colour match may be possible

Close colour match possible

The following chart shows the extended standard colour palette available in Microsoft Office applications. It includes the names of the 40 basic standard colours where they appear on the palette.
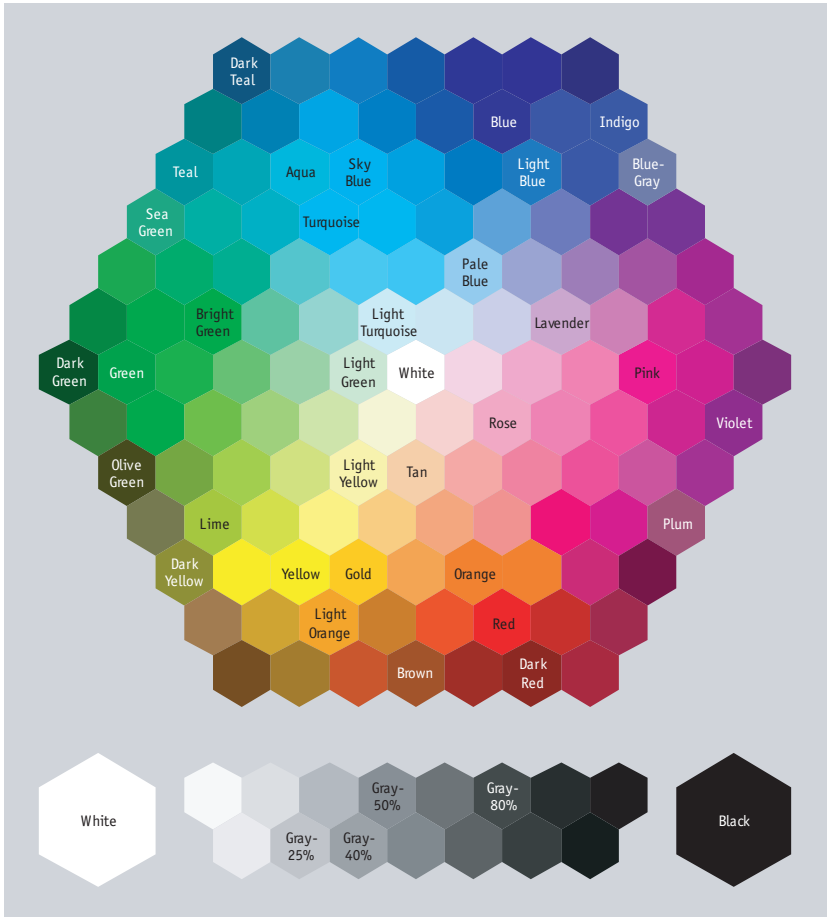
The last chart shows the same extended standard colour palette with out of gamut colours highlighted, ie, those colours that cannot be reproduced on a DocuColor 2060. Because there are many variables associated with colour reproduction, it is not possible to absolutely determine whether a Microsoft Office colour will or will not reproduce accurately. Therefore the following chart also highlights those colours where acceptable results may be achieved. (Note that not all of these colours may be reproduced simultaneously.)

Remember that the DocuColor 2060 will reproduce more Microsoft Office colours than a traditional offset press because of its broader gamut.
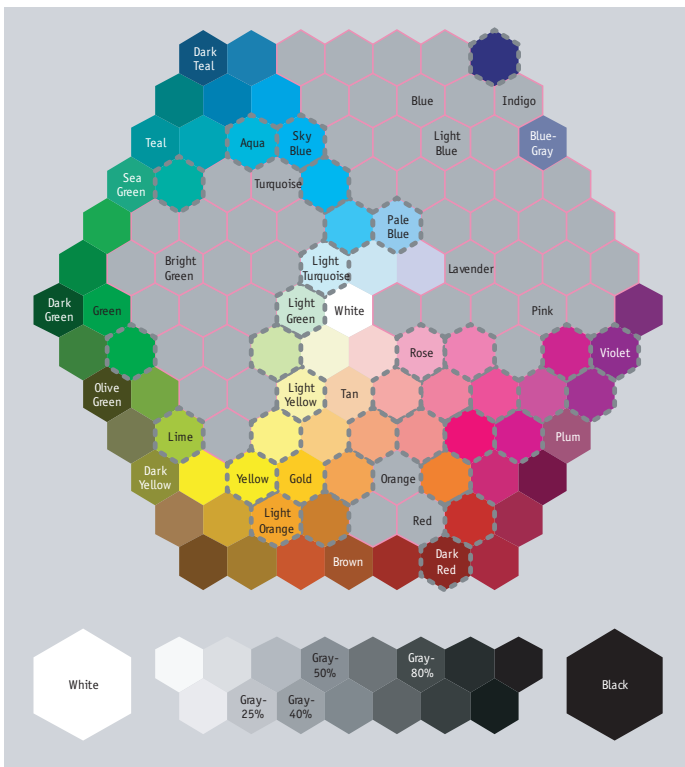
Out of gamut colour - no close match possible

Close to out of gamut - acceptable colour match may be possible

Close colour match possible

RGB colour charts

The RGB colour space (or gamut) is much broader than the gamut of a process colour printer or press. Consequently, many colours available in the RGB colour space cannot be reproduced on a process colour device.

A common area of discontent with customers is the issue of colour conversion from RGB to CMYK, ie, the colours they see on their display and the same colours as they appear on the printed page. Most customers who work in the office environment do not understand colour and how it is produced and/or reproduced.. A typical complaint is: "My PowerPoint background is blue – why is it printing as purple?"

The following charts can be used as a guide to how RGB colours are reproduced on the DocuColor 2060. Each chart has a fixed percentage of red and a mixture of green and blue in stepped increments.

Due to differences between individual DocuColor 2060 digital colour presses, machine set-up (eg screening), RIPs, RIP options, calibration used, environment, and papers used and their condition, these charts should be used as a guide only. The following charts may differ somewhat from the printed results you get on your DocuColor 2060.

Therefore it's important that you make sure you print these charts on your DocuColor 2060, utilising your RIP, settings, calibration and paper to give to clients for colour selection and matching.

Green

255
225
200
175
150
125
100
75
50
25
0

0 25 50 75 100 125 150 175 200 225 255

Blue

Red = 25

Green

255
225
200
175
150
125
100
75
50
25
0

0   25   50   75   100   125   150   175   200   225   255

Blue

Green

255
225
200
175
150
125
100
75
50
25
0

0   25   50   75   100   125   150   175   200   225   255

Blue

Red = 75

Green

Blue

Red = 100

Green

255
225
200
175
150
125
100
75
50
25
0

0   25   50   75   100   125   150   175   200   225   255

Blue

Red = 125

Green

255
225
200
175
150
125
100
75
50
25
0

0   25   50   75   100   125   150   175   200   225   255

Blue

Green

255
225
200
175
150
125
100
75
50
25
0

0   25   50   75   100   125   150   175   200   225   255

Blue

Red = 175

Green

255
225
200
175
150
125
100
75
50
25
0

0   25   50   75   100   125   150   175   200   225   255

Blue

Green

255
225
200
175
150
125
100
75
50
25
0

0   25   50   75   100   125   150   175   200   225   255

Blue

Red = 225

Green

255 · 225 · 200 · 175 · 150 · 125 · 100 · 75 · 50 · 25 · 0

0 · 25 · 50 · 75 · 100 · 125 · 150 · 175 · 200 · 225 · 255

Blue

Red = 255

Green

255
225
200
175
150
125
100
75
50
25
0

0   25   50   75   100   125   150   175   200   225   255

Blue
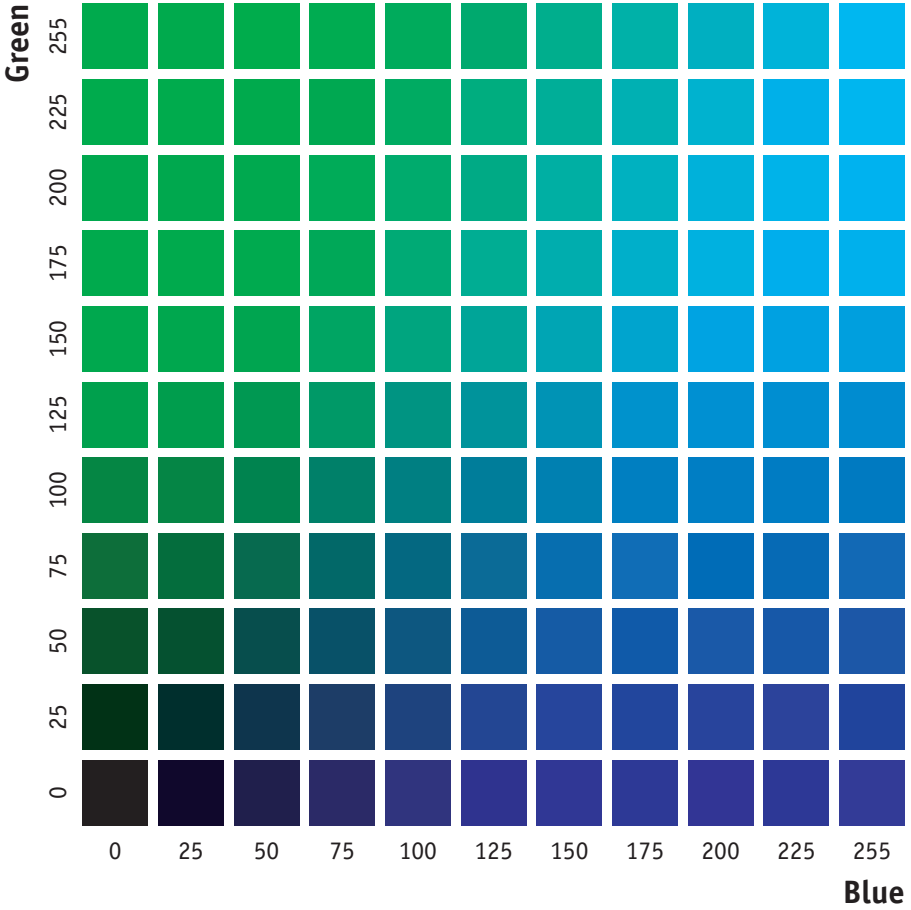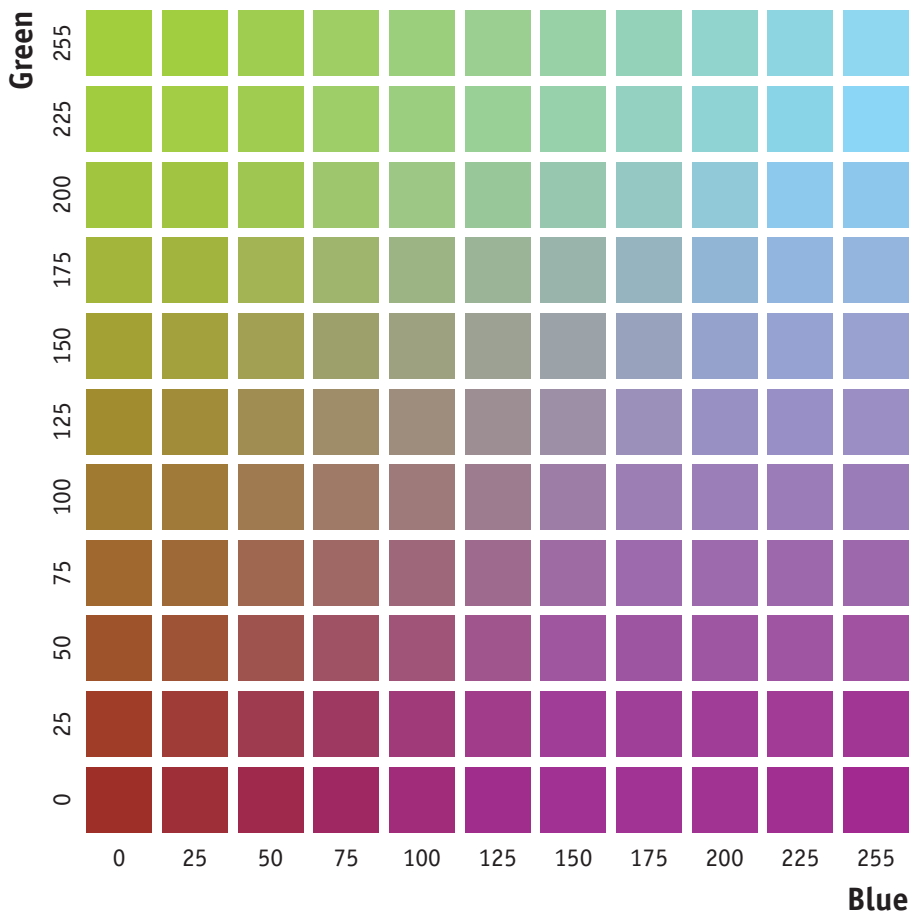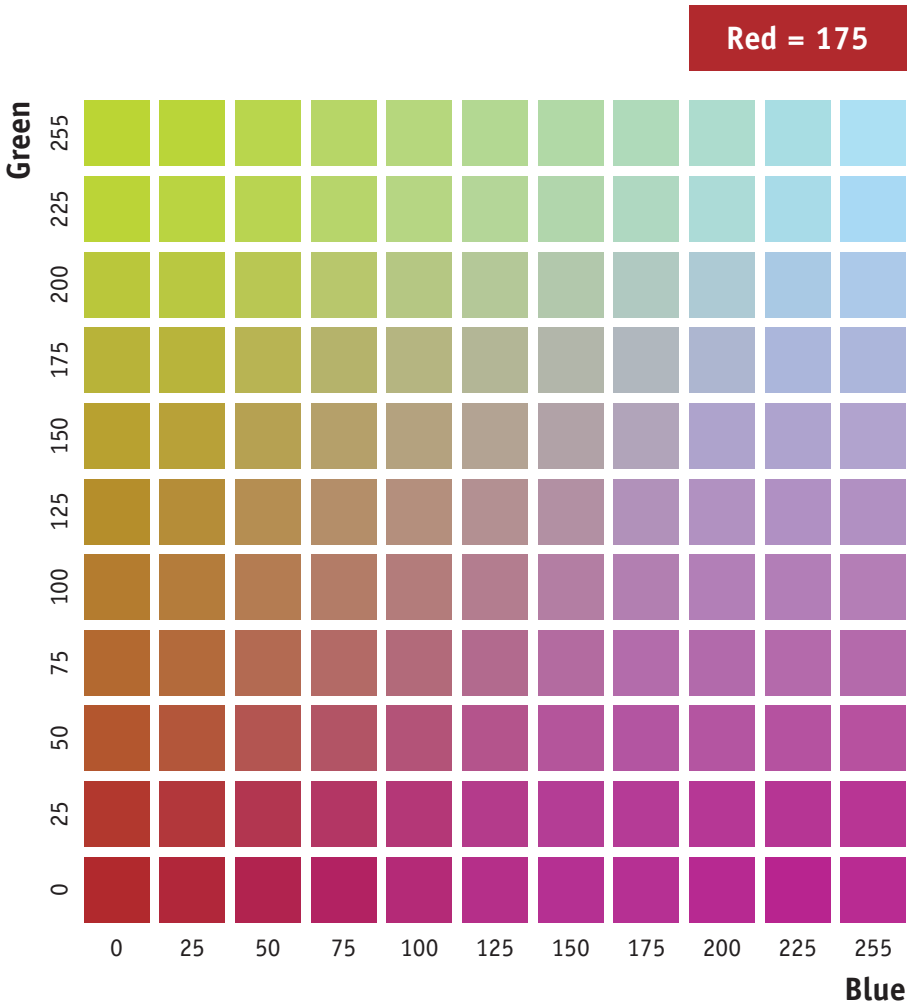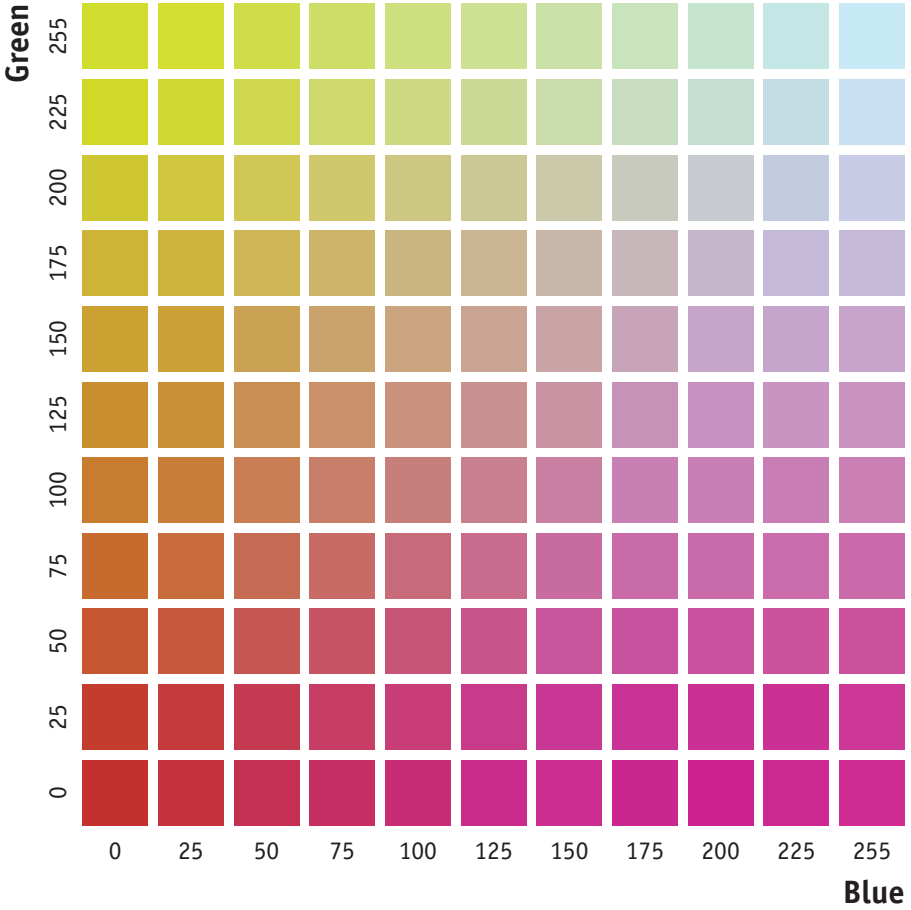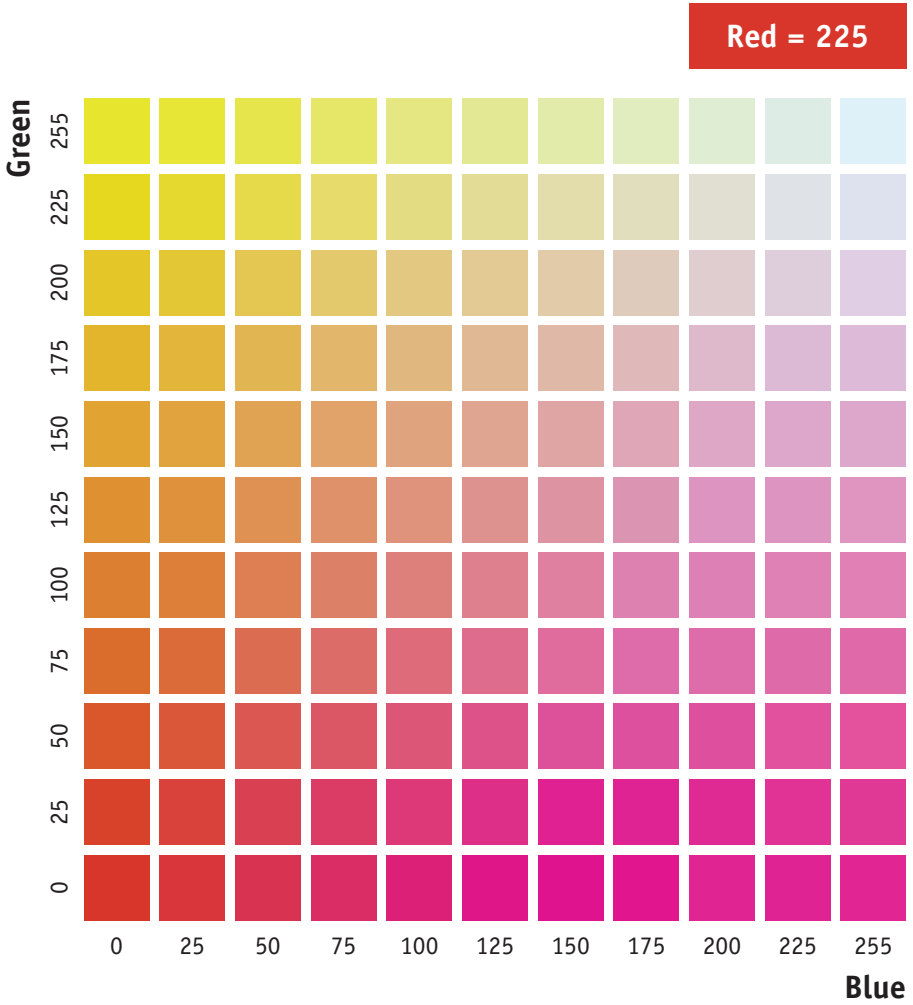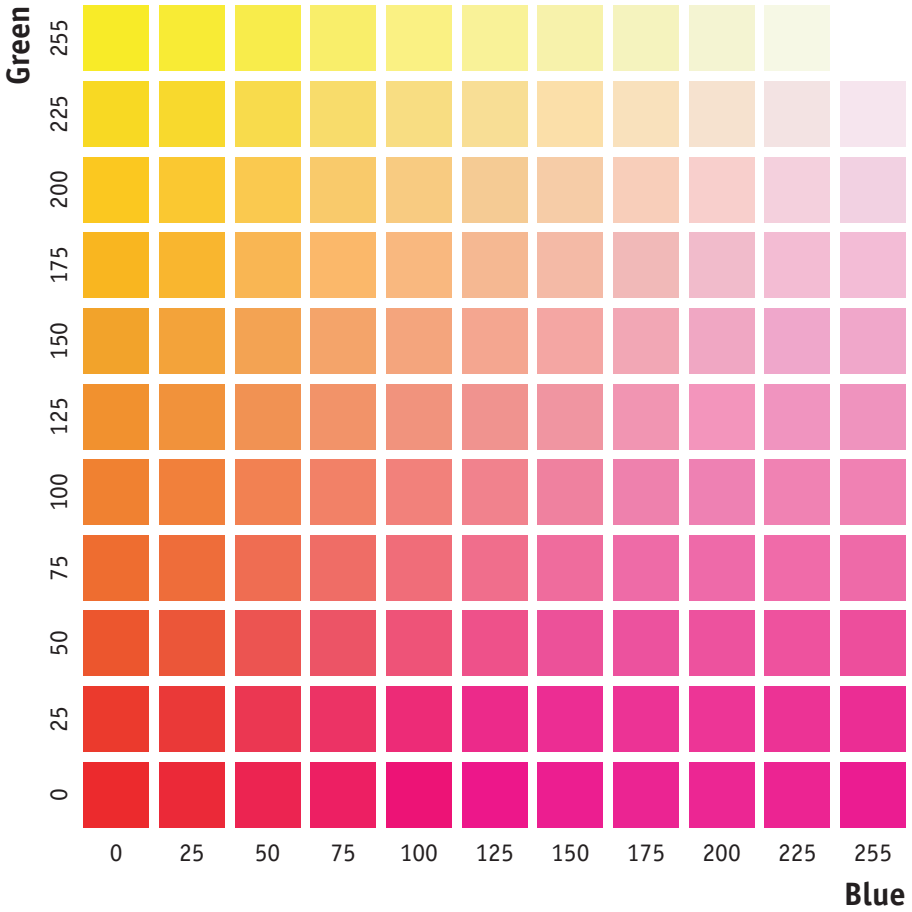
CMYK colour charts

The DocuColor 2060 prints using process colours, viz. cyan (C), magenta (M), yellow (Y) and black (K). You have the ability to mix and blend variations of CMYK to create virtually limitless colour palettes. The following charts provide examples of mixtures of CMYK that you can use to select colours.

Two types of sample charts are provided. On the left hand side is a chart with a fixed percentage of yellow and a mixture of cyan and magenta in 10% increments (from 0% to 100%). On the right hand side is the same chart with black added. For each combination of cyan, magenta and yellow, 5%, 10%, 20% and 30% black has been added.

Lighting conditions and surrounding colours will influence how you see colours. It is therefore recommended that you view sample charts like these under standardised lighting and use a white or neutral grey sheet of paper with a small square hole cut out to view individual colours.

Due to differences between individual DocuColor 2060 digital colour presses, machine set-up (eg screening), RIPs, RIP options, calibration used, environment, and papers used and their condition, these charts should be used as a guide only. The following charts may differ somewhat from the printed results you get on your DocuColor 2060.

Therefore it's important that you make sure you print these charts on your DocuColor 2060, utilising your RIP, settings, calibration and paper to give to clients for colour selection and matching.

0% Yellow

Magenta (vertical axis): 100%, 90%, 80%, 70%, 60%, 50%, 40%, 30%, 20%, 10%, 0%

Cyan (horizontal axis): 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%
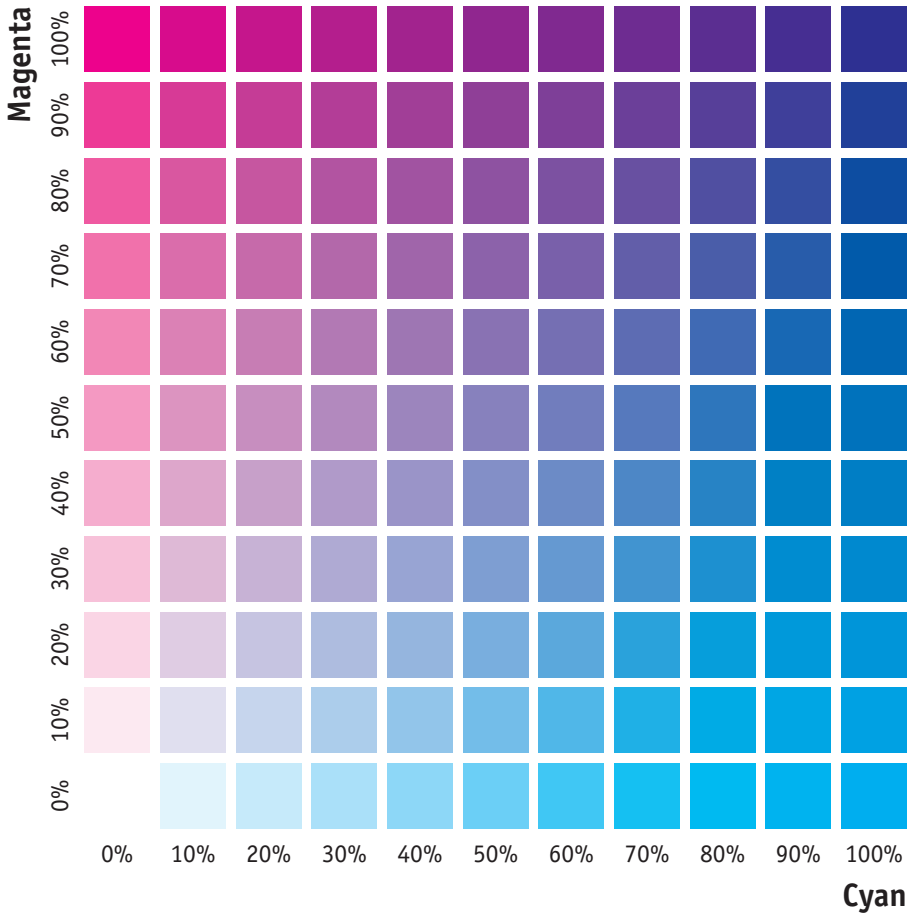
20% Black → | ← **30% Black**
5% Black → | ← **10% Black**

0% Yellow

Magenta

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan

Magenta

100% | 90% | 80% | 70% | 60% | 50% | 40% | 30% | 20% | 10% | 0%

0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100%

Cyan
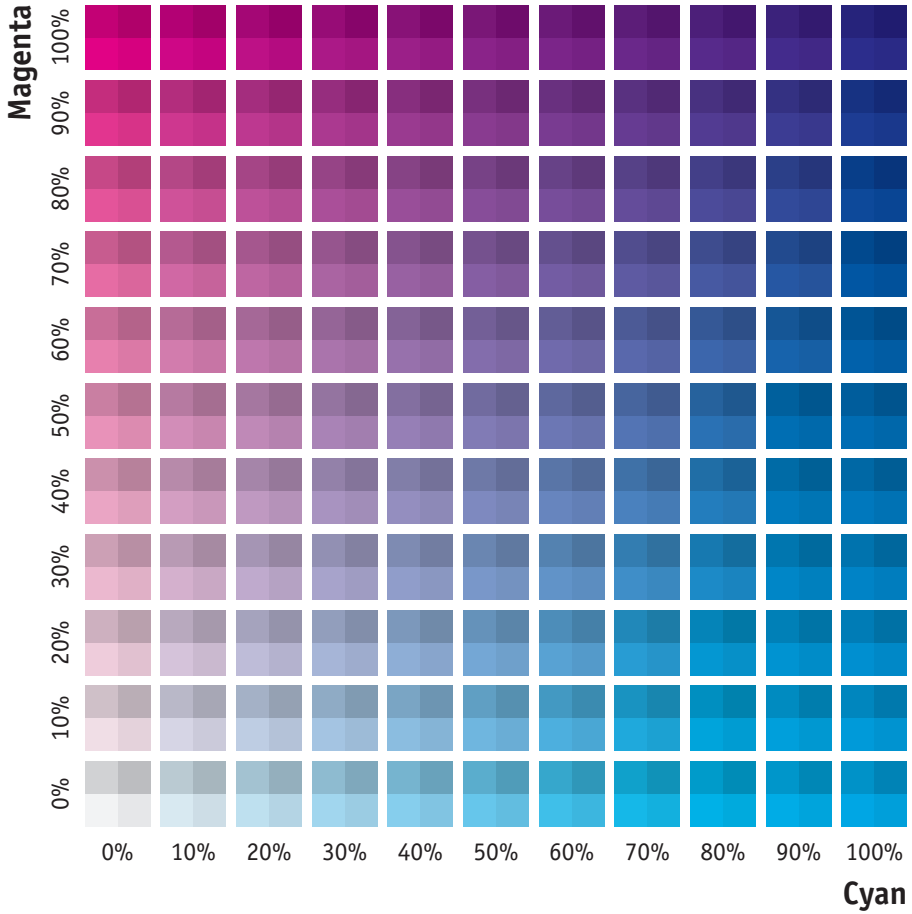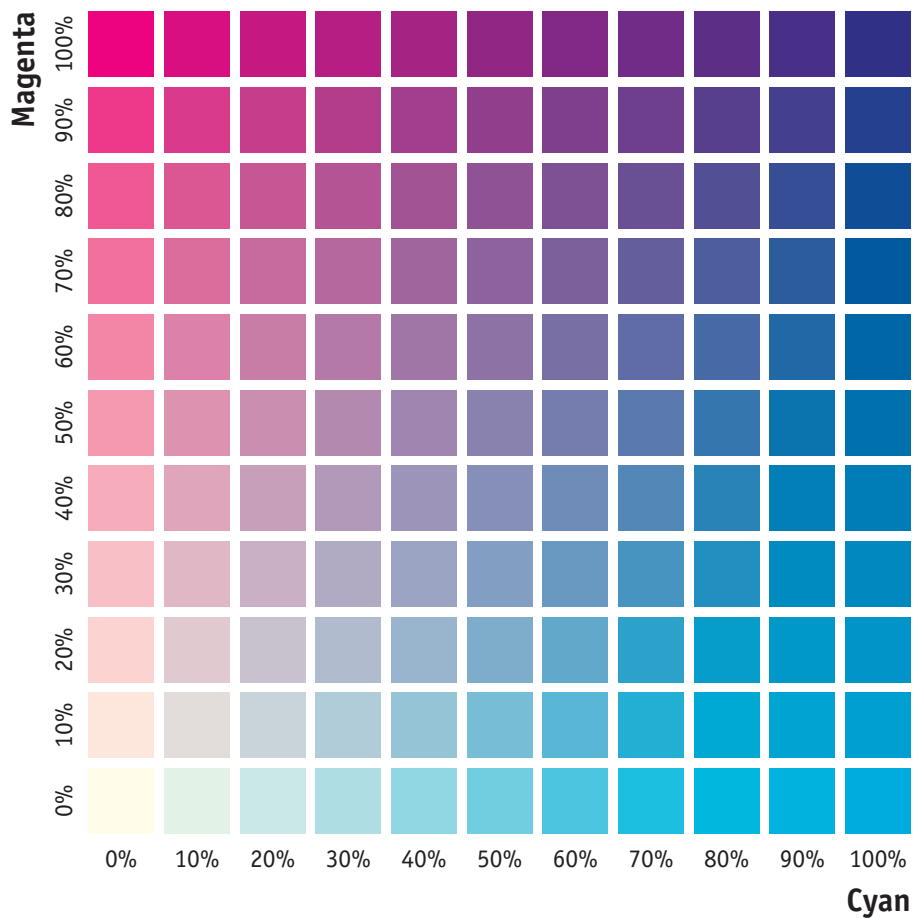
20% Black → ← **30% Black**
5% Black → ← **10% Black**

10% Yellow

Magenta

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan

Magenta

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan
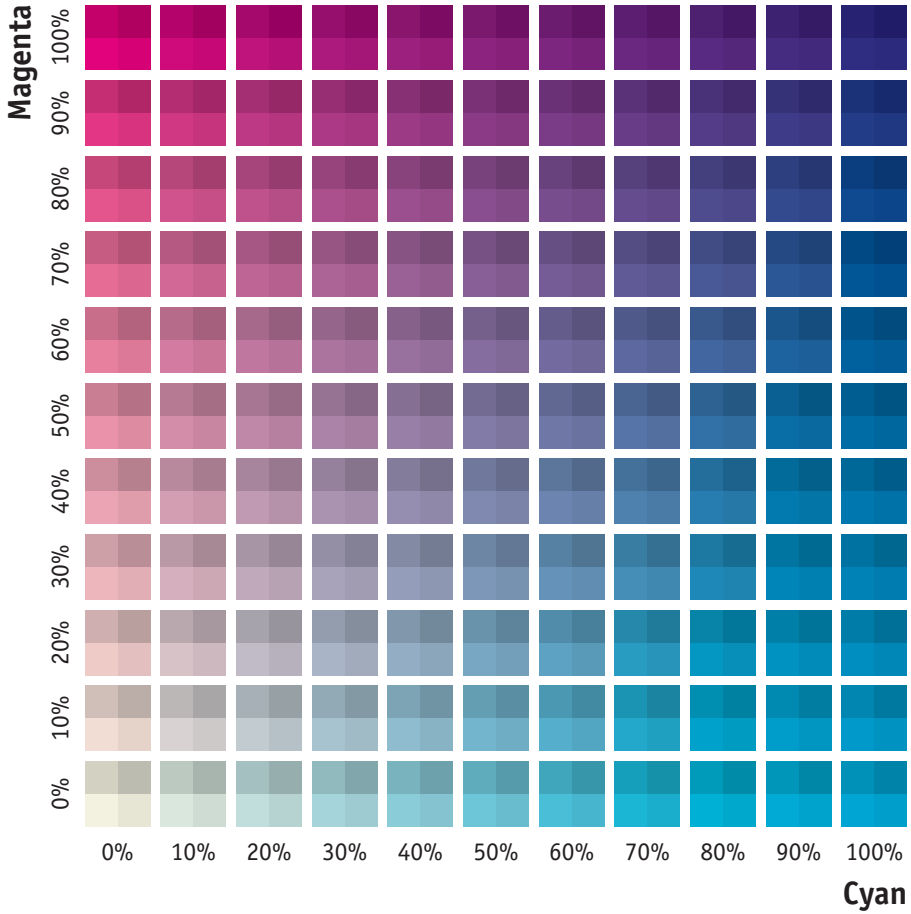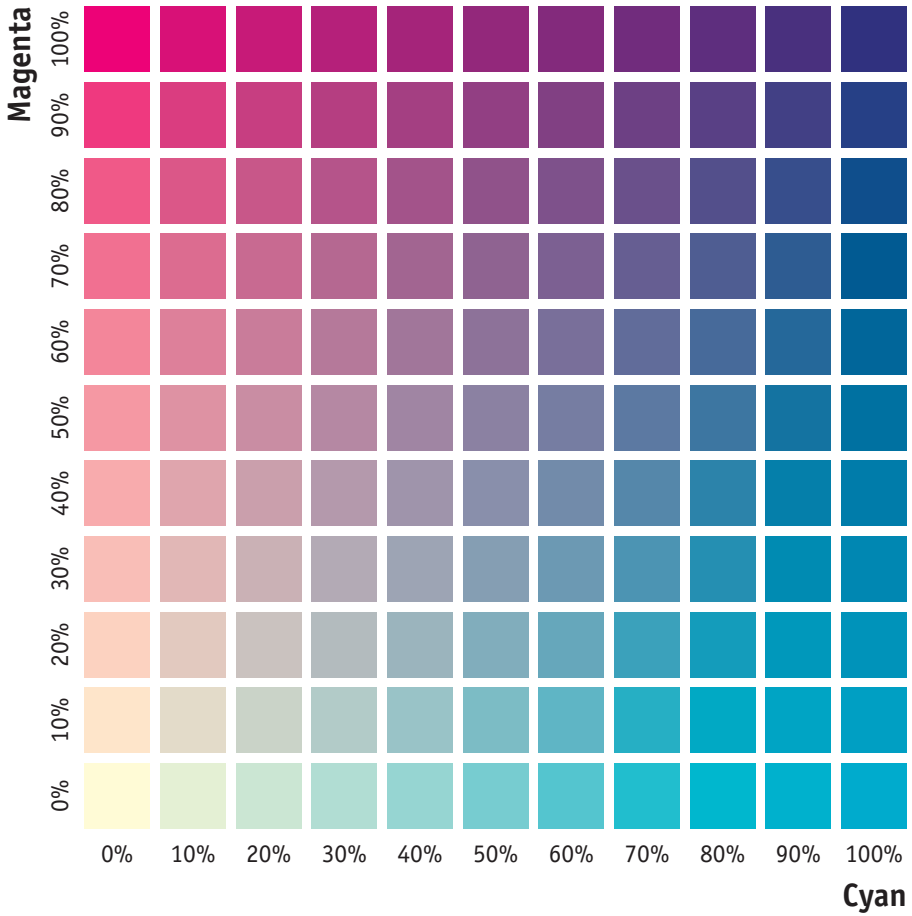
20% Black → ← **30% Black**
5% Black → ← **10% Black**

20% Yellow

Magenta

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan

30% Yellow

Magenta (vertical axis, top to bottom): 100%, 90%, 80%, 70%, 60%, 50%, 40%, 30%, 20%, 10%, 0%

Cyan (horizontal axis): 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%
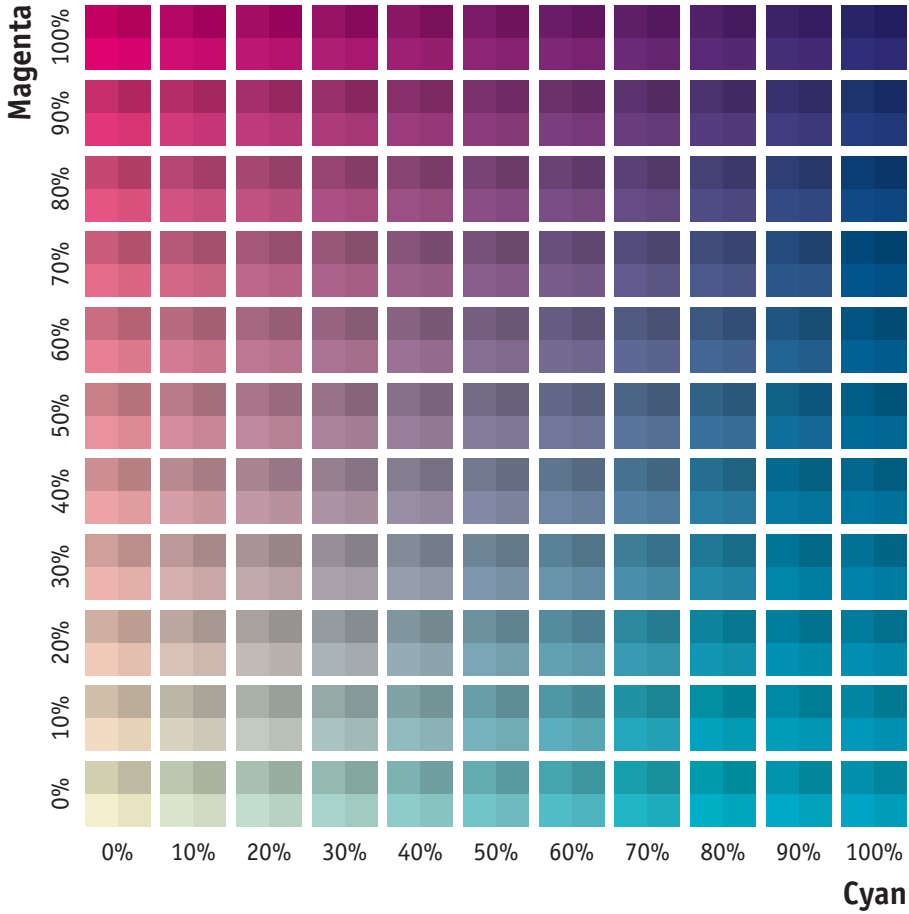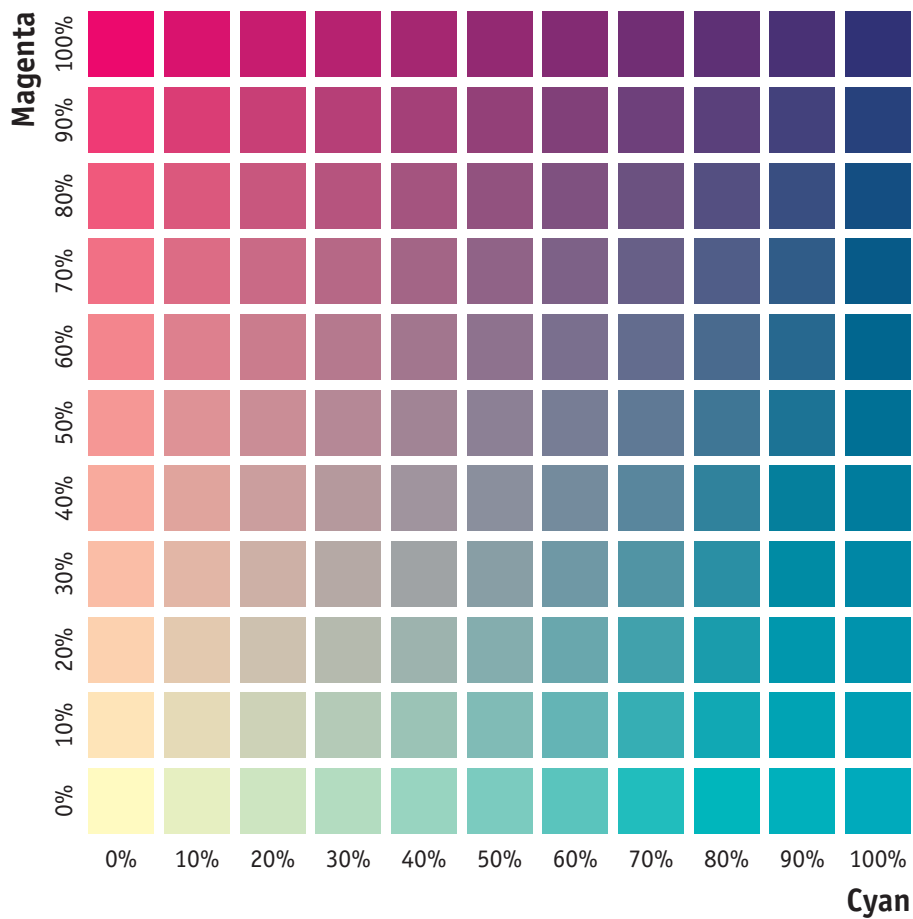
20% Black → **30% Black**
5% Black → **10% Black**

30% Yellow

Magenta

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan

Magenta

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

0%   10%   20%   30%   40%   50%   60%   70%   80%   90%   100%

Cyan
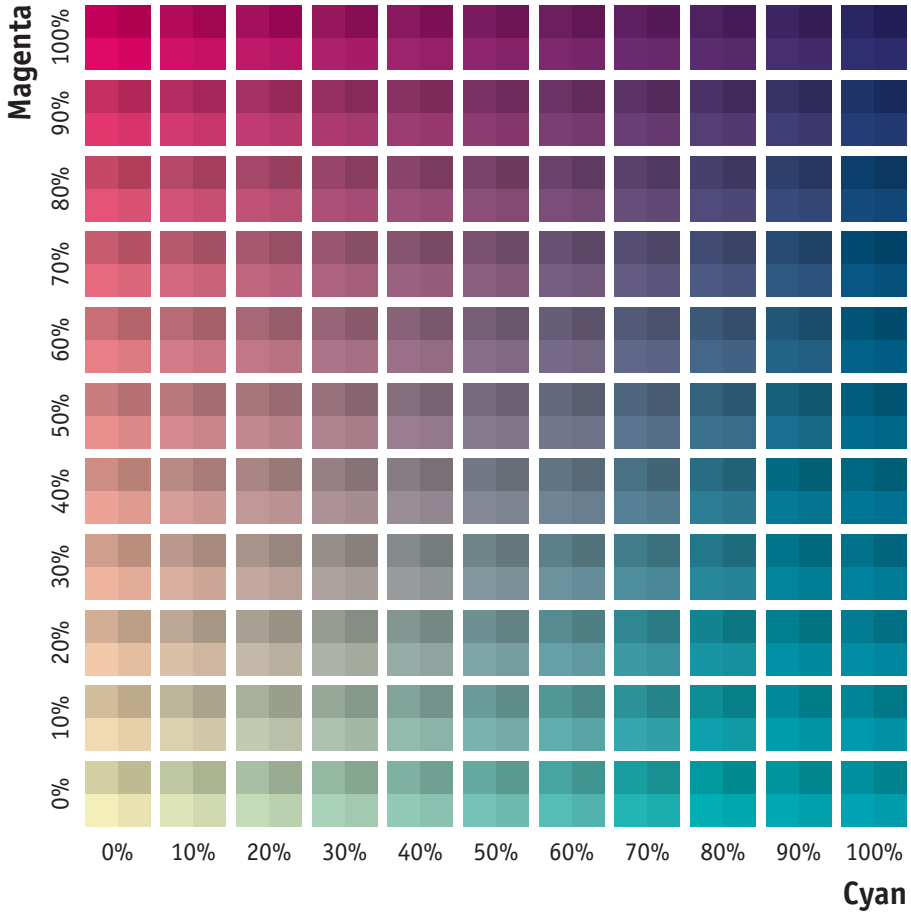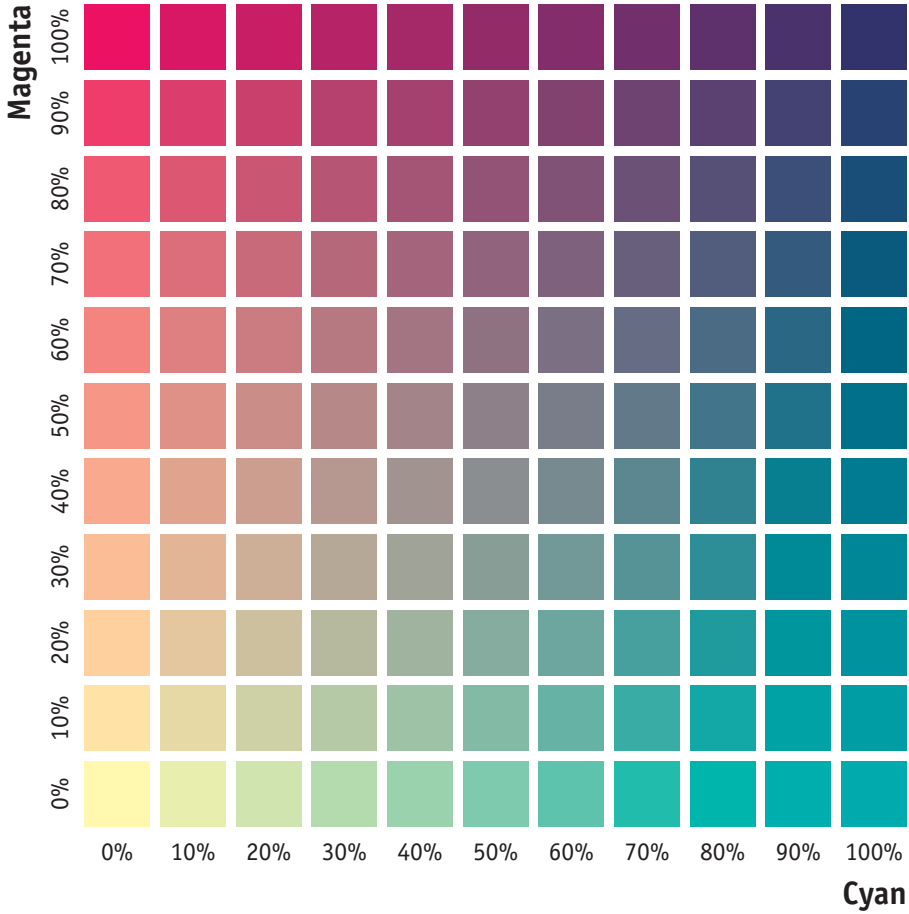
20% Black → **30% Black**
5% Black → **10% Black**

40% Yellow

Magenta

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan

Magenta

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan
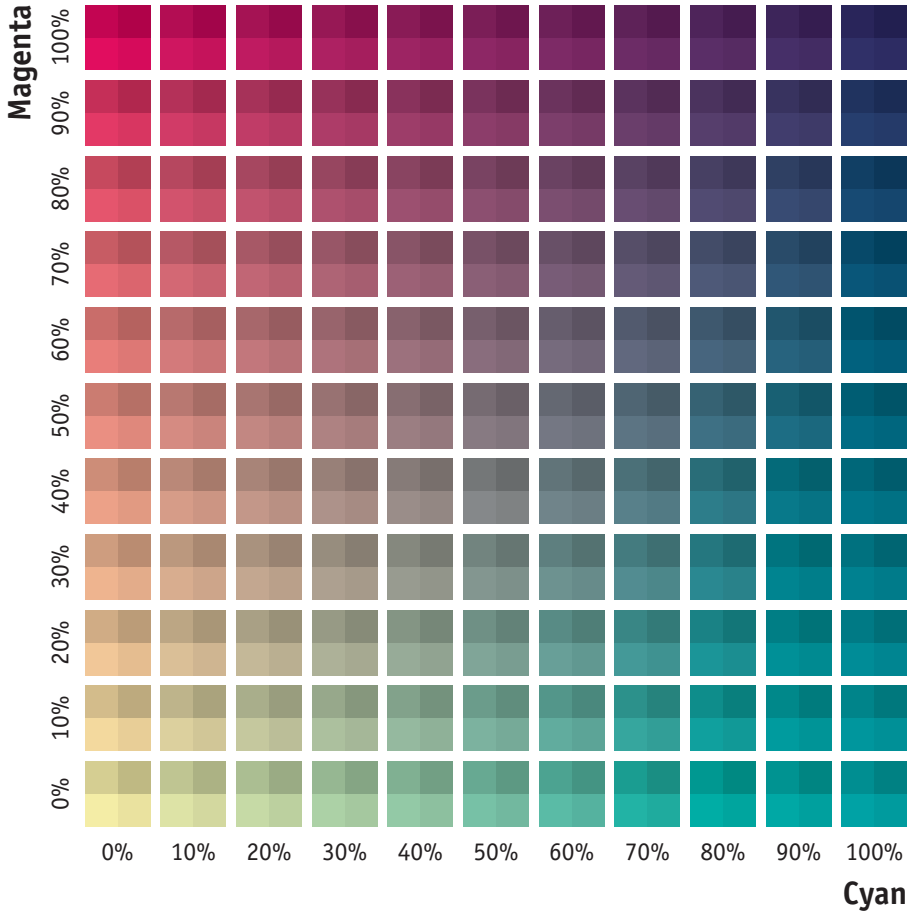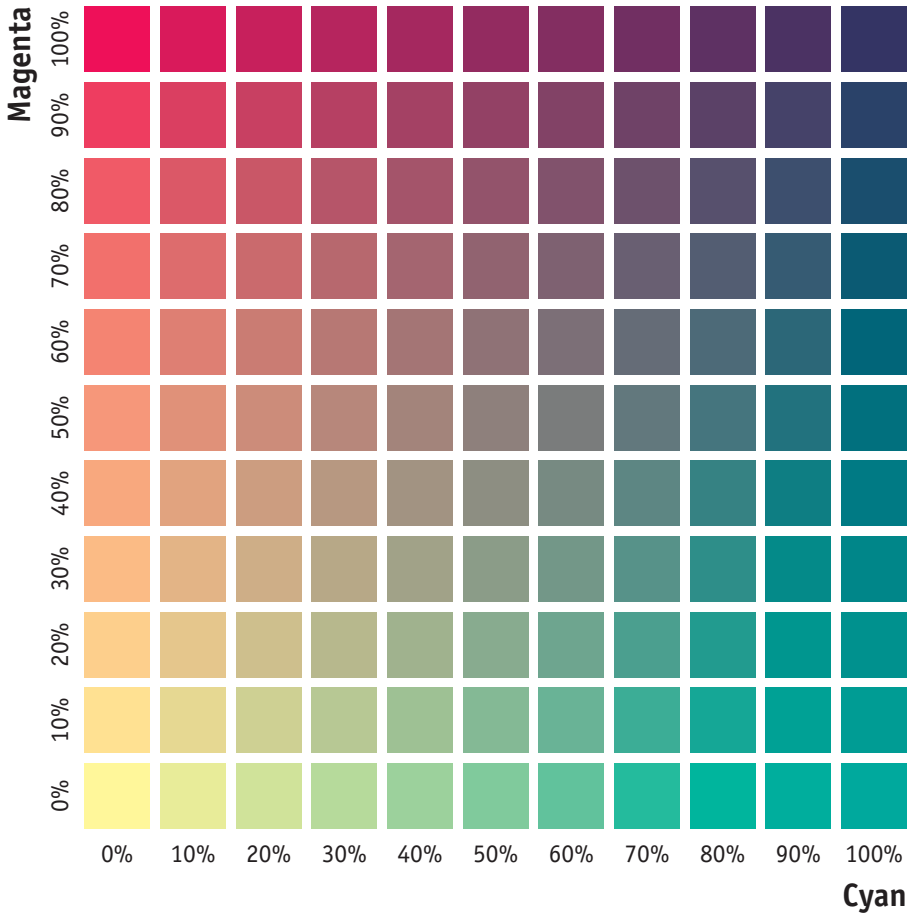
20% Black → ← **30% Black**
5% Black → ← **10% Black**

50% Yellow

Magenta

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan

Magenta

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan
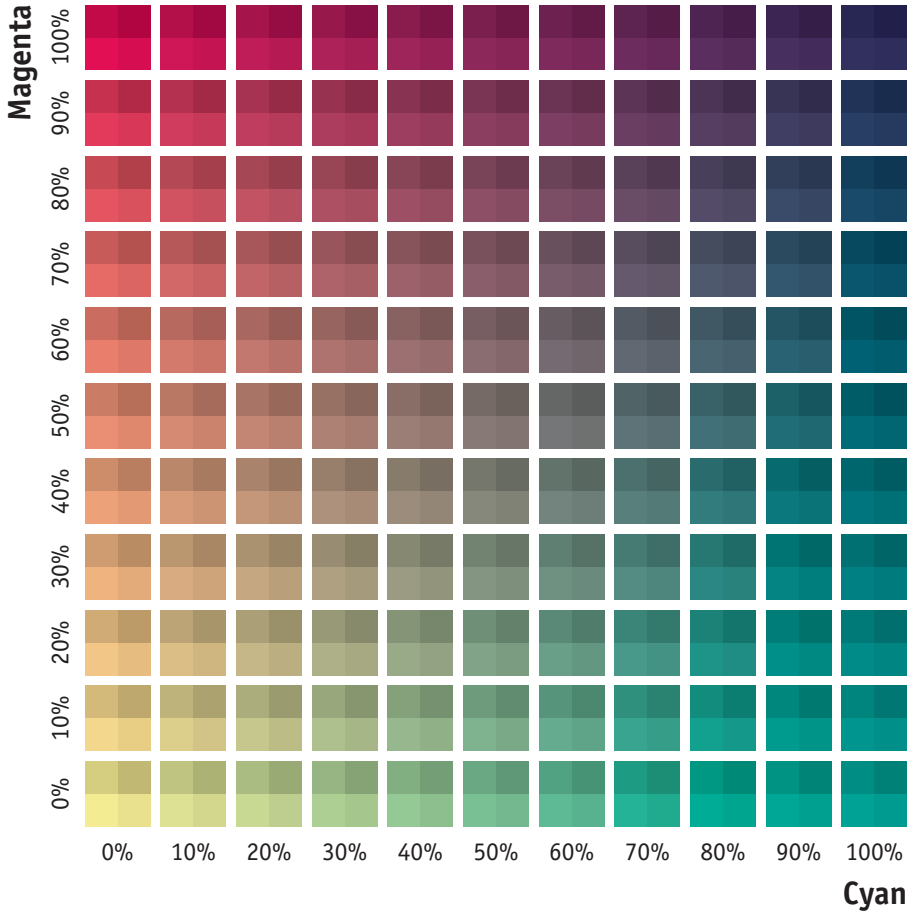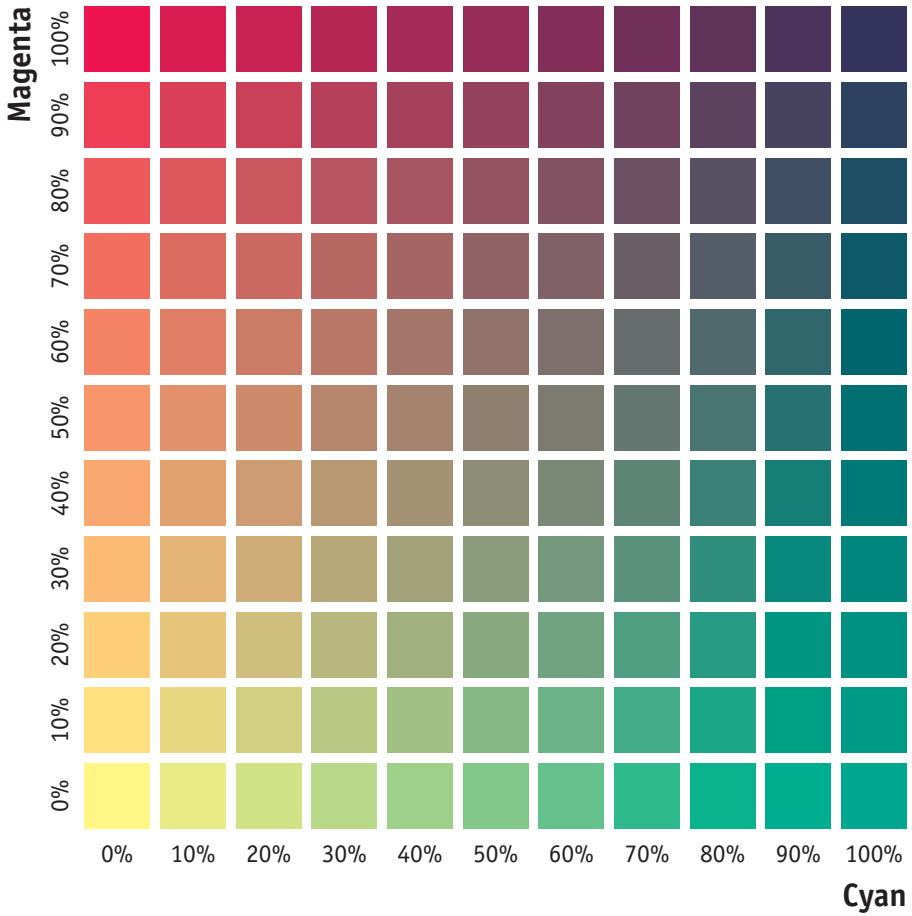
20% Black → ← **30% Black**
5% Black → ← **10% Black**

60% Yellow

Magenta

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan

Magenta

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan
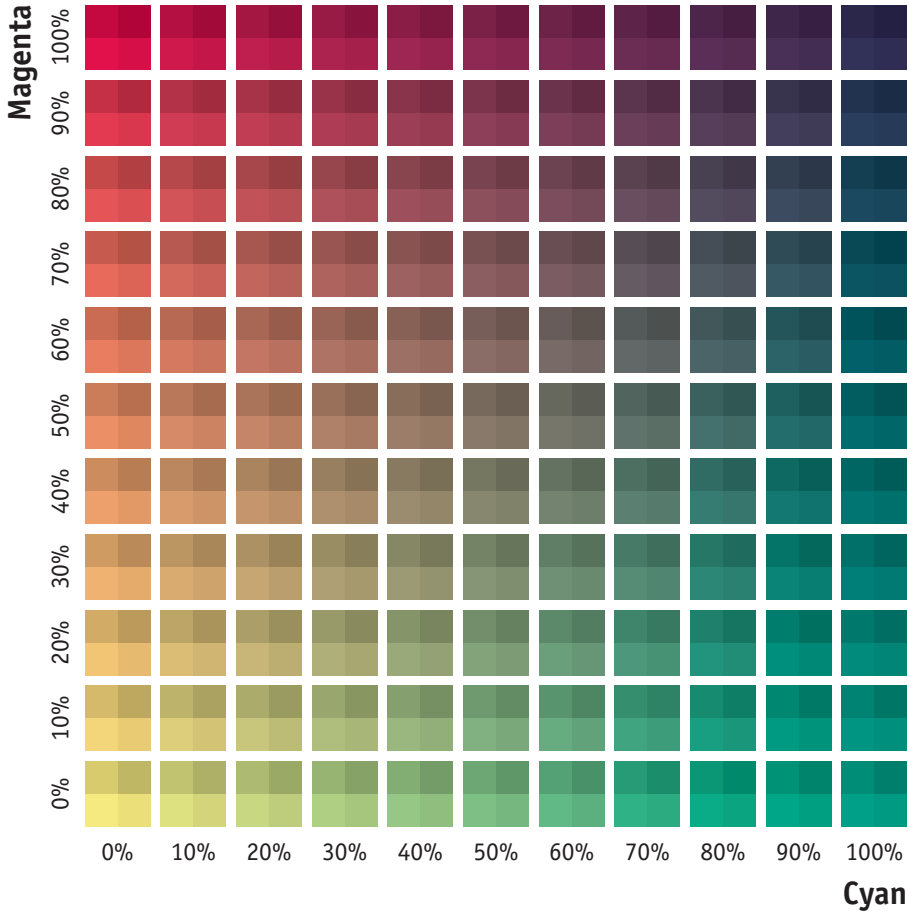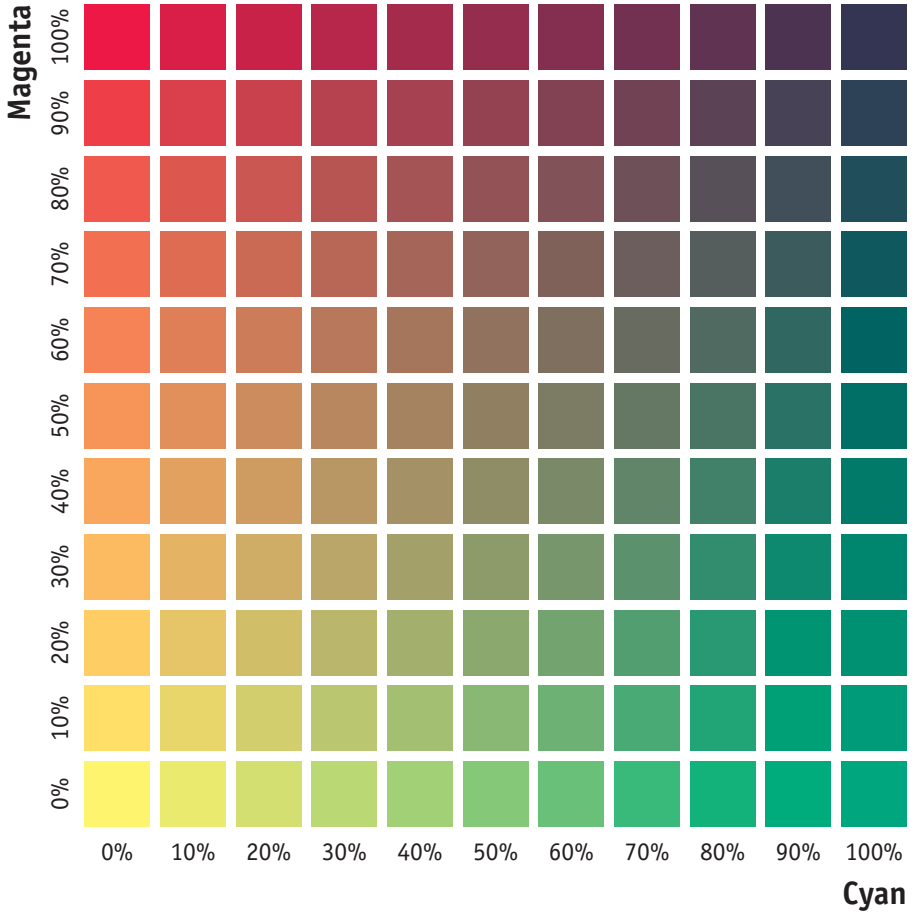
20% Black ⟶　⟵ **30% Black**
5% Black ⟶　⟵ **10% Black**

70% Yellow

Magenta

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan

80% Yellow

Magenta

Cyan values: 0%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100%

Magenta values (top to bottom): 100%, 90%, 80%, 70%, 60%, 50%, 40%, 30%, 20%, 10%, 0%

Cyan
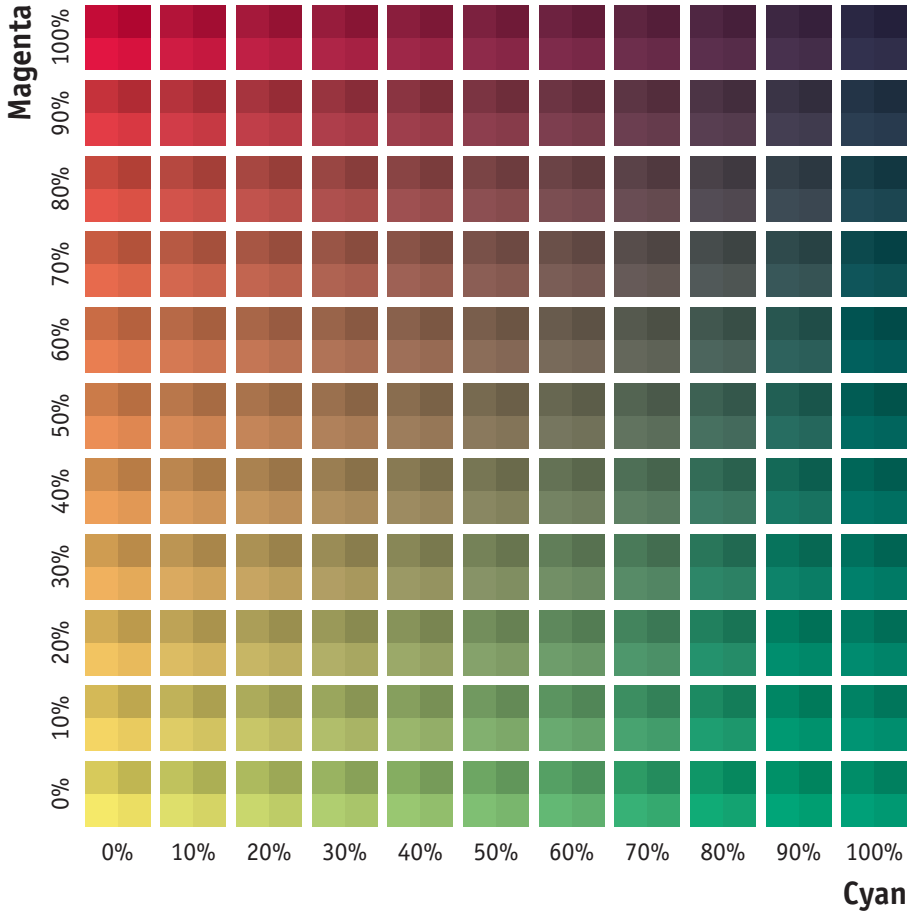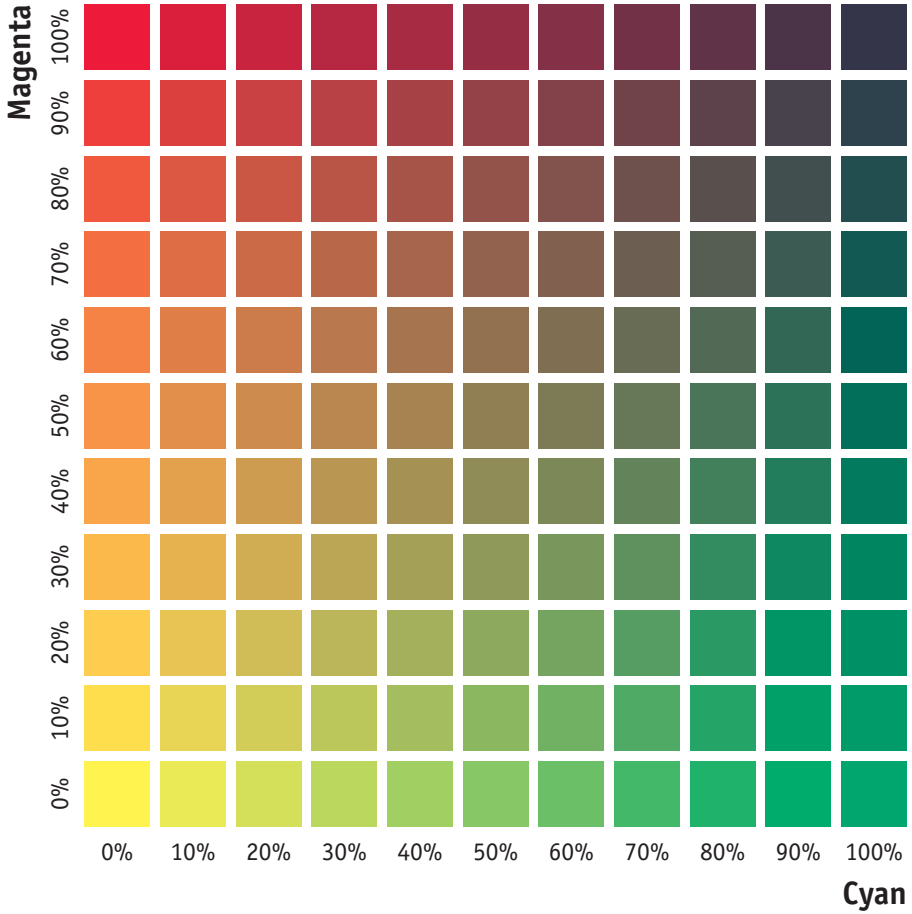
20% Black ⟶ ⟵ **30% Black**
5% Black ⟶ ⟵ **10% Black**

80% Yellow

Magenta

100% 90% 80% 70% 60% 50% 40% 30% 20% 10% 0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan

Magenta

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

0%   10%   20%   30%   40%   50%   60%   70%   80%   90%   100%

Cyan
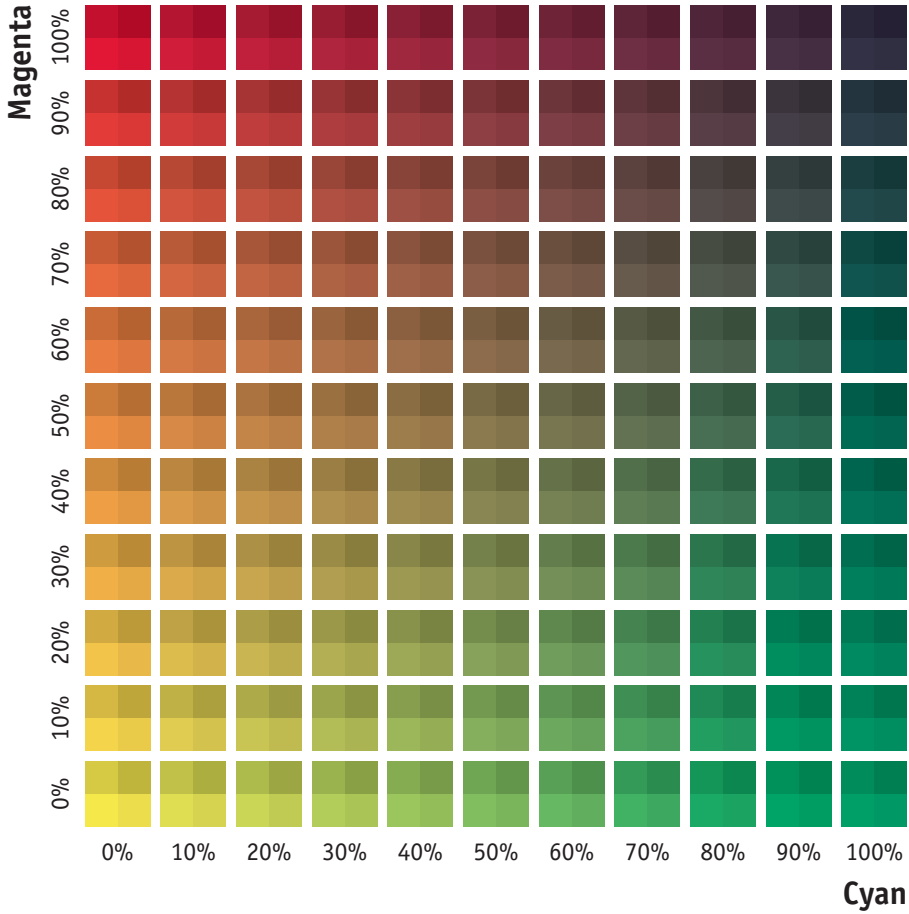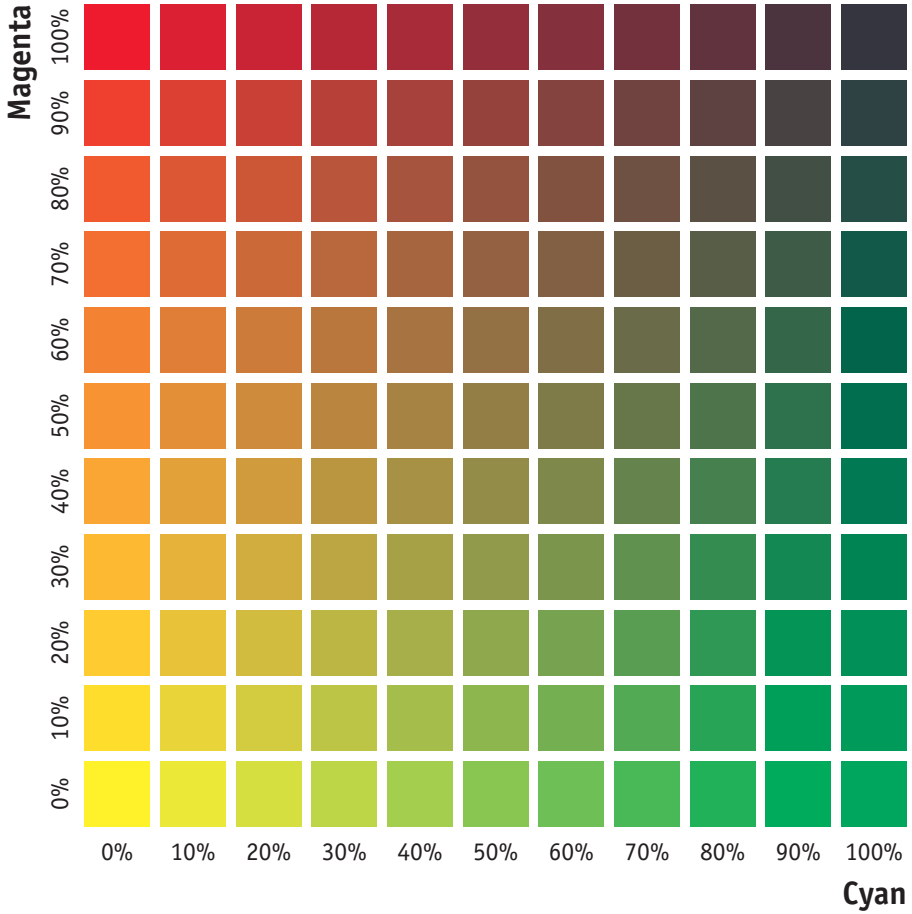
20% Black → **30% Black**
5% Black → **10% Black**

90% Yellow

Magenta

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan

100% Yellow

Magenta

| | 0% | 10% | 20% | 30% | 40% | 50% | 60% | 70% | 80% | 90% | 100% |

Cyan
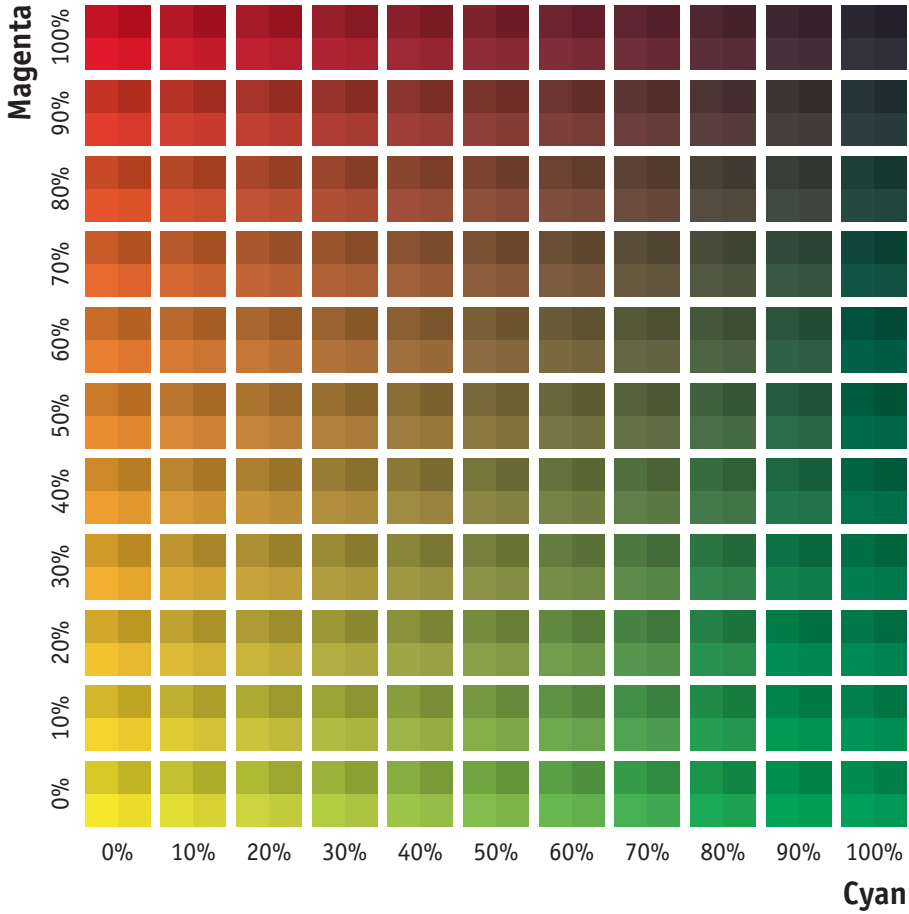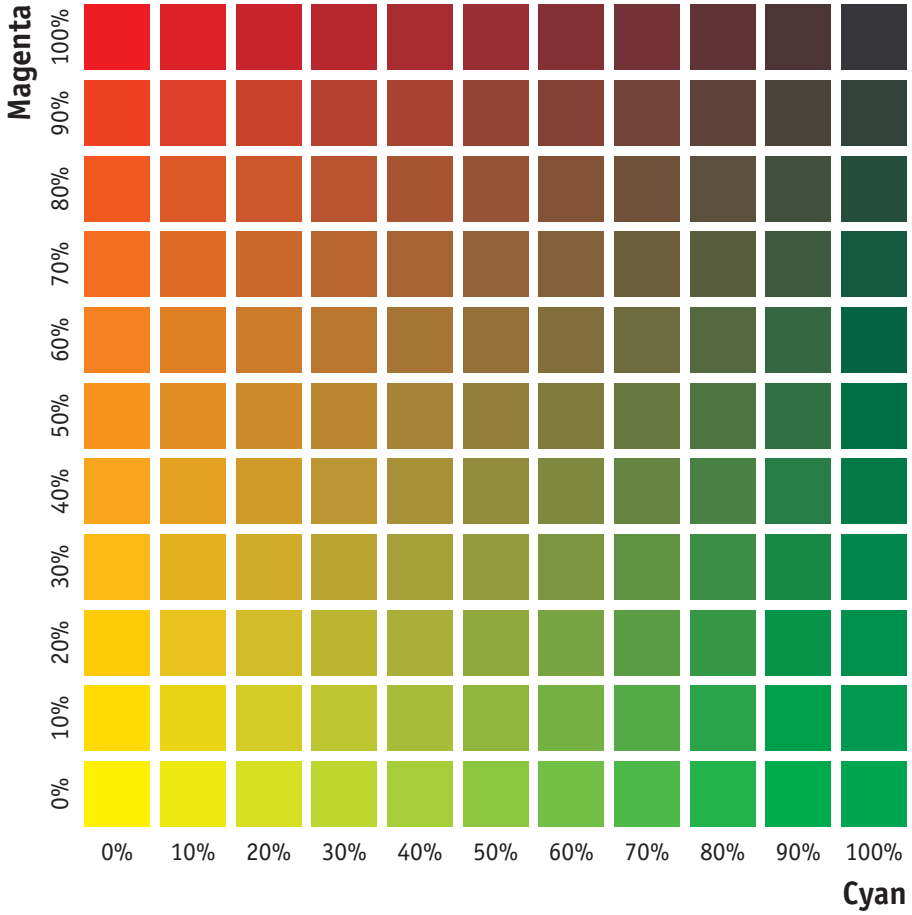
20% Black → ← 30% Black
5% Black → ← 10% Black

100% Yellow

Magenta

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Cyan
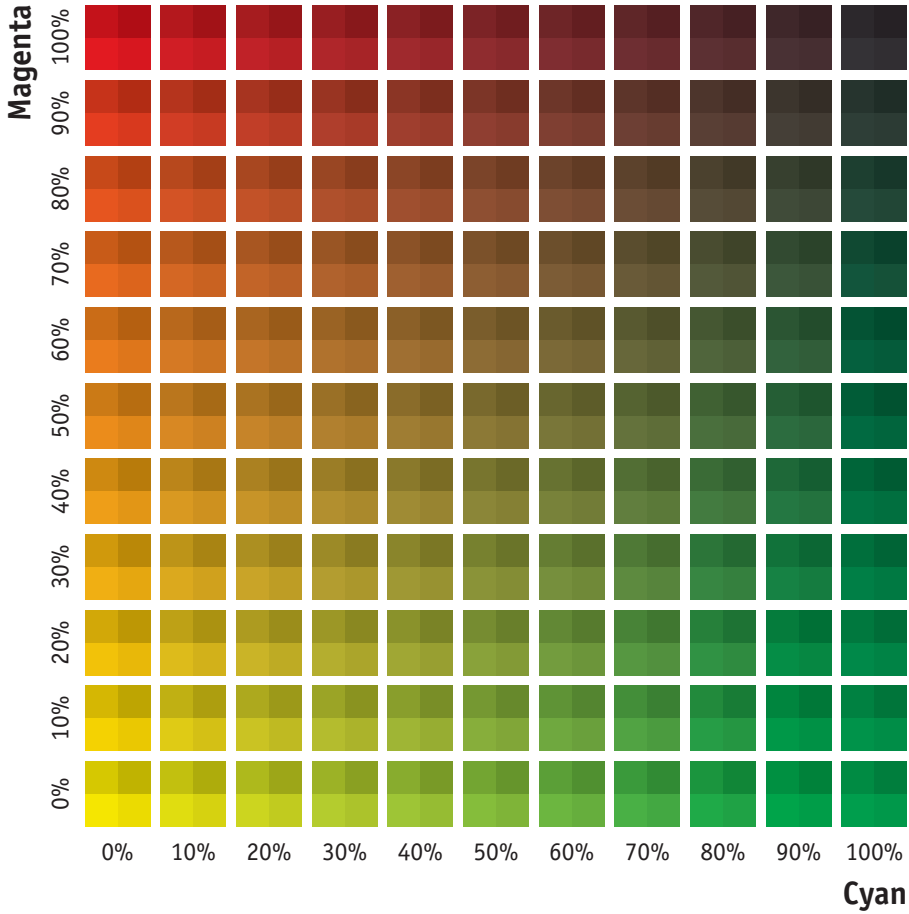
Pantone colour charts

The DocuColor 2060 is not capable of printing spot colours. However, it can convert Pantone colours into CMYK process colours on the fly during the RIP stage. Both the Fiery and CreoScitex RIPs will convert Pantone colours into process colours, but their conversion algorithms are slightly different.

Because the gamut of the DocuColor 2060 is broader than offset presses using process colours, it can match about 75% of all Pantone colours to an acceptable level compared with around 50% of offset presses running process colours.

The following charts show how Pantone colours are reproduced on the DocuColor 2060. Each Pantone colour is split into two halves. The left half shows the Pantone spot colour converted by the RIP. The right half shows the same colour using the Pantone Solid to Process values (ie, the CMYK simulation values specified by Pantone for that colour).

Due to differences between individual DocuColor 2060 digital colour presses, machine set-up (eg screening), RIPs (and their colour conversion algorithms), RIP options, calibration used, environment, and papers used and their condition, these charts should be used as a guide only. The following charts may differ somewhat from the printed results you get on your DocuColor 2060.
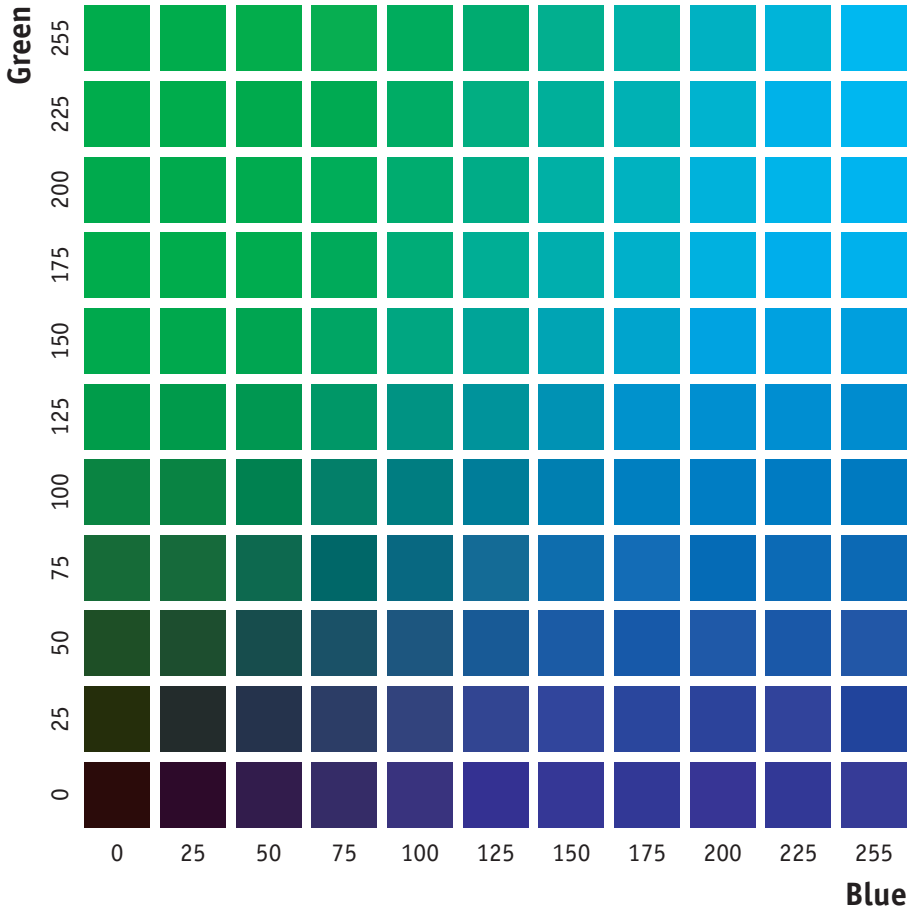
Therefore it's important that you make sure you print these charts on your DocuColor 2060, utilising your RIP, settings, calibration and paper to give to clients for colour selection and matching.

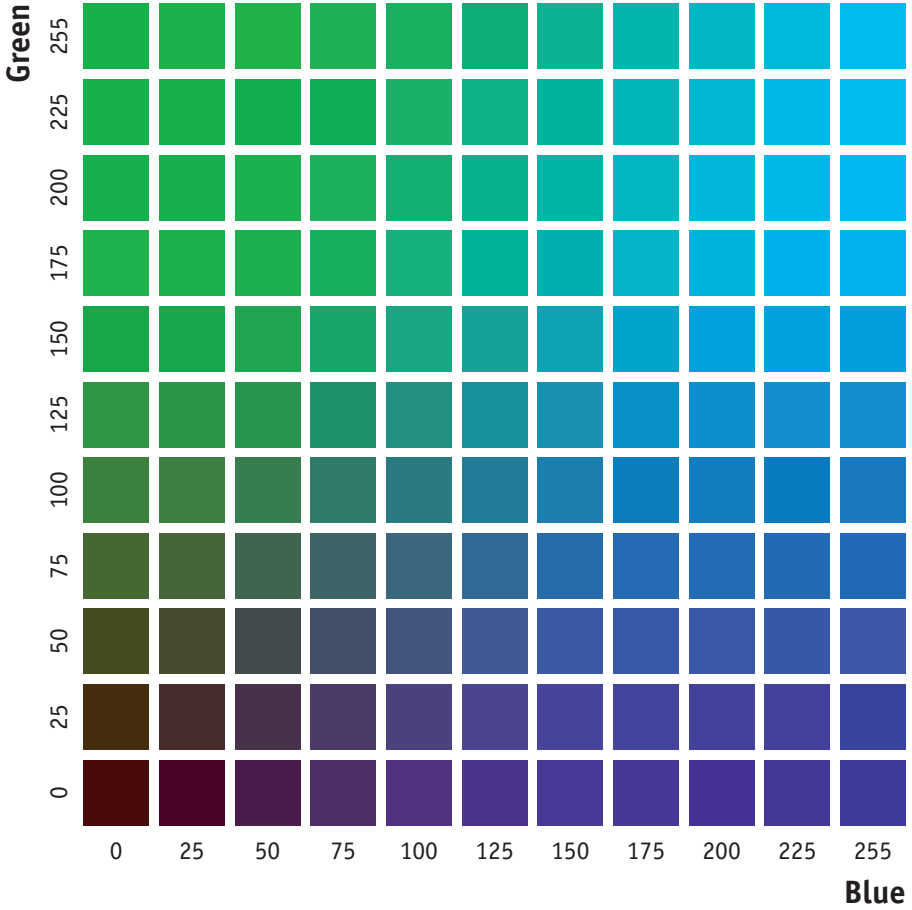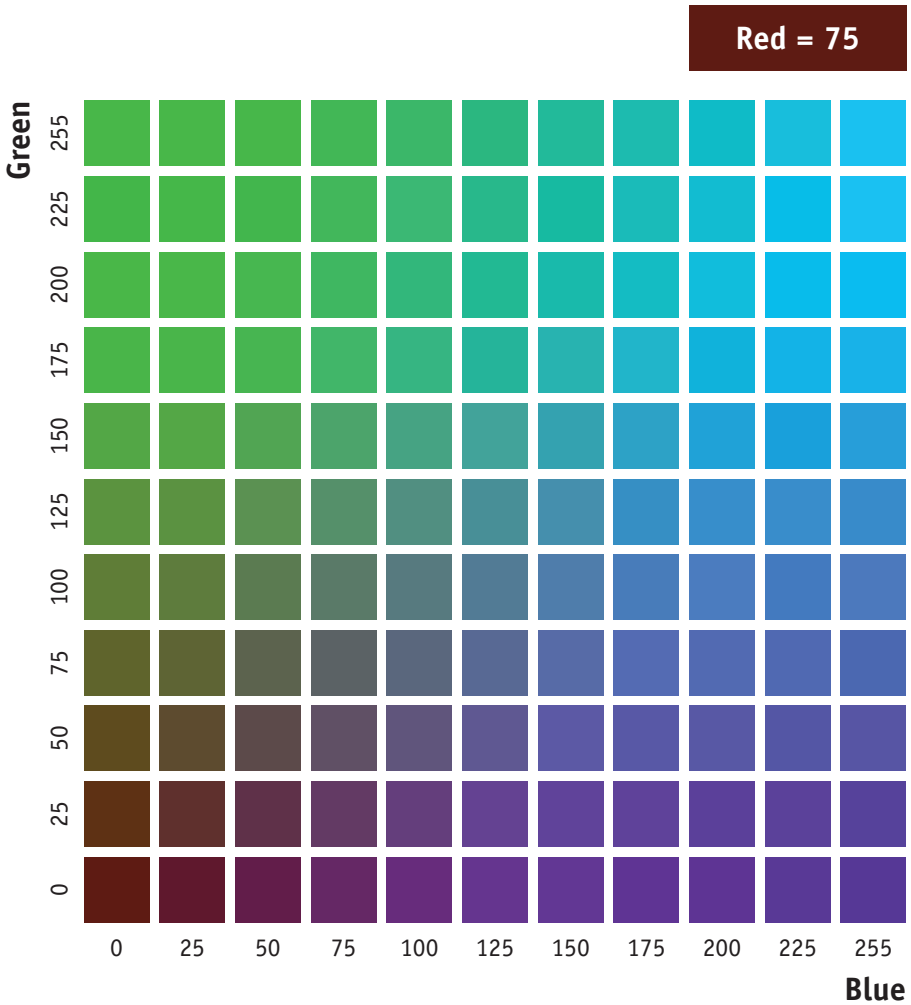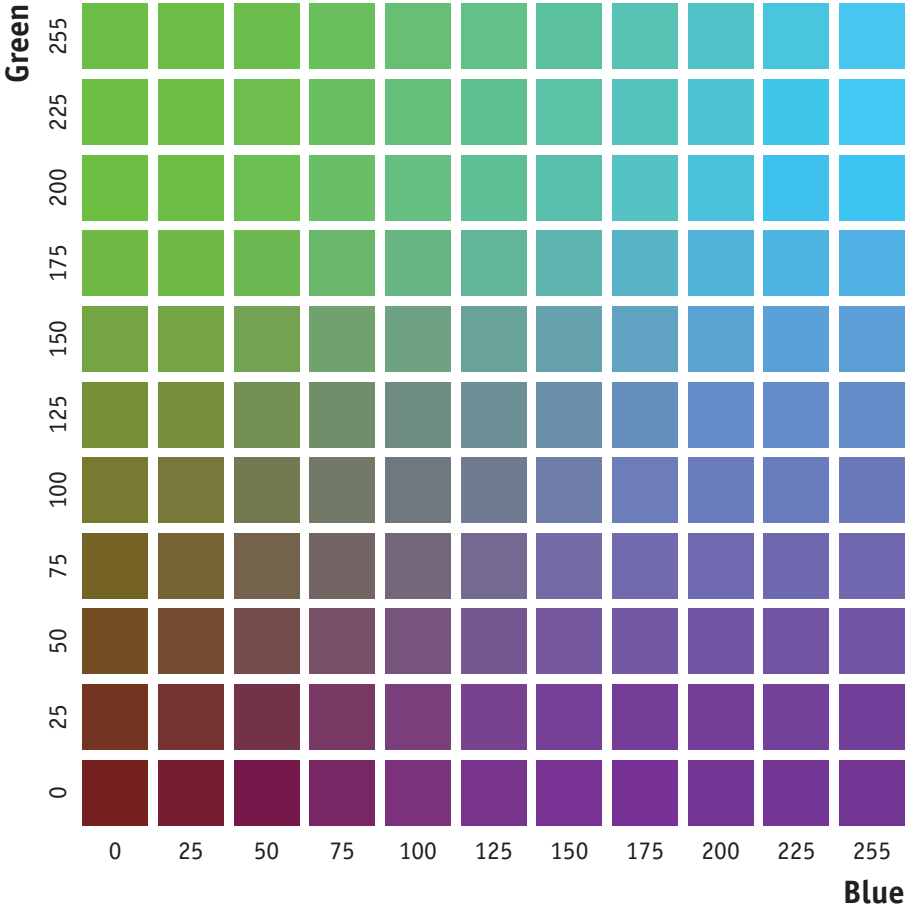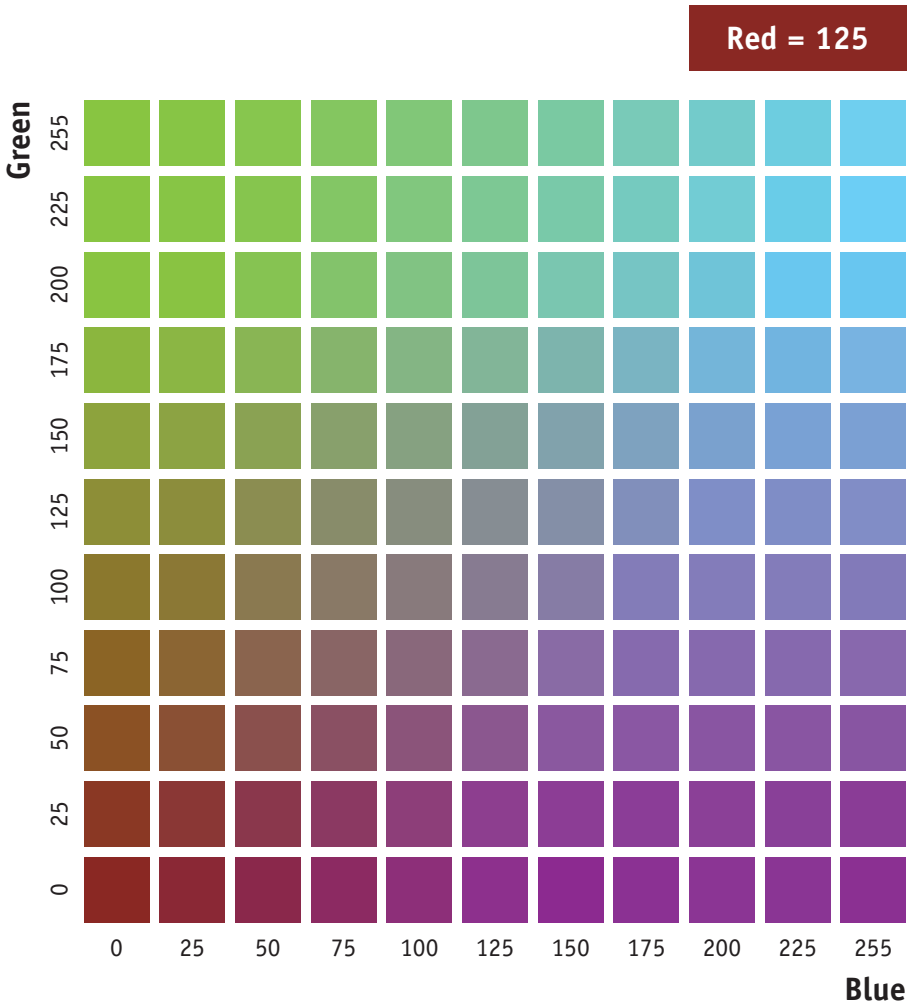|				
PANTONE 100	PANTONE 106	PANTONE 113	PANTONE 120	PANTONE 1205
PANTONE 101	PANTONE 107	PANTONE 114	PANTONE 121	PANTONE 1215
PANTONE 102	PANTONE 108	PANTONE 115	PANTONE 122	PANTONE 1225
Yellow	PANTONE 109	PANTONE 116	PANTONE 123	PANTONE 1235
PANTONE 103	PANTONE 110	PANTONE 117	PANTONE 124	PANTONE 1245
PANTONE 104	PANTONE 111	PANTONE 118	PANTONE 125	PANTONE 1255
PANTONE 105	PANTONE 112	PANTONE 119	PANTONE 126	PANTONE 1265

PANTONE colour converted by RIP ⟶ ⟶ **PANTONE process colour simulation**

PANTONE 127

PANTONE 134

PANTONE 1345

PANTONE 141

PANTONE 148

PANTONE 128

PANTONE 135

PANTONE 1355

PANTONE 142

PANTONE 149

PANTONE 129

PANTONE 136

PANTONE 1365

PANTONE 143

PANTONE 150

PANTONE 130

PANTONE 137

PANTONE 1375

PANTONE 144

PANTONE 151

PANTONE 131

PANTONE 138

PANTONE 1385

PANTONE 145

PANTONE 152

PANTONE 132

PANTONE 139

PANTONE 1395

PANTONE 146

PANTONE 153

PANTONE 133

PANTONE 140

PANTONE 1405

PANTONE 147

PANTONE 154

PANTONE colour converted by RIP ⟶ ⟵ **PANTONE process colour simulation**

PANTONE 1485

PANTONE 155

PANTONE 1555

PANTONE 162

PANTONE 1625

PANTONE 1495

PANTONE 156

PANTONE 1565

PANTONE 163

PANTONE 1635

PANTONE 1505

PANTONE 157

PANTONE 1575

PANTONE 164

PANTONE 1645

Orange 021

PANTONE 158

PANTONE 1585

PANTONE 165

PANTONE 1655

PANTONE 1525

PANTONE 159

PANTONE 1595

PANTONE 166

PANTONE 1665

PANTONE 1535

PANTONE 160

PANTONE 1605

PANTONE 167

PANTONE 1675

PANTONE 1545

PANTONE 161

PANTONE 1615

PANTONE 168
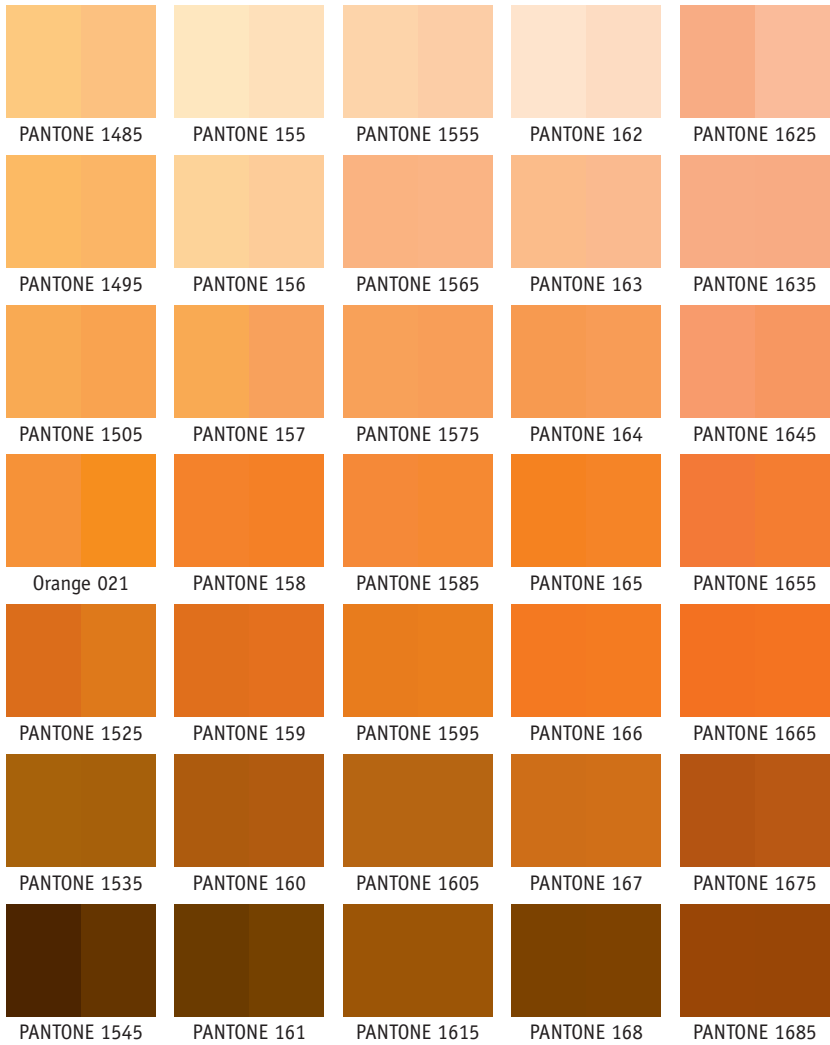
PANTONE 1685

PANTONE colour converted by RIP ⟶ ● ● ⟵ **PANTONE process colour simulation**

PANTONE 169	PANTONE 176	PANTONE 1765	PANTONE 1767	PANTONE 182
PANTONE 170	PANTONE 177	PANTONE 1775	PANTONE 1777	PANTONE 183
PANTONE 171	PANTONE 178	PANTONE 1785	PANTONE 1787	PANTONE 184
PANTONE 172	Warm Red	PANTONE 1788	Red 032	PANTONE 185
PANTONE 173	PANTONE 179	PANTONE 1795	PANTONE 1797	PANTONE 186
PANTONE 174	PANTONE 180	PANTONE 1805	PANTONE 1807	PANTONE 187
PANTONE 175	PANTONE 181	PANTONE 1815	PANTONE 1817	PANTONE 188

PANTONE colour converted by RIP ⟶   ⟵ **PANTONE process colour simulation**

PANTONE 189   PANTONE 1895   PANTONE 196   PANTONE 203   PANTONE 210

PANTONE 190   PANTONE 1905   PANTONE 197   PANTONE 204   PANTONE 211

PANTONE 191   PANTONE 1915   PANTONE 198   PANTONE 205   PANTONE 212

PANTONE 192   PANTONE 1925   PANTONE 199   PANTONE 206   PANTONE 213

PANTONE 193   PANTONE 1935   PANTONE 200   PANTONE 207   PANTONE 214

PANTONE 194   PANTONE 1945   PANTONE 201   PANTONE 208   PANTONE 215

PANTONE 195   PANTONE 1955   PANTONE 202   PANTONE 209   PANTONE 216

PANTONE colour converted by RIP ⟶   ⟵ **PANTONE process colour simulation**

PANTONE 217	PANTONE 223	PANTONE 230	PANTONE 236	PANTONE 2365
PANTONE 218	PANTONE 224	PANTONE 231	PANTONE 237	PANTONE 2375
PANTONE 219	PANTONE 225	PANTONE 232	PANTONE 238	PANTONE 2385
Rubine Red	PANTONE 226	Rhod. Red	PANTONE 239	PANTONE 2395
PANTONE 220	PANTONE 227	PANTONE 233	PANTONE 240	PANTONE 2405
PANTONE 221	PANTONE 228	PANTONE 234	PANTONE 241	PANTONE 2415
PANTONE 222	PANTONE 229	PANTONE 235	PANTONE 242	PANTONE 2425

PANTONE colour converted by RIP ⟶ **PANTONE process colour simulation**

PANTONE 243	PANTONE 250	PANTONE 256	PANTONE 2562	PANTONE 2563
PANTONE 244	PANTONE 251	PANTONE 257	PANTONE 2572	PANTONE 2573
PANTONE 245	PANTONE 252	PANTONE 258	PANTONE 2582	PANTONE 2583
PANTONE 246	Purple	PANTONE 259	PANTONE 2592	PANTONE 2593
PANTONE 247	PANTONE 253	PANTONE 260	PANTONE 2602	PANTONE 2603
PANTONE 248	PANTONE 254	PANTONE 261	PANTONE 2612	PANTONE 2613
PANTONE 249	PANTONE 255	PANTONE 262	PANTONE 2622	PANTONE 2623

PANTONE colour converted by RIP → ← **PANTONE process colour simulation**

PANTONE 2567	PANTONE 263	PANTONE 2635	PANTONE 270	PANTONE 2705
PANTONE 2577	PANTONE 264	PANTONE 2645	PANTONE 271	PANTONE 2715
PANTONE 2587	PANTONE 265	PANTONE 2655	PANTONE 272	PANTONE 2725
PANTONE 2597	PANTONE 266	PANTONE 2665	PANTONE 273	PANTONE 2735
PANTONE 2607	PANTONE 267	Violet	PANTONE 274	PANTONE 2745
PANTONE 2617	PANTONE 268	PANTONE 2685	PANTONE 275	PANTONE 2755
PANTONE 2627	PANTONE 269	PANTONE 2695	PANTONE 276	PANTONE 2765

PANTONE colour converted by RIP ⟶   ⟵ **PANTONE process colour simulation**

PANTONE 2706	PANTONE 2707	PANTONE 2708	PANTONE 277	PANTONE 283
PANTONE 2716	PANTONE 2717	PANTONE 2718	PANTONE 278	PANTONE 284
PANTONE 2726	PANTONE 2727	PANTONE 2728	PANTONE 279	PANTONE 285
PANTONE 2736	Blue 072	PANTONE 2738	Reflex Blue	PANTONE 286
PANTONE 2746	PANTONE 2747	PANTONE 2748	PANTONE 280	PANTONE 287
PANTONE 2756	PANTONE 2757	PANTONE 2758	PANTONE 281	PANTONE 288
PANTONE 2766	PANTONE 2767	PANTONE 2768	PANTONE 282	PANTONE 289

PANTONE colour converted by RIP ⟶ ← **PANTONE process colour simulation**

PANTONE 290	PANTONE 2905	PANTONE 297	PANTONE 2975	PANTONE 304
PANTONE 291	PANTONE 2915	PANTONE 298	PANTONE 2985	PANTONE 305
PANTONE 292	PANTONE 2925	PANTONE 299	PANTONE 2995	PANTONE 306
PANTONE 293	PANTONE 2935	PANTONE 300	PANTONE 3005	Process Blue
PANTONE 294	PANTONE 2945	PANTONE 301	PANTONE 3015	PANTONE 307
PANTONE 295	PANTONE 2955	PANTONE 302	PANTONE 3025	PANTONE 308
PANTONE 296	PANTONE 2965	PANTONE 303	PANTONE 3035	PANTONE 309

PANTONE colour converted by RIP ⟶   ⟵ **PANTONE process colour simulation**

PANTONE 310

PANTONE 3105

PANTONE 317

PANTONE 324

PANTONE 3242

PANTONE 311

PANTONE 3115

PANTONE 318

PANTONE 325

PANTONE 3252

PANTONE 312

PANTONE 3125

PANTONE 319

PANTONE 326

PANTONE 3262

PANTONE 313

PANTONE 3135

PANTONE 320

PANTONE 327

PANTONE 3272

PANTONE 314

PANTONE 3145

PANTONE 321

PANTONE 328

PANTONE 3282

PANTONE 315

PANTONE 3155

PANTONE 322

PANTONE 329

PANTONE 3292

PANTONE 316

PANTONE 3165

PANTONE 323

PANTONE 330

PANTONE 3302

PANTONE colour converted by RIP ⟶ ● ● ⟵ **PANTONE process colour simulation**

PANTONE 3245	PANTONE 3248	PANTONE 331	PANTONE 337	PANTONE 3375
PANTONE 3255	PANTONE 3258	PANTONE 332	PANTONE 338	PANTONE 3385
PANTONE 3265	PANTONE 3268	PANTONE 333	PANTONE 339	PANTONE 3395
PANTONE 3275	PANTONE 3278	Green	PANTONE 340	PANTONE 3405
PANTONE 3285	PANTONE 3288	PANTONE 334	PANTONE 341	PANTONE 3415
PANTONE 3295	PANTONE 3298	PANTONE 335	PANTONE 342	PANTONE 3425
PANTONE 3305	PANTONE 3308	PANTONE 336	PANTONE 343	PANTONE 3435

PANTONE colour converted by RIP ⟶ ← **PANTONE process colour simulation**

PANTONE 344

PANTONE 351

PANTONE 358

PANTONE 365

PANTONE 372

PANTONE 345

PANTONE 352

PANTONE 359

PANTONE 366

PANTONE 373

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PANTONE 356

PANTONE 363

PANTONE 370

PANTONE 377

PANTONE 350

PANTONE 357

PANTONE 364

PANTONE 371

PANTONE 378

PANTONE colour converted by RIP ⟶   ⟵ **PANTONE process colour simulation**

PANTONE 379	PANTONE 386	PANTONE 393	PANTONE 3935	PANTONE 400
PANTONE 380	PANTONE 387	PANTONE 394	PANTONE 3945	PANTONE 401
PANTONE 381	PANTONE 388	PANTONE 395	PANTONE 3955	PANTONE 402
PANTONE 382	PANTONE 389	PANTONE 396	PANTONE 3965	PANTONE 403
PANTONE 383	PANTONE 390	PANTONE 397	PANTONE 3975	PANTONE 404
PANTONE 384	PANTONE 391	PANTONE 398	PANTONE 3985	PANTONE 405
PANTONE 385	PANTONE 392	PANTONE 399	PANTONE 3995	Black

PANTONE colour converted by RIP ⟶   ⟵ **PANTONE process colour simulation**

PANTONE 406	PANTONE 413	PANTONE 420	PANTONE 427	PANTONE 434
PANTONE 407	PANTONE 414	PANTONE 421	PANTONE 428	PANTONE 435
PANTONE 408	PANTONE 415	PANTONE 422	PANTONE 429	PANTONE 436
PANTONE 409	PANTONE 416	PANTONE 423	PANTONE 430	PANTONE 437
PANTONE 410	PANTONE 417	PANTONE 424	PANTONE 431	PANTONE 438
PANTONE 411	PANTONE 418	PANTONE 425	PANTONE 432	PANTONE 439
PANTONE 412	PANTONE 419	PANTONE 426	PANTONE 433	PANTONE 440

PANTONE colour converted by RIP ——•   •—— **PANTONE process colour simulation**

PANTONE 441 Warm Grey 1 Warm Grey 6 Cool Grey 1 Cool Grey 6

PANTONE 442 Warm Grey 2 Warm Grey 7 Cool Grey 2 Cool Grey 7

PANTONE 443 Warm Grey 3 Warm Grey 8 Cool Grey 3 Cool Grey 8

PANTONE 444 Warm Grey 4 Warm Grey 9 Cool Grey 4 Cool Grey 9

PANTONE 445 Warm Grey 5 Warm Grey 10 Cool Grey 5 Cool Grey 10

PANTONE 446 Warm Grey 11 Cool Grey 11

PANTONE 447

PANTONE colour converted by RIP ⟶ ⟵ **PANTONE process colour simulation**

Black 2	PANTONE 448	PANTONE 4485	PANTONE 455	PANTONE 462
Black 3	PANTONE 449	PANTONE 4495	PANTONE 456	PANTONE 463
Black 4	PANTONE 450	PANTONE 4505	PANTONE 457	PANTONE 464
Black 5	PANTONE 451	PANTONE 4515	PANTONE 458	PANTONE 465
Black 6	PANTONE 452	PANTONE 4525	PANTONE 459	PANTONE 466
Black 7	PANTONE 453	PANTONE 4535	PANTONE 460	PANTONE 467
	PANTONE 454	PANTONE 4545	PANTONE 461	PANTONE 468

PANTONE colour converted by RIP ⟶ • ⟵ **PANTONE process colour simulation**

PANTONE 4625	PANTONE 469	PANTONE 4695	PANTONE 476	PANTONE 483
PANTONE 4635	PANTONE 470	PANTONE 4705	PANTONE 477	PANTONE 484
PANTONE 4645	PANTONE 471	PANTONE 4715	PANTONE 478	PANTONE 485
PANTONE 4655	PANTONE 472	PANTONE 4725	PANTONE 479	PANTONE 486
PANTONE 4665	PANTONE 473	PANTONE 4735	PANTONE 480	PANTONE 487
PANTONE 4675	PANTONE 474	PANTONE 4745	PANTONE 481	PANTONE 488
PANTONE 4685	PANTONE 475	PANTONE 4755	PANTONE 482	PANTONE 489

PANTONE colour converted by RIP → ← **PANTONE process colour simulation**

PANTONE 490	PANTONE 497	PANTONE 4975	PANTONE 504	PANTONE 511
PANTONE 491	PANTONE 498	PANTONE 4985	PANTONE 505	PANTONE 512
PANTONE 492	PANTONE 499	PANTONE 4995	PANTONE 506	PANTONE 513
PANTONE 493	PANTONE 500	PANTONE 5005	PANTONE 507	PANTONE 514
PANTONE 494	PANTONE 501	PANTONE 5015	PANTONE 508	PANTONE 515
PANTONE 495	PANTONE 502	PANTONE 5025	PANTONE 509	PANTONE 516
PANTONE 496	PANTONE 503	PANTONE 5035	PANTONE 510	PANTONE 517

PANTONE colour converted by RIP ⟶ ● ● ⟵ **PANTONE process colour simulation**

PANTONE 5115

PANTONE 518

PANTONE 5185

PANTONE 525

PANTONE 5255

PANTONE 5125

PANTONE 519

PANTONE 5195

PANTONE 526

PANTONE 5265

PANTONE 5135

PANTONE 520

PANTONE 5205

PANTONE 527

PANTONE 5275

PANTONE 5145

PANTONE 521

PANTONE 5215

PANTONE 528

PANTONE 5285

PANTONE 5155

PANTONE 522

PANTONE 5225

PANTONE 529

PANTONE 5295

PANTONE 5165

PANTONE 523

PANTONE 5235

PANTONE 530

PANTONE 5305

PANTONE 5175

PANTONE 524

PANTONE 5245

PANTONE 531

PANTONE 5315

PANTONE colour converted by RIP   •——   ——•   **PANTONE process colour simulation**

PANTONE 532

PANTONE 539

PANTONE 5395

PANTONE 546

PANTONE 5463

PANTONE 533

PANTONE 540

PANTONE 5405

PANTONE 547

PANTONE 5473

PANTONE 534

PANTONE 541

PANTONE 5415

PANTONE 548

PANTONE 5483

PANTONE 535

PANTONE 542

PANTONE 5425

PANTONE 549

PANTONE 5493

PANTONE 536

PANTONE 543

PANTONE 5435

PANTONE 550

PANTONE 5503

PANTONE 537

PANTONE 544

PANTONE 5445

PANTONE 551

PANTONE 5513

PANTONE 538

PANTONE 545

PANTONE 5455

PANTONE 552

PANTONE 5523

PANTONE colour converted by RIP ⟶   ⟵ **PANTONE process colour simulation**

PANTONE 5467 | PANTONE 553 | PANTONE 5535 | PANTONE 560 | PANTONE 5605

PANTONE 5477 | PANTONE 554 | PANTONE 5545 | PANTONE 561 | PANTONE 5615

PANTONE 5487 | PANTONE 555 | PANTONE 5555 | PANTONE 562 | PANTONE 5625

PANTONE 5497 | PANTONE 556 | PANTONE 5565 | PANTONE 563 | PANTONE 5635

PANTONE 5507 | PANTONE 557 | PANTONE 5575 | PANTONE 564 | PANTONE 5645

PANTONE 5517 | PANTONE 558 | PANTONE 5585 | PANTONE 565 | PANTONE 5655

PANTONE 5527 | PANTONE 559 | PANTONE 5595 | PANTONE 566 | PANTONE 5665

PANTONE colour converted by RIP ⟶ ⟵ **PANTONE process colour simulation**

PANTONE 567

PANTONE 574

PANTONE 5743

PANTONE 5747

PANTONE 581

PANTONE 568

PANTONE 575

PANTONE 5753

PANTONE 5757

PANTONE 582

PANTONE 569

PANTONE 576

PANTONE 5763

PANTONE 5767

PANTONE 583

PANTONE 570

PANTONE 577

PANTONE 5773

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PANTONE 5783

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PANTONE 585

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PANTONE 579

PANTONE 5793

PANTONE 5797

PANTONE 586

PANTONE 573

PANTONE 580

PANTONE 5803

PANTONE 5807

PANTONE 587

PANTONE colour converted by RIP **PANTONE process colour simulation**

PANTONE 5815	PANTONE 600	PANTONE 607	PANTONE 614	PANTONE 621
PANTONE 5825	PANTONE 601	PANTONE 608	PANTONE 615	PANTONE 622
PANTONE 5835	PANTONE 602	PANTONE 609	PANTONE 616	PANTONE 623
PANTONE 5845	PANTONE 603	PANTONE 610	PANTONE 617	PANTONE 624
PANTONE 5855	PANTONE 604	PANTONE 611	PANTONE 618	PANTONE 625
PANTONE 5865	PANTONE 605	PANTONE 612	PANTONE 619	PANTONE 626
PANTONE 5875	PANTONE 606	PANTONE 613	PANTONE 620	PANTONE 627

PANTONE colour converted by RIP ⟶ **PANTONE process colour simulation**

PANTONE 628

PANTONE 635

PANTONE 642

PANTONE 649

PANTONE 656

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PANTONE 634

PANTONE 641

PANTONE 648

PANTONE 655

PANTONE 662

PANTONE colour converted by RIP ⟶ ⟵ **PANTONE process colour simulation**

PANTONE 663

PANTONE 670

PANTONE 677

PANTONE 684

PANTONE 691

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PANTONE 666

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PANTONE 680

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PANTONE 668

PANTONE 675

PANTONE 682

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PANTONE 696

PANTONE 669

PANTONE 676

PANTONE 683

PANTONE 690

PANTONE 697

PANTONE colour converted by RIP ⟶ ⟵ **PANTONE process colour simulation**

PANTONE 698	PANTONE 705	PANTONE 712	PANTONE 719	PANTONE 726
PANTONE 699	PANTONE 706	PANTONE 713	PANTONE 720	PANTONE 727
PANTONE 700	PANTONE 707	PANTONE 714	PANTONE 721	PANTONE 728
PANTONE 701	PANTONE 708	PANTONE 715	PANTONE 722	PANTONE 729
PANTONE 702	PANTONE 709	PANTONE 716	PANTONE 723	PANTONE 730
PANTONE 703	PANTONE 710	PANTONE 717	PANTONE 724	PANTONE 731
PANTONE 704	PANTONE 711	PANTONE 718	PANTONE 725	PANTONE 732
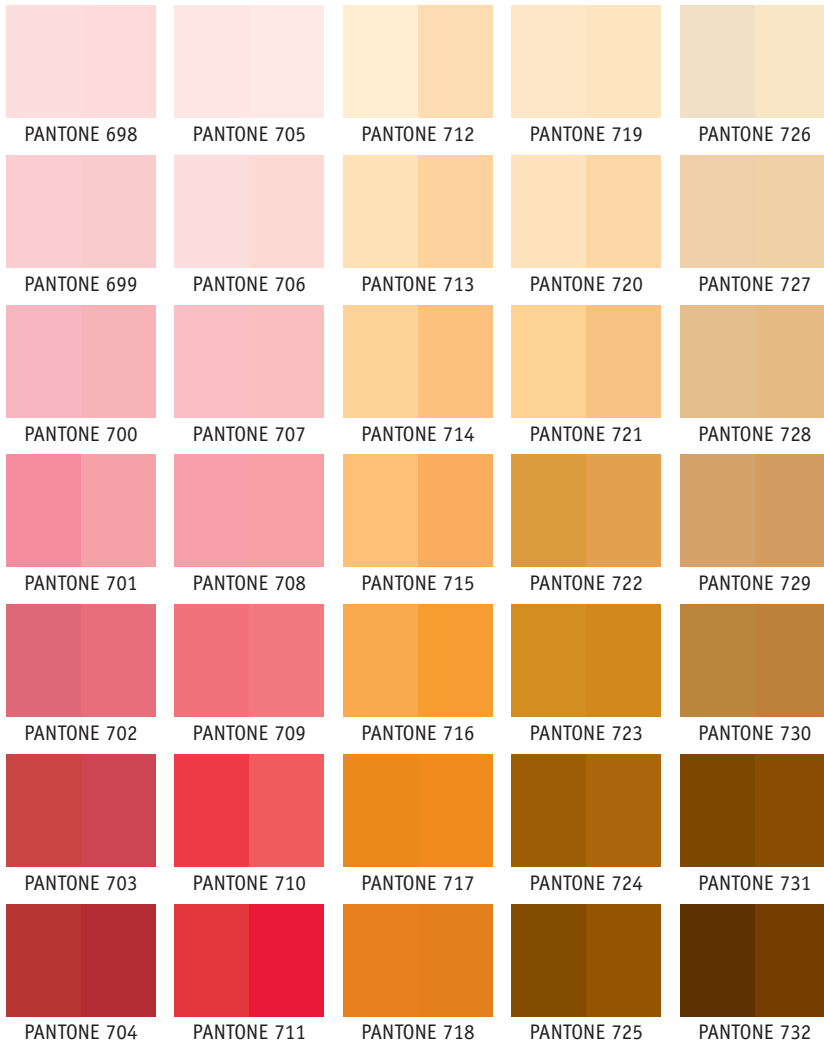
PANTONE colour converted by RIP ⟵• •⟶ **PANTONE process colour simulation**

PANTONE 7401	PANTONE 7408	PANTONE 7415	PANTONE 7422	PANTONE 7429
PANTONE 7402	PANTONE 7409	PANTONE 7416	PANTONE 7423	PANTONE 7430
PANTONE 7403	PANTONE 7410	PANTONE 7417	PANTONE 7424	PANTONE 7431
PANTONE 7404	PANTONE 7411	PANTONE 7418	PANTONE 7425	PANTONE 7432
PANTONE 7405	PANTONE 7412	PANTONE 7419	PANTONE 7426	PANTONE 7433
PANTONE 7406	PANTONE 7413	PANTONE 7420	PANTONE 7427	PANTONE 7434
PANTONE 7407	PANTONE 7414	PANTONE 7421	PANTONE 7428	PANTONE 7435

PANTONE colour converted by RIP ⟶ • • ⟵ **PANTONE process colour simulation**

PANTONE 7436	PANTONE 7443	PANTONE 7450	PANTONE 7457	PANTONE 7464
PANTONE 7437	PANTONE 7444	PANTONE 7451	PANTONE 7458	PANTONE 7465
PANTONE 7438	PANTONE 7445	PANTONE 7452	PANTONE 7459	PANTONE 7466
PANTONE 7439	PANTONE 7446	PANTONE 7453	PANTONE 7460	PANTONE 7467
PANTONE 7440	PANTONE 7447	PANTONE 7454	PANTONE 7461	PANTONE 7468
PANTONE 7441	PANTONE 7448	PANTONE 7455	PANTONE 7462	PANTONE 7469
PANTONE 7442	PANTONE 7449	PANTONE 7456	PANTONE 7463	PANTONE 7470

PANTONE colour converted by RIP ⟶ ◀ ▶ ⟵ **PANTONE process colour simulation**

PANTONE 7471	PANTONE 7478	PANTONE 7485	PANTONE 7492	PANTONE 7499
PANTONE 7472	PANTONE 7479	PANTONE 7486	PANTONE 7493	PANTONE 7500
PANTONE 7473	PANTONE 7480	PANTONE 7487	PANTONE 7494	PANTONE 7501
PANTONE 7474	PANTONE 7481	PANTONE 7488	PANTONE 7495	PANTONE 7502
PANTONE 7475	PANTONE 7482	PANTONE 7489	PANTONE 7496	PANTONE 7503
PANTONE 7476	PANTONE 7483	PANTONE 7490	PANTONE 7497	PANTONE 7504
PANTONE 7477	PANTONE 7484	PANTONE 7491	PANTONE 7498	PANTONE 7505

PANTONE colour converted by RIP ⟶　　⟵ **PANTONE process colour simulation**

PANTONE 7506	PANTONE 7513	PANTONE 7520	PANTONE 7527	PANTONE 7534
PANTONE 7507	PANTONE 7514	PANTONE 7521	PANTONE 7528	PANTONE 7535
PANTONE 7508	PANTONE 7515	PANTONE 7522	PANTONE 7529	PANTONE 7536
PANTONE 7509	PANTONE 7516	PANTONE 7523	PANTONE 7530	PANTONE 7537
PANTONE 7510	PANTONE 7517	PANTONE 7524	PANTONE 7531	PANTONE 7538
PANTONE 7511	PANTONE 7518	PANTONE 7525	PANTONE 7532	PANTONE 7539
PANTONE 7512	PANTONE 7519	PANTONE 7526	PANTONE 7533	PANTONE 7540

PANTONE colour converted by RIP ⟶ • ← **PANTONE process colour simulation**

PANTONE 7541

PANTONE 801

PANTONE 808

PANTONE 871

PANTONE 7542

PANTONE 802

PANTONE 809

PANTONE 872

PANTONE 7543

PANTONE 803

PANTONE 810

PANTONE 873

PANTONE 7544

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PANTONE 811

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PANTONE 7545

PANTONE 805

PANTONE 812

PANTONE 875

PANTONE 7546

PANTONE 806

PANTONE 813

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PANTONE 7547

PANTONE 807

PANTONE 814

PANTONE 877

PANTONE colour converted by RIP ⟶   ⟵ **PANTONE process colour simulation**

Glossary

1/0	"One over zero" refers to printing with one colour on one side of a sheet, leaving the other side blank.
2-up/4-up/8-up	The number of images printed on one side of a sheet.
4/0	"Four over zero" refers to printing with four colours on one side of a sheet of paper, leaving the other side blank.
4/4	"Four over four" refers to four colour printing on both sides of a sheet.
6/2	"Six over two" refers to printing with six colours (four process colours + 2 spot colours) on one side and two colours on the other side. This is common with specification sheets where full colour is required on the front but only black and one accent colour is needed on the back.
A0	Standard ISO cut sheet size of 841 x 1189 mm.
A1	Standard ISO cut sheet size of 594 x 841 mm.
A2	Standard ISO cut sheet size of 420 x 594 mm.
A3	Standard ISO cut sheet size of 297 x 420 mm.
A4	Standard ISO cut sheet size of 210 x 297 mm.
AM screening	Conventional "lined" halftone screening that breaks up the image into regularly spaced dots of varying size to simulate the original image.
Anti-aliasing	A process that removes jagged edges from curves and lines (including characters), producing smooth lines and edges.
APR	Creo Automatic Picture Replacement. An extension to PostScript that provides for automatic replacement of low-resolution placeholder images with high-resolution images. Similar to OPI.
Aqueous coating	A water based coating applied after offset printing, which gives a gloss, dull or matte finish and will accept ink jet printing to add variable data.
Artifact	A repeatable defect in a printed image caused by some discrete element in the printing system.
Backing-up	Printing the reverse side of a sheet that is already printed on one side.
Banding	Undesirable horizontal or vertical bands on a printed image.
Binder's creep	A term used to describe how the gutter margin varies from page to page when large signatures are folded and trimmed (the printed area moves slightly with respect to other pages). Adjustments are made at the DFE to correct for creep.
Bitmap	An image file consisting of a two-dimensional array (or grid) of pixels. Also called a raster image.

Bleed	An image that extends to all four edges of a page. The extra amount of the image that is printed on a sheet beyond the crop marks (the sheet is then trimmed to size).
Calendered	Paper that has been passed through a series of stainless steel rollers that produce a very smooth finish to the paper.
Calibration	A procedure to set equipment (such as displays, printers, presses, and scanners) to a standard level to ensure predictable results.
Caliper	The thickness of a sheet of paper, measured in microns.
Chalking	Pigment dusts off of prints because the ink was absorbed too rapidly into the paper (when printing on an offset press).
Choke	A form of trapping. A choke traps a light background to a dark foreground. The lighter colour is spread inward slightly into the darker colour to maintain the visual edge. See also spread.
Chroma	The vividness or dullness of a hue. One of the three characteristics that describe colour (along with hue and value). Also called saturation.
CIELAB	A device-independent colour space in which three variables (L*, a* and b*) are used to describe a colour. L* represents lightness, and the chromatic axes are a* (the red/green axis) and b* (the yellow/blue axis). CIELab defines the largest gamut or colour space.
CMM	Short for Colour Matching Module. A part of the colour management system that connects together profiles to produce colour transformations for a group of devices.
CMS	Short for colour management system.
CMYK	Short for cyan, magenta, yellow and black – the four printing, or process, colours. They are the three subtractive primaries (cyan, magenta and yellow), as well as black, used to enhance colour and improve contrast.
Coated	Paper that has additional pigments and binders added to enhance the surface quality and printability of the stock.
Collate	The ability of the printing press to assemble sheets in the correct order.
Collating	The process of gathering signatures together so that page 1 is followed by page 2, page 3, and so on.
ColorSync	The colour management framework that is used in the Macintosh environment.
Colour management system	A software system that controls the transformation of colour values of different devices to ensure consistent results between different devices. Profiles are generated for input devices (like scanners and digital cameras), displays, and output devices (like printers and presses). These profiles tell the conversion routines of the colour management system how to convert the colour values of one device to another.

Colour rendering dictionary	A lookup table in PostScript that describes how to map colour from one device to another. Also called CRD.
Colour separations	A full colour image broken down into a series of single colour images of the primary printing colours. This is most often the four process colour images (CMYK), but may also include spot or specialty colours.
Colour space	The range of colours that can be seen, displayed or printed. Also called gamut.
Compression	A technique to reduce the size of image files, reducing storage and transmission requirements. There are two categories of compression: lossy and loss-less. Lossy compression means that some data is permanently removed during the compression, leading to a loss of quality (the degradation of quality is linked to the amount of data removed). Loss-less files are larger, but retain all original image data.
Consumable	Any material, such as paper, ink or toner, that is used up (or consumed) during the printing process.
Continuous tone	An image that has an unbroken range of intensities, as found in black and white photographs. Continuous tone images have not been screened, and contain gradient tones from black to white.
Contone	Short for continuous tone, an image that has an unbroken range of intensities, as found in black and white photographs. Continuous tone images have not been screened, and contain gradient tones from black to white.
Contract proof	A proof made as a true indicator of the final printed product. It is used to secure final approval by the customer before a job is printed.
Conventional angle set	In the colour separation process using AM screening, there are four screens made of dots (one for each process colour). To avoid Moiré patterns when two or more screen grids are combined, a rosette pattern is used. To create this pattern, the four halftone screens must be placed at different angles. The conventional angles are: Black at 45°, Magenta at 75°, Cyan at 15° or 105°, Yellow at 0° or 90°.
Conventional printing	A common term for offset printing.
Copies per minute	A term commonly used with xerographic printing for measuring print speed.
cpm	Short for copies per minute.
CRD	Short for colour rendering dictionary.
Creep	A term used to describe how the gutter margin varies from page to page when large signatures are folded and trimmed (the printed area moves slightly with respect to other pages). Adjustments are made at the DFE to correct for creep.
Crop marks	Lines printed in the margins of a sheet to indicate where the sheet should be trimmed.

Crossover	Occurs when an image is printed on two adjacent pages in a publication so readers perceive a single, unbroken image.
Customisation	A form of variable information printing. Used to describe a document that has been customised to its audience. Generally a common document template is used with different messages and content based on customer preferences. See personalisation, versioning.
Delta-E	A scientific measurement for the difference between two colours. A colour difference of 0 DE is a perfect match, 1 DE is defined as the threshold of what is perceptible to the human eye, and 5 DE is considered acceptable to print buyers.
Densitometer	A device used to measure light reflectance or transmission. Used for calibration of a printer or press.
DFE	Short for digital front end. Also called RIP.
DI press	Offset press with direct imaging (DI) of plates digitally on the press. Still a traditional offset press that offers reduced make-ready (or set-up) times.
Die-cut	The process of cutting specific shapes onto a page with sharp steel knives.
Digital front end	The platform that is responsible for job management, queue management, raster image processing, and transfer of the image to the print station. It encompasses the print service, the colour RIP, the storage of Work In Process (WIP), RIPed files and fully automated production services.
Digital printing	A printing system utilising electrostatic technology (where dry or liquid toner is transferred using an electric charge). A characteristic of digital printing is that every imaged page can be different.
Dot gain	The tendency for halftone dots to become larger and appear darker because of wet ink spreading when it comes into contact with paper. It is not a problem with digital or xerographic printing. Also called dot spread.
Dot spread	The tendency for halftone dots to become larger and appear darker because of wet ink spreading when it comes into contact with paper. It is not a problem with digital or xerographic printing. Also called dot gain.
Dots per inch	Used as a measure of addressability of a digital printer or sampling resolution of a scanner. For example, the DocuColor 2045 and 2060 print at 600 dots per inch.
dpi	Short for dots per inch.
Duotone	A two-colour halftone, usually printed with black and another colour.
Duplex	A form of double-sided printing. The printing press prints the first side, flips the sheet, then prints the second side during a second pass.

Electrophotography	The image transfer system used in printers and copiers where images are produced using electrostatic forces. Electrical charges are used to create an image on a photoconductive surface to which toner is attracted. The toner is then transferred and fused to paper.
Embossing	A process in which paper is pressed between two dies to raise a portion of the printed image, creating a three dimensional image on the page.
EPS	Short for Encapsulated PostScript. A file format designed to transfer PostScript information between compatible applications. It provides the highest quality images available from a PostScript output device. Includes a PICT component to allow it to be displayed on a screen and to print on a non-PostScript printer.
Fan-out	Distortion of the paper on the press caused by wavy paper edges that have absorbed excess moisture.
Finishing	A term used to describe the process a job goes through after printing is finished and before the job is distributed. Examples include scoring, folding, trimming and binding.
FM screening	A relatively new method for creating halftones. Stochastic screening generates equal size dots that appear to be placed randomly. Advanced algorithms are used to determine the optimum placement of dots so as not to cause visual artifacts (such as moiré patterns). Registration on press is slightly more difficult than with lined screens but the colours can be very brilliant. The concepts of screen frequency and screen angles do not apply with FM screening. Also called stochastic screening.
Folio sheet	A US size for sheets used in sheet-fed offset presses. Images are laid out in printer spreads from which they can be later cut and folded into booklets, brochures, and so on. Common sizes include 25" x 38", 20" x 26", 19" x 25" and 23" x 35".
Form	A signature printed on one side only.
Formation	Describes how paper fibres are distributed on a sheet.
Four-colour	Printing with the four process colours – cyan, magenta, yellow and black.
Full bleed	An image that extends beyond all four edges of a page. Because no printers are able to print to the edge of a sheet, the edges must be trimmed after printing.
Gamut	The range of colours that can be reproduce on a display or printer. Also called colour space.
GCR	Short for Grey Component Replacement. A method for replacing equal combinations of cyan, magenta and yellow with black.
Ghosting	The undesirable faint repetition of printed images. Can occur in offset printing and digital printing.
GIF	Short for Graphics Interchange Format. A graphics file format widely used on the internet because of its small file size.

Grain	Grain direction is the orientation of fibres with respect to the long edge of the paper. For example, in an A4 sheet, the fibres of a long grain sheet are parallel to the 297 mm dimension of the page (the pages of a short grain sheet are parallel to the 210 mm dimension).
Graininess	Weak image (on an offset print) with a granular look caused by ink becoming waterlogged and caked.
Grammage	The weight in grams of one square metre of paper (abbreviated to gsm).
Grey balance	The mix of cyan, magenta, yellow and black that produces a neutral grey across the tonal range.
Gripper margin	The 10 mm lead edge of the sheet that is rendered unprintable by grippers (the row of clips that holds a sheet of paper as it moves through an offset press).
gsm	The weight in grams of one square metre of paper. Also called grammage.
Gutter	The blank space, or inner margin, from the printing area to the binding.
Halftone	A continuous tone image that has been reproduced with groups of small dots.
Halftone screen	To produce continuous tone images on a printing device, the image must be broken down into a series of dots of various sizes and colours, called a halftone screen.
Halo	The result when a dark coloured object knocks out a coloured background that is composed of more than 30 to 70% of one toner colour on a xerographic printer.
Hickey	A recurring, unplanned spot appearing on an offset printed image caused by dust, lint, dried ink or paper stuck to the blanket.
Highlight	The lightest area in an image or photograph.
Hue	The name of colour, such as green, blue, purple or orange. One of the three characteristics that describe colour (along with saturation and value).
ICC	Short for International Colour Consortium. An industry body that has been set up to create a common framework for colour management.
ICC profile	A file that describes how a particular device (eg, printer, display or scanner) reproduces colour (ie, its gamut or colour space).
ICM	Short for Image Colour Matching. The colour management framework that is used in the Windows environment. ICC profiles in the Windows environment have a .icm extension.
Imposition	The positioning of individual pages on a signature (or press sheet) so that after printing, folding and cutting, all pages will appear in the proper sequence.

Impressions per hour	The term most commonly used with offset printing for measuring print speed. One impression can consist of multiple images on a large sheet that will be cut into smaller sized sheets after being printed.
Impressions per minute	The term most commonly used with offset printing for measuring print speed. One impression can consist of multiple images on a large sheet that will be cut into smaller sized sheets after being printed.
In-line finisher	A finishing device, such as a folder or stitcher, that is directly connected to a digital printer. Paper moves directly from the printer into the finishing device.
iph	Short for impressions per hour.
ipm	Short for impressions per minute.
JPEG	Short for Joint Photographic Experts Group. An industry body that has defined a standard for digital compression of image graphic files. The file size is directly proportional to how much data is discarded.
Just-in-time printing	Documents stored digitally and then printed in the exact quantity required at the precise time required.
Knockout	When printing a shape or type in colour, the shape is printed by eliminating all background colours. This results in a pure colour against the paper.
L/G	Short for long grain.
Lamination	A sheet covered with a thin layer of polyester (laminate) to yield a strong and washable surface.
Lead edge	Feed edge of the paper.
Leaf	Consists of two pages (front and back of a sheet) in a comb bound or wire bound book.
LEF	Short for long edge feed.
Lightfastness	The degree to which a printed page will resist colour changes when exposed to light.
Lightness	The darkness or lightness of a hue. One of the three characteristics that describe colour (along with hue and saturation). Also called value.
Lines per inch	A measure of resolution, especially with halftone screens. The number of lines, or rows, of halftone dots per linear inch. See screen frequency.
Long edge feed	The longest edge of the paper is fed into the printer first.
Long grain	Paper in which the orientation of fibres is parallel to the long edge of the sheet. For example, in an A4 sheet, the fibres of a long grain sheet are parallel to the 297 mm dimension of the page.
Lookup table	A reference file used to convert images from one colour space to another, such as converting RGB pixels into CMYK pixels for printing.

Looseleaf binding	A binding method that includes drilling holes into a paper's edge to be easily inserted into binders.
lpi	Short for lines per inch. See screen frequency.
LUT	Short for lookup table.
Makeready	All work required to set up a press for printing. This can include loading plates, paper, ink or toner, as well as adjustments to the press. Very little required in digital printing.
Mechanical binding	Wire or plastic binding inserted into holes that are drilled or cut along one gutter edge of a paper.
Media	A digital printing or xerographic term used to refer to all types of paper, transparencies, and other printable materials. Also called substrate or stock.
Merge	Insertion of text or graphic elements into a printed document from a database or other external file.
Metamerism	The tendency of colour to change with the light source in which it is viewed.
Midtone	The range of tones in an image or photograph that are approximately midway between the highlights and shadows.
Misregistration	Paper stretch, plate stretch, or misaligned plates can cause multi-colour jobs to print out of register, resulting in slight gaps between overlapping colours.
Moiré	An undesirable pattern caused by improperly aligned halftone screens in process colour printing.
Mottle	A spotty or uneven appearance on prints, mostly in solid areas.
Off-line finisher	A finishing device, such as a folder or stitcher, that is located away from a printer or press. Paper must be moved manually from the printer into the finishing device.
Offset printing	A traditional printing process where ink is transferred from the plate to a blanket to the paper.
Offsetting	In offset printing, the ink from one printed page does not dry properly and rubs off onto the next page.
	In digital printing, dry ink sticks to the photoreceptor belt or fuser roll and is transferred to the next sheet.
On demand printing	Refers to printing where the printed documents can be printed and delivered where and when required.
Opacity	The degree to which paper will allow images and text printed on side to show-through to the other.
OPI	Short for Open Prepress Interface. An extension to PostScript which

	provides for automatic replacement of low-resolution placeholder images with high-resolution images.
Overprint	When printing a shape or type in colour, the shape prints over whatever colours have already been printed. This can result in a shift of colour due to overlapping ink or toner.
Page	One side of a sheet of paper. Both together are called a sheet or leaf.
Page description language	A programming language used to describe how type and graphics should be produced on a printer.
Pages per minute	The term most commonly used with digital printing for measuring print speed.
Pantone	The common name for most widely used colour specification system for special colours. It is a registered name of an ink colour.
PDF	Short for Portable Document Format.
PDL	Short for page description language.
Perfect	To print both sides of a piece of paper in one pass through a printing press.
Perfect binding	Signatures bound together with an adhesive applied to the document's spine.
Personalisation	A form of variable information printing. A document that is tailored to a specific individual. Variables could include text, images or other information. See customisation, versioning.
PICT	A graphic file format used on Macintosh computers.
Pixel	Short for "picture element". The basic units of digital imaging, it is the smallest point of a raster image.
PMS	Short for Pantone Matching System. A commercial system of spot colours as distinct from CMYK or process colours.
Portable Document Format	A file format modelled on PostScript that allows easy transfer between computers and to printers.
Postpress	All operations in the print production process that take place after a job is printed that are required to deliver a finished product to the customer. This can include trimming, folding, binding, packing and delivery.
PostScript	A page description language that is the industry standard for high quality printing.
ppi	Short for pixels per inch. A measurement used when scanning images and when images are displayed on a monitor.
ppm	Short for pages per minute.

Preflight	A step in the prepress process used to test every component of a job to ensure it will print correctly. This can include fonts, image files and links, colour gamut, etc.
Prepress	All operations in the print production process that take place up to the point where the job is sent to the RIP of a digital printer (or where plates are made for an offset press). It starts after the design of a job is completed.
Press proof	A colour proof printed on the press used to check that the job is being printed correctly.
Print engine	The part of the digital printing press that does the printing.
Printability	Describes how well a paper performs with ink on a press.
Process colours	The four printing colours – cyan, magenta, yellow and black (CMYK).
Profile	A part of the colour management system that contains the characteristics of a particular device.
Proof	A proof is a good simulation of how the job will look when it is printed. A proof can be made at any stage of the production process, from design to final printing. A visual or rough proof allows the designer to confirm the concept. A design proof allows confirmation of the layout, design and text. A contract proof very closely simulates the final finished job.
PS	Short for PostScript.
Raster image	An image or image file consisting of a two-dimensional array (or grid) of pixels. Also called a bitmap.
Raster Image Processor	Generally shortened to RIP. In digital imaging, software and/or hardware that inputs high-level page descriptions and outputs low-level data streams that can be fed directly to a digital print engine. A RIP translates PostScript commands into a bitmap that can be printed. The term RIP is used both as a noun to describe the software/hardware and as a verb to describe the process of translating the data.
Register mark	A mark on the sheet used to check that a job is in register. When the mark is overprinted by each colour perfectly, the colours are in register.
Registration	The perfect alignment of each colour layer on a page.
Resolution	The number of dots available to represent a graphics image. On a display, resolution is measured in ppi (pixels per inch), while on a printer it is measured in dpi (dots per inch).
RGB	Short for red, green and blue. These are the three primary additive colours used in displays, scanners and digital cameras.
RIP	Short for Raster Image Processor.
RIP time	The amount of time it takes to RIP a file. Ineffective or improper page layout work will cause extra RIP time.

Rosette	The (acceptable) dot cluster formation that is created in four-colour images.
RTP	Short for ready to print. A file that has been ripped
Runnability	Describes the ease with which paper moves through the printing press or printer. A paper that performs well on the press (dust free, ideal moisture content, no curves or waves, trimmed correctly, and trouble-free feeding).
S/G	Short for short grain.
Saddle stitch	An automated method of binding where signatures are opened, straddled across a metal right angle plate, and stapled using continuous wire.
Saturation	The vividness or dullness of a hue. One of the three characteristics that describe colour (along with hue and value). Also called chroma.
Scoring	A way of folding paper using a long, blunt edged rule that presses firmly down on a document, causing a crease in the paper. The paper is then folded over the crease.
Screen	The lined screen through which images are photographed to create halftones. Shooting through the mesh of a screen breaks an image into tiny dots.
Screen angles	The angles at which the halftone screens are placed in relation to one another to avoid undesirable Moiré patterns.
Screen frequency	How close the lines are in a screen measured in lines per inch. The closer the lines of the screen, the smaller the dots, the more dots per inch, and the crisper the image. In offset printing, the less the paper absorbs and spreads ink, the finer the screen that can be used. Newspapers use screen frequencies of 55 to 85 lines per inch. Most trade publications use 85 to 110 lines per inch. Coated paper can hold dots from a 200 line screen. With waterless printing, the paper can hold dots with even finer screen frequencies, however, it is difficult for the human eye to discern the difference in resolution above 200 lines per inch.
Screening	The breaking up of the contone image into a half-tone image for colour printing. The finer the screen, the more dots per inch, the crisper the image.
Scum	Areas on prints that should remain unprinted which take on ink in an offset press.
SEF	Short for short edge feed.
Separations	A colour page split into its component colours (for example, cyan, magenta, yellow, black and each spot colour). Each separation is used to reproduce a particular colour for printing.
Shadow	The darkest areas in an image or photograph.
Sheet	A loose leaf of paper, printed or plain

Sheet-fed press	A printing press, either digital or offset, that prints on cut sheets of paper.
Sheets per hour	A term commonly used to describe the speed of binding and folding operations.
Short edge feed	The shortest edge of the paper is fed into the printer first.
Short grain	Paper in which the orientation of fibres is parallel to the shortest edge of the sheet. For example, in an A4 sheet, the fibres of a short grain sheet are parallel to the 210 mm dimension of the page.
Short run	A run length on a printing press typically less than 1,000 copies.
Show-through	Printing on one side of a sheet that can be seen on the other side under normal lighting conditions.
Signature	Both sides of a printed sheet that are folded to make up a section of a printed piece. A greeting card is a good example – when opened fully, the card is divided into quadrants.
Simplex	To print on one side of a sheet and leave the other side blank (digital or xerographic printing term).
Spectrophotometer	An instrument for measuring colour in CIE colour spaces.
Spot colour	A colour printed with custom inks rather than process colours. The colour is usually specified using the PMS or Pantone numbers.
Spread	A form of trapping. A spread traps a light foreground to a dark background. The lighter colour is spread outward slightly into the darker colour to maintain the visual edge. See also choke.
Spreads	Printer spreads are pages that appear next to each other so that after folding and finishing, they are in the proper order. Reader spreads are pages that appear across from one another in the final bound and finished publication (ie, what the reader actually sees).
SRA0	Standard ISO cut sheet size of 900 x 1280 mm. The sheet size is slightly larger than A0 allowing for bleed.
SRA1	Standard ISO cut sheet size of 640 x 900 mm. The sheet size is slightly larger than A1 allowing for bleed.
SRA2	Standard ISO cut sheet size of 450 x 640 mm. The sheet size is slightly larger than A2 allowing for bleed.
SRA3	Standard ISO cut sheet size of 320 x 450 mm. The sheet size is slightly larger than A3 allowing for bleed.
Stochastic screening	A relatively new method for creating halftones. Stochastic screening generates equal size dots that appear to be placed randomly. Advanced algorithms are used to determine the optimum placement of dots so as not to cause visual artifacts (such as moire patterns). Registration on press is slightly more difficult than with lined screens but the colours can be very brilliant. The concepts of screen frequency and screen angles do not apply with stochastic screening. Also called FM screening.

Stock	A term used to refer to all types of paper, transparencies, and other printable materials. Also called media or substrate.
Streaking	Undesirable artifacts caused by linear irregularities in ink or toner transfer.
Substrate	A term used to refer to all types of paper, transparencies, and other printable materials. Also called media or stock.
Swatch	A sample book, usually of available printed colours (such as spot or Pantone colours).
SWOP	Short for Specifications for Web Offset Publications. A set of standards for offset printing that contains specifications for ink, paper, print densities, etc.
Tail edge	The edge of the paper that is last fed into an offset press.
TIFF	Short for tagged image file format. A bitmapped graphic file format that is widely used.
Tint	A tint is a lightened spot or process colour created by printing smaller halftone dots of the base colour.
Toner	Particles used in the electrophotographic print process. They consist of a resin binder, pigments (for colour), and a charge agent. Toners can be dry or liquid.
Traditional printing	A common term for offset printing.
Trail edge	The edge of the paper that is last fed into a printer.
Trapping	The slight, intentional overlapping of the edges of print elements to compensate for minor variations in registration. Used to eliminate white lines between colours which may otherwise appear while printing.
Trim	The cutting of a printed job to the correct finished size.
Turnaround	The elapsed time between submission of a print job and receipt of the final finished product.
UCR	Short for Under Colour Removal. A method for replacing equal combinations of cyan, magenta and yellow with black.
Uncoated	Paper in which the printing surface is the paper stock itself.
Undertrapping	A condition that occurs on an offset press when less ink transfers to previously printed ink than to unprinted paper.
Value	The darkness or lightness of a hue. One of the three characteristics that describe colour (along with hue and saturation). Also called lightness.
Variable data	Data that changes from page to page in a digital printing operation (also called variable information). See customisation, personalisation, versioning.
Variable information	Data that changes from page to page in a digital printing operation (also called variable data). See customisation, personalisation, versioning.

Varnish	A finishing process in which a coating, or varnish, is applied over the printed area (or whole page) to protect it or enhance its visual appeal.
Vector	An image file that uses mathematical formulae to describe lines and curves.
Versioning	A form of variable information printing. Several versions of a document are created based on certain target criteria (such as demographics or purchase history). Document appears personalised but is identical to that produced for other recipients with the same profile. See customisation, personalisation.
Vignette	An image in which colours blend smoothly and gradually from one to another (usually from a lighter tone to a darker tone).
VIPP	Short for Variable-data Intelligent PostScript Printware. Xerox software for printing variable data.
VPS	Short for Variable Print Specification. A variable print file format.
Web press	A printing press, either digital or offset, that prints on roll (or web) fed paper.
Weight	The weight of paper or stock, measured in gsm (grams per square metre).
Work-and-tumble	To print one side of a sheet of paper on an offset press, then turn it over from gripper to back using the same side guide and plate to print the second side.
Work-and-turn	To print one side of a sheet of paper on an offset press, then turn it over from left to right and print the second side using the same gripper and plate but opposite side guide.
Wrinkles	The uneven surface than can be caused by the drying of inks. Also, paper creasing that occurs during printing.
Xerography	Another term for electrophotography. Derived from Greek for "dry writing" and associated with Xerox.