

The background is a deep blue gradient with a subtle pattern of white dots. Overlaid on the left side are several concentric circular lines and arcs in a lighter blue color. A prominent circular scale with degree markings from 140 to 260 is visible. Various curved arrows indicate a clockwise direction of movement. The overall aesthetic is technical and modern.

DESIGNING FOR REPRODUCTION & PRINT

INTRODUCTION

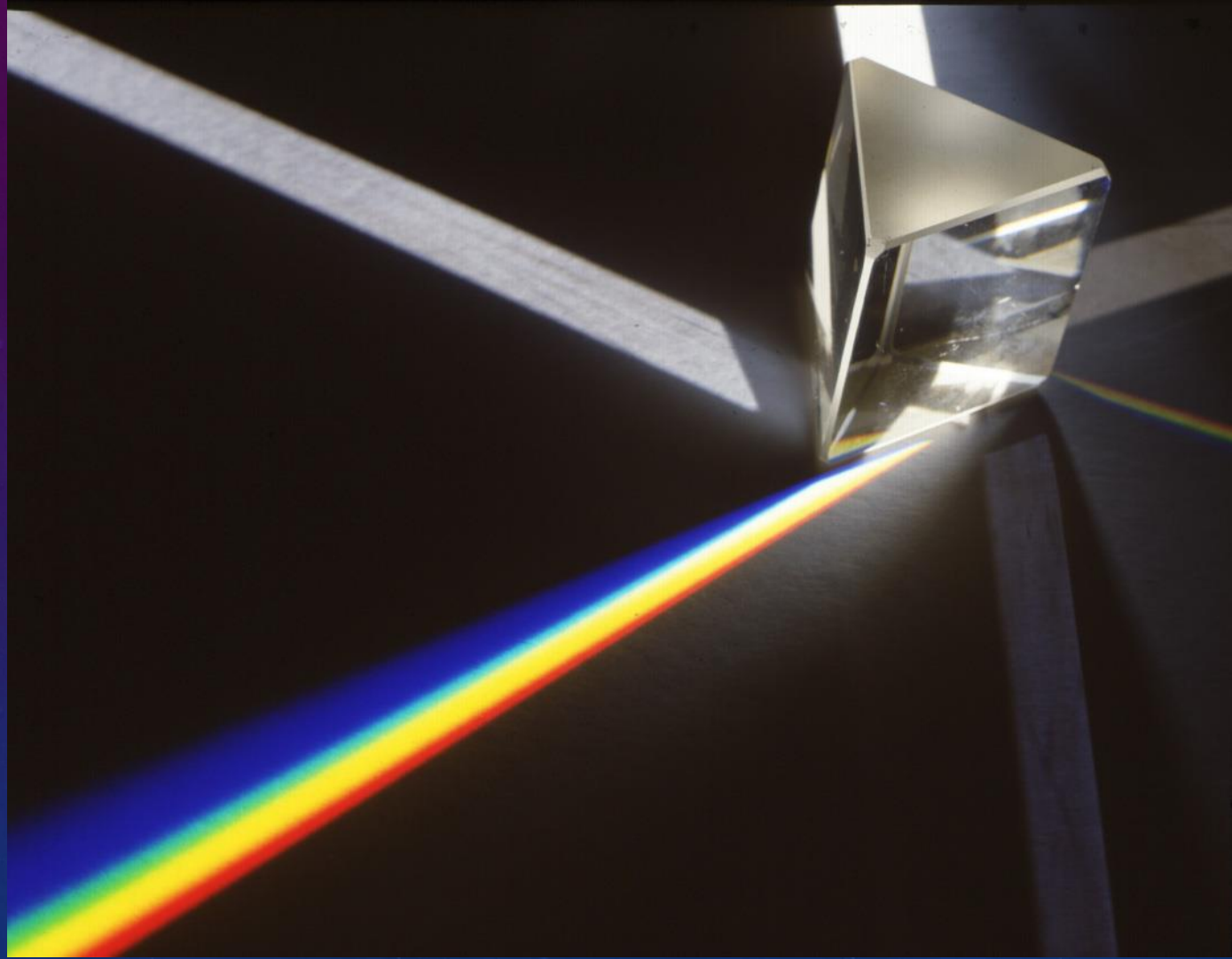
It's important for designers to have a good understanding of how the work that you create will be reproduced.

Professional reproduction solutions can be very different from solutions available to you in university. This lecture will help you plug those knowledge gaps.

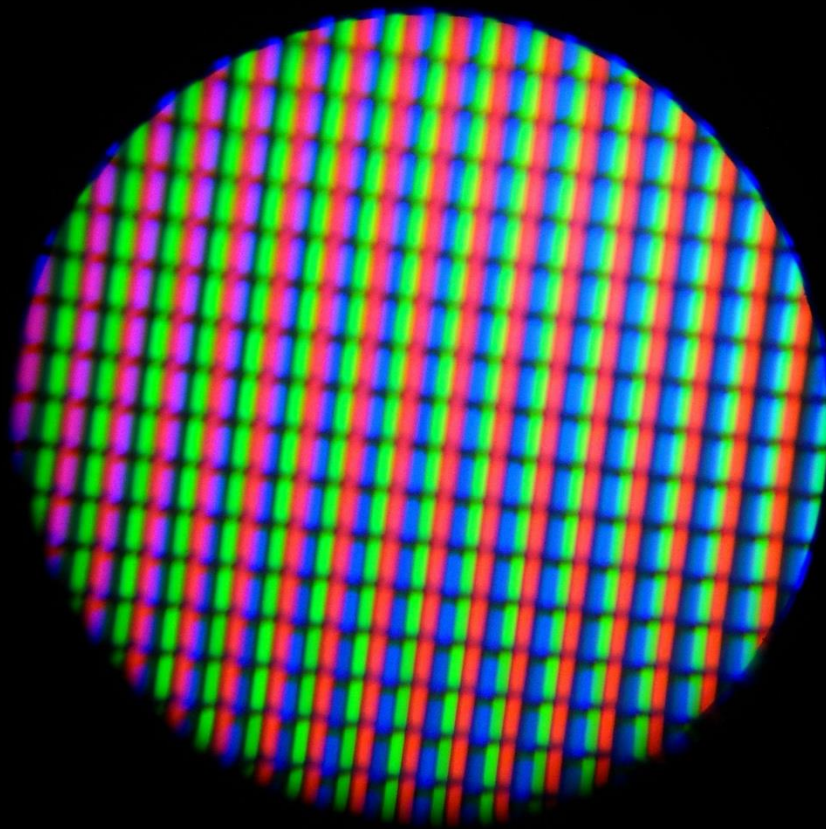
RGB & CMYK

- RGB – Red, Green & Blue, are the colours used in designing for screen. TV, Computers, mobile devices and other screen or projection-based equipment.
- It is an 'Additive' colour mix because they are able to create the illusion of colours by adding their light together.
- These beams of light scan so quickly over the screen that we cannot usually see them.

RGB

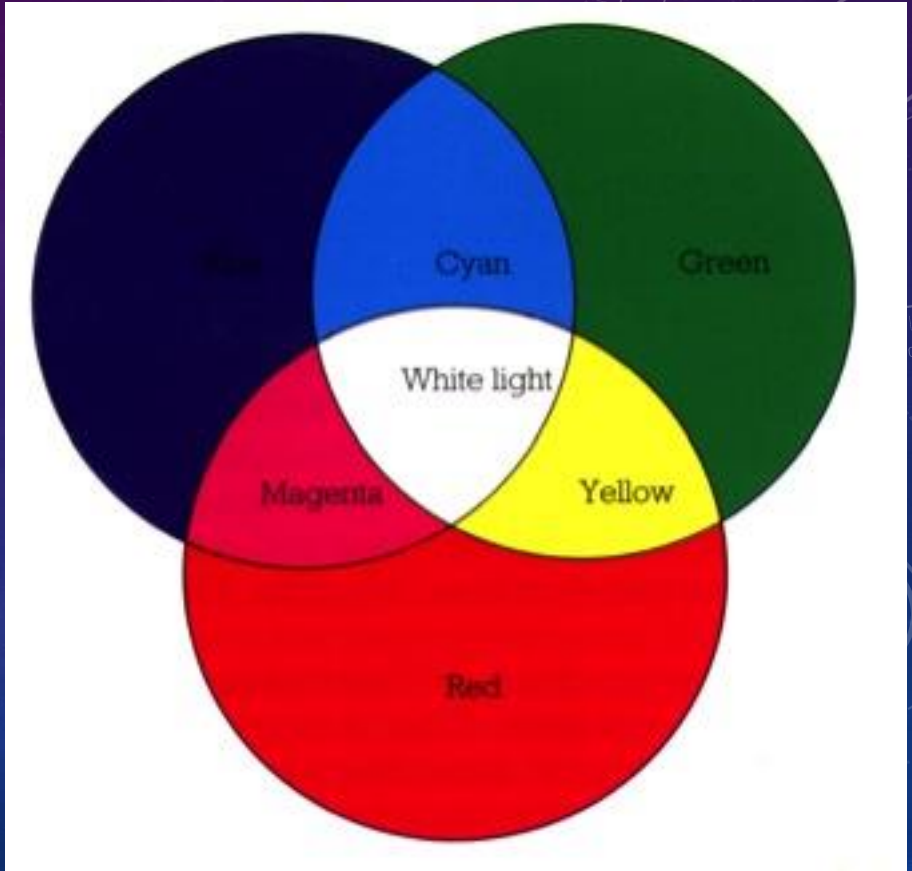


RGB



RGB COLOUR MIX

RGB – As each coloured light is added this is the effect of the mixing of the colours.

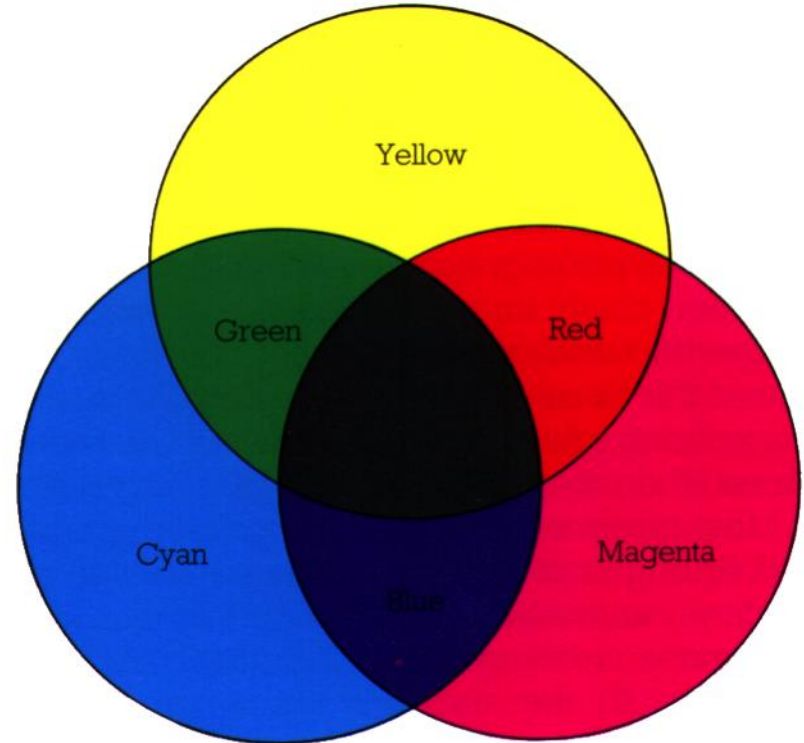


CMYK

- CMYK – Cyan, Magenta, Yellow & Key (Black) make up the four 'Process Colours'.
- 'Most' colours can be made by adding varying amounts of these four colours, but not all colours can be made.
- Our eyes actually mix the process colours...
- ...because we are actually seeing an image made up of carefully created CMYK dots.

CMYK COLOUR MIX

CMYK – As each additional ink is added a different mix occurs.



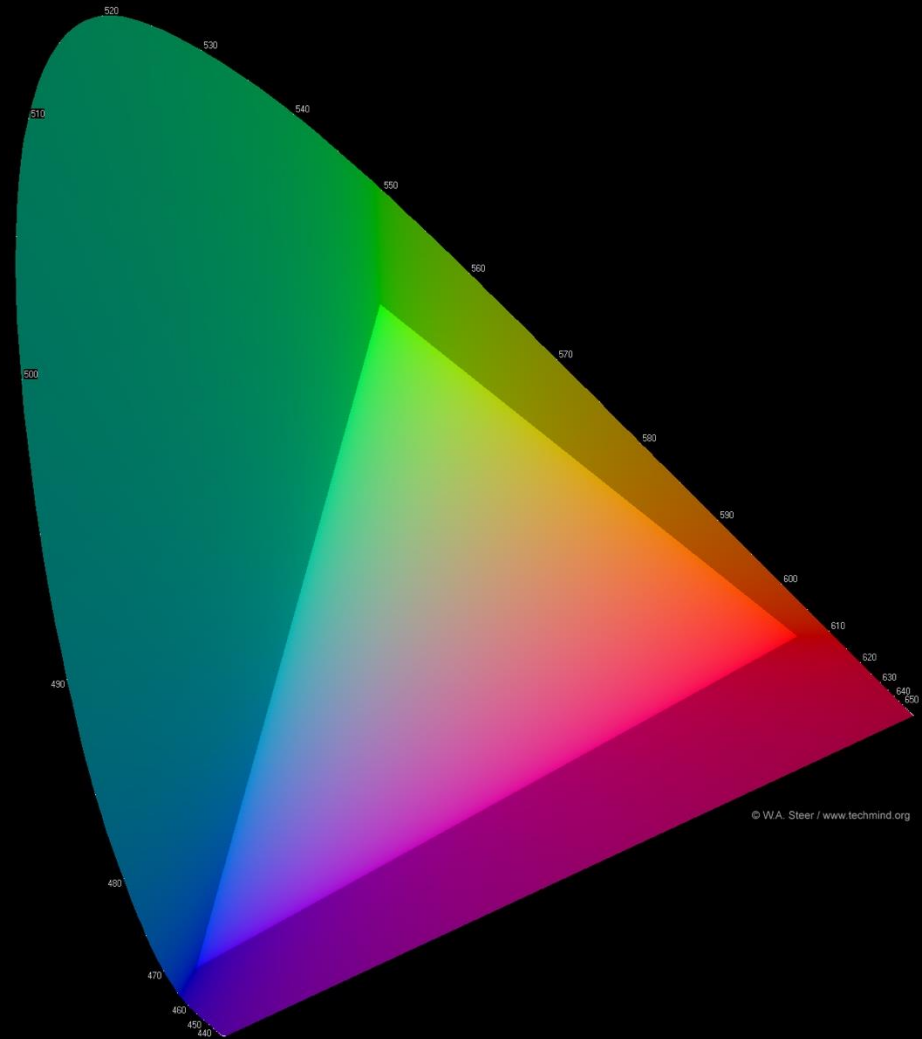
RGB & CMYK

- Colour needs to be controlled!
- Professional design applications allow you to assign 'profiles' to your documents to control the colour.
- Colour profiles are not all the same, each has a different capacity for colour known as 'Gamut'.
- Never trust a monitor unless it is in a controlled environment and has been calibrated.

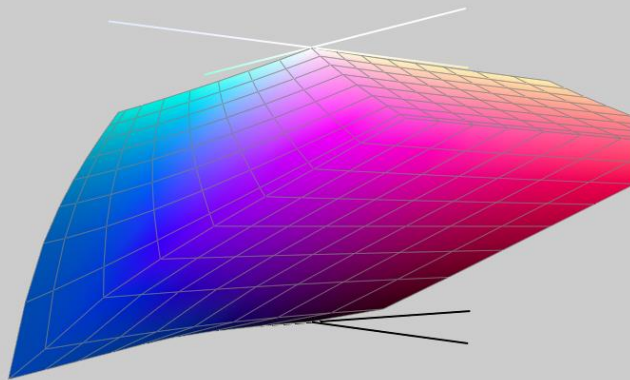
GAMUT

Generic RGB Colour
Gamut compared with
the gamut of the
human eye.

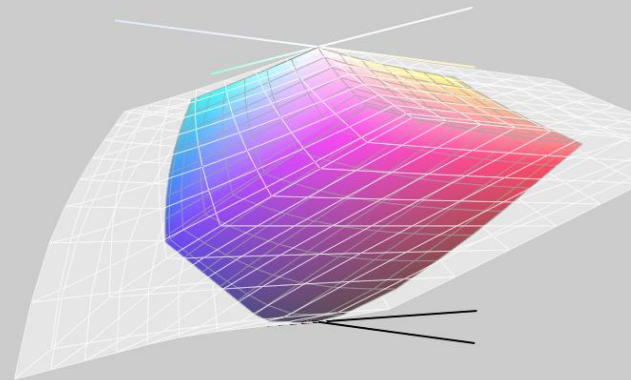
The Colour Gamut is a
3D space.



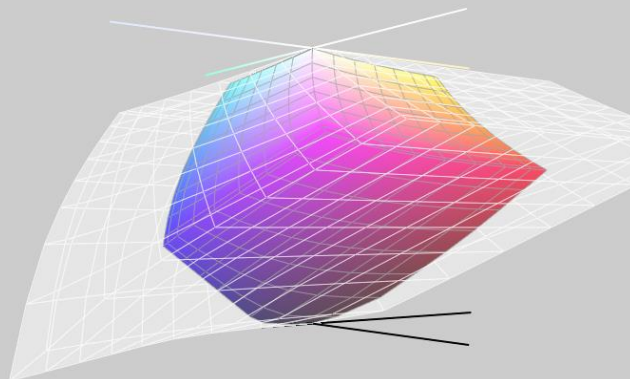
ProPhoto RGB



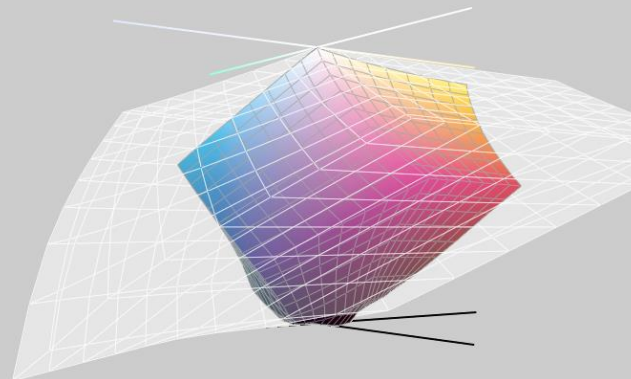
Adobe RGB 1998



sRGB



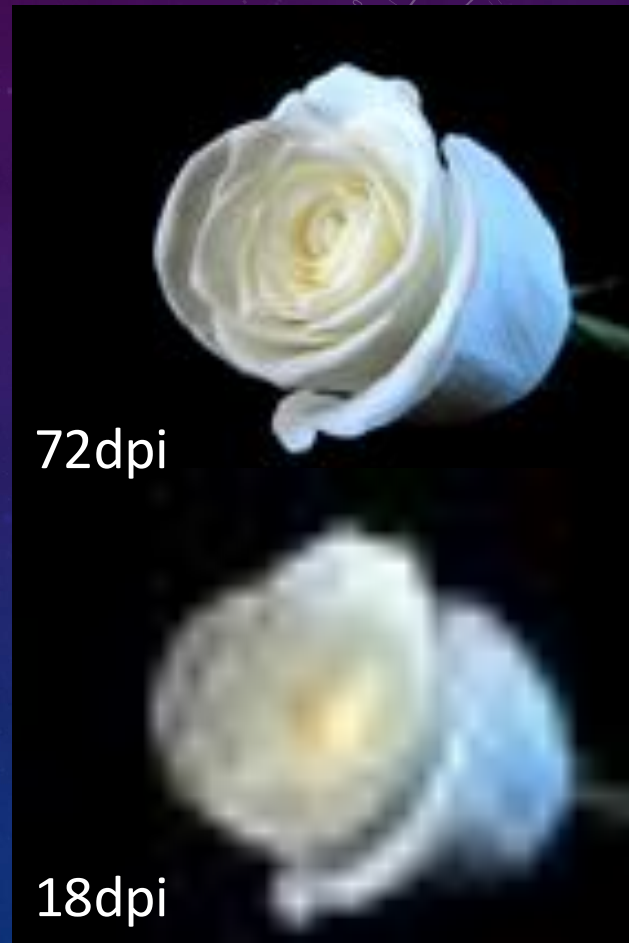
Fogra 39 (CMYK)



DPI & LPI

- DPI – Dots Per Inch refers to the density of dots in an image. Also referred to as the image resolution.
- Documents for print should be at 300dpi to give a smooth sharp image.
- LPI – Lines Per Inch refers to the lines of dots that make up a Halftone Screen.
- The more lines in the Halftone Screen – the finer the dot pattern – the better the quality.
- 65, 85, 100, 120, 133 & 150 are common sizes.

DPI



LPI



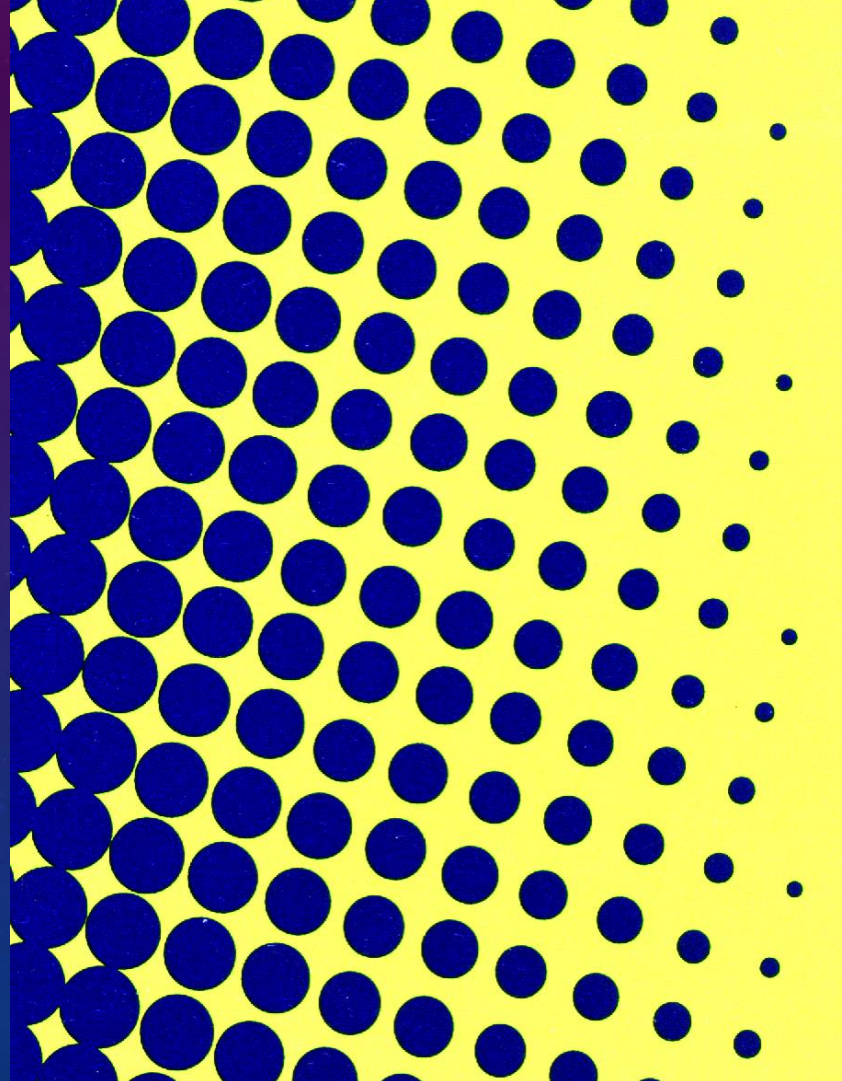
65 LPI



100 LPI

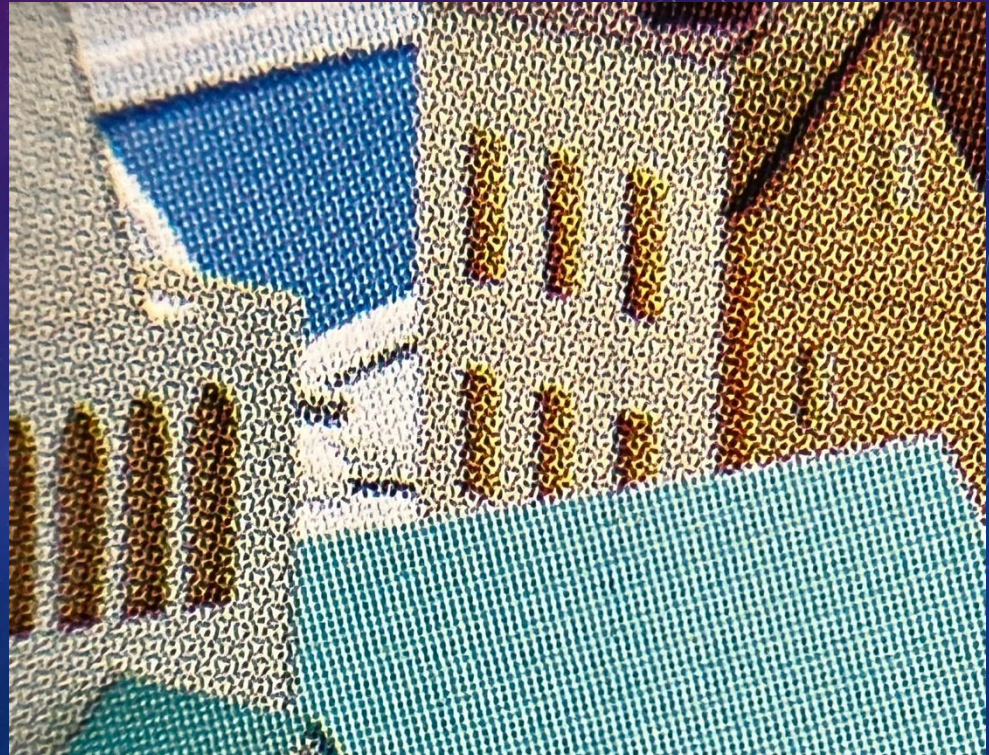
HALFTONE SCREENS

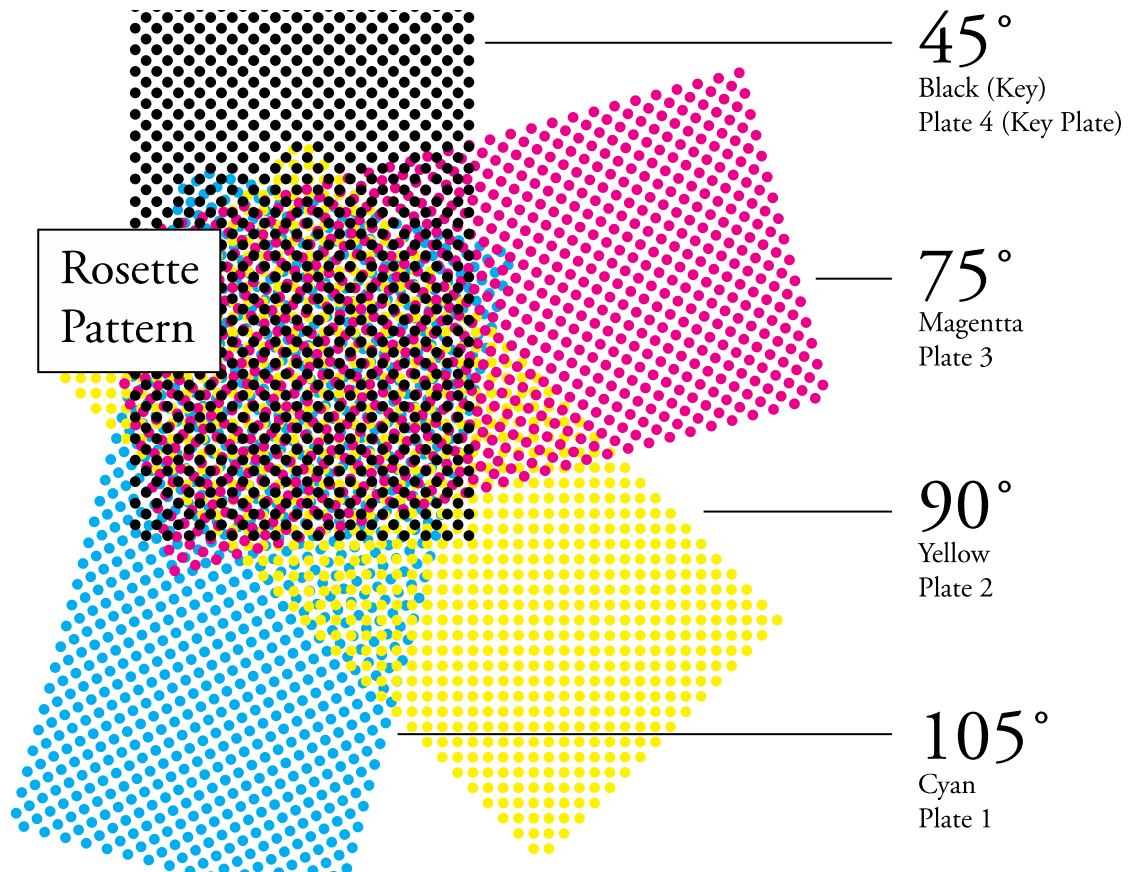
- The dots can be difficult to see unless magnified.
- The bigger the dot – the denser the colour.
- A Halftone Screen is created for each of the CMYK colours.
- These are what then get made into printing plates.



POSITIONING THE SCREENS

- To avoid the lines of CMYK dots being seen when printed together the screens are set to different angles.
- The dots blend together to create the 'Rosette Pattern'.

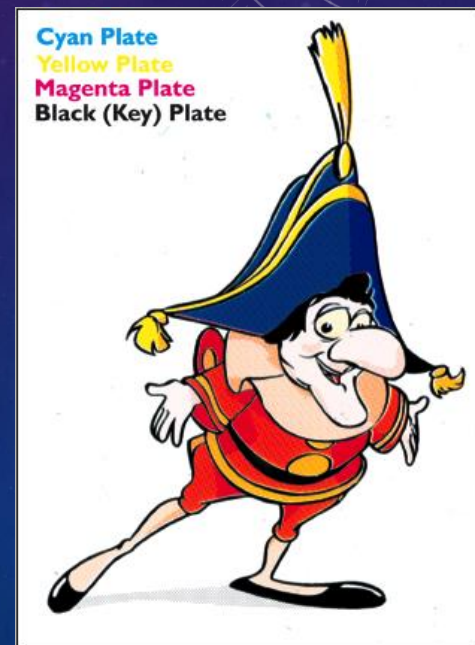




CMYK



The dots can be seen when magnified.



CMYK PLATES

Cyan Plate



Cyan Plate
Magenta Plate



Cyan Plate
Magenta Plate
Yellow Plate



Cyan Plate
Magenta Plate
Yellow Plate
Black (Key) Plate



PRINT ERRORS



MOIRE PATTERN

- The same effect will occur if you scan a printed image from a magazine or book.
- Because the image has already been printed it will have already been screened and will be made up of dots. Rescreening a screened image will create a Moire pattern...again, this is bad!
- Try to scan from photographs or film if you can not get a digital file.
- If you must scan from a printed image, use the scan software to 'de-screen' the image...but don't expect great results.

COLOUR PROFILES

- All colour digital equipment will use a Colour Profile at some level, this can be a Generic Profile or a Custom Profile.
- ICC (International Color Consortium) Profiles are the standard for digital colour management.
- You can custom create your own profiles by using a variety of calibration devices.
- You will need to control both your RGB & CMYK colour space to get good colour output.

COLOUR PROFILES & GAMUT

- Profiles are different & have a different effective Gamut.
- RGB – If you are unable to do your own calibration you should at least set your RGB colour space to ‘Adobe 1998’.
- CMYK profiles will change dramatically depending on what paper your work will be printed on.
- CMYK – For Matte paper use an Uncoated Fogra Profile & for a SemiGloss or Gloss paper use a Coated Fogra Profile.

COLOUR PROFILES & GAMUT

Camera
Scanner
Etc.



Computer
Or
Design System



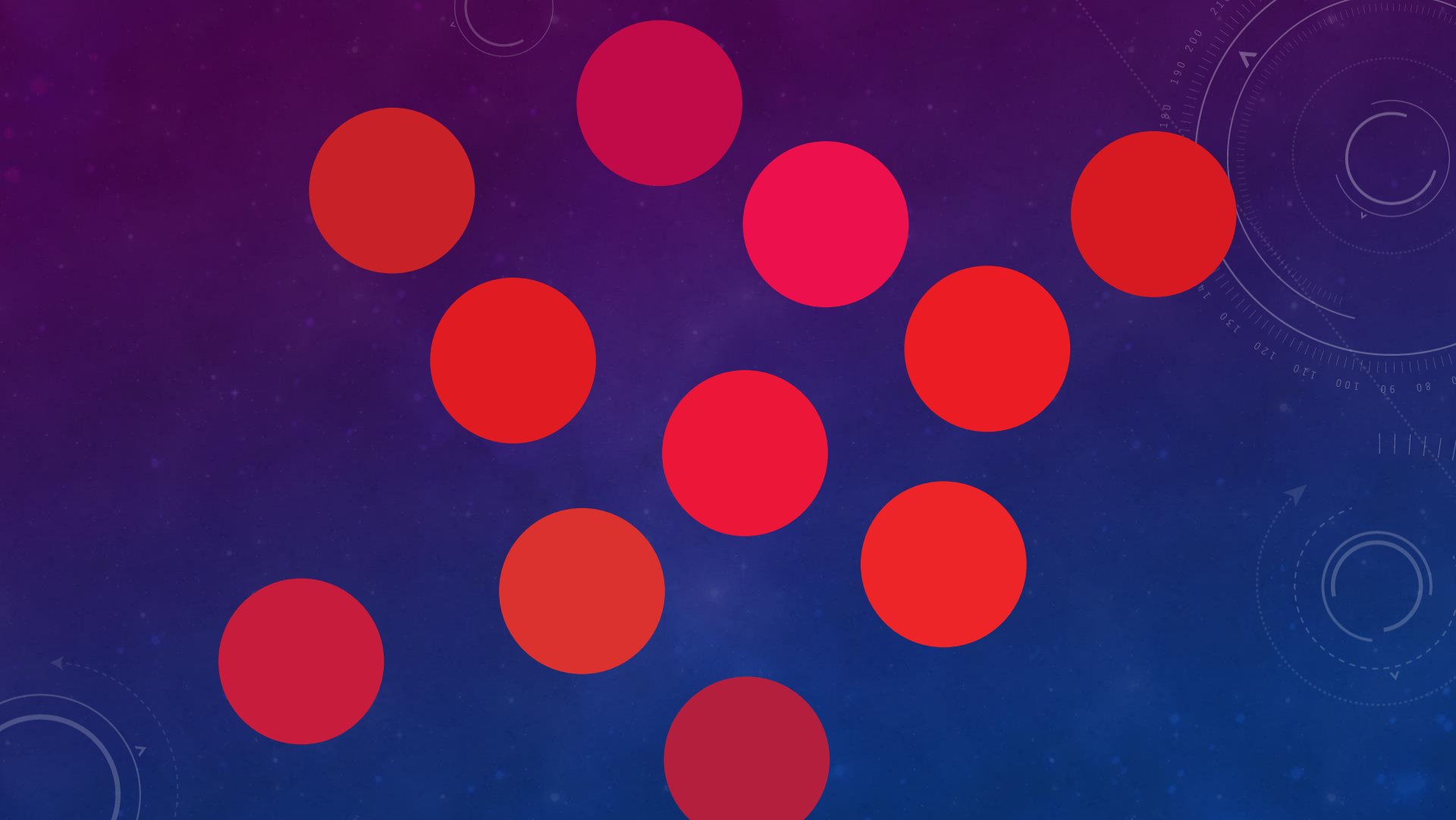
Printer
Or
Output System



Camera
Scanner
Etc.

Computer
Or
Design System

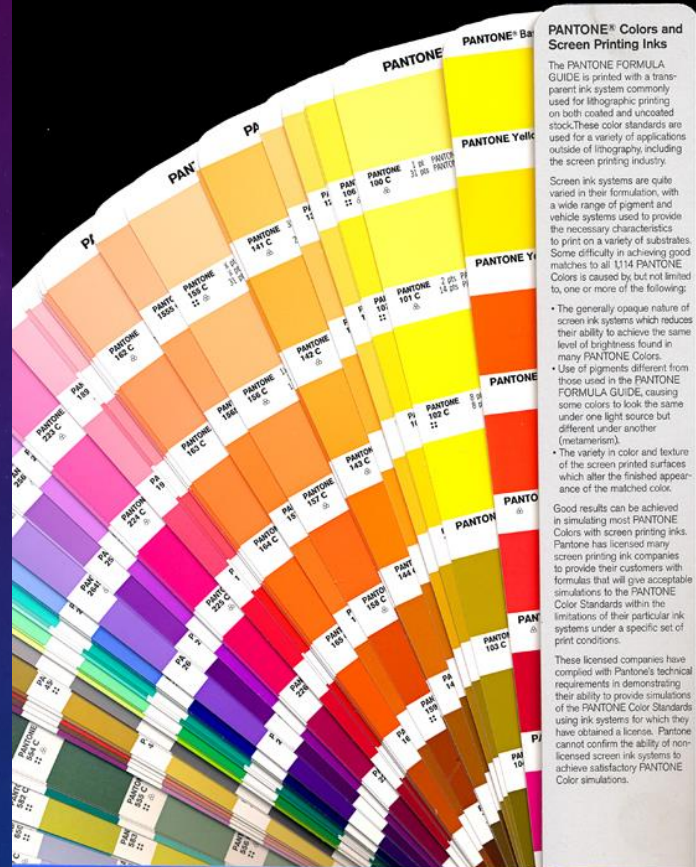
Printer
Or
Output System





SPOT & PANTONE COLOURS

- A Spot Colour is an extra colour to CMYK printing.
- It is a unique colour and not a composite (mix) of CMYK.
- It will create strong solids and smooth tones without Rosette patterning.
- Pantone is a referencing system for CMYK colour mixes and Spot Colours.



PANTONE® Colors and Screen Printing Inks

The PANTONE FORMULA GUIDE is printed with a transparent ink system commonly used for lithographic printing on both coated and uncoated stock. These color standards are used for a variety of applications outside of lithography, including the screen printing industry.

Screen ink systems are quite varied in their formulation, with a wide range of pigment and vehicle systems used to provide the necessary characteristics to print on a variety of substrates. Some difficulty in achieving good matches to all 114 PANTONE Colors is caused by, but not limited to, one or more of the following:

- The generally opaque nature of screen ink systems which reduces their ability to achieve the same level of brightness found in many PANTONE Colors.
- Use of pigments different from those used in the PANTONE FORMULA GUIDE, causing some colors to look the same under one light source but different under another (metamerism).
- The variety in color and texture of the screen printed surfaces which alter the finished appearance of the matched color.

Good results can be achieved in simulating most PANTONE Colors with screen printing inks. Pantone has licensed many screen printing ink companies to provide their customers with formulas that will give acceptable simulations to the PANTONE Color Standards within the limitations of their particular ink systems under a specific set of print conditions.

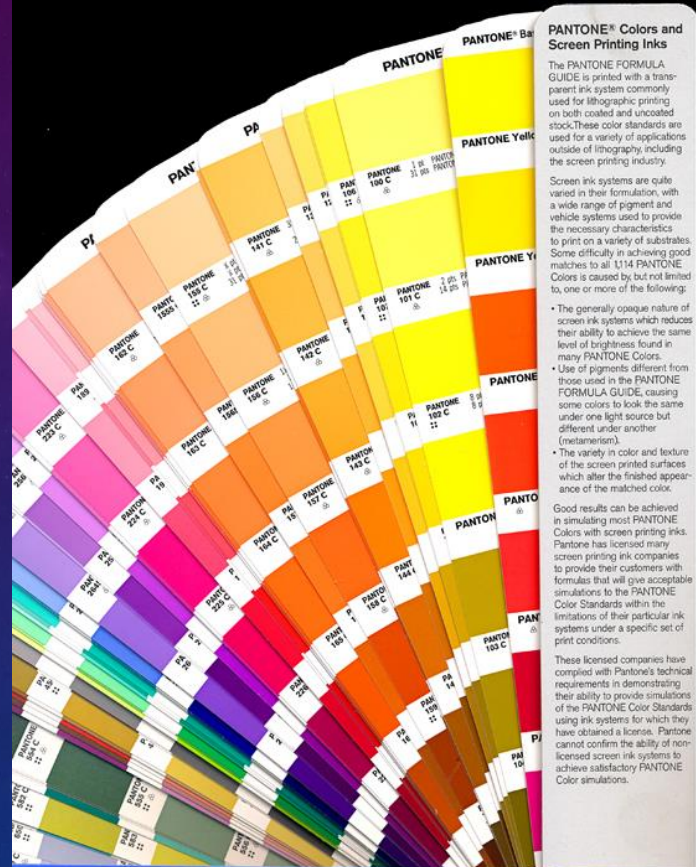
These licensed companies have complied with Pantone's technical requirements in demonstrating their ability to provide simulations of the PANTONE Color Standards using ink systems for which they have obtained a license. Pantone cannot confirm the ability of non-licensed screen ink systems to achieve satisfactory PANTONE Color simulations.



COLOR GUIDE
/coated
screen printer edition

SPOT & PANTONE COLOURS

- There are many different Pantone Swatch Libraries...
- ... Coated, Uncoated, Composite CMYK, Metallic, Pastels and so on...
- They are very useful when talking colour with clients.
- They can be expensive to buy, but cheaper than a print rerun.



PANTONE® Colors and Screen Printing Inks

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COLOR GUIDE
/coated
screen printer edition

RECAP

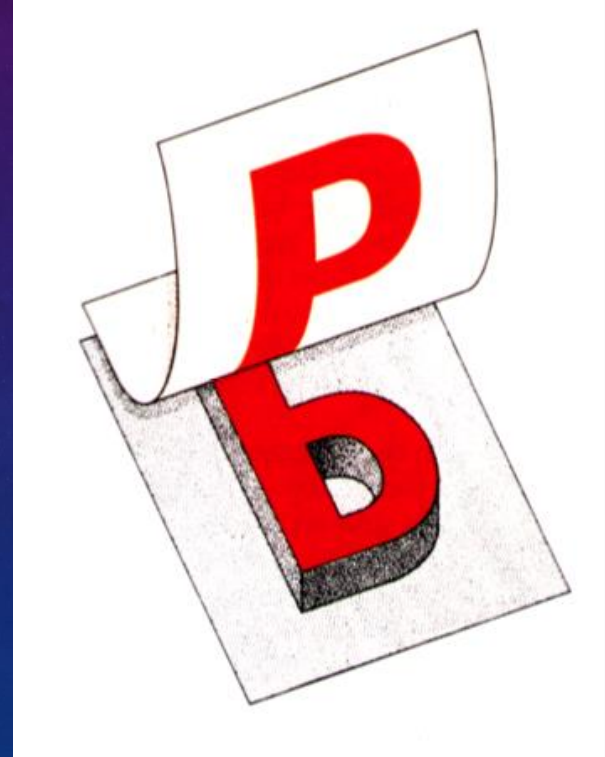
- RGB – Colour mix for screen-based design.
- CMYK – Colour mix for print based design.
- DPI – 300dpi for print, 72dpi for screen.
- LPI – Quality of the halftone screen.
- Halftone Screen – Separating the colours of the design into printing plates.

AN OVERVIEW OF PRINTING

- When you graduate you will most likely be asked to prepare work for more than one printing process.
- In order to help you understand the various techniques that are available we will discuss some of them in this lecture.
- Printing can be defined as the transferring of an image to another surface using ink.
- Very little changed until the introduction of computers.

LETTERPRESS PRINTING

- One of the most commonly known techniques is relief printing – woodcuts, linocut, spud prints etc.
- This method is still used today commercially but is not the most commonly used technique.



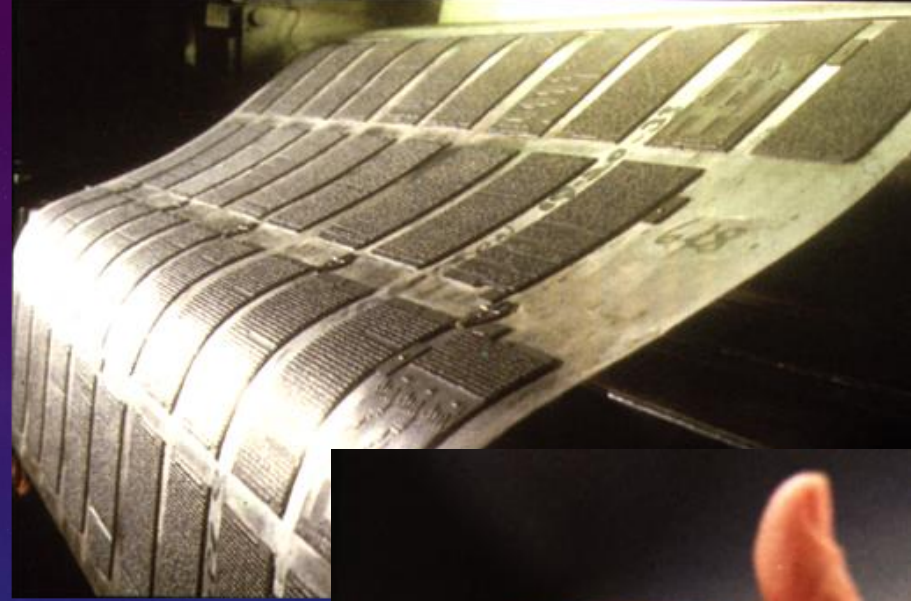
LETTERPRESS PRINTING

- Letterpress employs both individual pieces of type and specially made metal plates.
- All are assembled into a framework called a 'forme' and locked together.



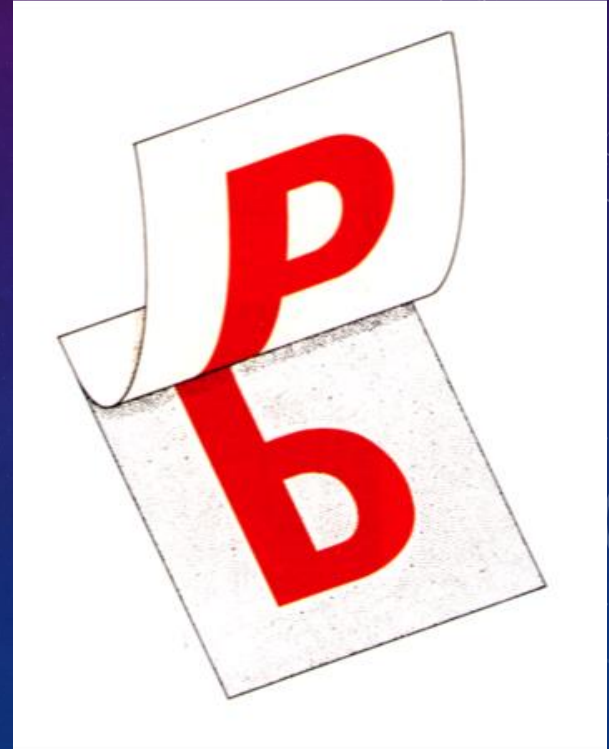
FLEXOGRAPHY PRINTING

- A derivative of letterpress.
- Plates are made of rubber or photopolymer.
- It is flexible by name and by nature, it can print onto almost anything.
- Uses include printing onto boxes, plastic bags, drinks cartons, wallpaper...



LITHOGRAPHIC PRINTING

- Most of your work will be printed this way.
- It relies on the fact that oil and water do not mix.
- This allows the printing surface to be flat.



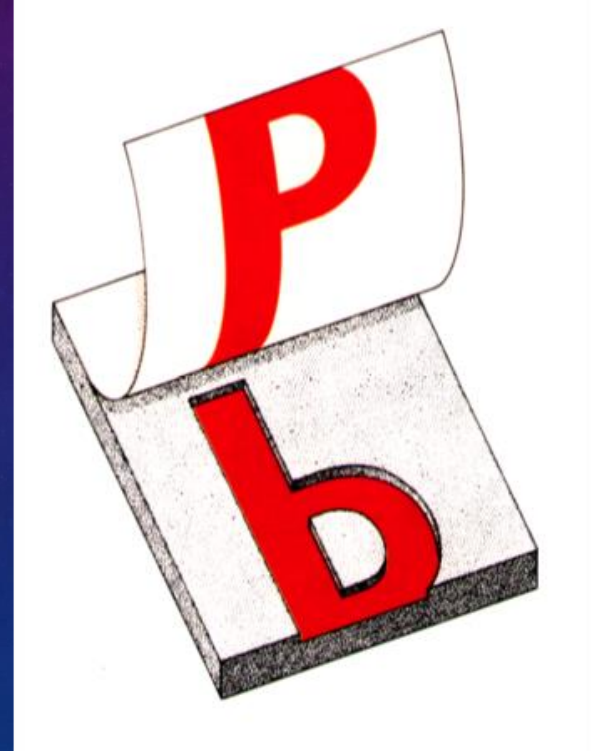
LITHOGRAPHIC PRINTING

Four or more inking sections enable full colour printing.



GRAVURE (INTAGLIO) PRINTING

- Gravure is a specialist technique used mainly for long print runs and high quality
- Almost the opposite of 'Relief', it has cells etched into the surface of the plate to accept ink.



SCREEN (STENCIL) PRINTING

- Screen printing utilises a stencil.
- It is cheap, flexible and very suited to small specialist print runs.

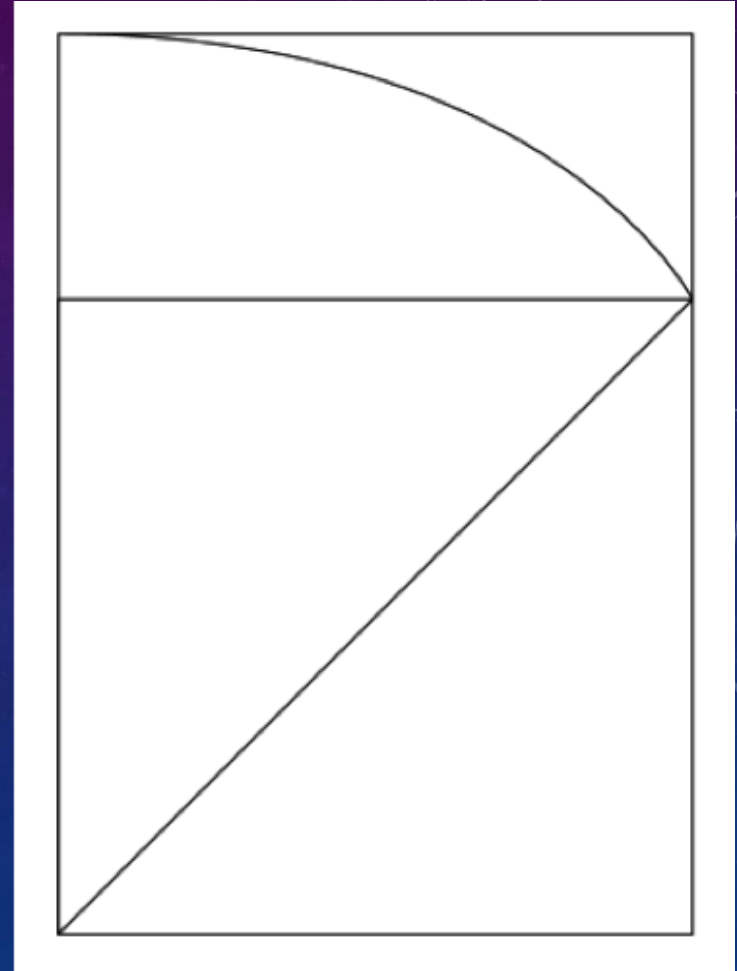


PRINTING – A SUMMARY

- In most cases you will be dealing with the Offset Lithography method of printing.
- However, you may need to work with another, for example Gravure for packaging or Screen printing for T-Shirts.
- Be prepared to take advice if you are unsure.
- Don't be afraid to talk to printers.

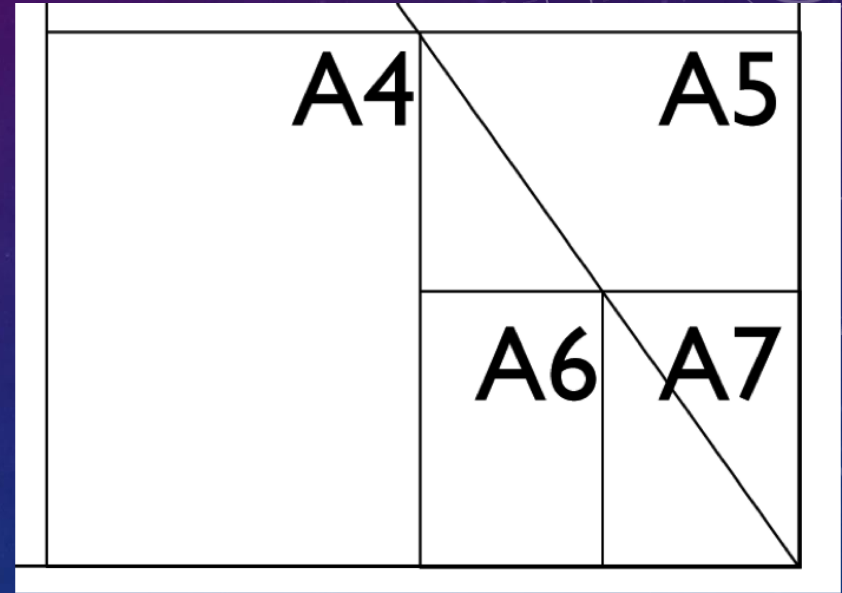
PAPER SIZES

- The 'A' sizes are best known.
- They are based on the 'Golden Triangle'.
- There are other paper sizes...



PAPER SIZES

- 'S' and 'SR' accommodate the oversize papers that allow for crop marks and bleed etc.
- 'B' sizes exist for poster formats.
- 'C' are for envelopes.



PAPER THICKNESS

- Countries using the ISO 216 sizing system refer to the thickness of paper as 'weight'.
- Measured in grams per square metre.
- Printing paper is generally 60g to 120g.
- Heavier than 160g is considered card.



PAPER SAMPLES

- Research paper merchants.
- Ask for paper samples.
- Sample books allow you to see textures, finishes and weights.
- More importantly...
- They allow your CLIENT to see textures, finishes and weights.



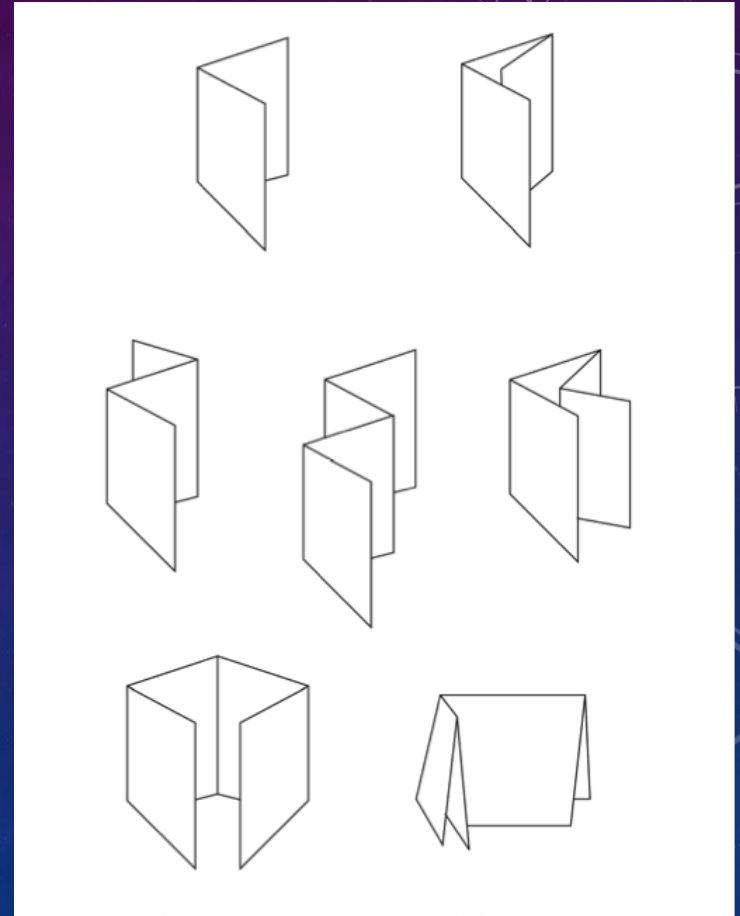
FOLDING

- Folding weakens the paper by damaging the fibers in the paper.
- An obvious type of fold is for pages in a book or magazine.
- The technique of folding can become quite complex.

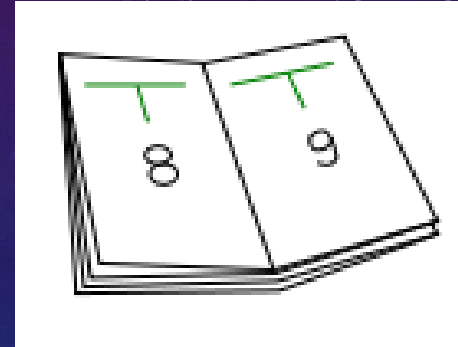
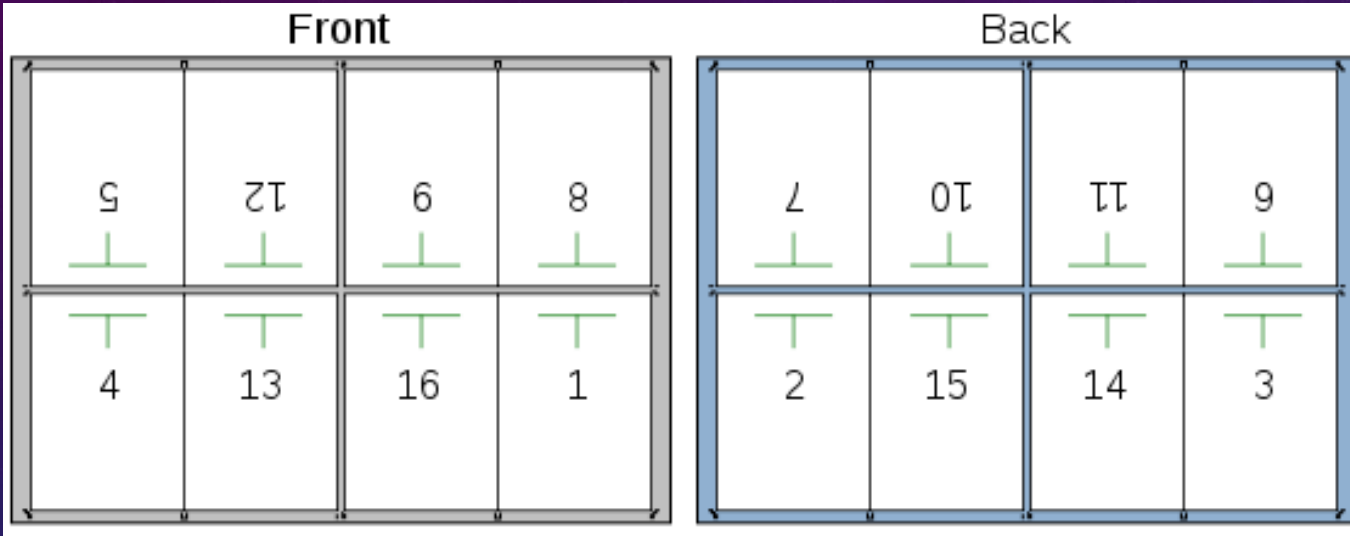


FOLDING

- Each folding technique can be specified by name: Single, Gate, Concertina, Parallel, Double, Broadside etc.
- The designer will be expected to specify required folding.
- When ever possible supply a mockup of the folding.



IMPOSITION



- Pages of your design may need to be arranged for printing. This is called Imposition.
- It can get very confusing so make up a dummy to get your page numbering correct.

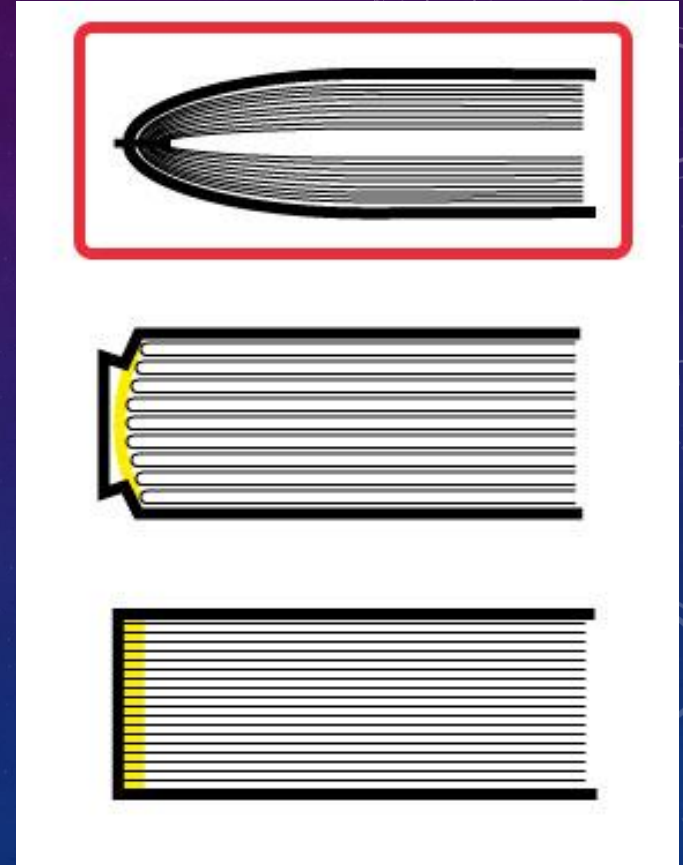
BINDING

- There are many forms of Binding.
- Three methods are most common in mass production.
- Saddle Stitch.
- Edition Binding.
- Perfect Binding.



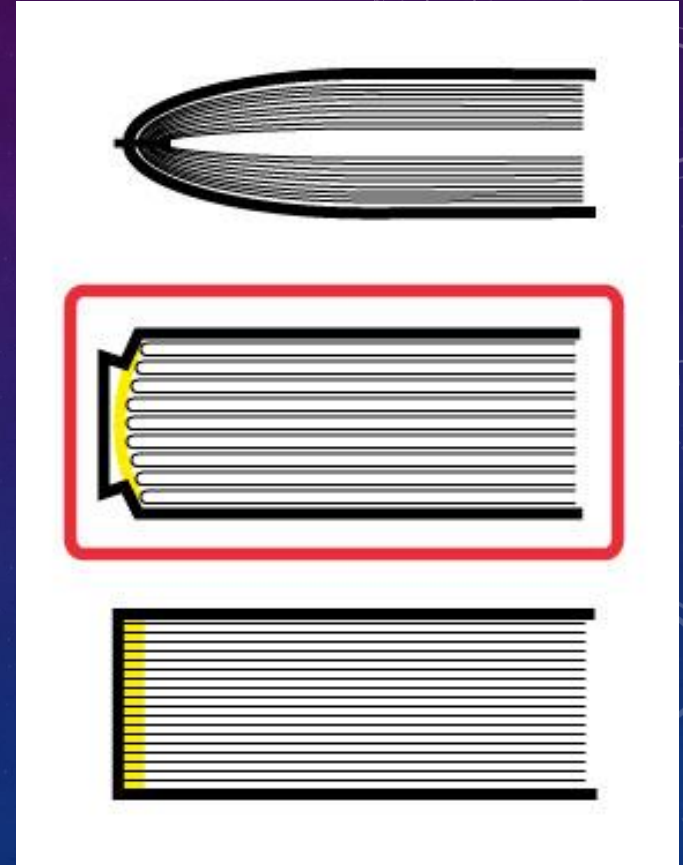
SADDLE STITCH

- Common in coffee table magazines & some newspapers.
- Made up of spreads containing 4 pages then stapled together.
- Number of pages are always in multiples of 4.
- Generally 64 pages or less depending on paper stock.



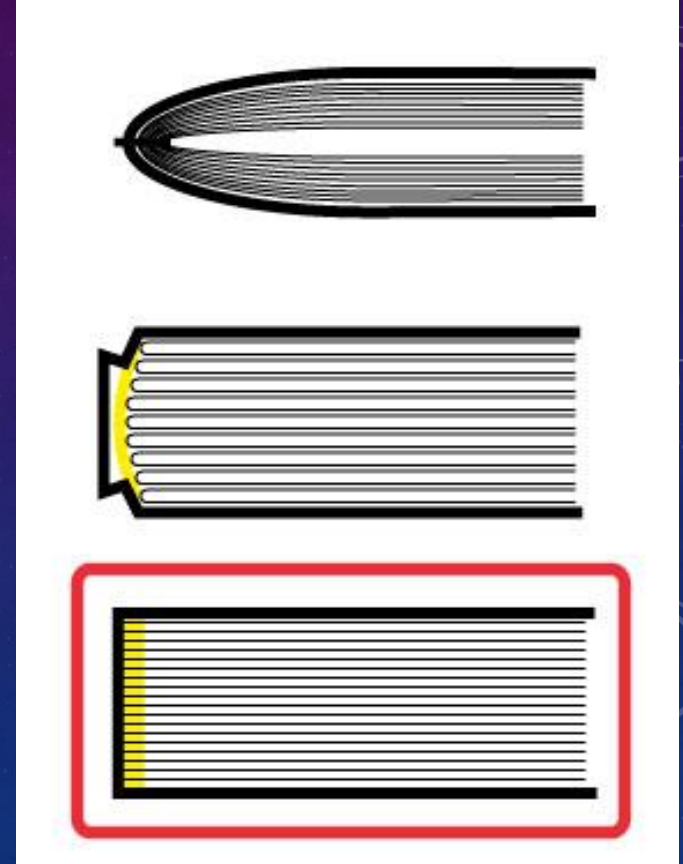
EDITION BINDING

- Made up of 'signatures' that are stitched together with thread.
- Signatures have a similarity to Saddle Stitch in that they are made up in a similar way.
- Used in binding hard back books.



PERFECT BINDING

- The pages are more individual than in other methods of binding.
- All the pages are gathered and glued into the cover.
- This method easily allows for different paper stock to be used in the same book.



CUTTING

- Once printed the work will require trimming.
- This can be straight forward by using a guillotine.
- More complex Die Cutting.
- Or Laser Cutting.
- Laser cutting can create greater detail but is more expensive.



FOIL BLOCKING

- Allows for special colours & metallic finishes.
- The process requires heat and the stock needs to be chosen accordingly.



EMBOSSING

- Embossing can be a subtle way to enhance your designs.
- Good paper stock is a must.
- The paper is effectively clamped between a male and female mold.



