Printing!

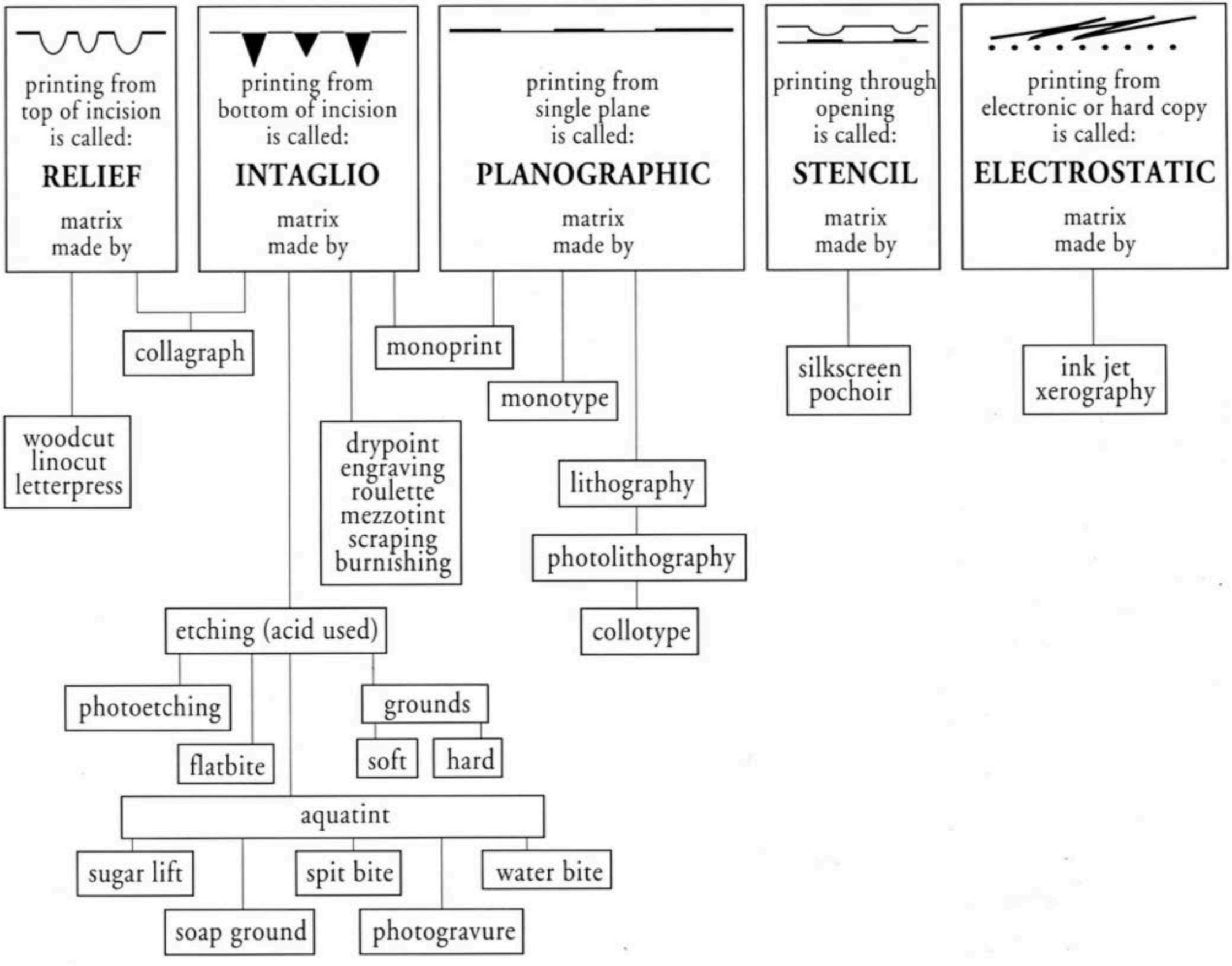
The Various Processes & How They Apply To YOU

- What is Production?

- Quick history of printing (Timeline)
  - Letterpress 1450's Gutenburg & Incunabula–1970
  - Lithography early 1796, Alois Senefelder
  - Chromolithography early 1900's
  - Offset Lithography, 1960's – present
  - Commercial Printing as we know it,1950's – present

Printmaking Processes

- Relief Printing
  - linoleum
  - woodcut
  - letterpress
- Intaglio
  - etching
  - engraving
- Stencil
  - silkscreen
- Planographic
  - lithography
- Electrostatic Digital Printing
  - inkjet
  - xerographic (laser)


printing from top of incision is called:
RELIEF
matrix made by
printing from bottom of incision is called:
INTAGLIO
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printing from single plane is called:
PLANOGRAPHIC
matrix made by
printing through opening is called:
STENCIL
matrix made by
printing from electronic or hard copy is called:
ELECTROSTATIC
matrix made by
woodcut
linocut
letterpress
collagraph
drypoint
engraving
roulette
mezzotint
scraping
burnishing
monoprint
monotype
lithography
photolithography
collotype
silkscreen
pochoir
ink jet
xerography
etching (acid used)
photoetching
flatbite
grounds
soft
hard
aquatint
sugar lift
soap ground
spit bite
photogravure
water bite

Commercial Printing Processes

- Offset Lithography
- Flexography
- Thermography
- Screen Printing
- Gravure
- Digital Printing
- 3D Printing
- Transfer Printing

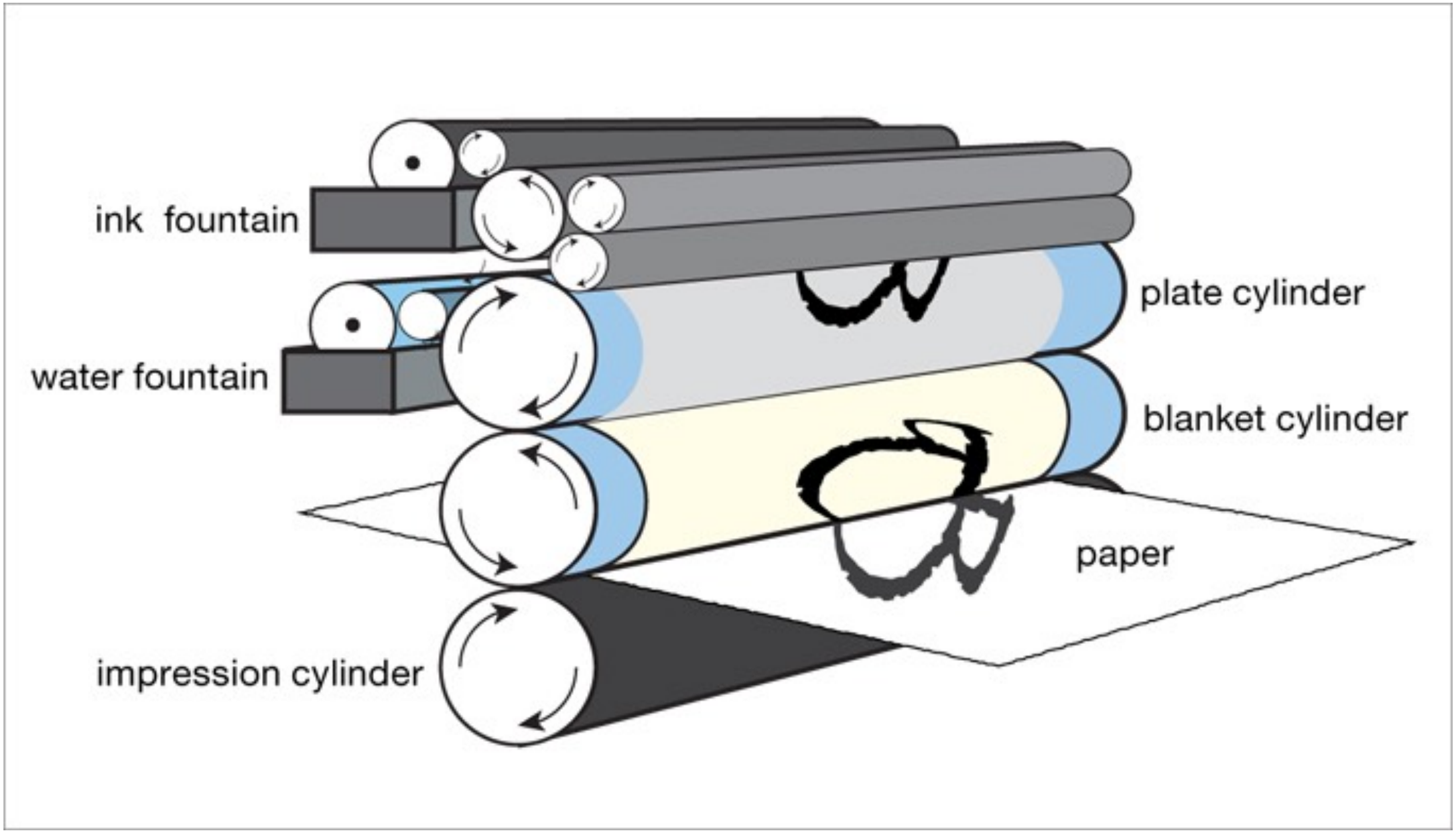
Specialty Processes

- Foil Stamping
- Embroider Printing
- Embossing
- Coating (Aqueous, Varnish, UV, etc.)

Offset Lithography

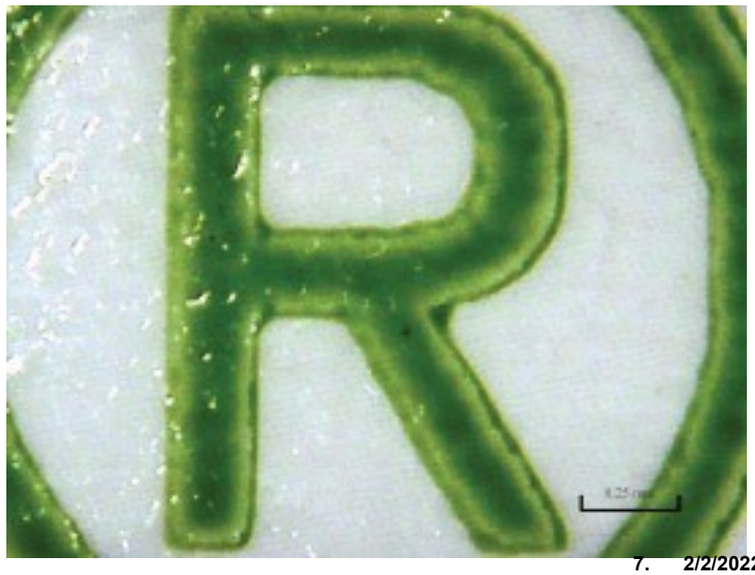
- Most commonly used commercial method
- Image on metal plate is "**offset**" onto rubber **blanket**, then to sheet of paper
- Process based on fact that "oil & water don't mix"
- Printing area is made ink receptive, while non-printing areas is ink repellent (with water)
- Can be used to print single sheets one at a time or rolls of paper

Offset Lithography

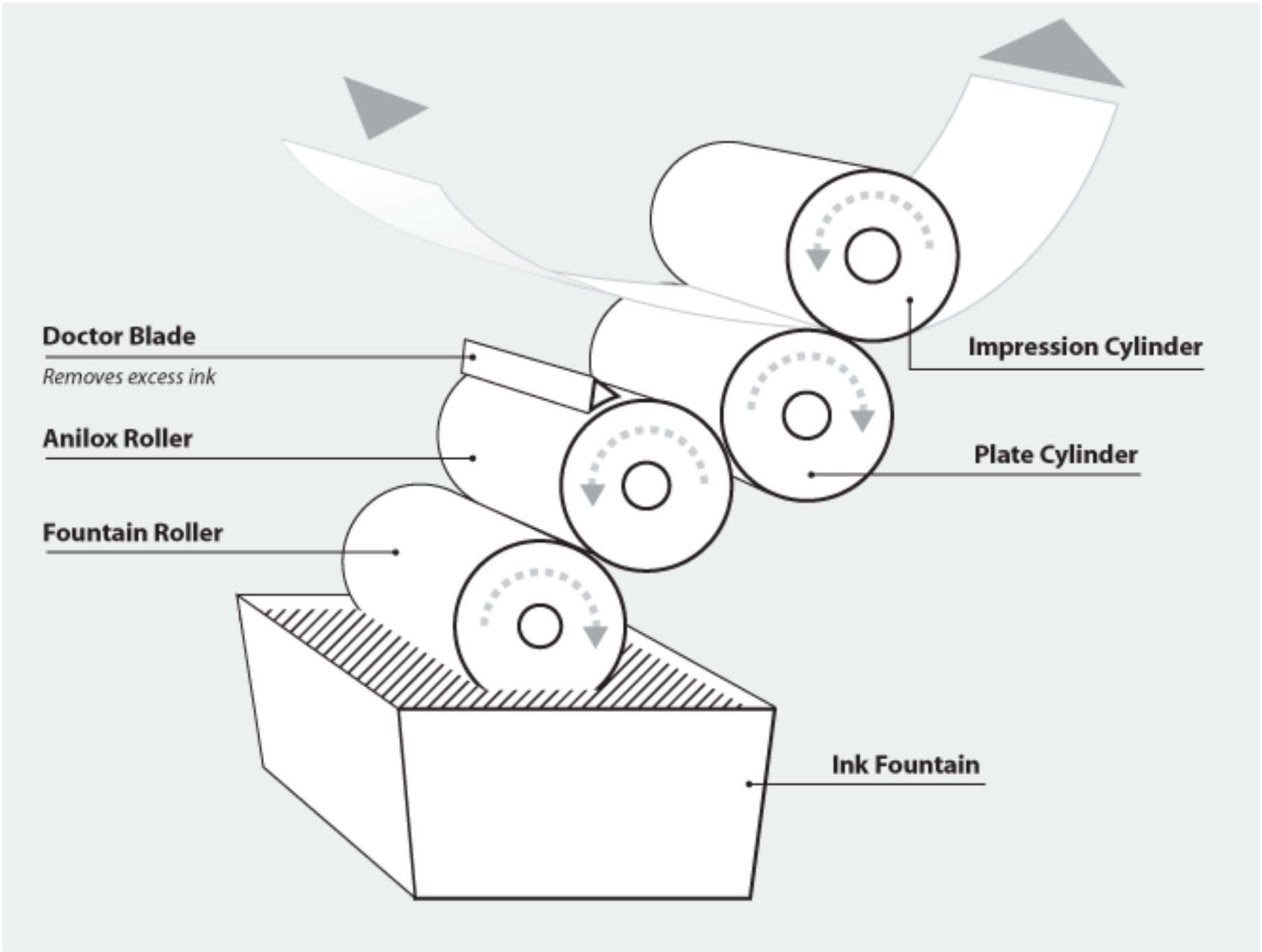


Flexography

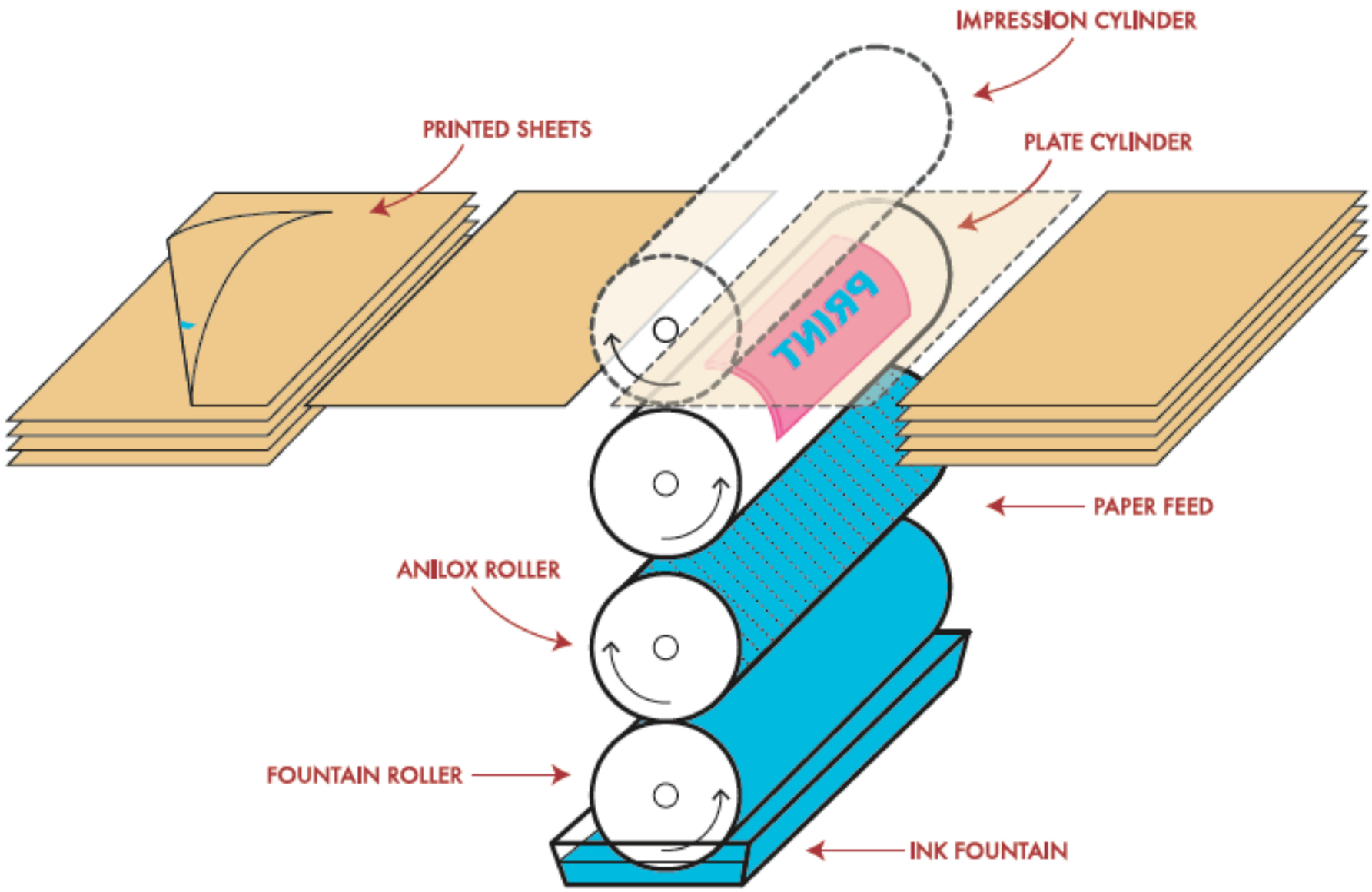
- Sometimes called "flexo"
- Inked plate applies directly to the substrate
- Used to print on corrugated boxes, plastic, foil, acetate (bags, labels, stickers)
- Flexible printing plates made of rubber or plastic
- Fast drying inks
- High speed / High quality process - high print runs
- Like a giant rubber stamp - look at edges to identify



Flexography



Flexography



Litho/Flexo Comparison

Lithographic printing - offset process.
- The plate and the blanket are mounted on (wrapped around) cylinders.
- Press applies ink to the printing plate, then from the plate to a rubber blanket, which transfers it to the paper

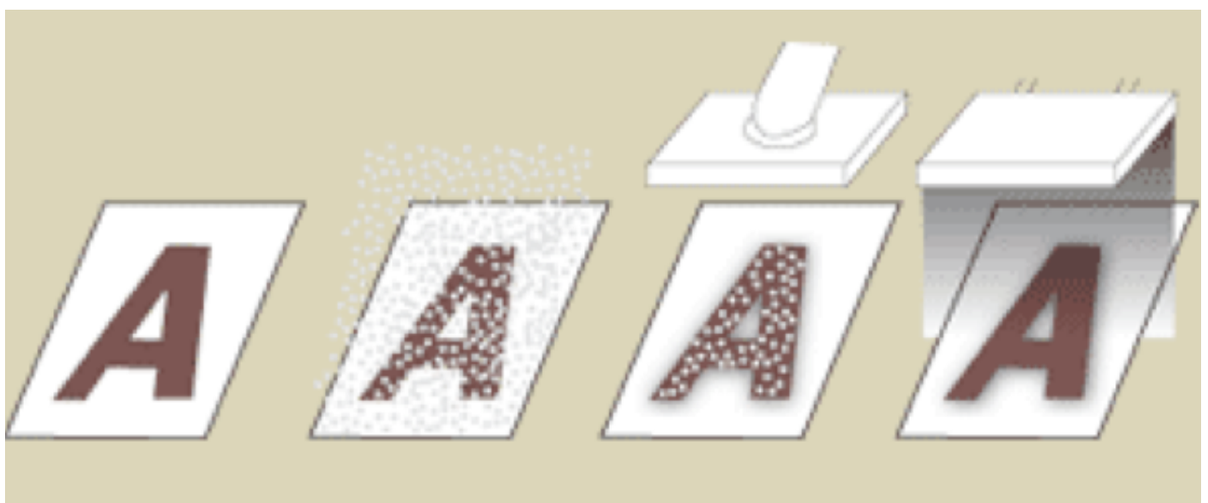
- Time-tested, high quality option that works great for flat packaging and paper.
- Litho plates are inexpensive, but the printing process is more expensive than flexo.
- Most major book and magazine publishers use this method.
- Some value-added processes, such as specialty coating can be done “in-line”.

Flexographic printing - direct print process
- Flexible (stamp like) plates mounted onto a cylinder.
- The anilox roll applies the ink on the printing plate.
- Then, the substrate runs between the print roller and an impression cylinder.

- Flexo works on a wide range of substrates, including non-flat media (bags, bottles)
- Flexography offers a reduced production cost, but much higher setup (the plates can be re-used).
- Older flexo presses tend to produce relatively low quality (low LPI) prints, though new higher-end presses can rival lithography in clarity and quality.

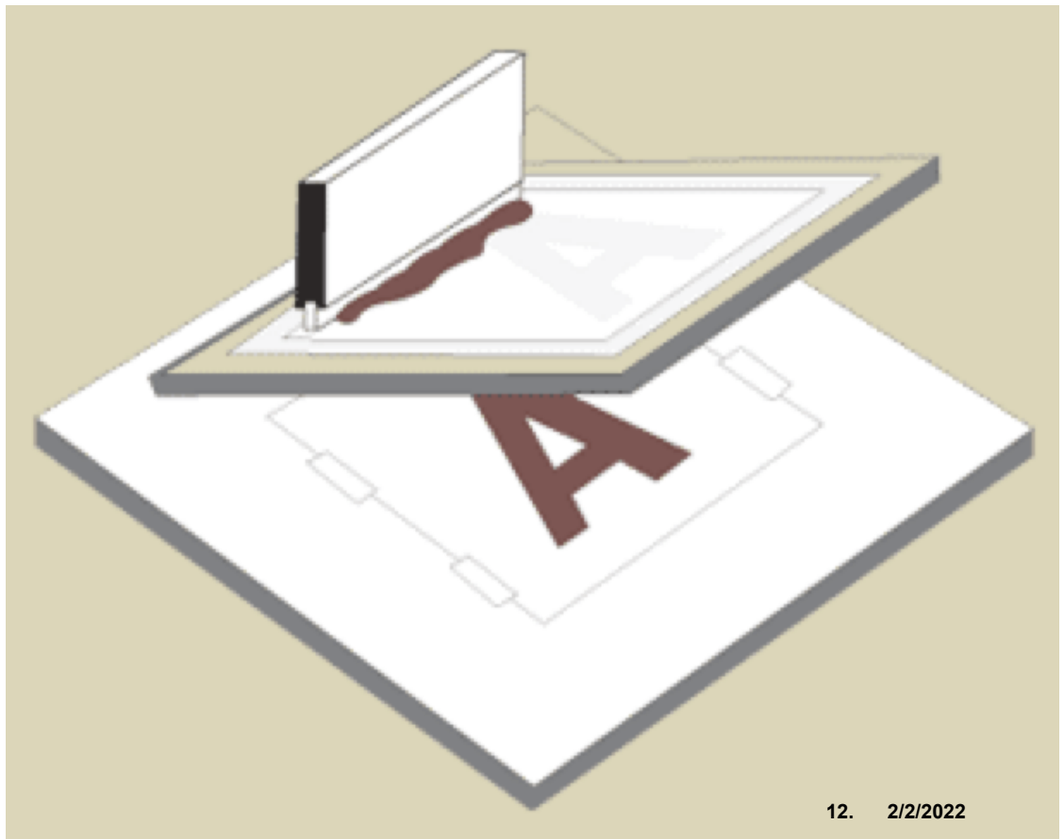
Thermography

- Powder is applied to a slow-drying ink
- Excess is vacuumed away & heat is applied
- Heat causes ink & powder to "puff-up" giving a raised impression
- Not appropriate for **halftones**, large areas of color or fine detail (ie: small serif typefaces)
- Color choices are limited

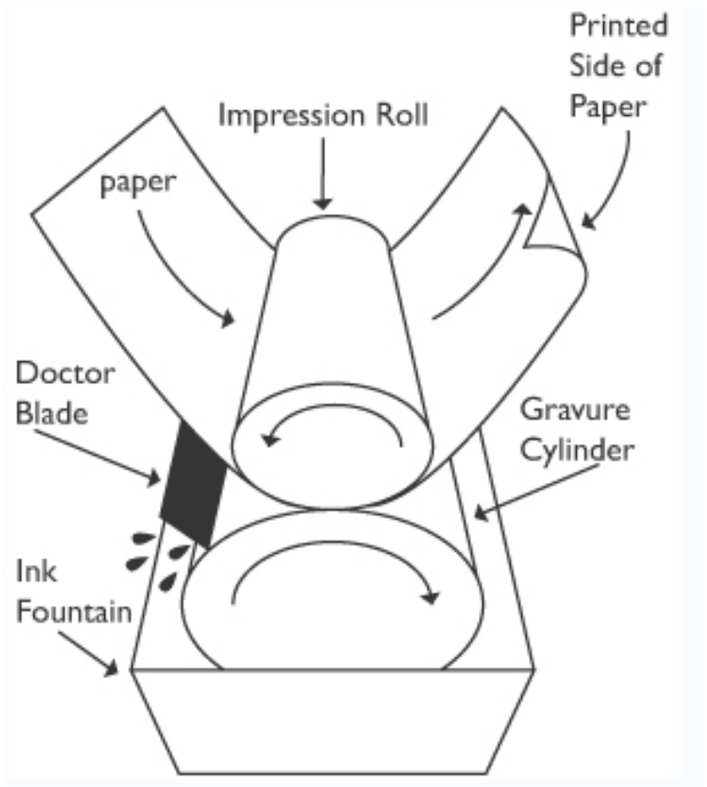


Serigraphy (Screen Printing)

- Uses a screen (silk, polyester, nylon, etc) & stencil
- Squeegee pulled across, forcing ink onto surface
- Labor intensive process
- Suitable for surfaces that don't work with offset printing (t-shirts, industrial materials, acrylic, metal, etc.)
- Coarse **half-tone** screen - most fine detail is lost
- Can be done by machine or by hand.



Rotogravure (Gravure)



- Skips the blanket in offset printing
- Image transferred directly from plate (usually digitally engraved by diamond tip machine or laser) to paper.
- Engraved cylinder is partially immersed in ink
- **Doctor Blade** (squeegee) scrapes ink off the non printing (non-recessed) areas
- **Impression roller** applies force to draw ink out of grooves
- Remarkable density range - more ink that other processes
- Long run (over 1,000,000) - expensive cylinder costs

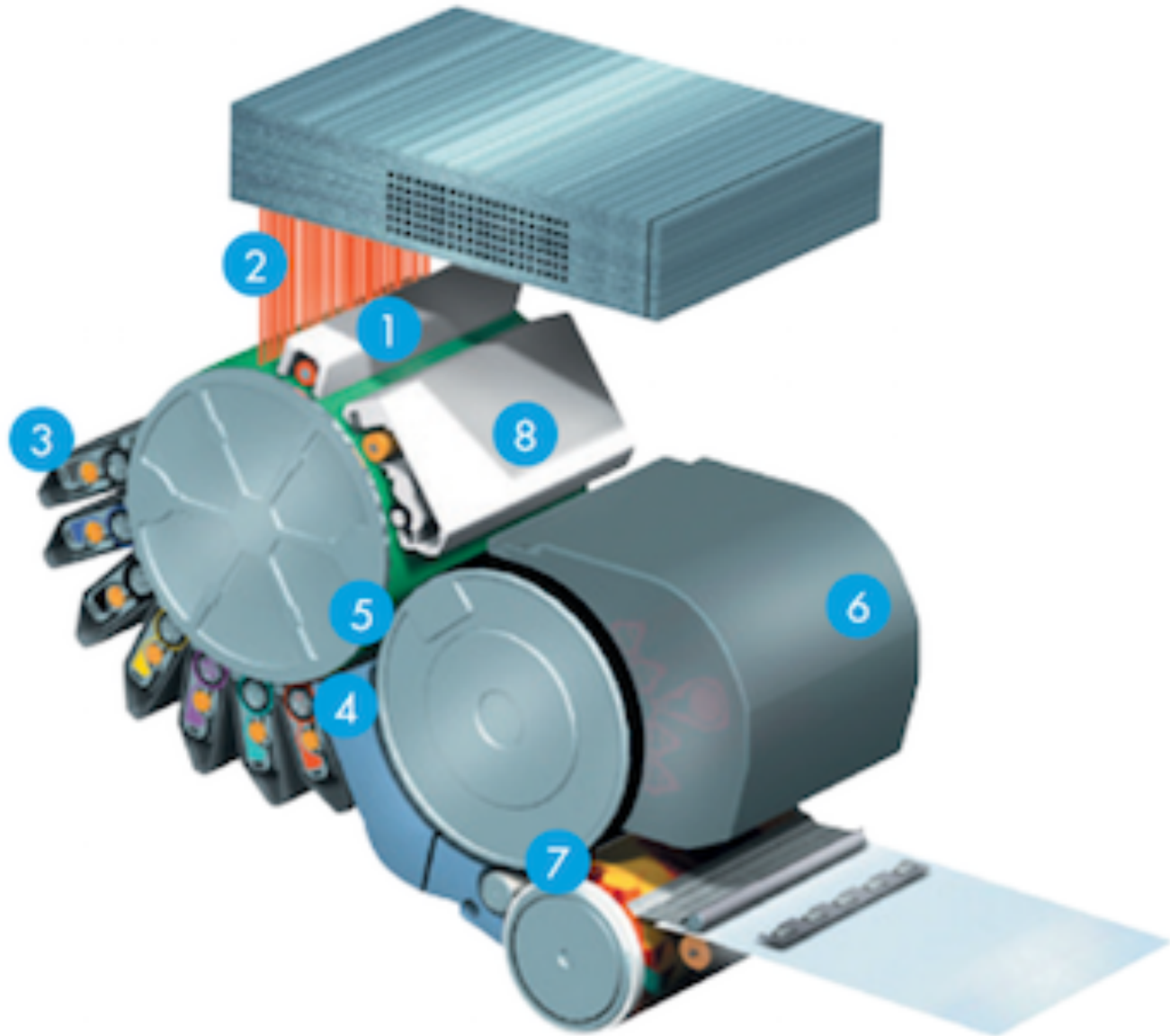
Digital Printing

- Less **set-up waste** than offset printing
- Content goes directly from the computer to a waterless, offset printing press, (eliminates film & plates)
- **Laser Ablation**: laser removes silicone to exposes a polyester layer that accepts ink. No chemicals are used in this process and it is done almost instantaneously.
- Lower cost than traditional offset printing
- Exact proofing and **variable data** projects are possible
- Doesn't require wetting the stock resulting in less paper stretch and more consistent process control.
- Perfect for small quantities.

Electrostatic, Digital Printing

HP Indigo digital press printing cycle

1. Charging station
2. Laser exposure
3. Binary Ink Developer units (BIDs)
4. Pre-transfer erase unit (PTE)
5. First transfer (PIP to blanket)
6. Blanket heating
7. Second transfer (blanket to substrate)
8. Photoconductor cleaning station



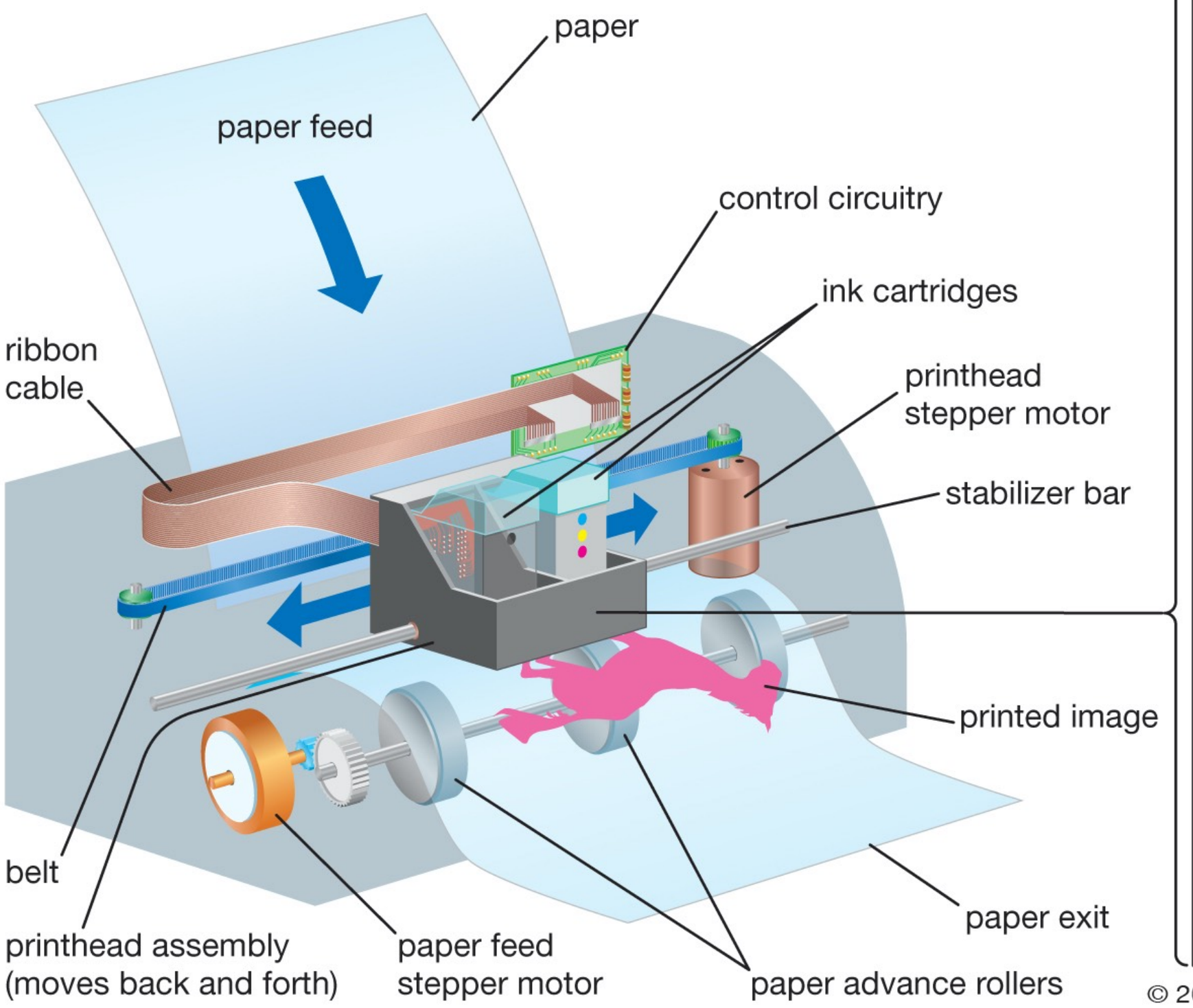
Examples of Variable Data Printing

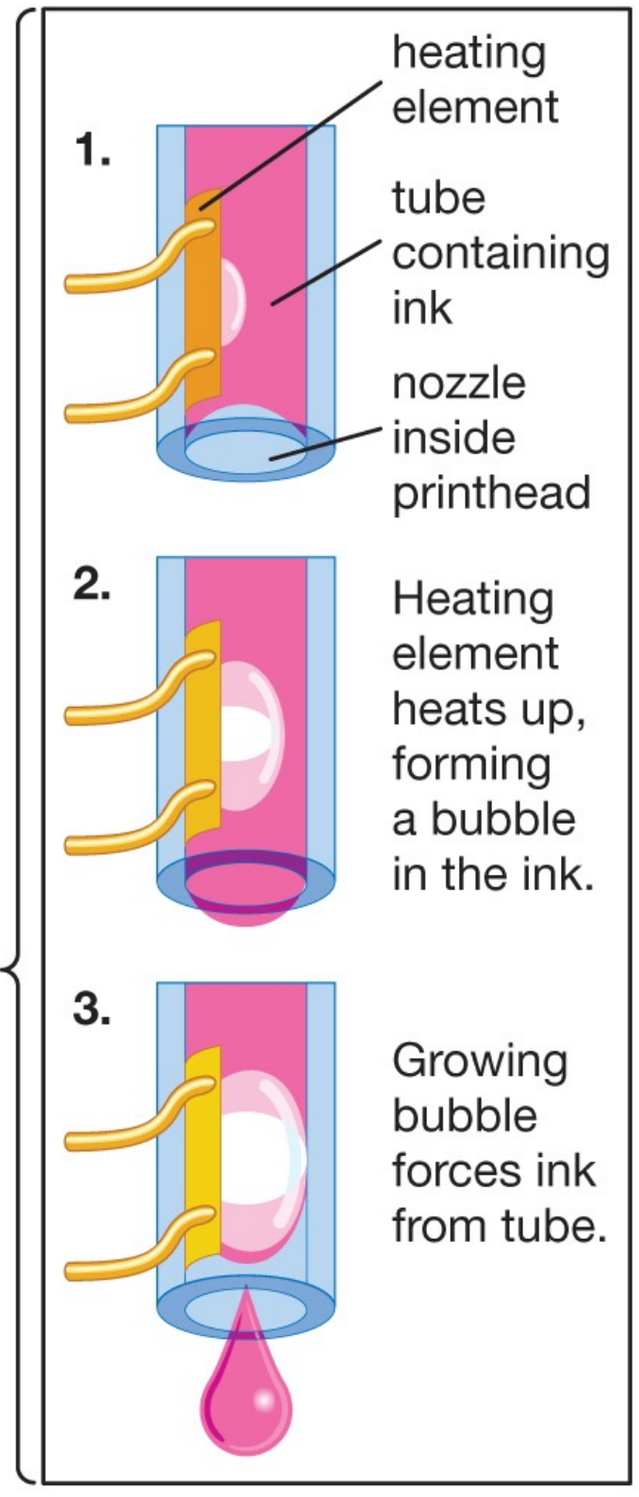
Ink Jet Printing

- Small jets propel droplets of ink onto paper to create an image.
- There are two main inkjet technologies currently used by printer manufacturers:
    - **Thermal bubble (Bubble Jet)** - Used by Canon and HP
        - Tiny resistors create heat which vaporizes the ink to create a bubble.
        - Some of the ink is pushed out of a nozzle by the expanding bubble and onto the paper.
        - When the bubble "pops" (collapses), a vacuum is created which pulls more ink into the print head from the cartridge.
        - A typical bubble jet print head has 300 or 600 tiny nozzles, and all of them can fire a droplet simultaneously.
    - **Piezoelectric (Ink Jet)** - Patented by Epson
        - A piezo crystal is located at the back of the ink reservoir of each nozzle.
        - The crystal receives a tiny electric charge that causes it to vibrate inward, forcing a tiny amount of ink out of the nozzle.
        - As it vibrates out, more ink is pulled into the reservoir to replace the ink sprayed out.

Ink Jet Printing (Bubble Jet)

Principle of the ink-jet printer





Additional Printing Processes

• **Letterpress:** A relief printing method where movable wood or metal type and wood engravings/ linoleum blocks are locked into the "bed" or "chase" of a press, inked, and pressed against paper to transfer the ink from the type to create an impression on the paper. This was the state-of-the-art process for commercial printing from the time of Gutenburg and the Incunabula until the 1960's

• **Engraving:** Incising a design onto a hard surface by cutting grooves into it. Traditional engraving, by burin or with the use of machines, continues to be practiced by goldsmiths, glass engravers, gunsmiths and others. Modern industrial techniques such as photoengraving and laser engraving are used to create metal intaglio printing plates for printing on paper.

• **Xerography:** An electrostatic method of image transfer onto smooth paper.

• **Laser printing:** similar to photocopying. Laser beam turns on and off rapidly as it scans a charged drum. The drum then attracts toner powder to the areas not exposed to the light. Finally, the toner is fused to paper over a belt by heated rollers.

• **Holographic Printing:** produced with special lasers, presenting a three-dimensional scene (without the need for special 3D glasses). Used in labels, stickers, decals to thwart forgery and tampering

• **Lenticular Printing:** Digital files are specially prepared and printed onto lens material (plastic composed of "lenticules" or special lenses). A different image (of a series of two or three images) is printed in an interlaced pattern on the lens material, when you move the plastic, you will see movement or depth. Think of a lenticular print as a high-tech "flip book", you can simulate motion.

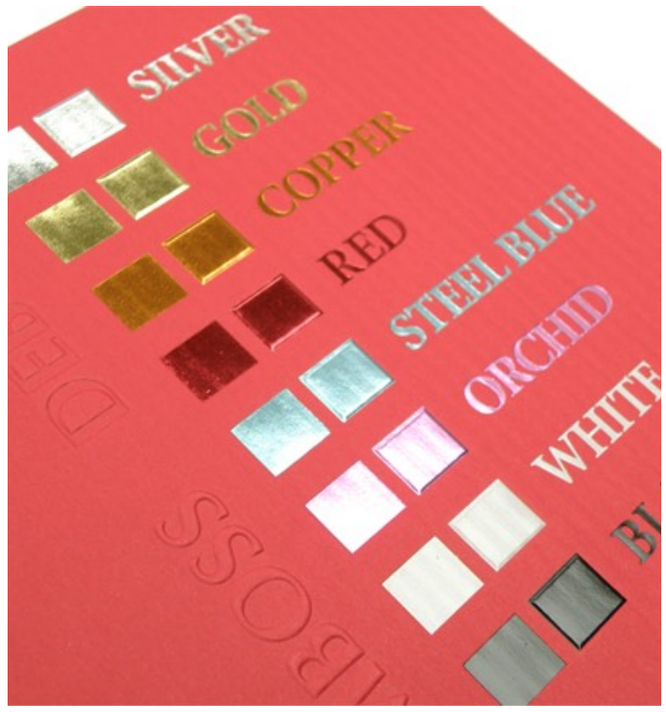
Sheet fed press

- Grippers (metal fingers) grab single sheet and pull it through the press
- **Registration** can be very accurate
- Very accurate color control by pressman
- Finishing (fold & trim) is done by separate machine

Web press

- Typically used for jobs over 20,000
- Can be left as rolls (pre-print), or

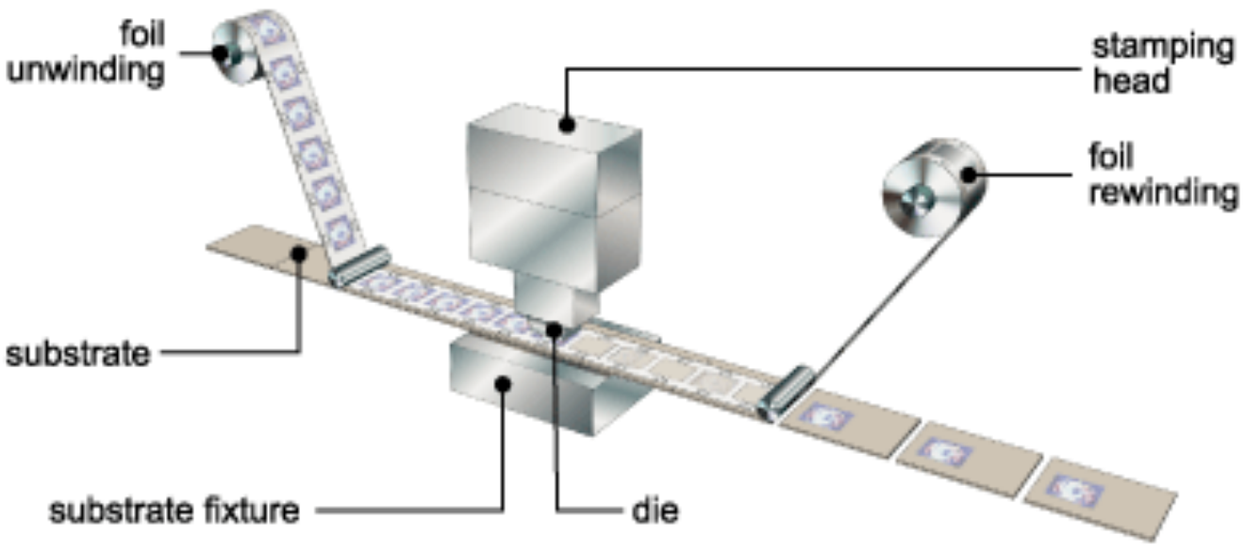
  folding & trimming can be done "in-line"
- Registration not as accurate as sheet-fed
- Must stick to standard roll sizes

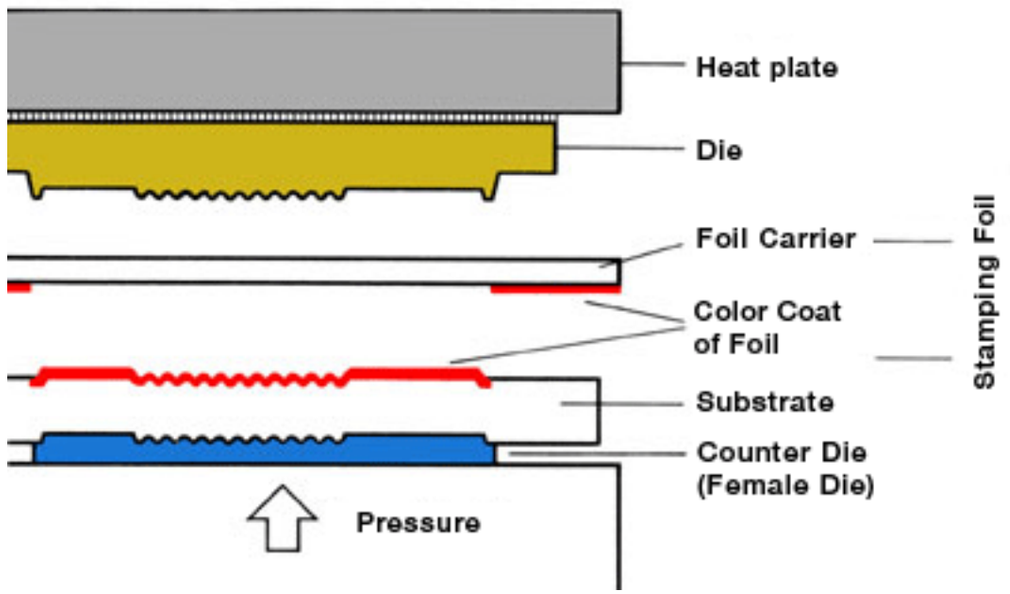


Specialty "Value-Added" Processes

Foil Stamping

- Hot die presses thin plastic film into paper.
- Hundreds of colors available
  - Metallic, pearlized, mirror, patterned, clear/varnish-like
- Suitable for application to anything that can withstand the heat: paper, cloth, pencils, vinyl binders, etc...
- Can be followed with an embossing process to create a "foil emboss"





Foil is available in many colors.

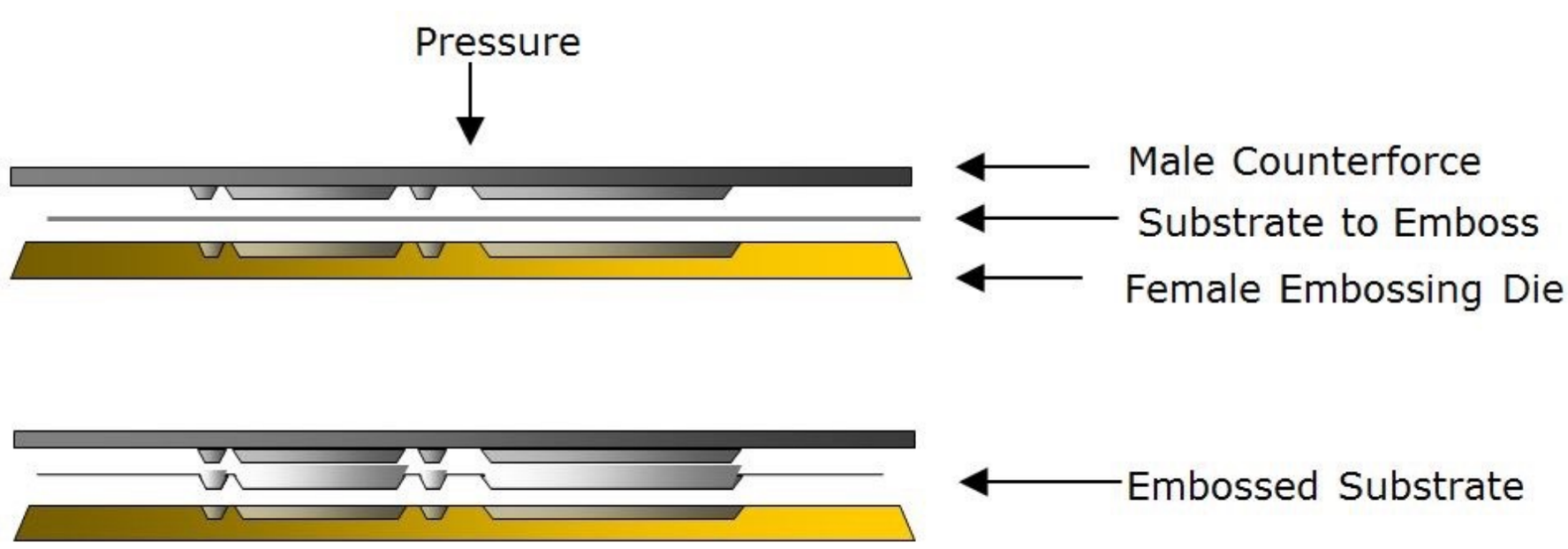
FOIL DIE

ROLLS OF FOIL FILM

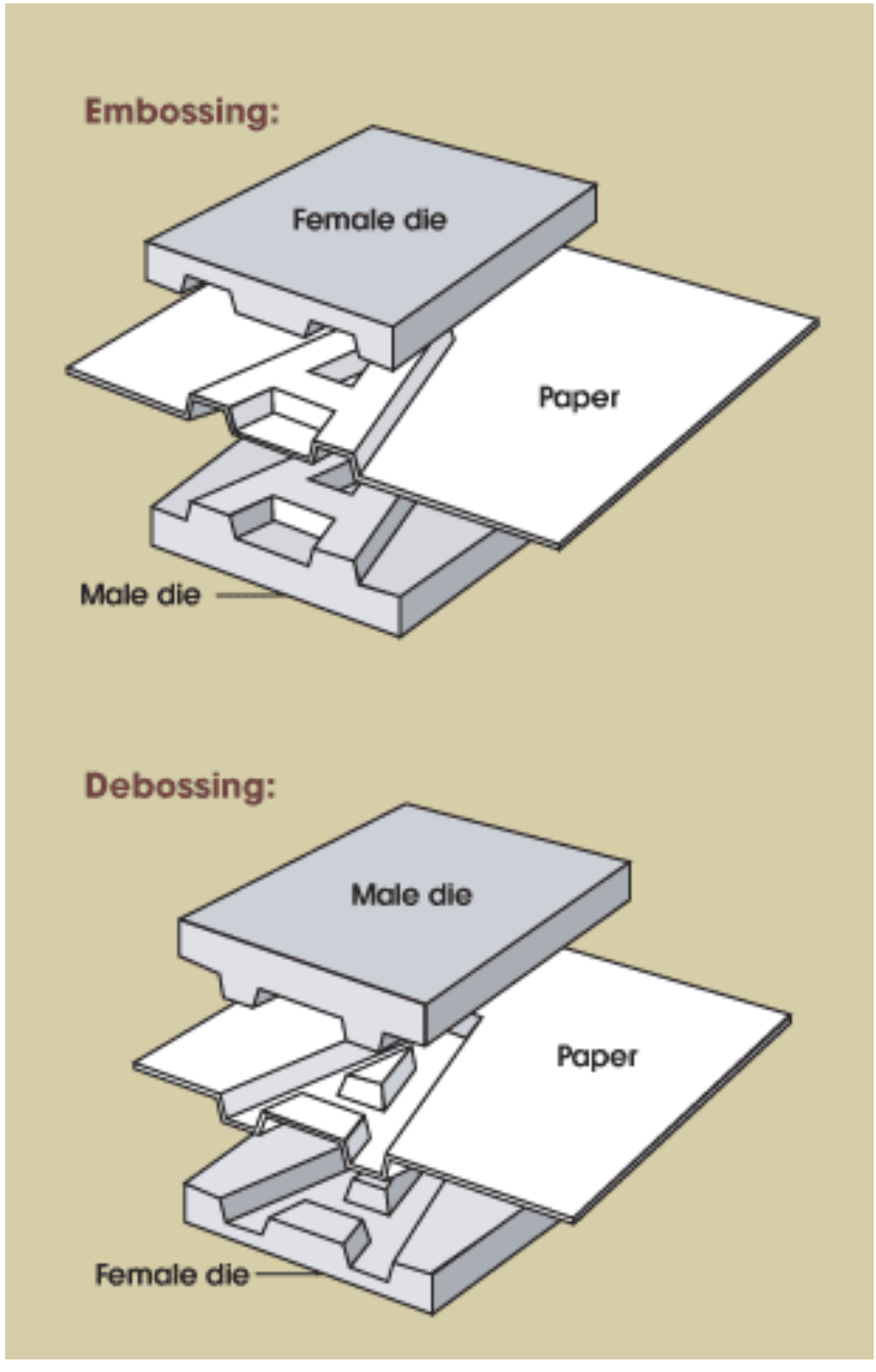
FINISHED FOIL STAMP

Emboss/Deboss

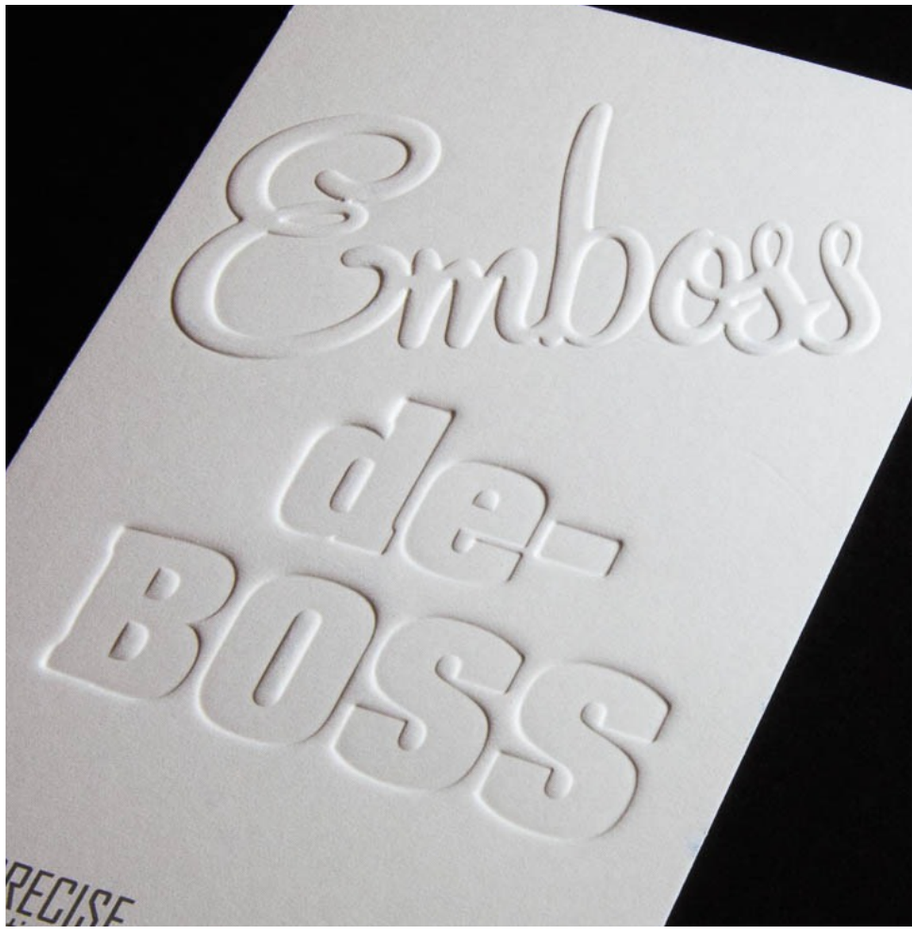
- Creates either raised or recessed relief image on paper.
- An **embossed** pattern is raised against the background,
- A **debossed** pattern is sunken into the surface of the material (might protrude somewhat on the reverse, back side).



Emboss/Deboss Dies

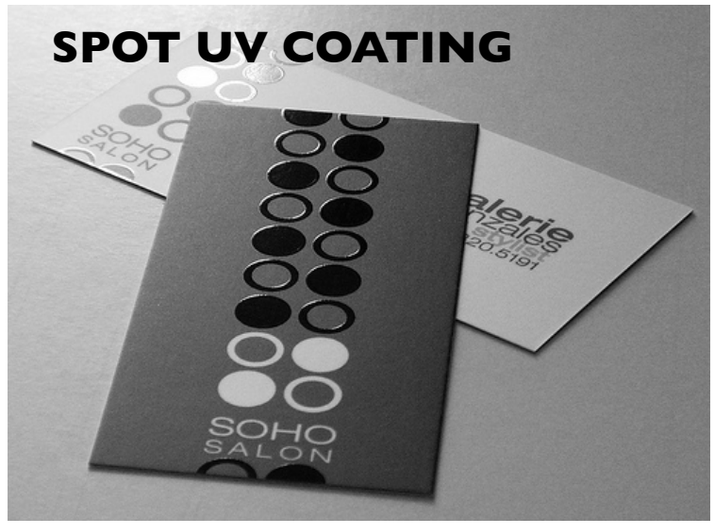


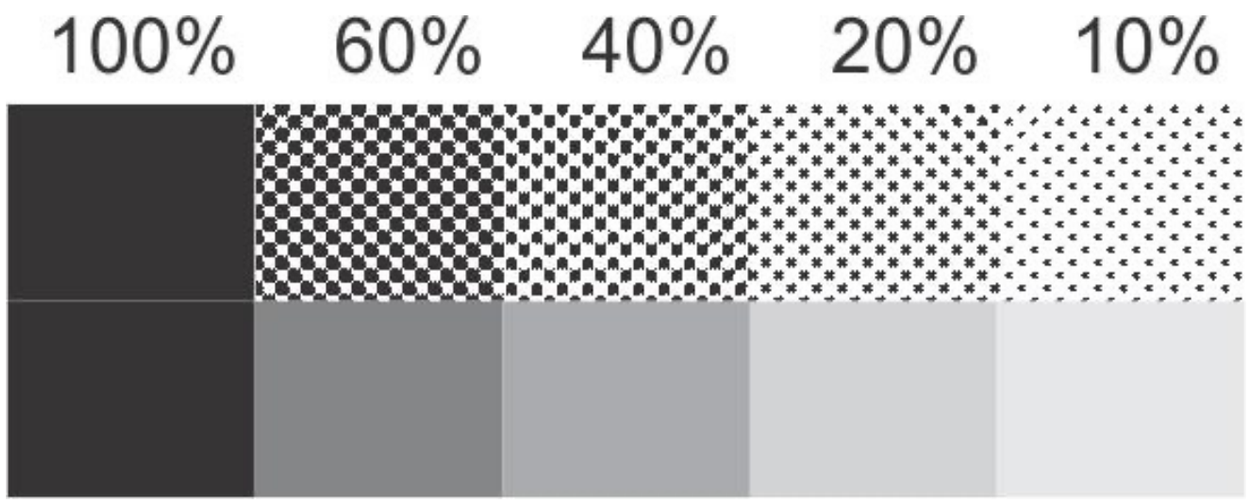
Emboss/Deboss Examples



Coatings

- Applied overall or as a "spot"
- Matte, Satin or Gloss Varnish
  - Inexpensive, apply in print unit
  - BUT can yellow over time
- Aqueous Matte or Gloss (Water Based)
  - Applied by most presses
  - Protects the ink from scuffing
- UV Matte or Gloss (Cured with UV light)
  - Must be applied by a press with UV lights to "cure"
  - Gloss is VERY Durable
  - Can have "add-ins", sparkle, pearl, etc
  - Can be applied thickly for texture
- Laminate
  - Plastic film applied at a different machine



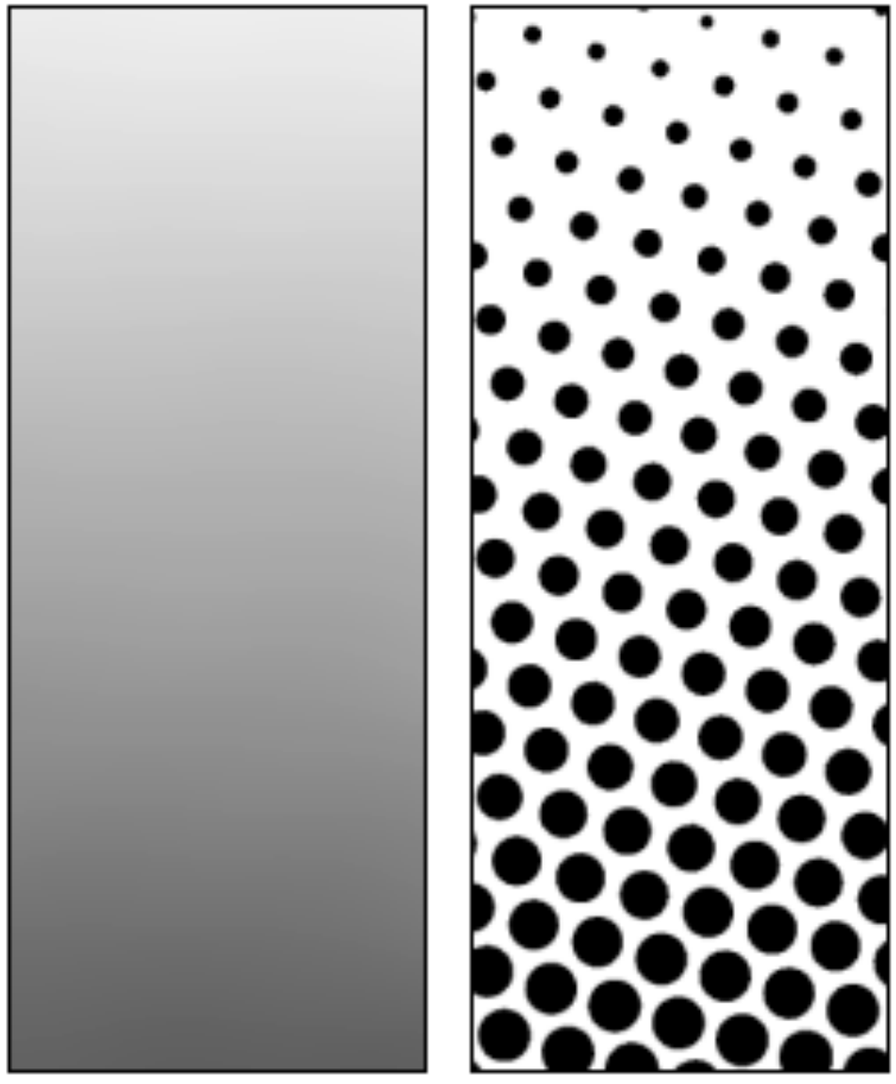


Screens

Continuous Tone vs. Half Tone

Continuous Tone Image:
Images containing a range of tones from white to black with indefinite shades of gray represented

–Film Photographs
–Television/Computer
–Digital Images

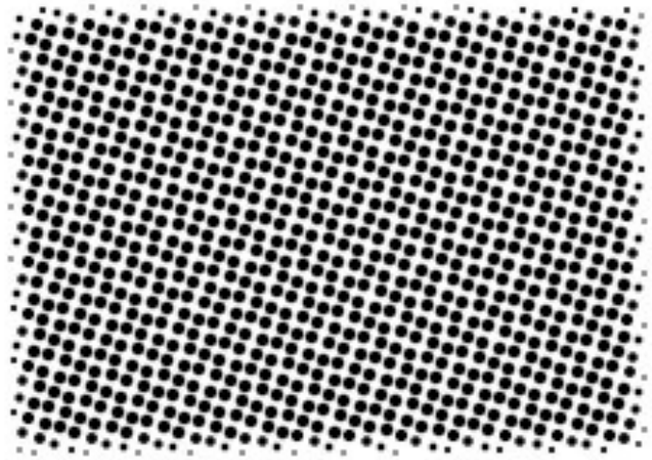


Half Tone Image:
A reproduction of a photograph or image in which the various tones of gray or color are produced by variously sized dots of ink.

–Newspaper/Magazine
–Printed Materials

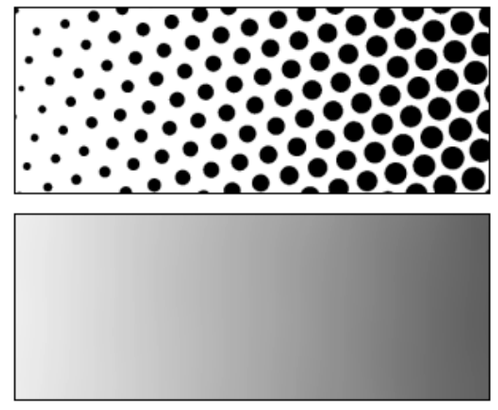
Shades of black shown as **Continuous Tones**





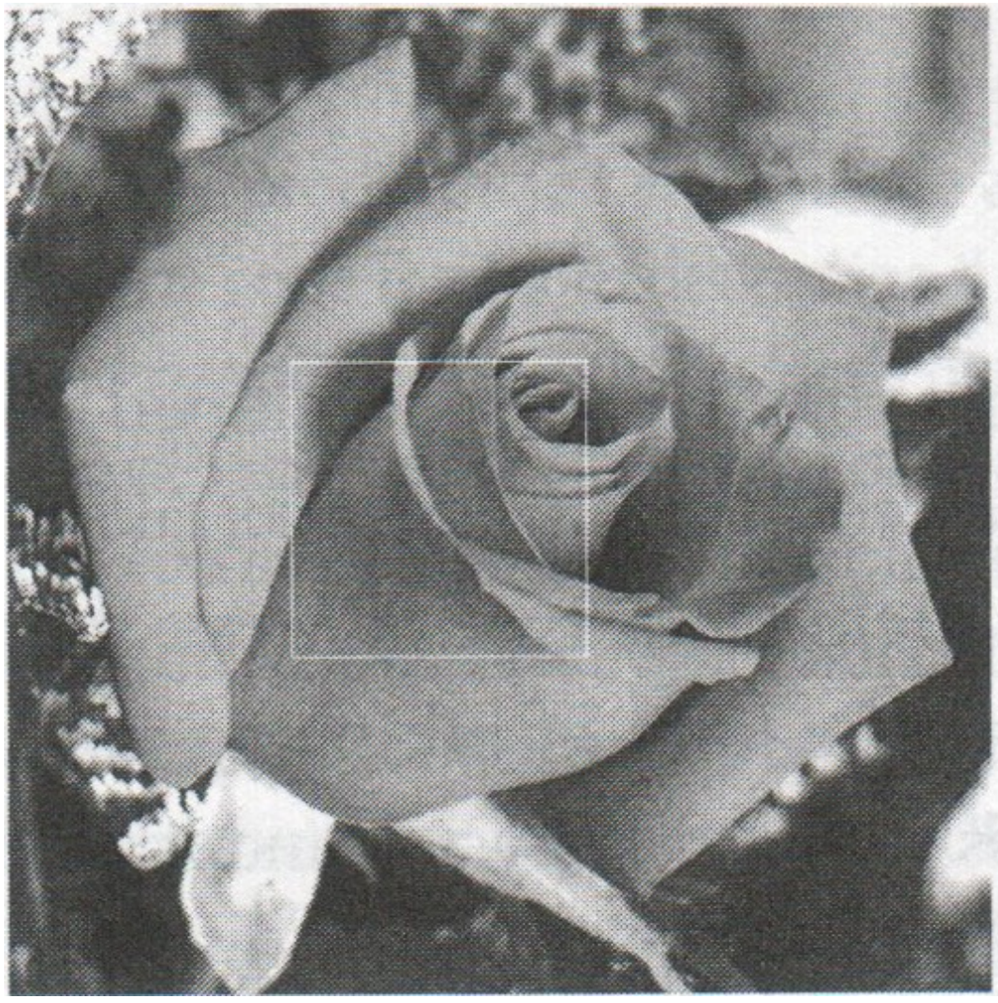

The illusion of shades of black
created using **Half Tones.**

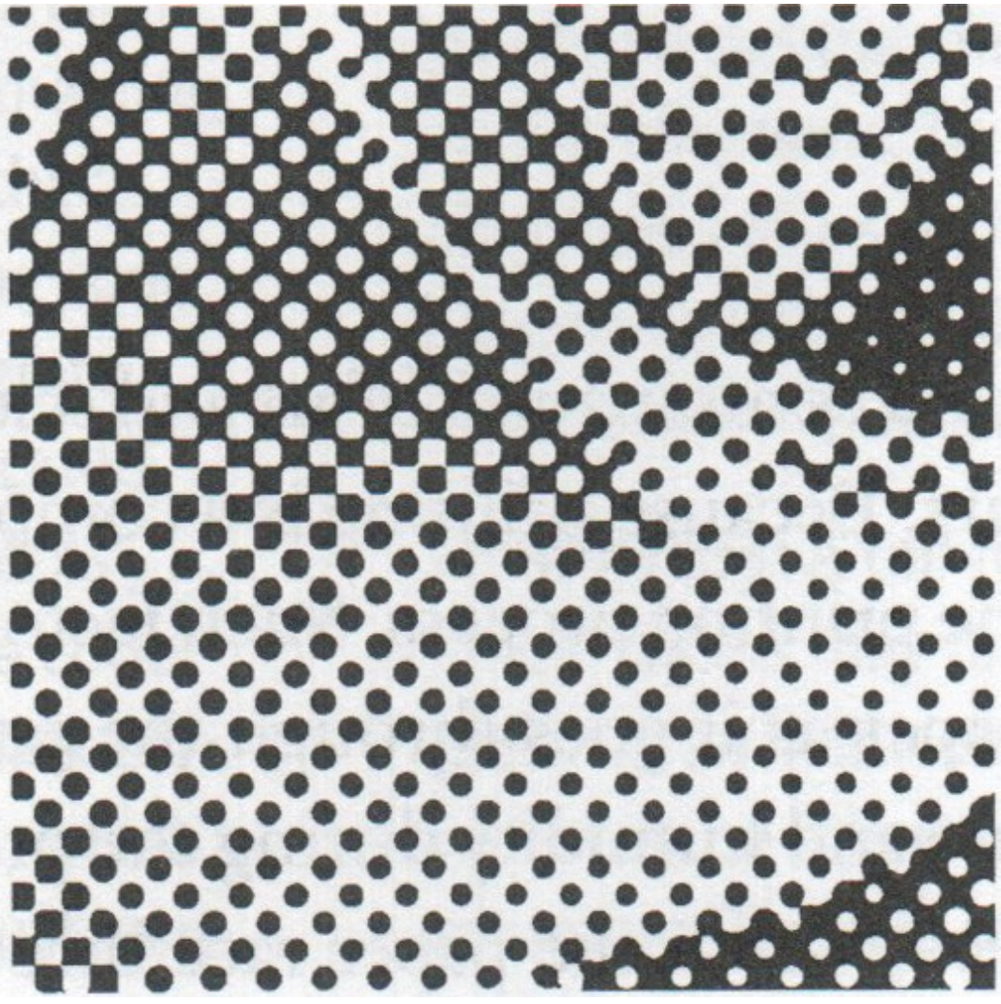
Why Halftone?



- It is not practical to print continuous tones on a commercial printing press.
  - *"Halftones" were created to simulate changes in tone using only black ink.*
- A half tone is is an image whose continuous tones have been converted into a pattern of varying size dots.
- When viewed as a whole, the pattern of dots looks like a continuous tone image to the human eye.
- Shades/tones are really a pattern of single colored dots in various sizes

CLOSE UP OF HALF TONE IMAGE

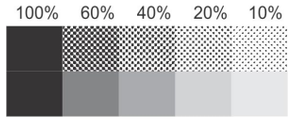




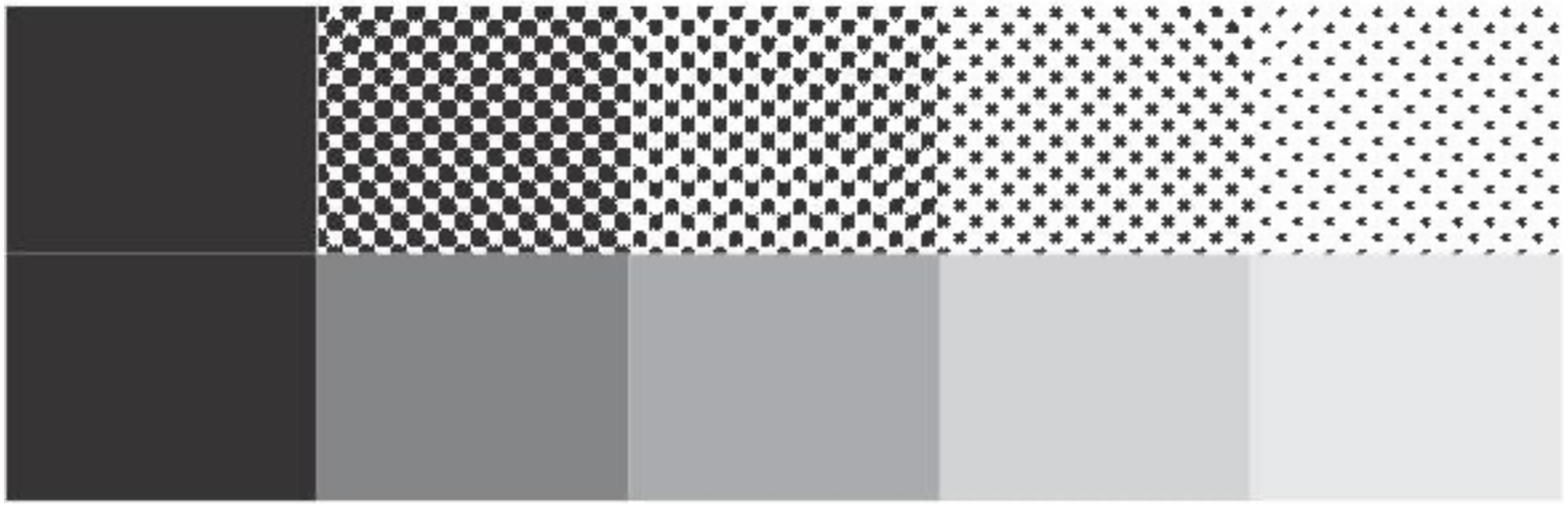
Half tone (black or white) representations of continuous-tone images are ***optical illusions*** based on the limited optical resolution of the human eye.

When observed from a ***normal, practical distance,*** a printed field of <u>tiny halftone dots is seen by the human eye as a smooth continuous tone</u>.

When viewed at print size the half tone dots almost disappear.



100% 60% 40% 20% 10%

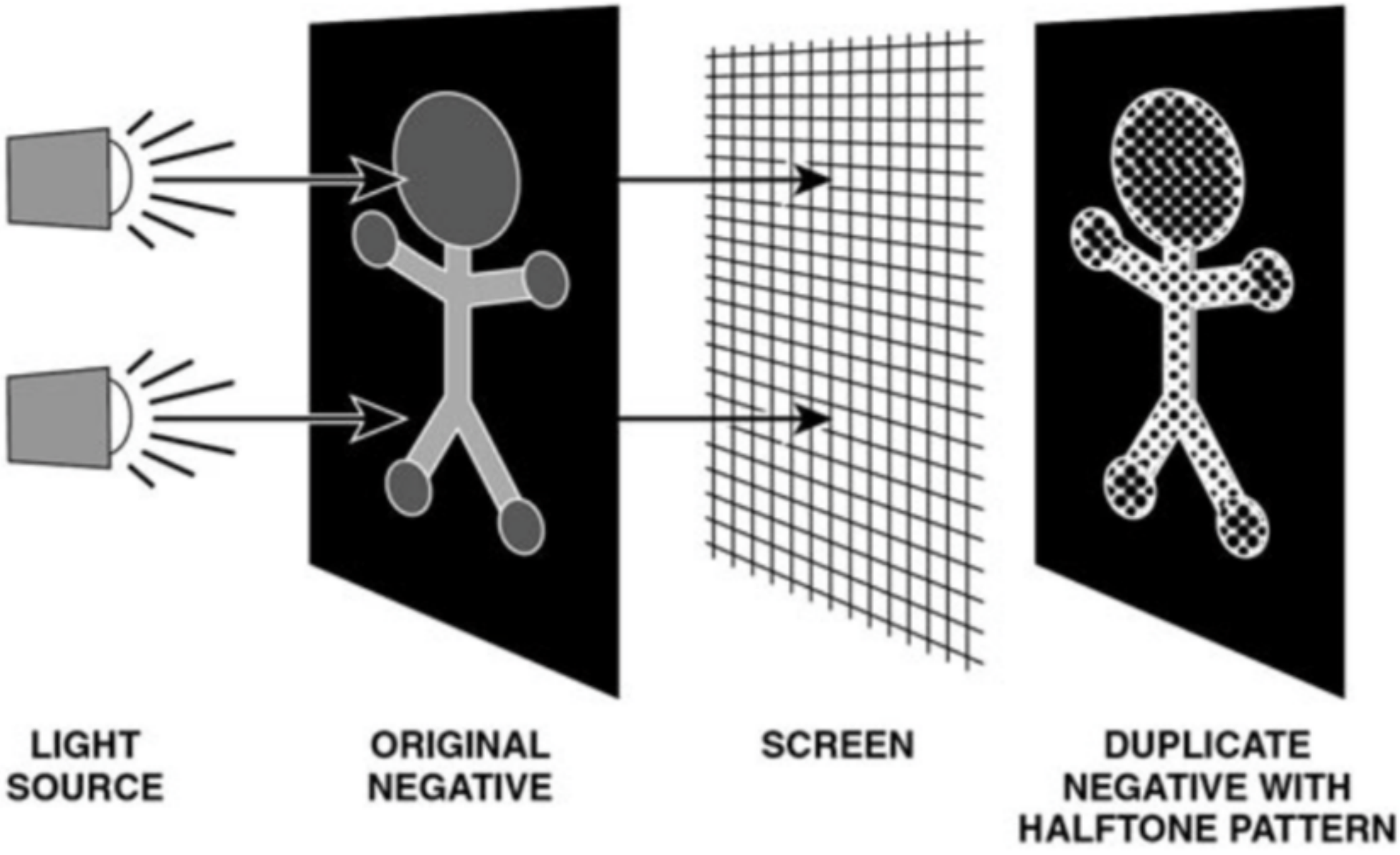


How do they make a Halftone image?

- Halftones are created by placing a screen over the plate that's being exposed. The screens are made with a varying number of lines per inch, depending on the application
- Using a camera, you could position an ordinary window screen between the film and the lens…the light passing through the screen would diffuse the image creating a half tone dot pattern in your exposure.

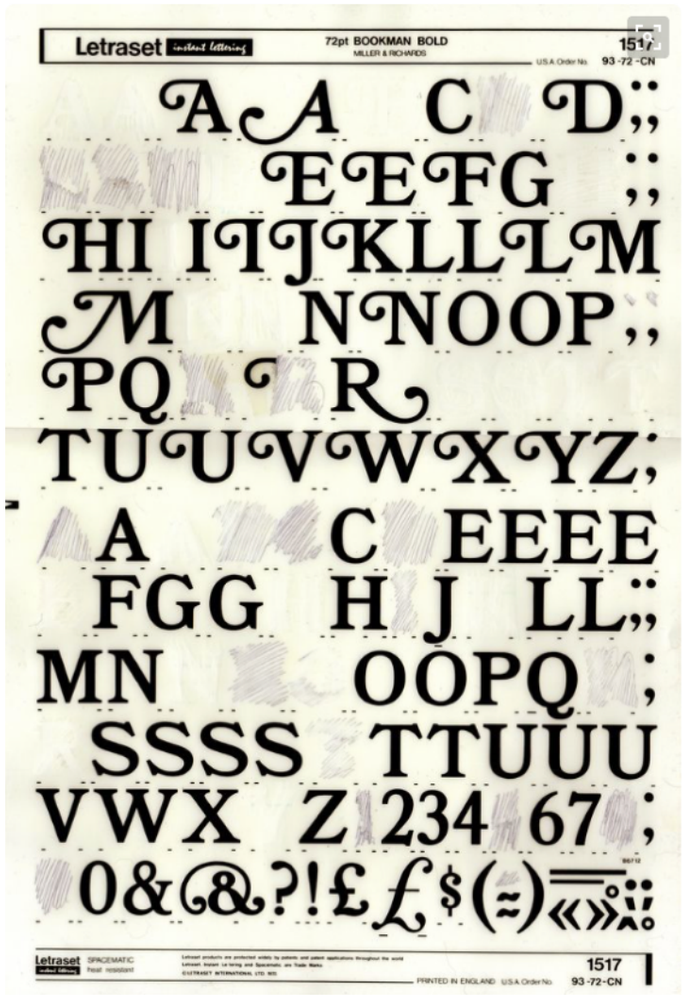
- ***Historically*** printers made half-tones using large screens, film & fancy cameras.
- ***Currently,*** halftones are made using a digital filter that is applied to artwork at the **RIP** *(Raster Image Processing)* stage.

Making a Halftone using film & screen.



Historical way of making print plates

- **"Camera-ready"** artwork created
- Art is photographed & screened negatives are "stripped" together to create page.



Historical way of making print plates

- Film stripper aligns all pieces for the page using light table.
- Whole press sheet is photographed to create a large negative using a **stat camera**.
- Negatives are used to expose photosensitive print plate.
- Plates are developed (much like darkroom photographs)

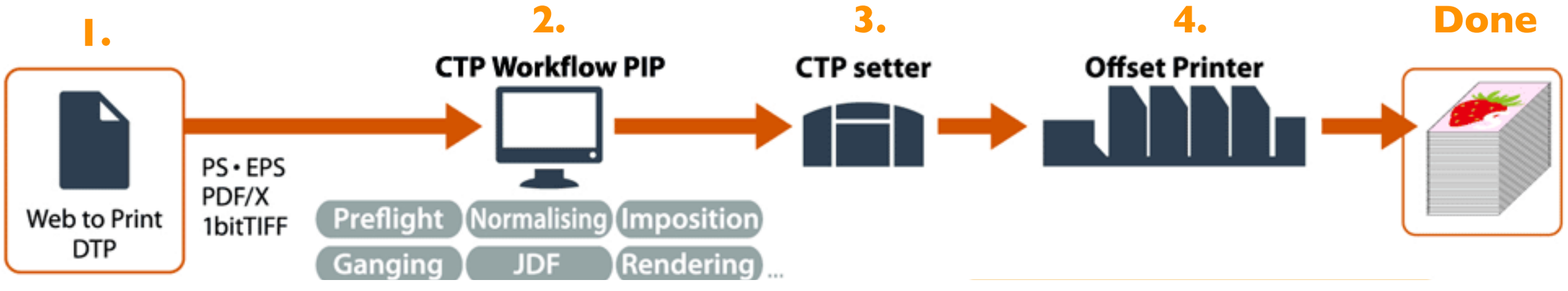
Film stripper

Stat camera

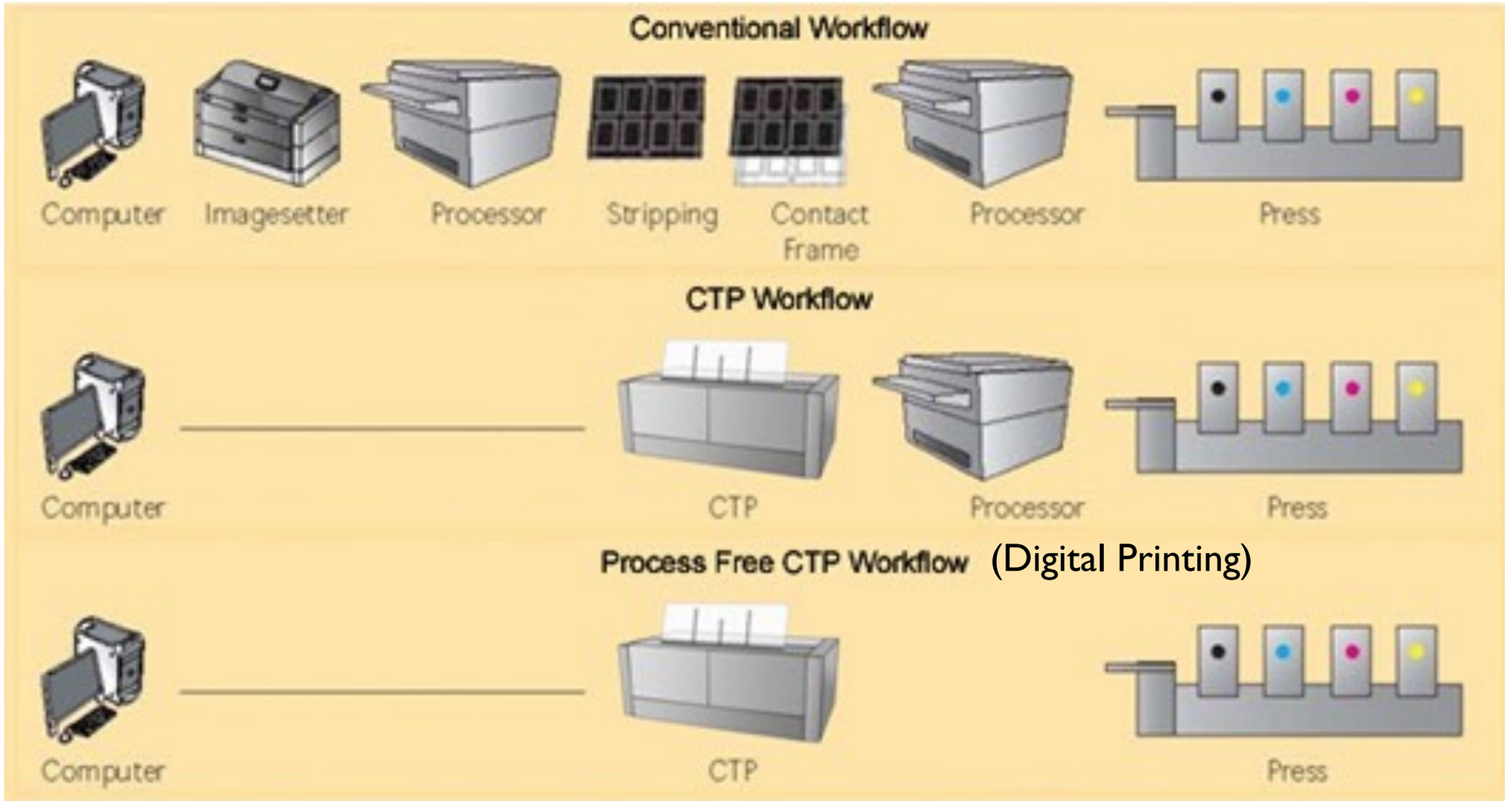
Printing Plates

Current Lithographic Process

- CTP (Computer to Plate)
    1. Design is sent to printer / pre-press house for review
    2. Pre-press adjusts file for trap, imposition, etc and sends file through RIP (Raster Image Processing) Software.
    3. The light sensitive plates are exposed directly to the digital file by an imagesetter and processed.
    4. Plates mounted on press - job is printed.



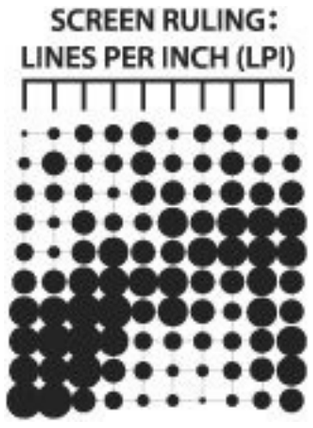
Historical, CTP & Digital Workflow

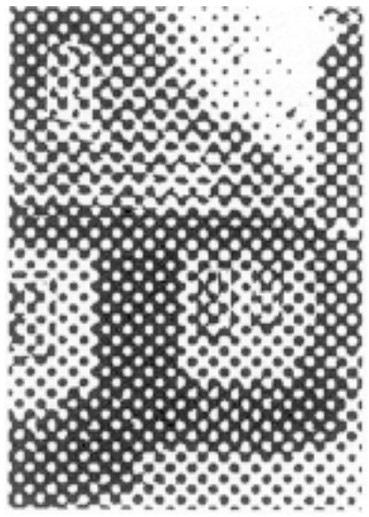


(Digital Printing)

Screen Ruling or Line Screen

- Screen Ruling is the measure of half-tone dot frequency.
- Measured in lines per inch **(lpi),** or the number of lines per inch of the screen used to prepare the image.
- Different processes & substrates require different lpi.
  - Newsprint (rough & porous): Course halftone of 65-85 lpi
  - Magazines (smooth & glossy): Fine halftone of 133-150 lip
- Lots of variables: paper, type of press, type of plates





25 Lpi

45 Lpi

85 Lpi

LPI Chart
talk to your printer to find the LPI you should be using for each type of printing project

output / paper	**typical LPI**
screen printing	35-65
laser printer / photocopier (copier or matte laser paper)	50-90
laser printer / photocopier (coated paper)	75-110
quick printer (uncoated or matte bond paper)	75-110
offset printing (newsprint)	60-**85**
offset printing (uncoated paper)	85-**133**
offset printing (coated paper)	120-150 +
high quality offset or gravure (such as glossy magazines)	150-300

LPI Formulas
LPI x 2 is most common, x 1.5 is sufficient in some cases, talk to your printer and experiment to find the best resolution for your needs

Coarse Line Screen vs. Fine Line Screen

Line Screen (LPI) measures the number of lines per inch ***of the screen used to prepare the image***.

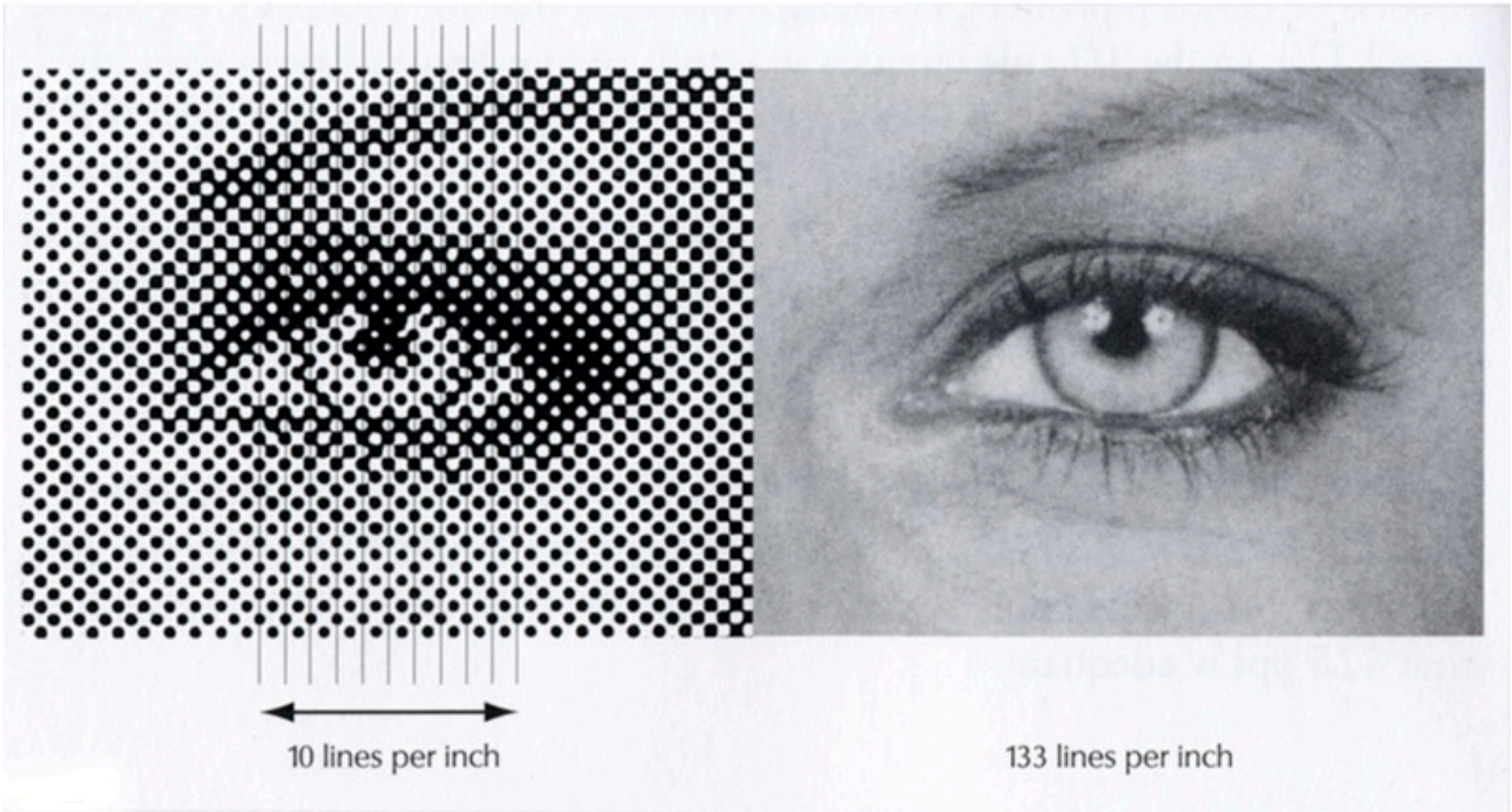
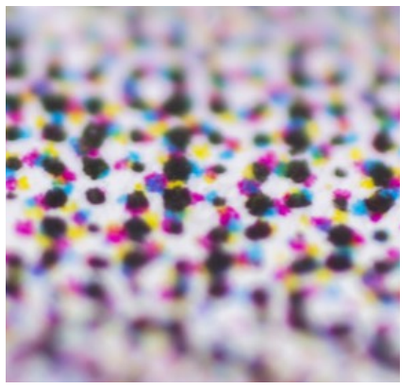
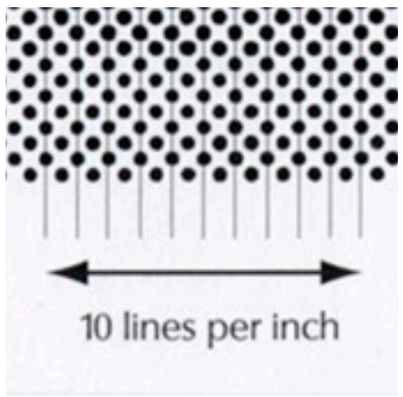


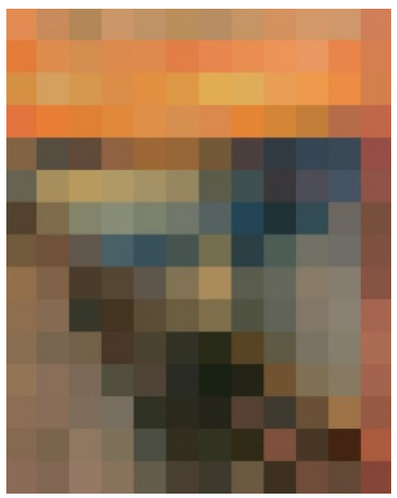
Image Resolution



- **DPI** – Dots per inch (resolution of imaging device)
  - The number of *physical dots of ink* per inch on a printed or scanned image. *Desktop printer 600 - 1200 dpi Imagesetter or platesetter 2400 dpi or higher*



- **LPI** – Lines per inch (frequency of half tone)
  - The number of *lines per inch of the screen* used to prepare the image. *Ranges from 35 - 150+ lpi*



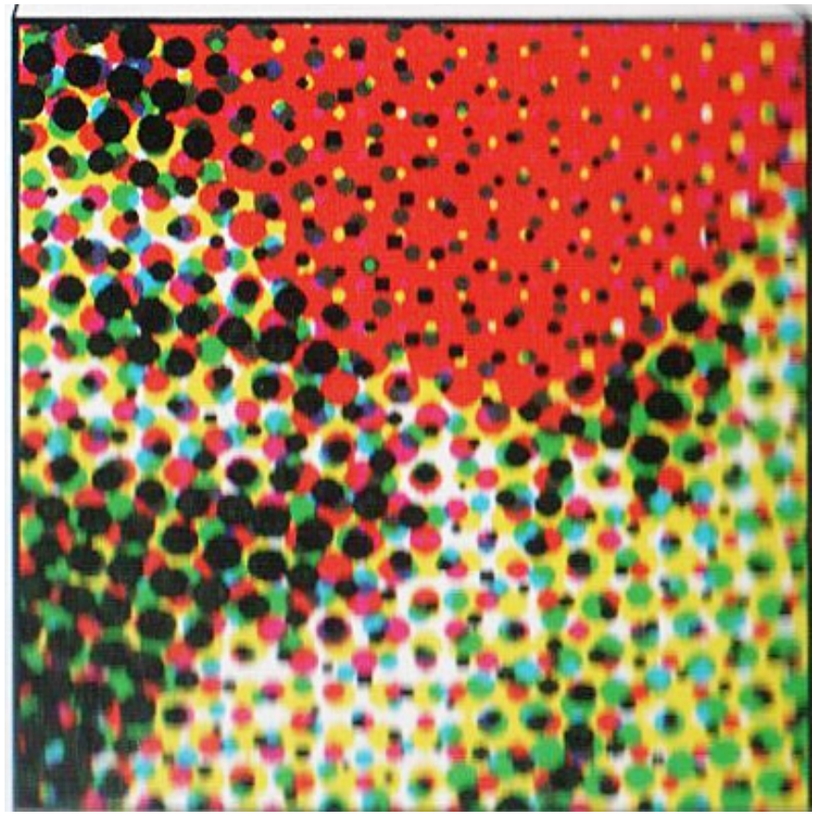
- **PPI** – Pixels per inch (image resolution)
  - Number of "picture elements," small squares of color that become more visible when zoomed in on a raster image. *Screens: 72 ppi, Print: 150 - 300ppi*

DPI vs. LPI vs. PPI

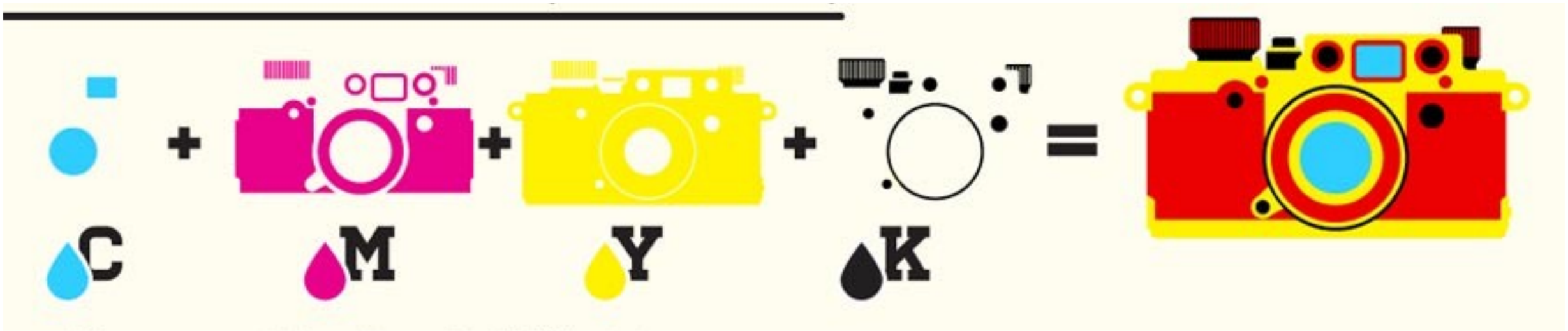
- Each printer/press has a preferred/recommended LPI.
- PPI is determined by the LPI that will be used at the printer.
- Image Resolution (PPI) is typically 2X LPI.
- Designer sets PPI in photoshop.
- **300 PPI is sufficient for most print applications.**
- DPI is what you see when you look at the final printed piece using a loupe (magnifying glass).

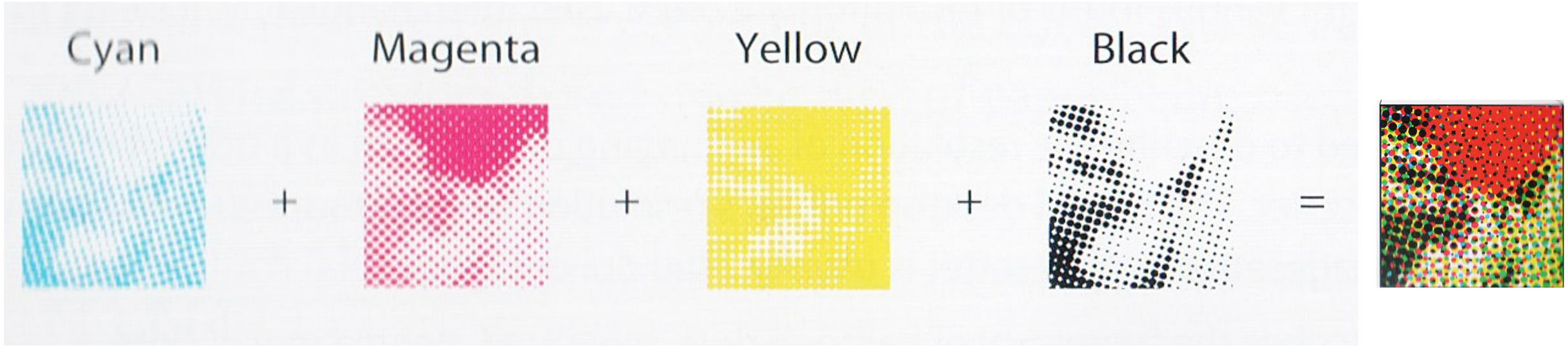
Four-Color Process

- **CMYK – Cyan, Magenta, Yellow, Black**
- Process inks are transparent
- Four screens placed on top of each other
  so colors interact with each other creating other colors.



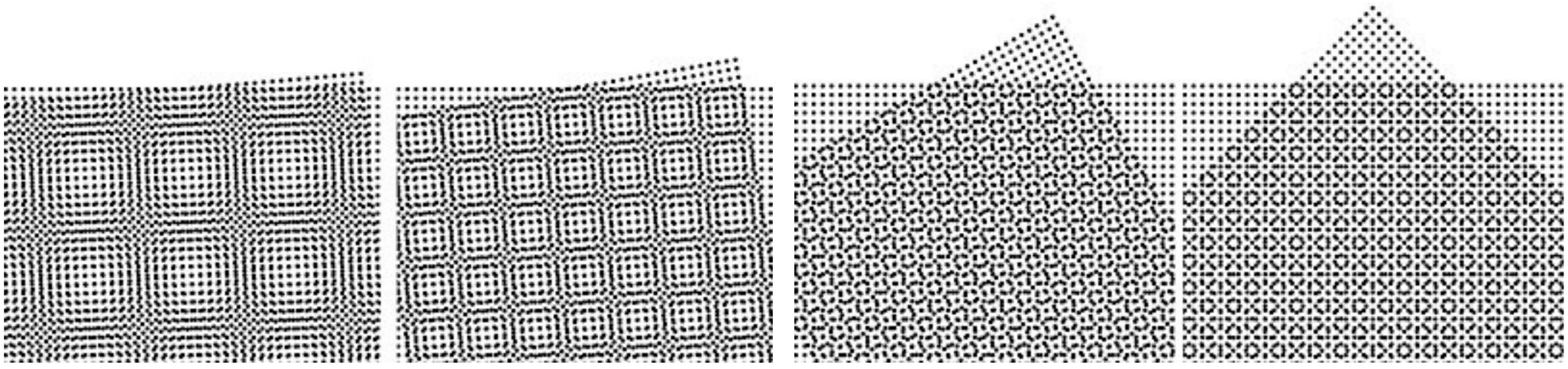
Four-Color Process (CMYK)





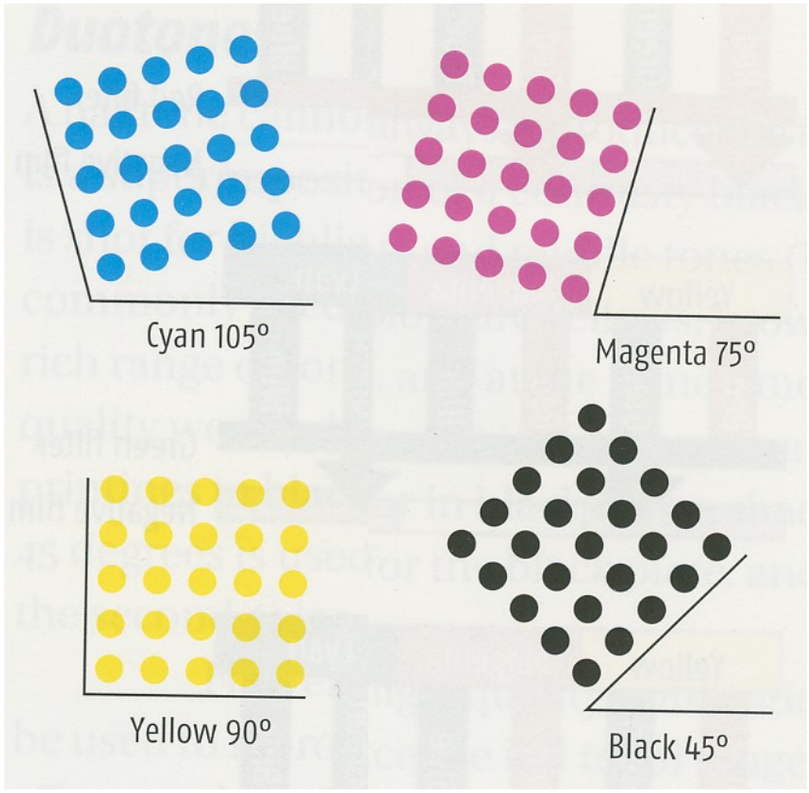
CMYK Screen Angles

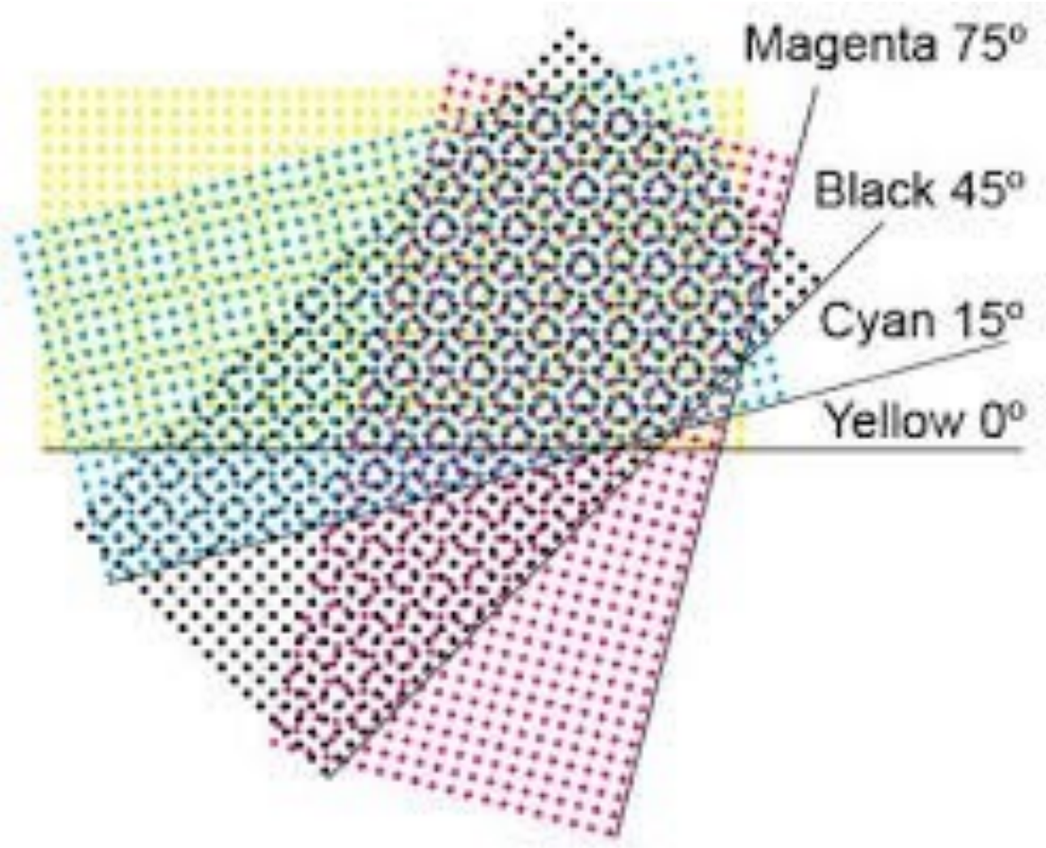
- The angle at which the halftones of a separated color is output to lithographic film, plates & final product media.
- Different screen angles create various effects / patterns.
- The least "objectionable" pattern is the rosette
    - The least visible color, yellow, is placed at the most visible angle 0° (90°).
    - Then the most visible color, black, is placed at 45°.
    - The cyan and magenta are then placed between these two.
    - Cyan at 15° (105°)
    - Magenta at 75°

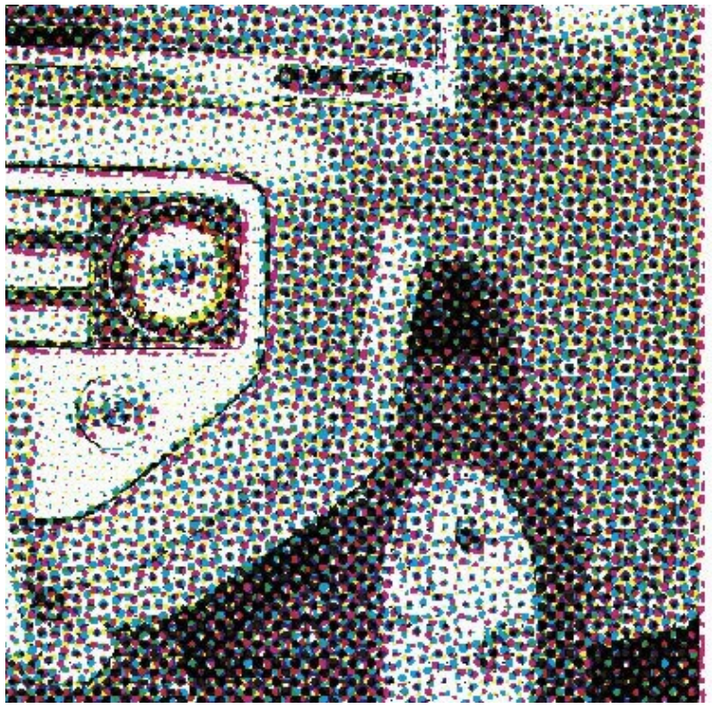


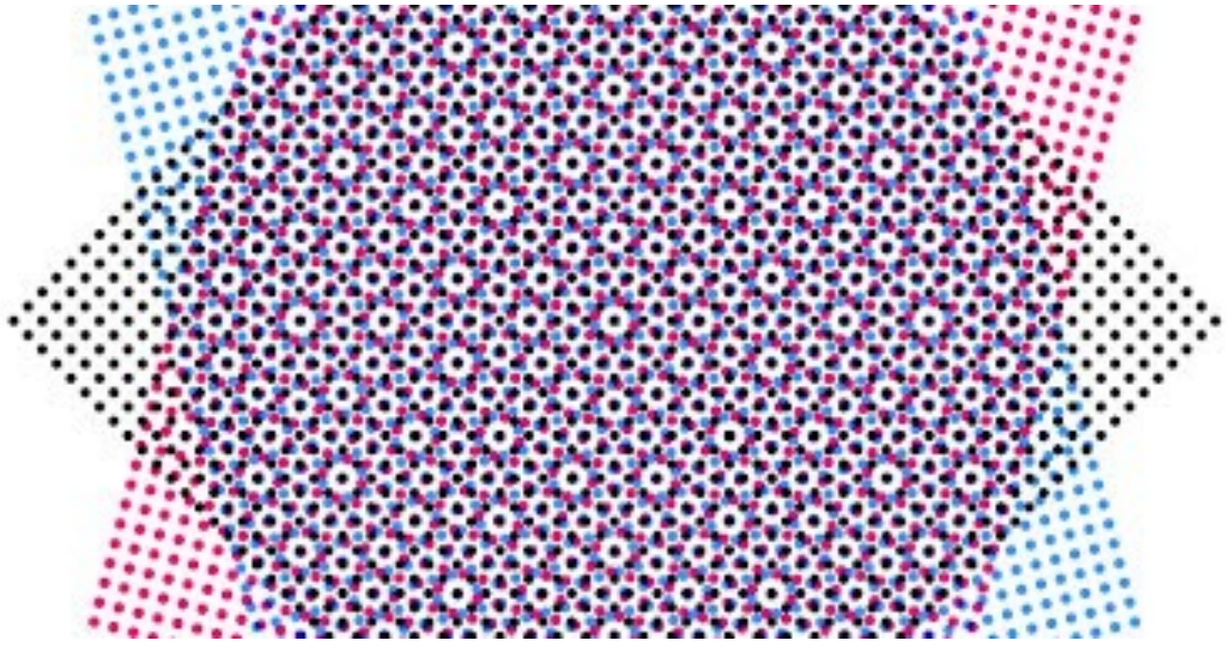
Examples of various screen angle rotations.

Screen Angles



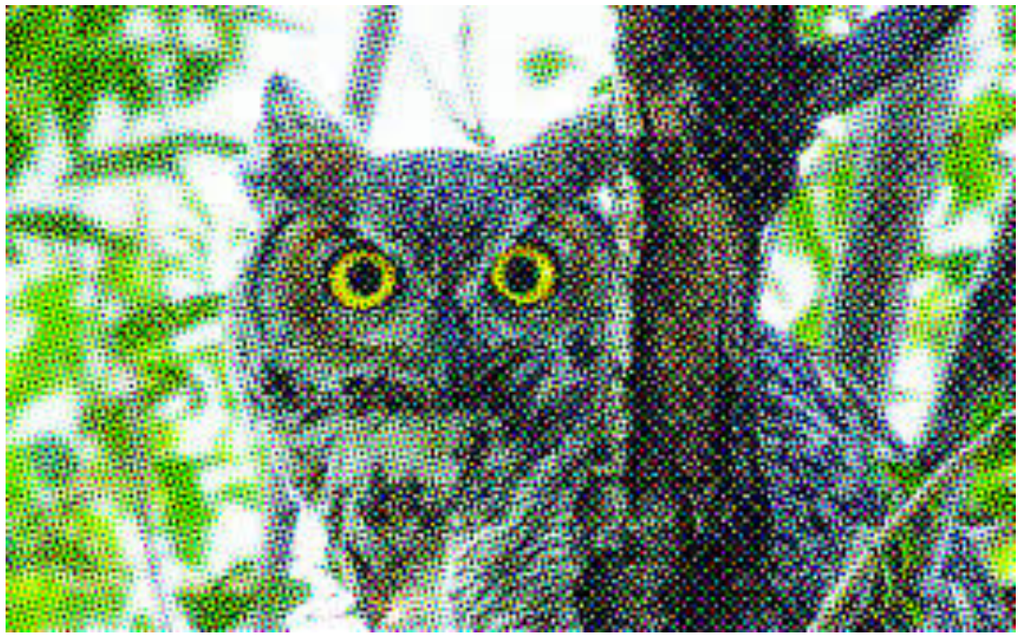






Moiré

- Correct screen angles can help avoid **moiré** effect



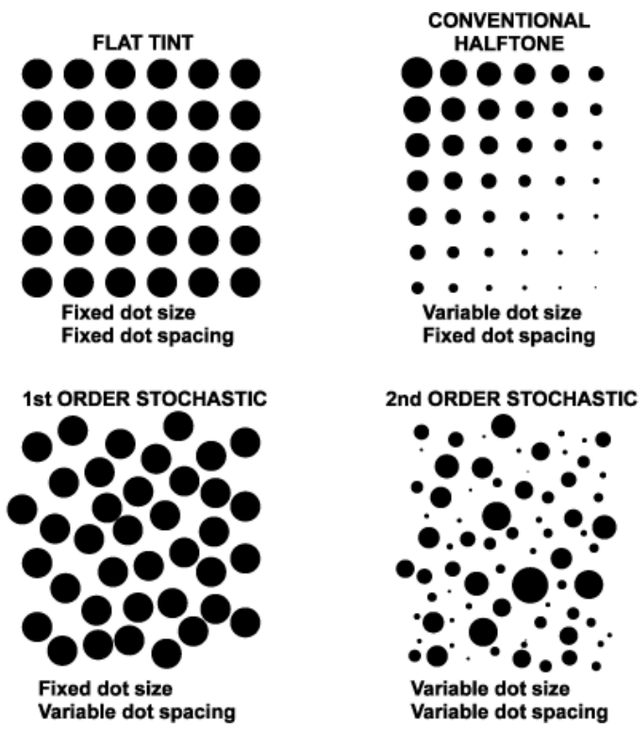
Sometimes a pattern in an image (fine stripes, feathers, speaker dots) will interact with the line screen values and cause an unintended morié effect.

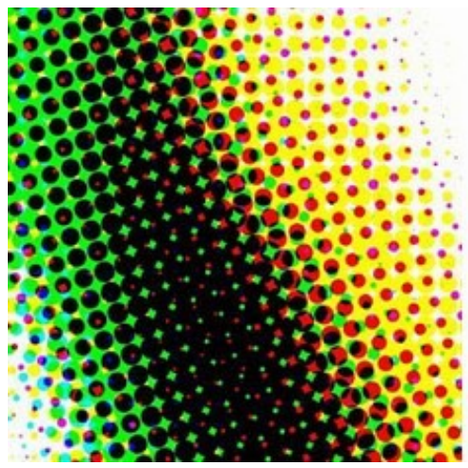
Moiré

When using a scanner to capture a half tone image it's important to use a "descreening filter" to avoid a moiré effect.

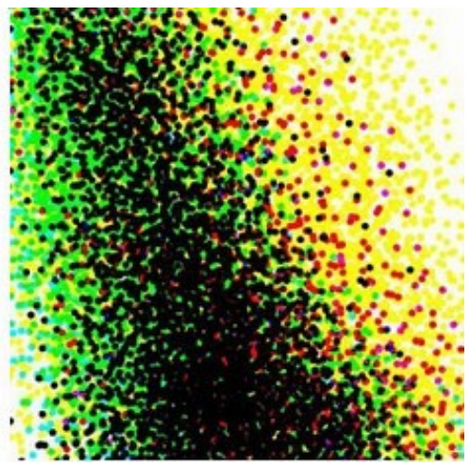
Stochastic Screens

- Random dots - dot density varied to create an image closer to continuous tone, NO screen pattern.
- Eliminate the problem of moiré patterns
- Ink jet printers are a sample of this
- BUT: dust particles on plate can be bigger than dots.
- More expensive & takes longer than half tone printing.





conventional



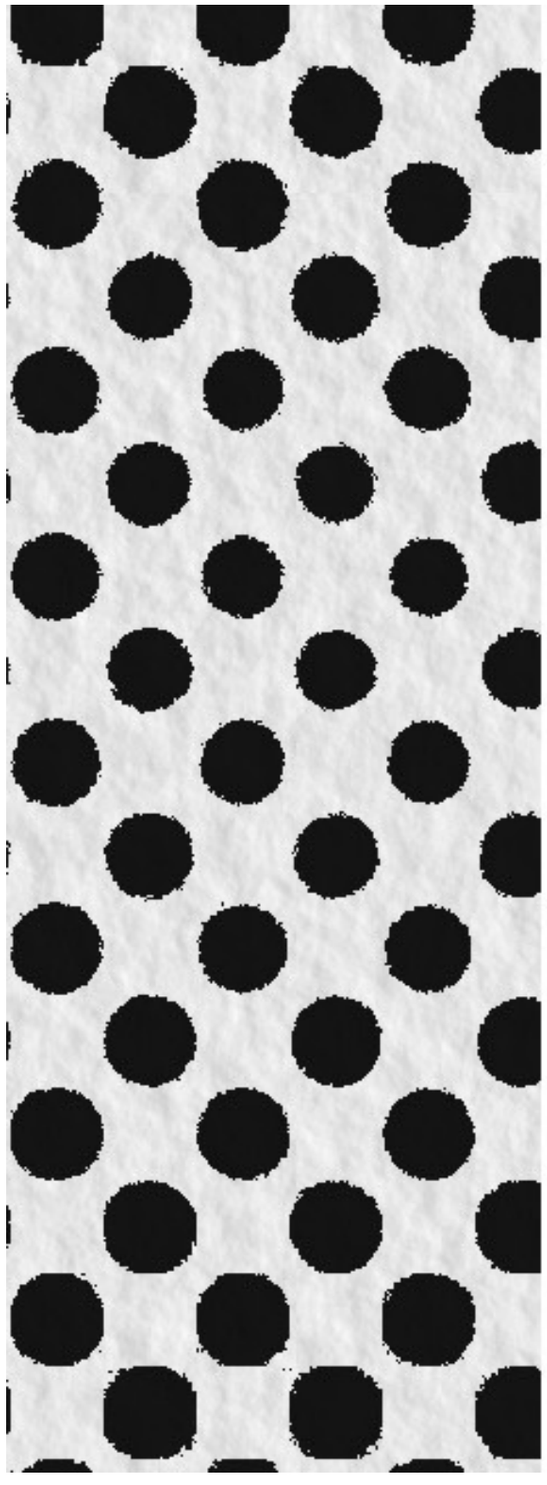
stochastic

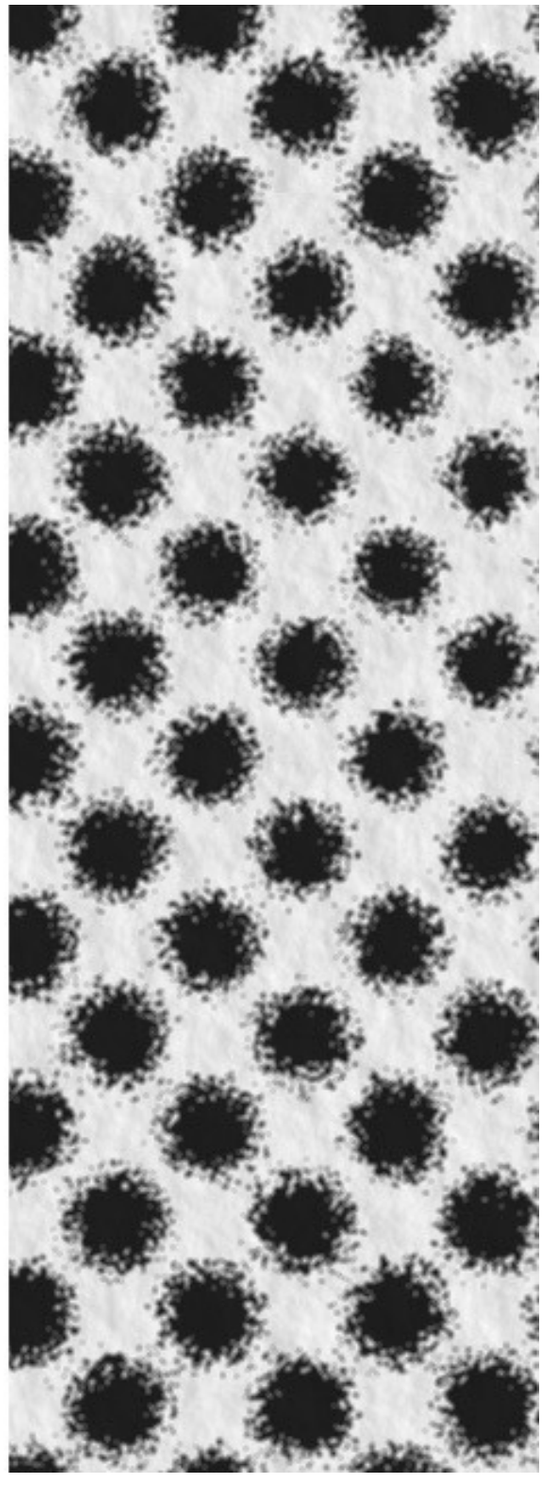
stochastic

Dot Gain

- Dot gain, (ink spread creating an increase in tone) causes printed material to look darker than intended.
- Halftone dots grow in area between the original digital file and the final printed result.
    - Historically - through the multi-step process
    - Paper is porous - it absorbs! So ink spreads on the paper.
    - Ink viscosity
    - Press pressure

Original/
Intended Look





Dot Gain

Dot Gain may cause:

Thin gaps fill in

50% looks more like 80%

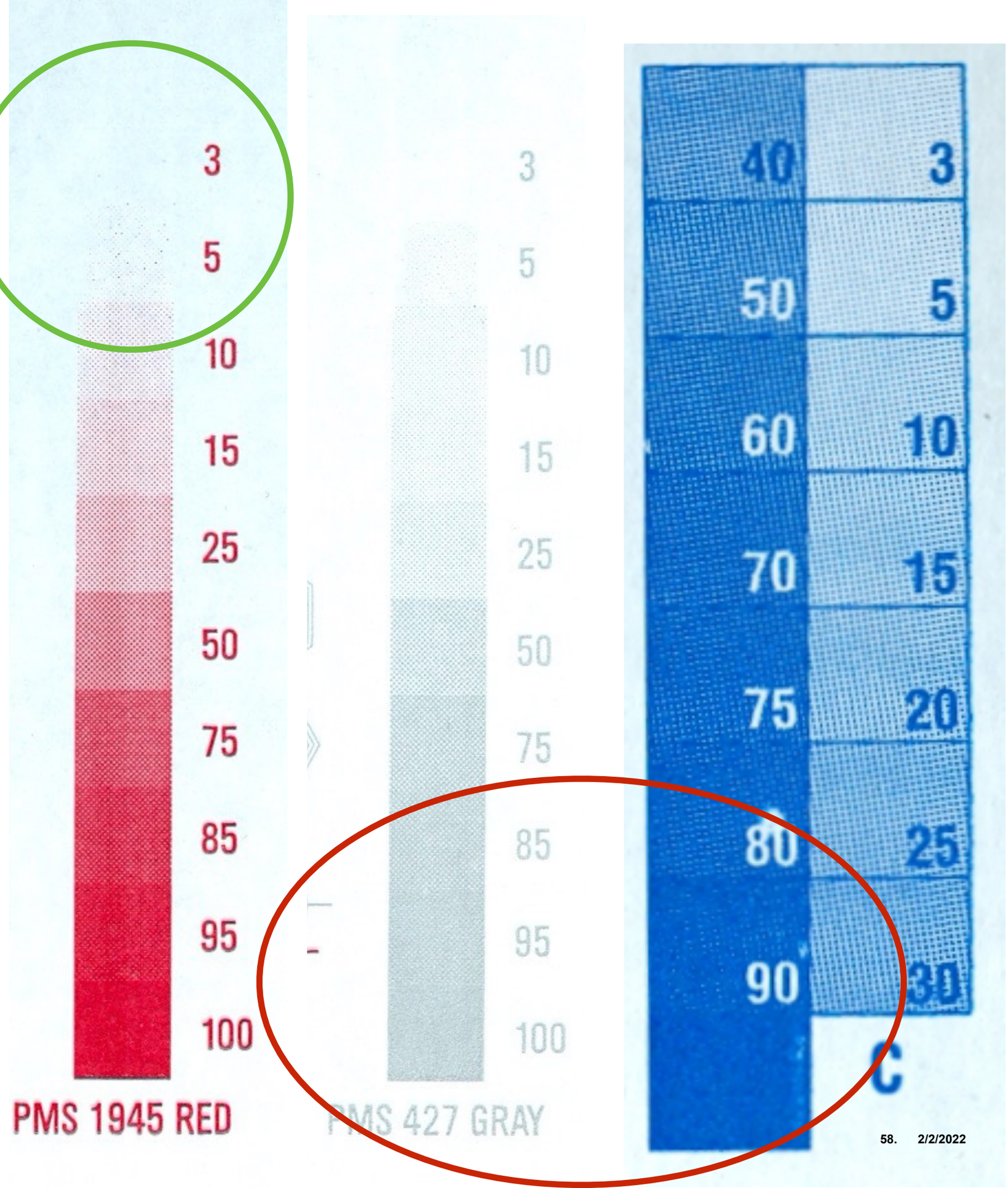
Small details get lost

Images appear darker

Note:

Dot Gain may cause dark tints to fill in, looking darker than intended.

Adjustments to the artwork (to help avoid dot gain) may cause light tints to disappear completely.




Color

What is Color?

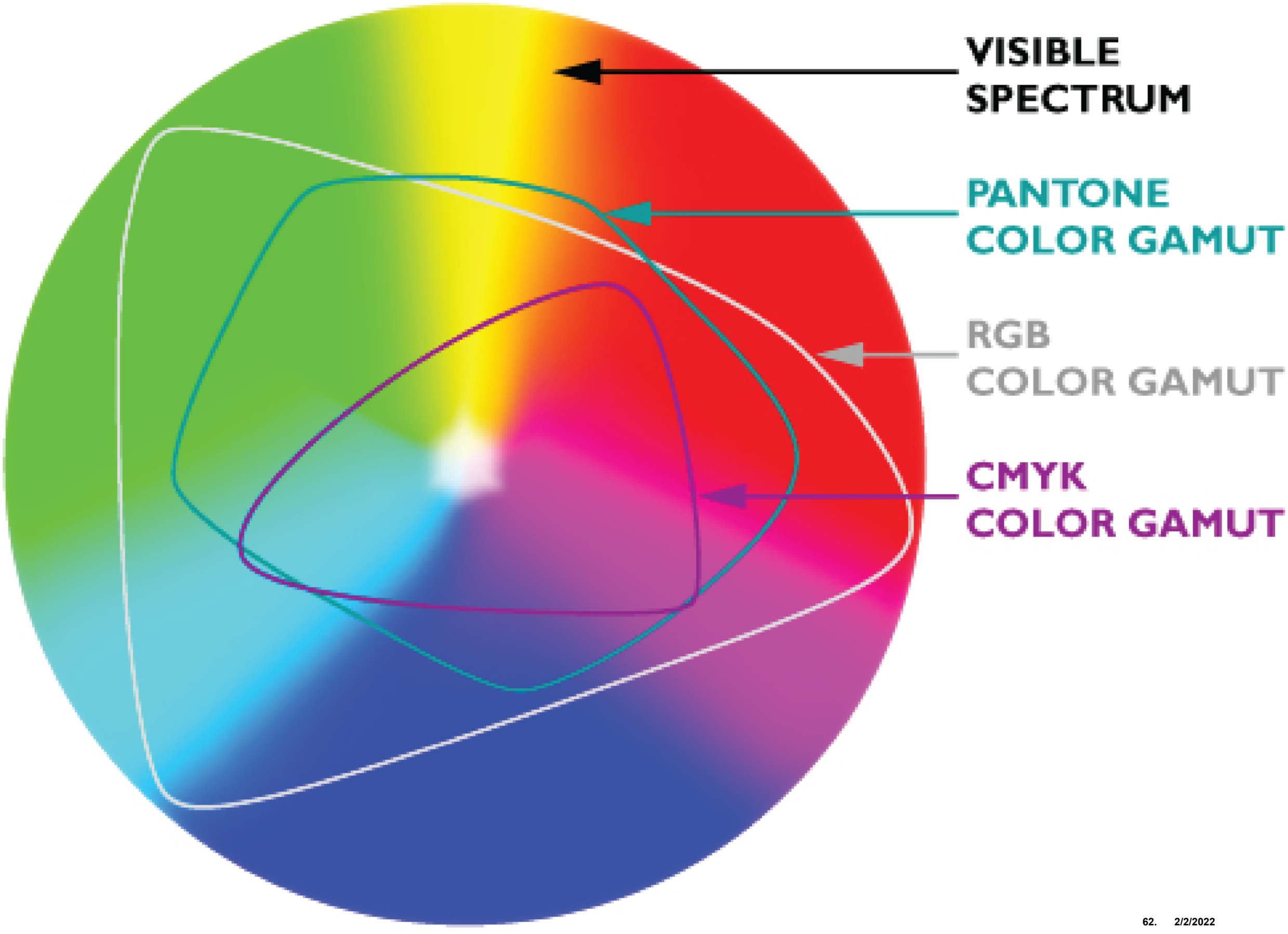
Color is the sensation produced in response to selective absorption of wavelengths from visible light. It possesses the attributes of Brightness, Colorfulness and Hue. – (www.Color.org)

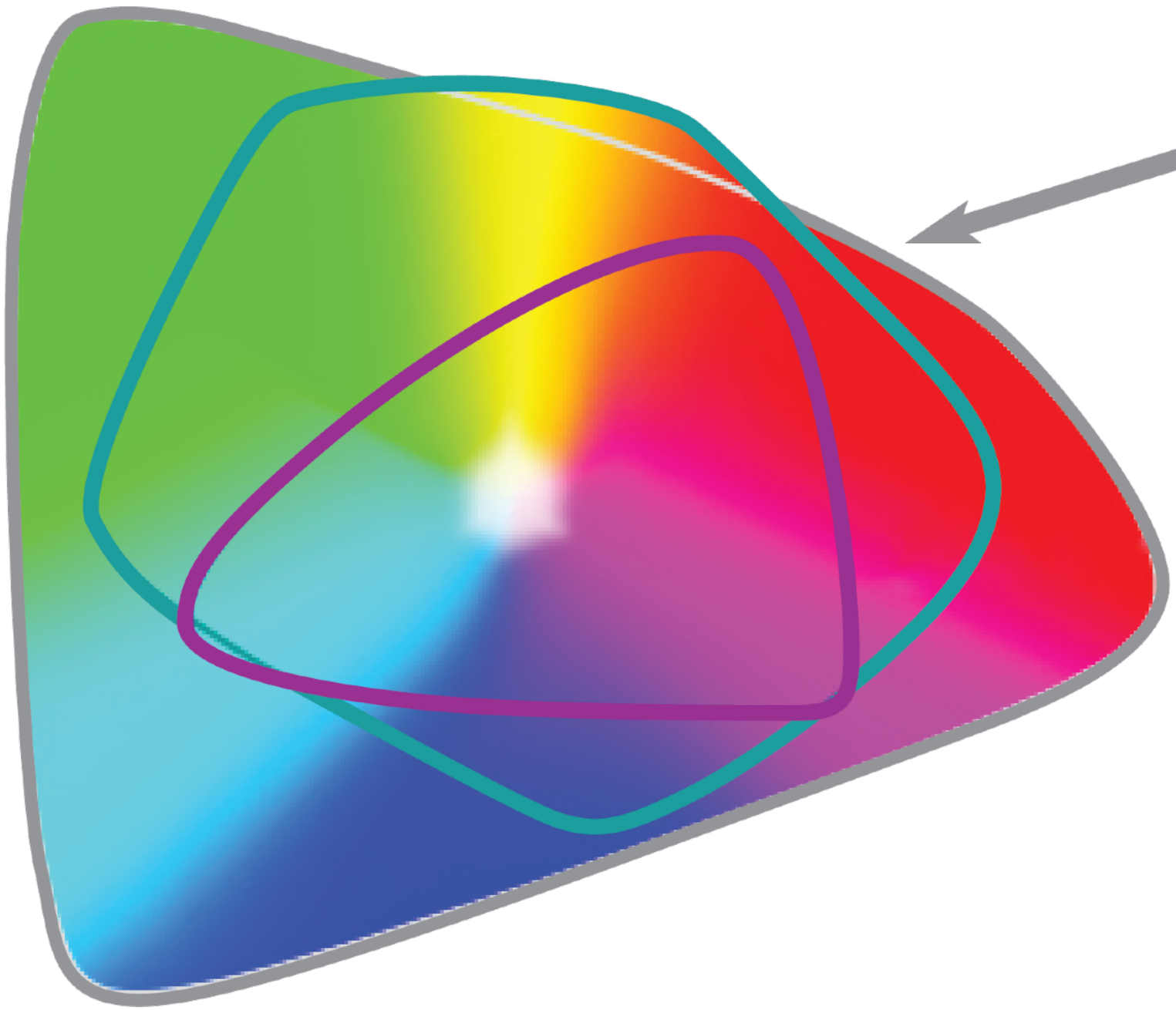
- Light is emitted by a source such as the Sun or a light bulb.
- Only the colors that cannot be absorbed by an object are reflected.
- Light is reflected into our eyes by the object, the receptors in the eye react to the specific wavelength of light.
- The object itself does not emit the color.
- The surface properties of the object reflect the colors that it does not absorb.

What is Color Gamut?

Color Gamut is the range of colors that can be represented, reproduced, or output by that device.

- The gamut that can be achieved on press is different from your computer!
- How does that affect you as a designer?


VISIBLE
SPECTRUM
PANTONE
COLOR GAMUT
RGB
COLOR GAMUT
CMYK
COLOR GAMUT

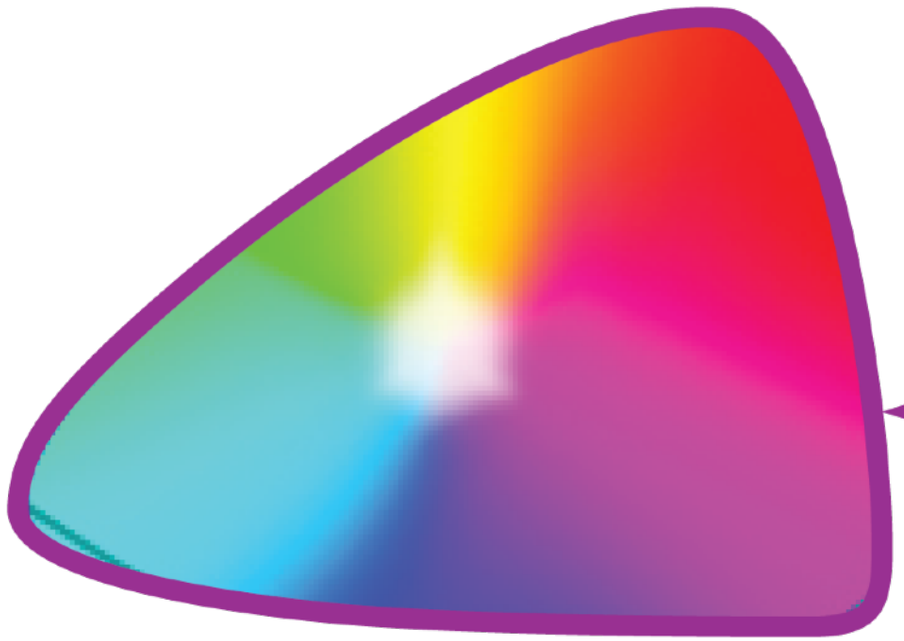


VISIBLE SPECTRUM

RGB COLOR GAMUT

PANTONE COLOR GAMUT

CMYK COLOR GAMUT



VISIBLE
SPECTRUM

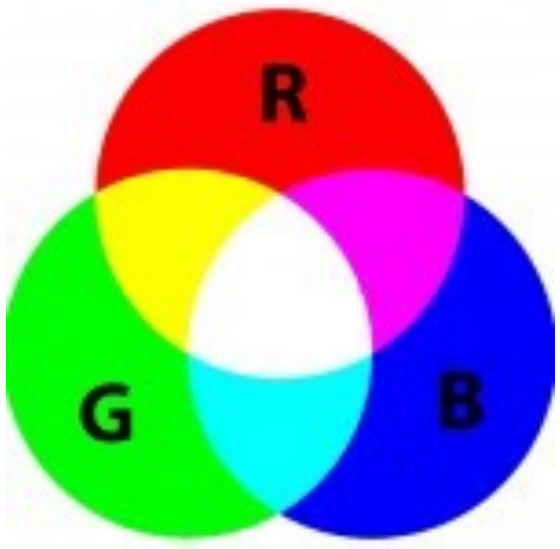
RGB
COLOR GAMUT

PANTONE
COLOR GAMUT

CMYK
COLOR GAMUT

Screen

ADDITIVE COLOR

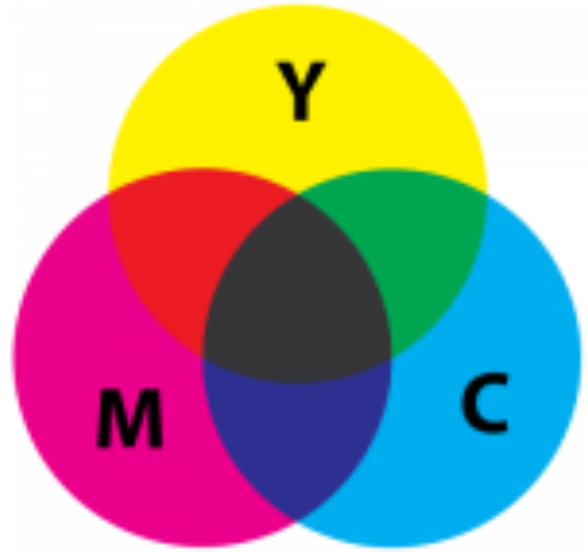


RGB

- The colors that you see now on your monitor are created by adding white (light) to black.
- As more color is added to the black screen, the closer it is to white.
- Red, Green and Blue (RGB) are the additive primary colors and combined together produce 100% white.
- The RGB model is used for web graphics.

Print

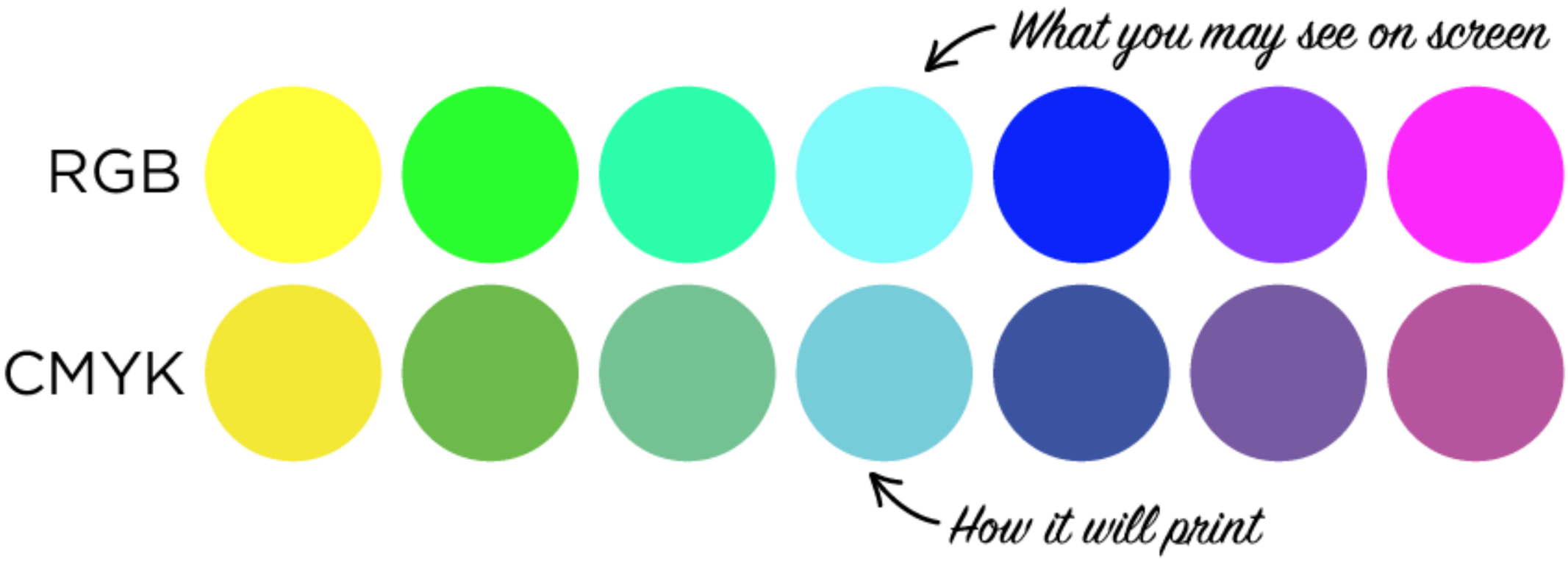
SUBTRACTIVE COLOR



CMYK

- By applying ink, the amount of white from the paper is reduced or subtracted.
- Cyan, Magenta and Yellow are the subtractive color primaries.
- Combining these three colors produces a muddy brownish black.
- To achieve a better blacks and to save ink, black (K) was added to the mix.
- The CMYK model is used for print.

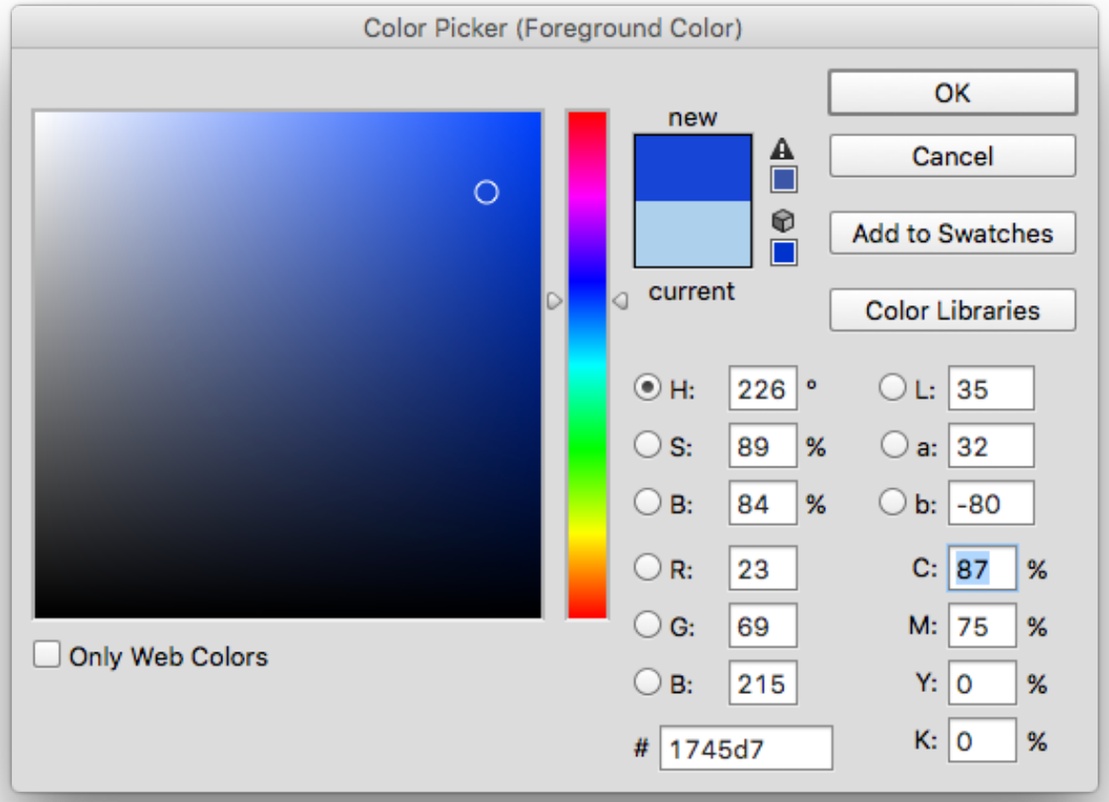
Color Gamut: RGB vs CMYK

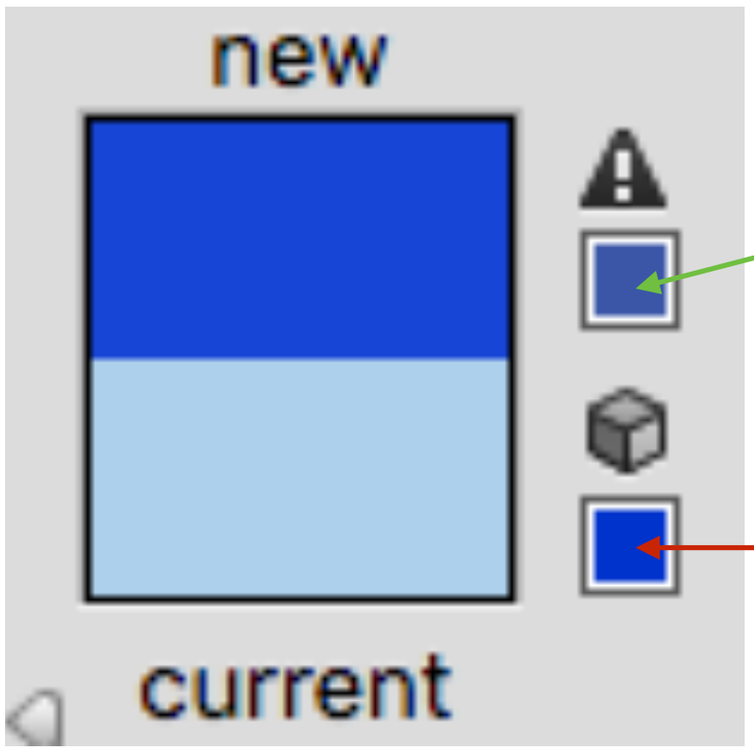


Color Gamut: RGB vs CMYK

Color Gamut:

How do I know if my color is with range?





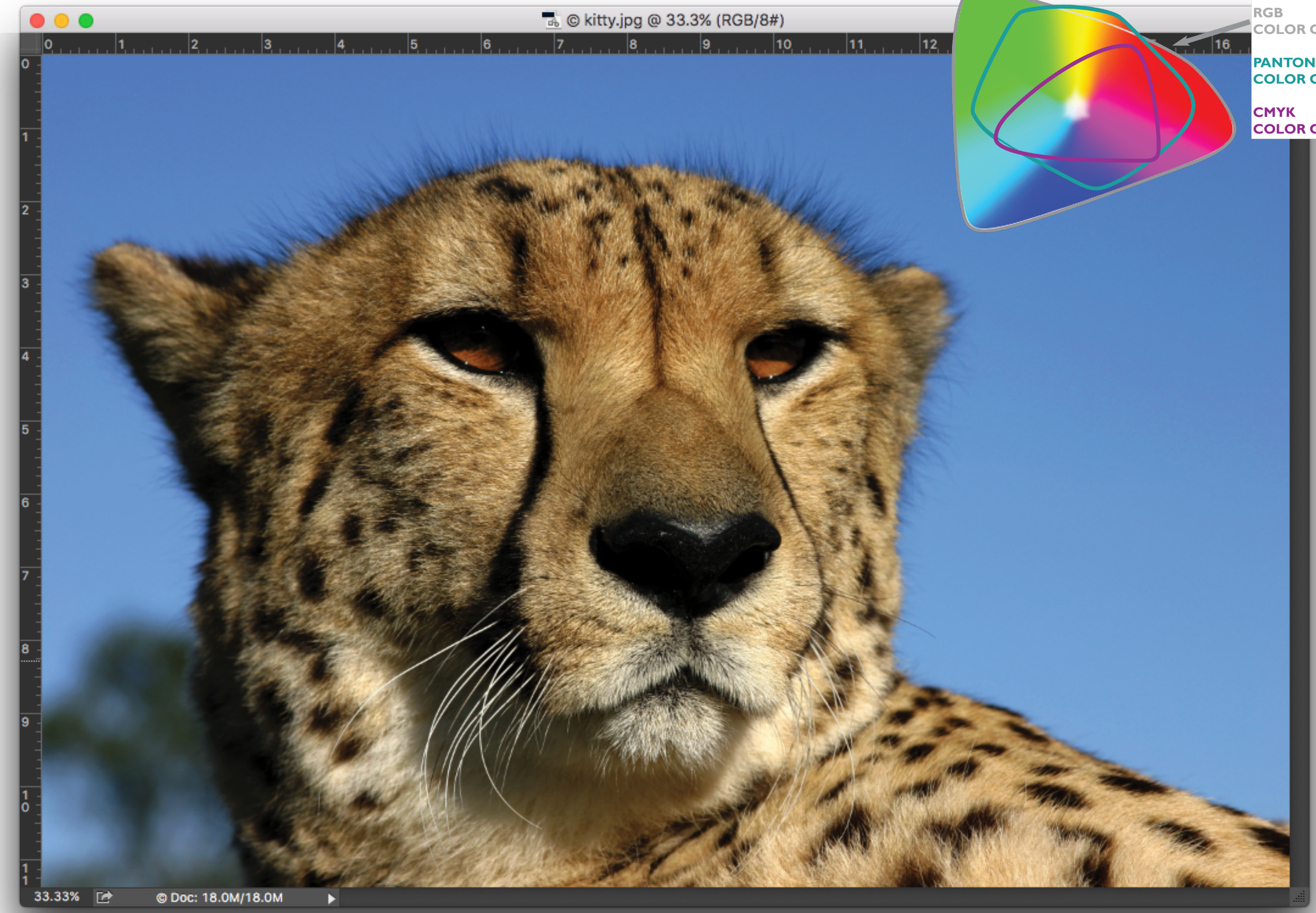
Out of Gamut for Printing

CLICK TO AUTO-SELECT THE CLOSEST COLOR THAT IS WITHIN THE CMYK GAMUT.

Not Web Safe

CLICK TO AUTO-SELECT THE CLOSEST COLOR THAT IS WITHIN THE WEB-SAFE PALLET.

RGB Color Mode



VISIBLE SPECTRUM

RGB COLOR GAMUT

PANTONE COLOR GAMUT

CMYK COLOR GAMUT

CMYK Color Mode (Automatic Conversion)

VISIBLE SPECTRUM

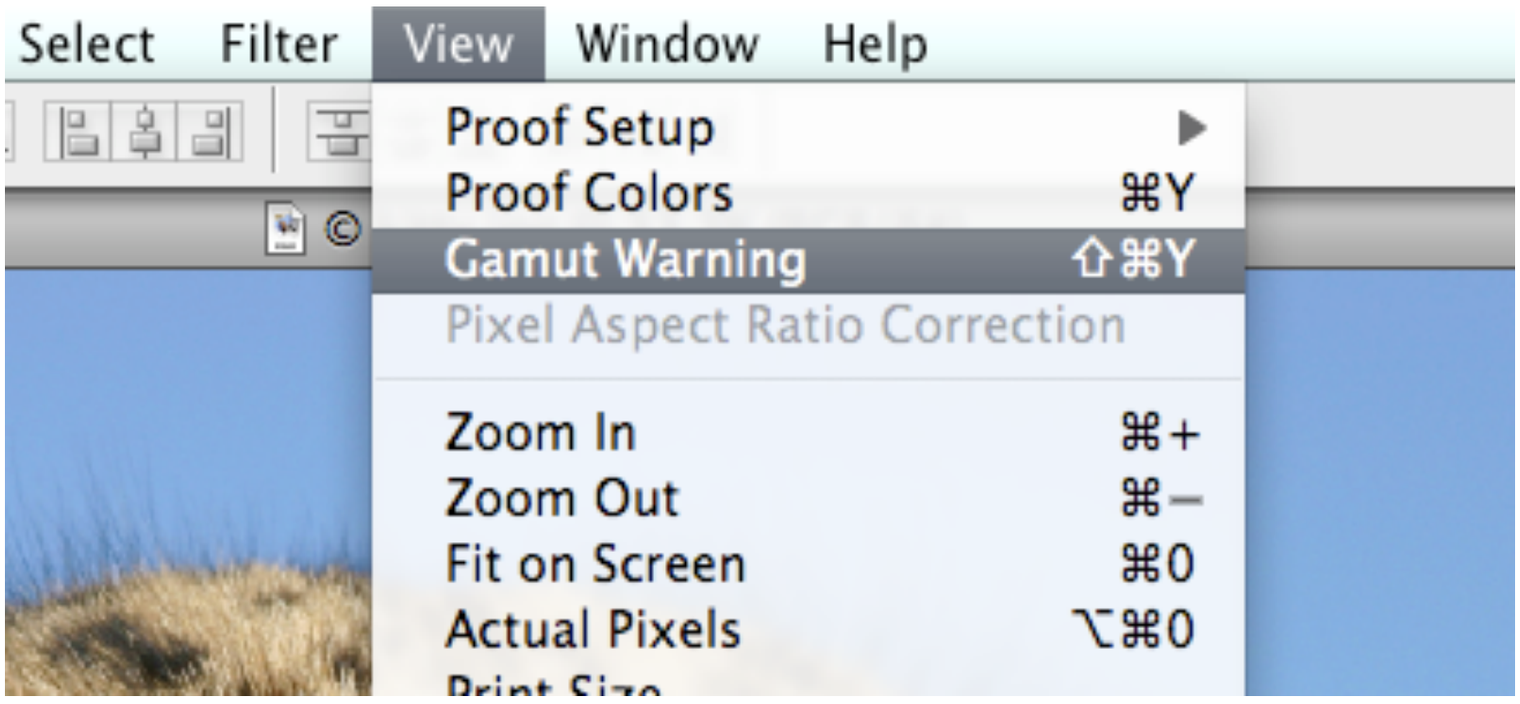
RGB COLOR GAMUT

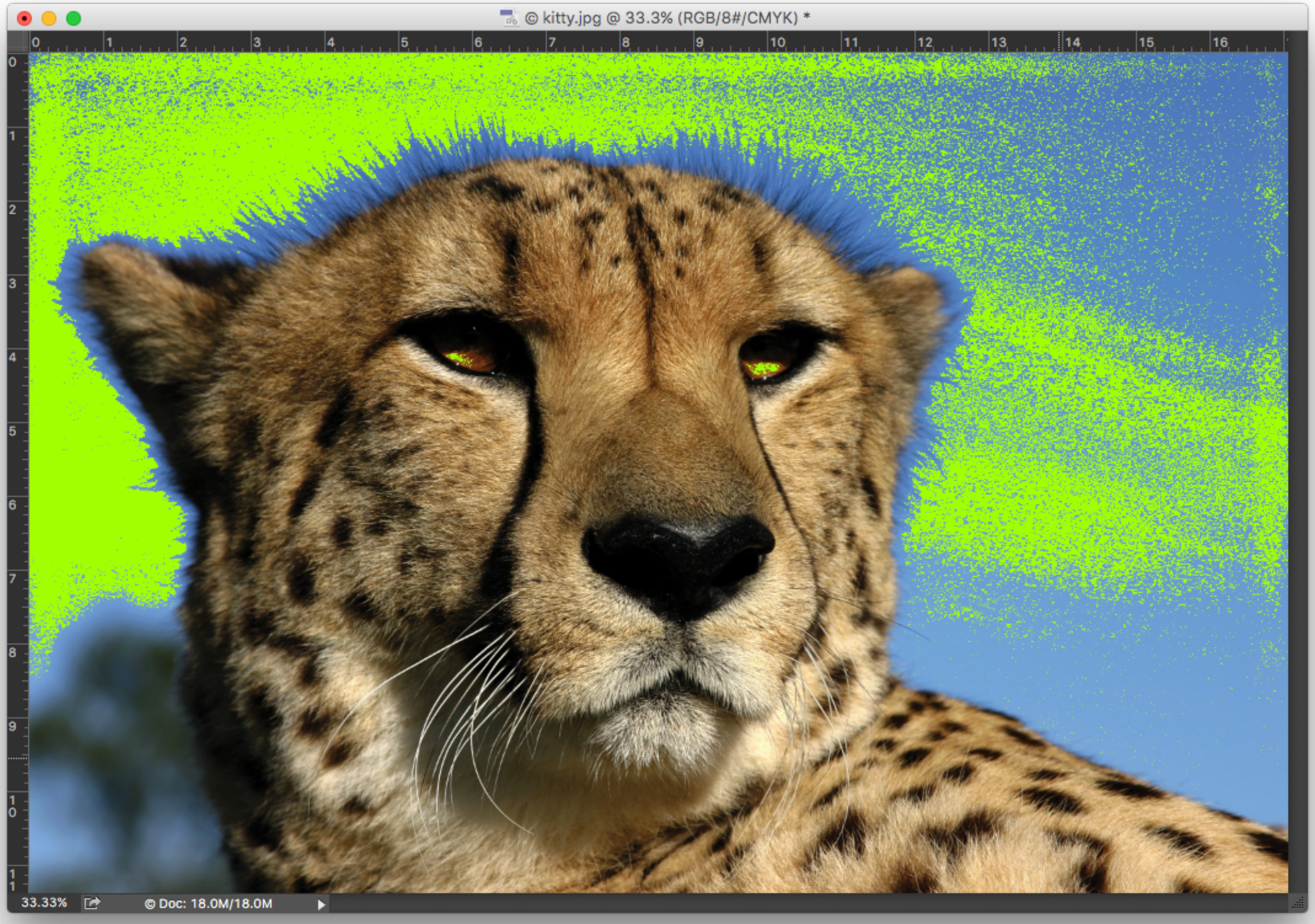
PANTONE COLOR GAMUT

CMYK COLOR GAMUT

Check images for colors that are out of Gamut:

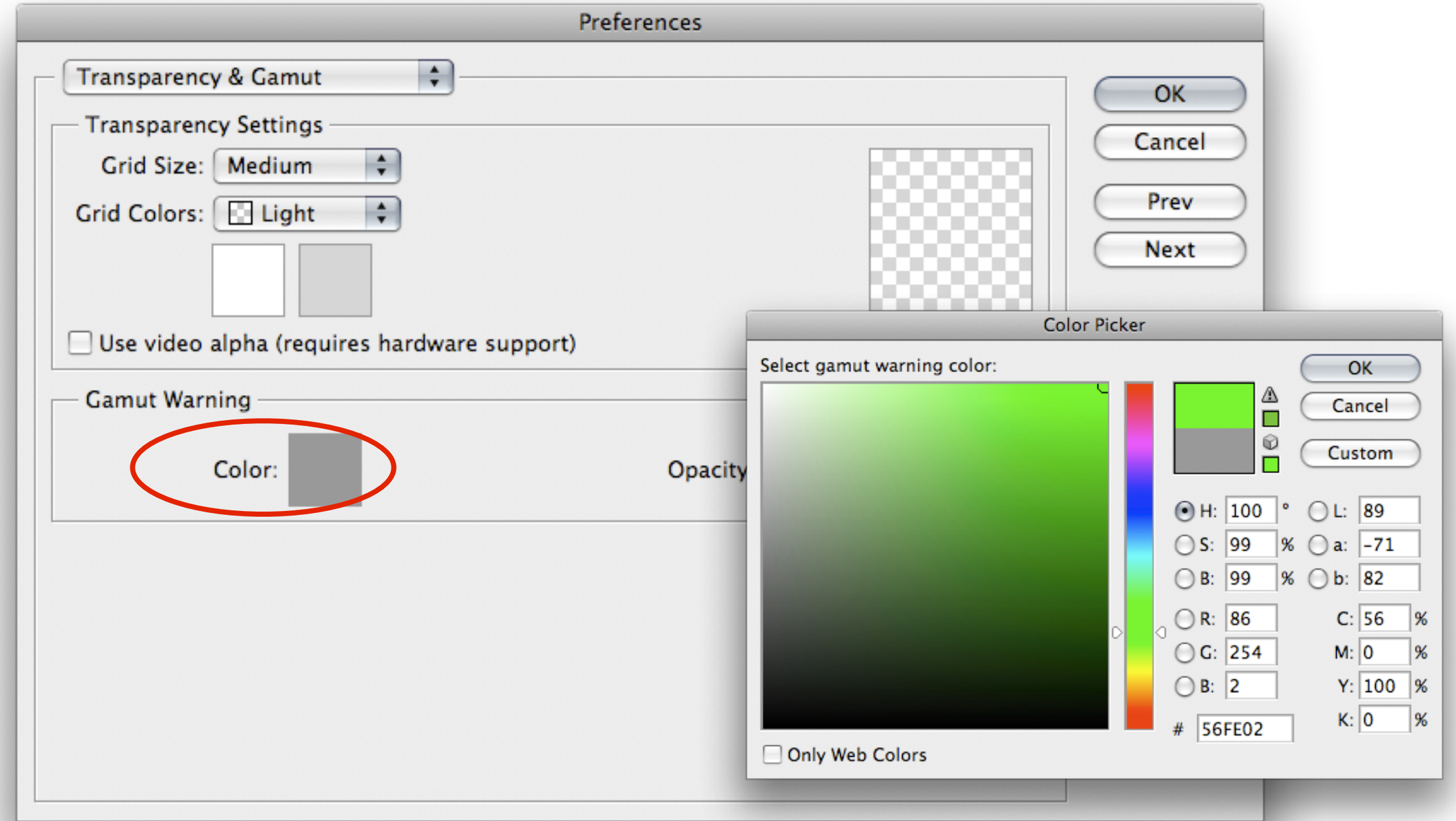
- In Photoshop:
  - View >> Gamut Warning
  - Look for color overlay
    - Can change color of overlay to make it easier to see.

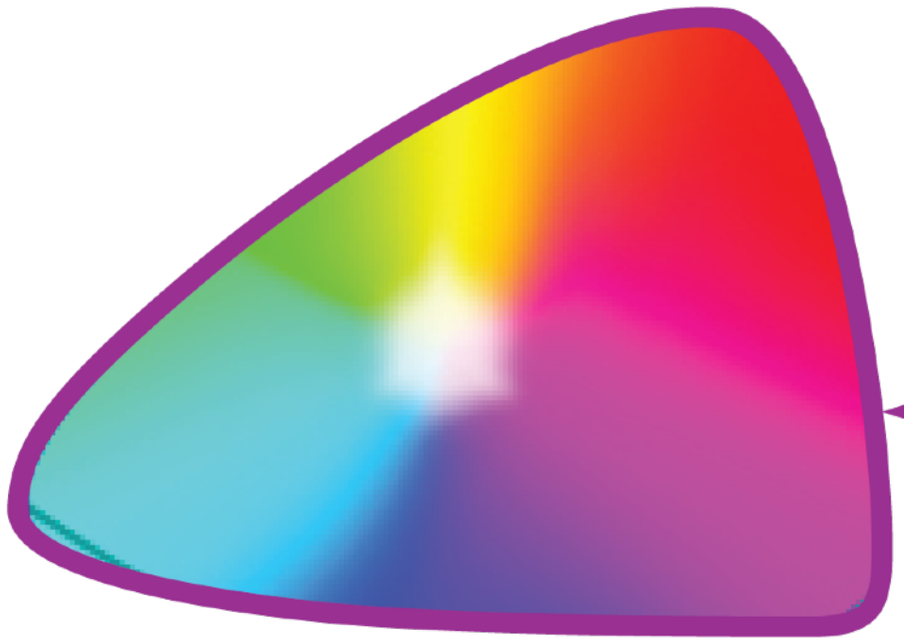



© kitty.jpg @ 33.3% (RGB/8#/CMYK) *
33.33%
© Doc: 18.0M/18.0M

Change Gamut Warning Color:

Photoshop >> Preferences >> Transparency & Gamut



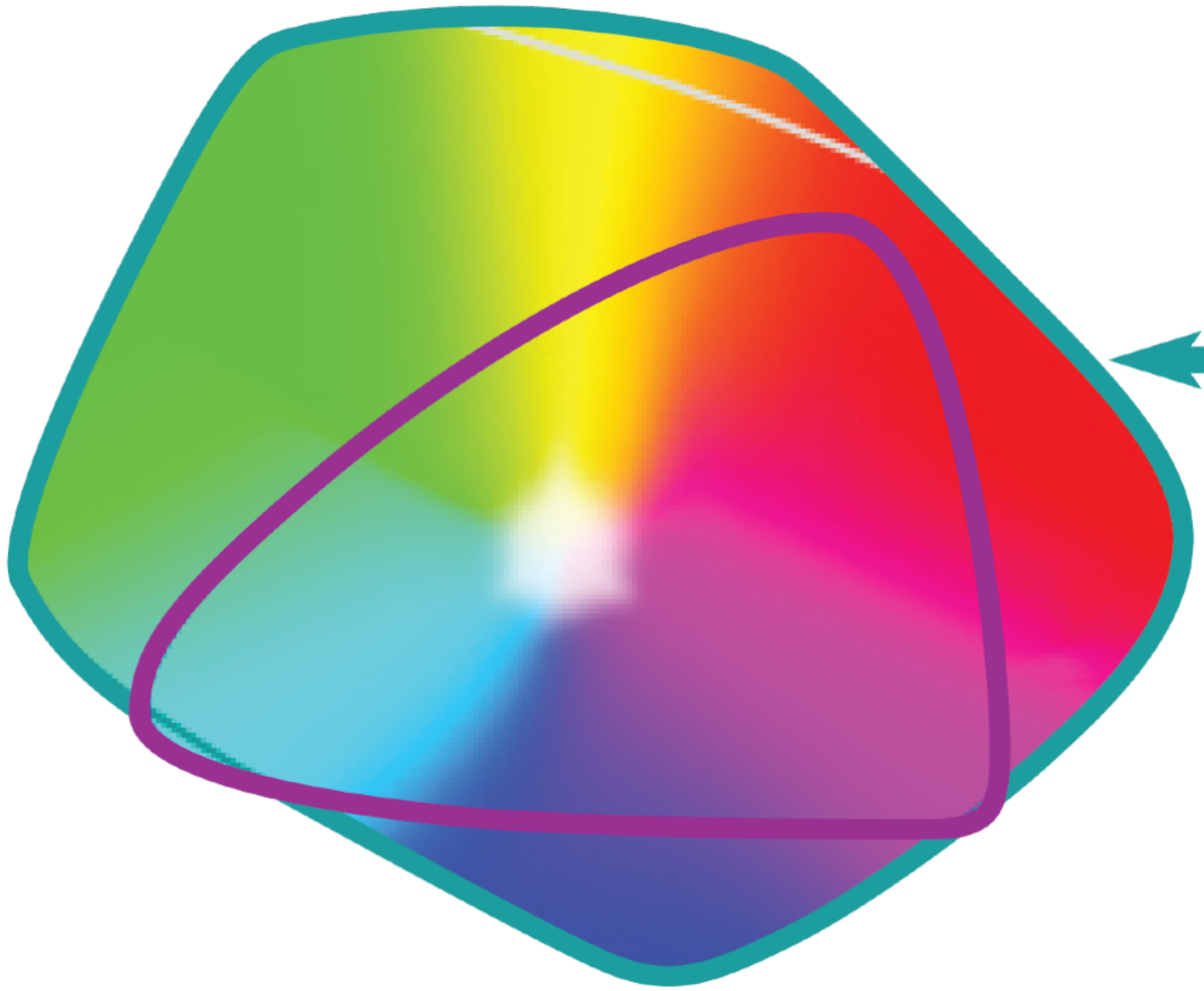


VISIBLE
SPECTRUM

RGB
COLOR GAMUT

PANTONE
COLOR GAMUT

CMYK
COLOR GAMUT



VISIBLE
SPECTRUM

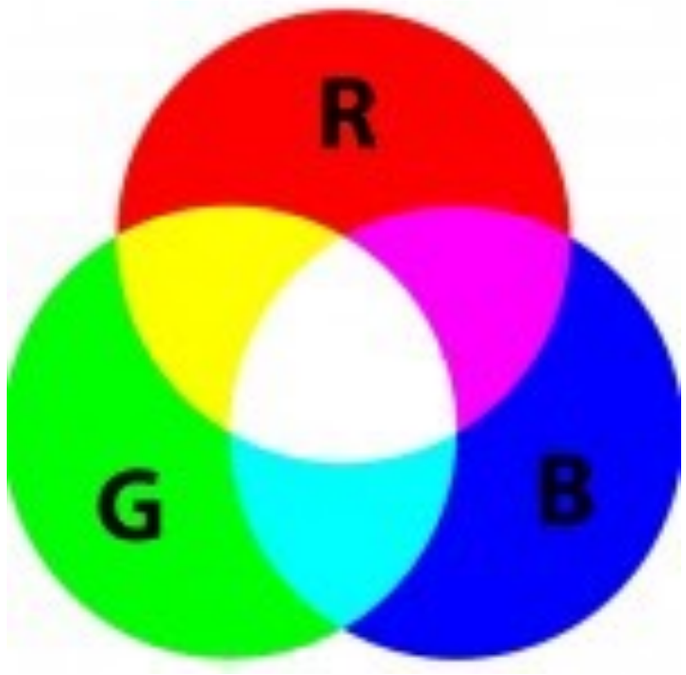
RGB
COLOR GAMUT

PANTONE
COLOR GAMUT

CMYK
COLOR GAMUT

Screen

ADDITIVE COLOR



RGB

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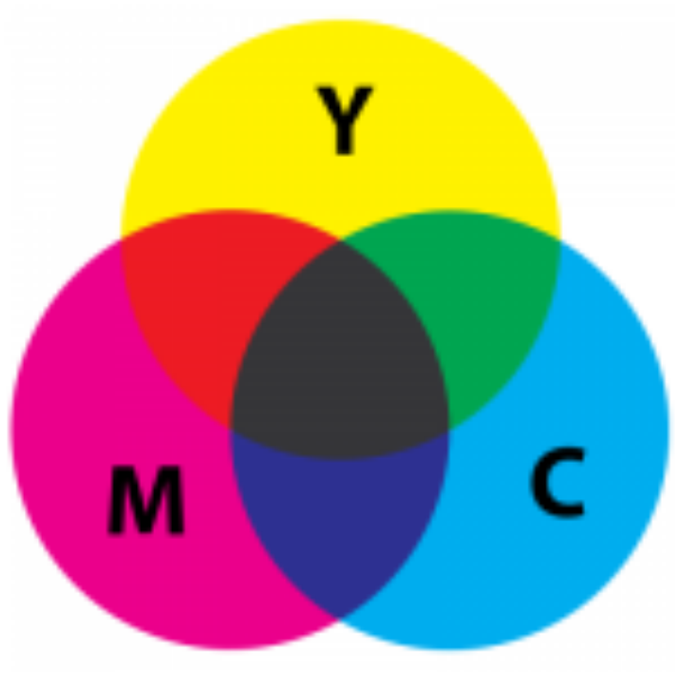
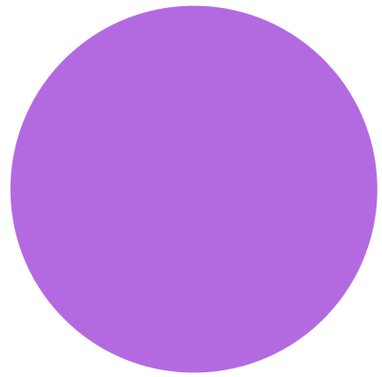
Print

SUBTRACTIVE COLOR





CMYK

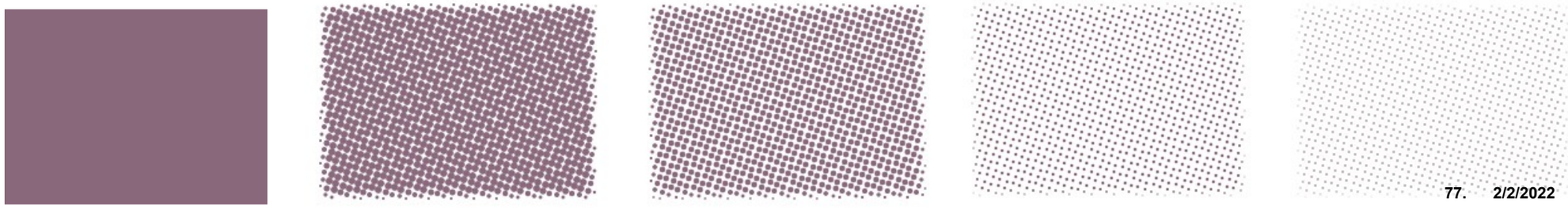
- By applying ink, the amount of white from the paper is reduced or subtracted.
- Cyan, Magenta and Yellow are the subtractive color primaries.
- Combining these three colors produces a muddy brownish black.
- To achieve a better blacks and to save ink, black (K) was added to the mix.
- The CMYK model is used for print.

Spot

- Best color accuracy.
- Pantone is the industry standard for spot colors.
- Inks are carefully mixed according to specifications.
- Not a good option for photographic images with hundreds of tones.
- Not for web use.

Spot Color

- Not created by 4-Color Process, requires an additional plate & ink.
- Industry-Standard: Pantone (PMS), or Toyo
- Printer can also match almost any color as a "special match".
- May see a letter after the PMS number, that is for the paper it's printed on - ink is always the same.
- Spot colors can print as a solid or tint (half-tone)



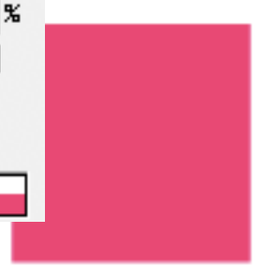
Why do we need Spot Colors?

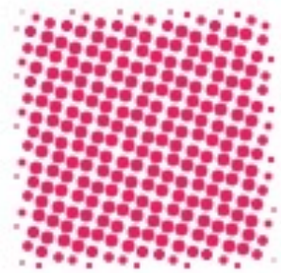
- Need to print a color that isn't achievable in CMYK
  - Pantone has a larger color gamut than CMYK.
  - Metallic, Neon, etc.
- Want to print color, but not 4 Color Process (2 color job).
- Simplify color control or fix registration issues.
- All manufacturing processes have "tolerances" – some shift is allowed. Large areas of a process color can be hard to control on press and may result in color variation.
- CMYK colors may vary slightly from one run to the next
- Small type or type reversed out of a CMYK color creates difficult registration.

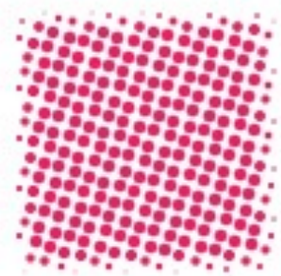
Communicating Colors

- Yellow can be referred to as *Lemon* or *Canary*, but to replicate it there must be a standard.
- Today's standard: Pantone Matching System® (PMS)
  - Widely used in the print and design industry
  - Default matching system for Adobe® Software
- With Pantone, a designer can designate a specific PMS color in his artwork and the printer all the way on the other side of the world can replicate the color exactly as the designer expected it to be via a Pantone swatch.

Tints of PMS colors:



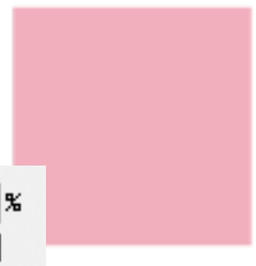


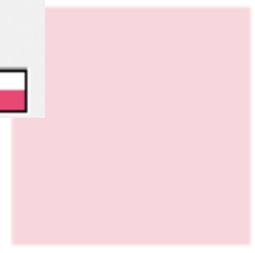


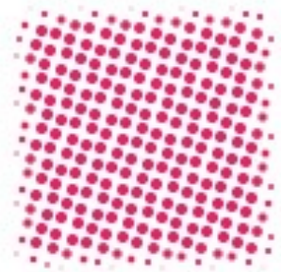
- Give the illusion of additional colors (ie: dark pink & light pink), without cost of additional print plates

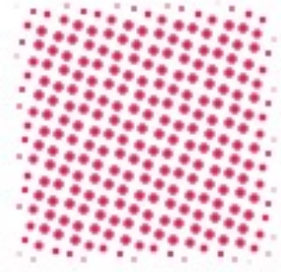
- NOTE: Some PMS colors can look gray, or the hue can shift when screened

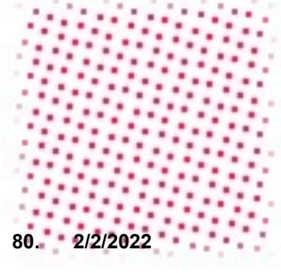
- NOTE: Half tone screen may be visible in small type and very light screens











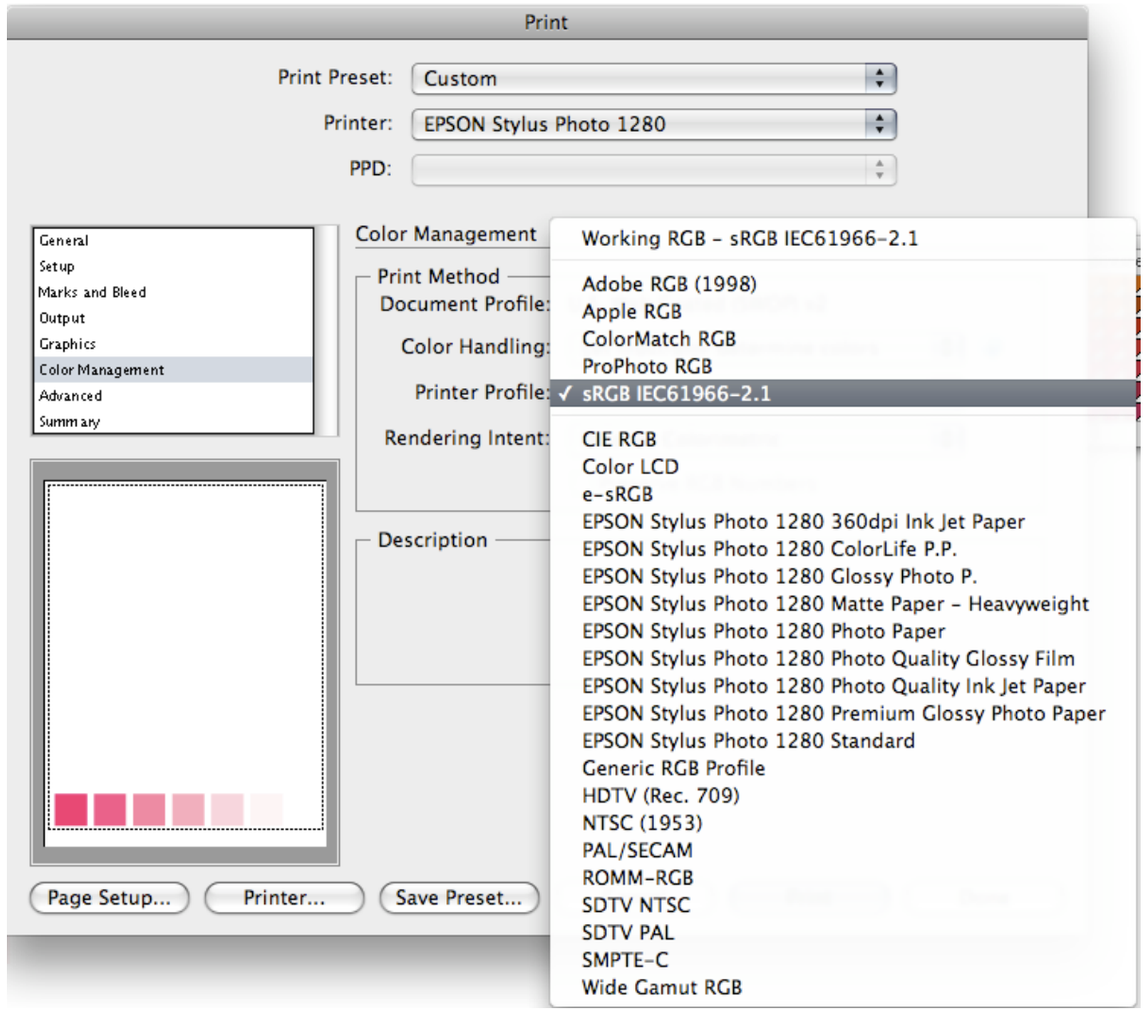
Matching colors:

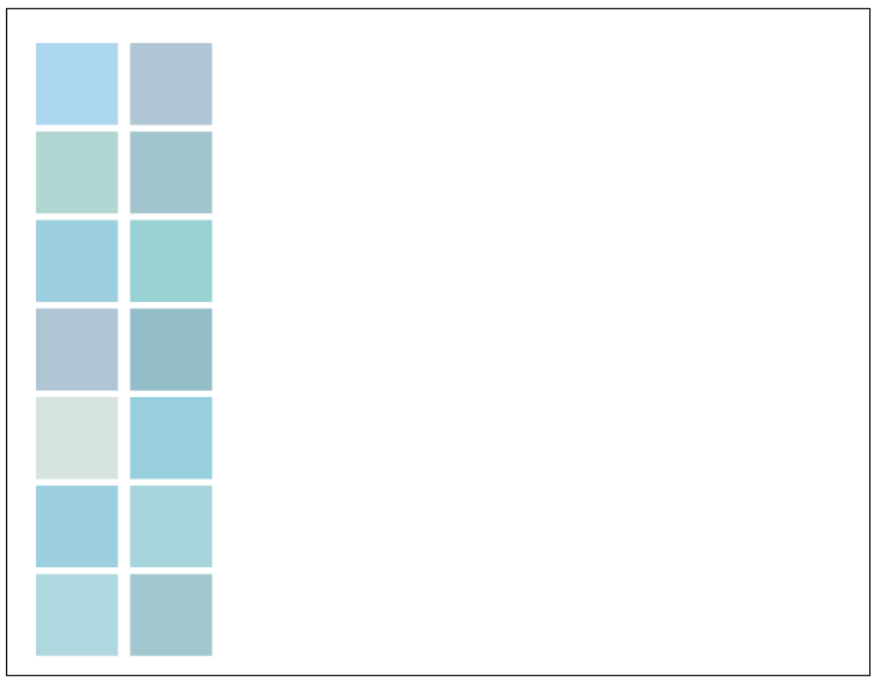
- Because PMS colors offer a wider gamut, some spot colors cannot be replicated in CMYK, (use **Pantone Bridge** book to find closest match within CMYK gamut.)

- Some CMYK, Pantone and RGB colors cannot be replicated on ink jet "proof" printers.

How do I get my colors to match?

- Use colors within gamut of your output device!
- Use correct printer/ paper profiles
- If that doesn't work... match colors manually as best as you can.





CMYK USE

CMYK is used for **printed materials**. CMYK colors do not appear as bright as RGB (they are missing the added bonus of a lighted screen). Brochures, business cards, posters, etc. may be printed in CMYK.

RGB USE

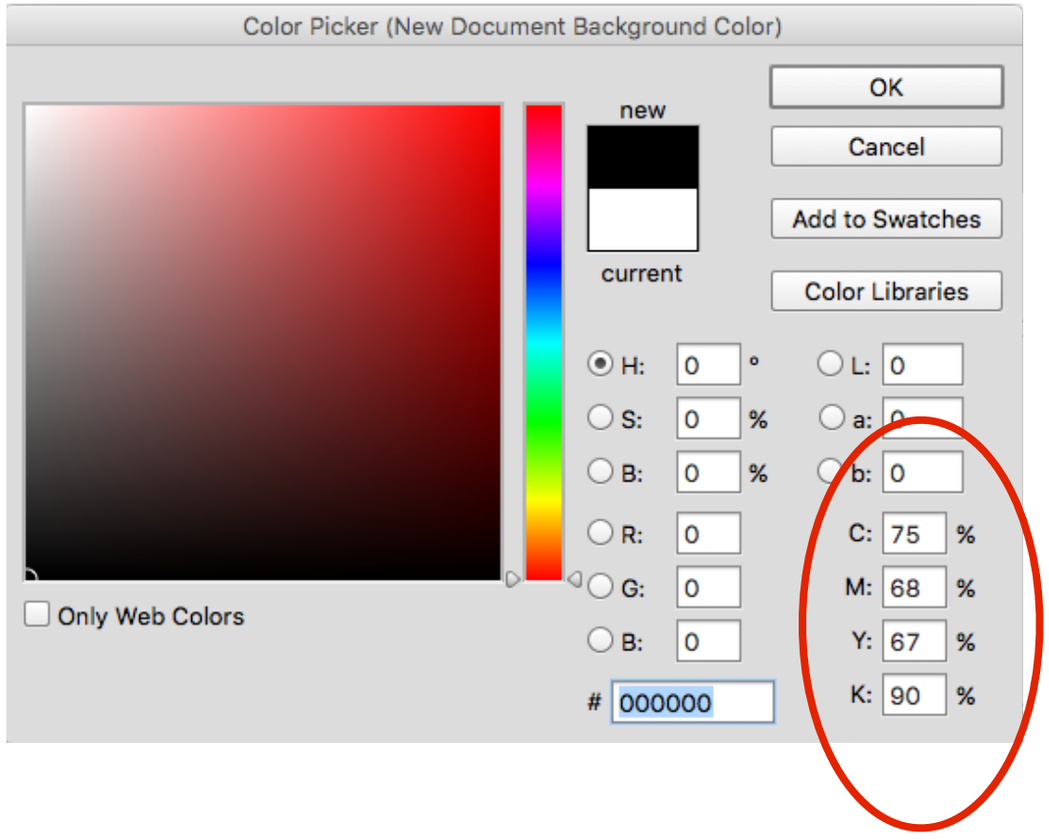
RGB is the color profile used for **digital screens and devices**. Your screen mixes red, green, and blue light to produce the bright colors you see on your display. Websites, mobile apps, video, etc. are in RGB.

PMS USE

Pantone Matching System can be used to accurately match colors for **anything** from fabrics and paints to t-shirts and printed materials.

Rich Black

- Looks much deeper and richer in color (because it is!)
- Most printers have their own preferred formula for rich black.
- Helps with color control on press
- Rich black is sometimes called photoshop black
- Excellent choice when extending a black background from a photo into black in a design.
- Poor choice for small type



BLACK vs RICH BLACK

When creating your design, keep in mind that there are two types of black—standard black and rich black. Standard black uses only black ink (100% **k**), whereas rich black contains elements of other colors (**c**yan, **m**agenta, and **y**ellow). Because rich black uses more ink, the resulting color will be deeper and more saturated.

The two might look the same on your screen, but they won't on paper. In print, the difference will be something like what you see below. Be sure to check the values for each color in all your blacks for the sake of consistency.

C	=	0	C	=	30
M	=	0	M	=	30
Y	=	0	Y	=	30
K	=	100	K	=	100

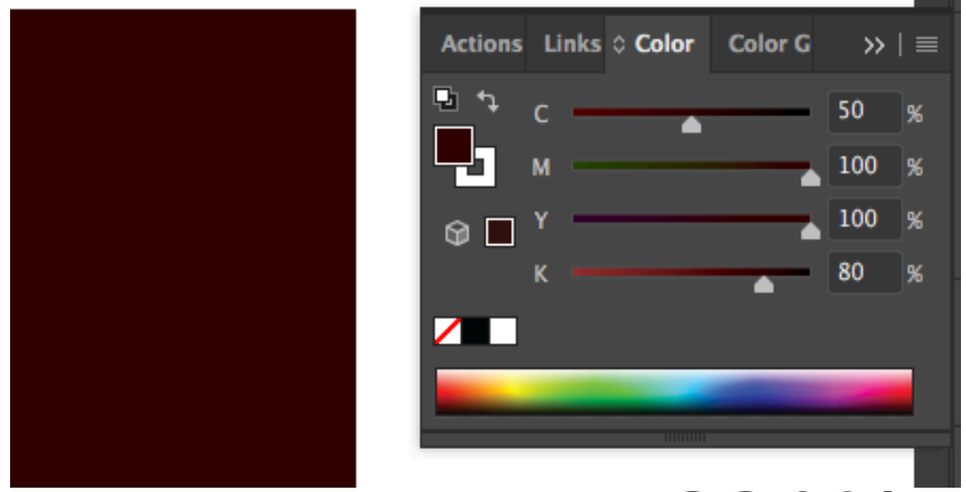
PrintNinja

Total Ink Coverage / Maximum Ink Density

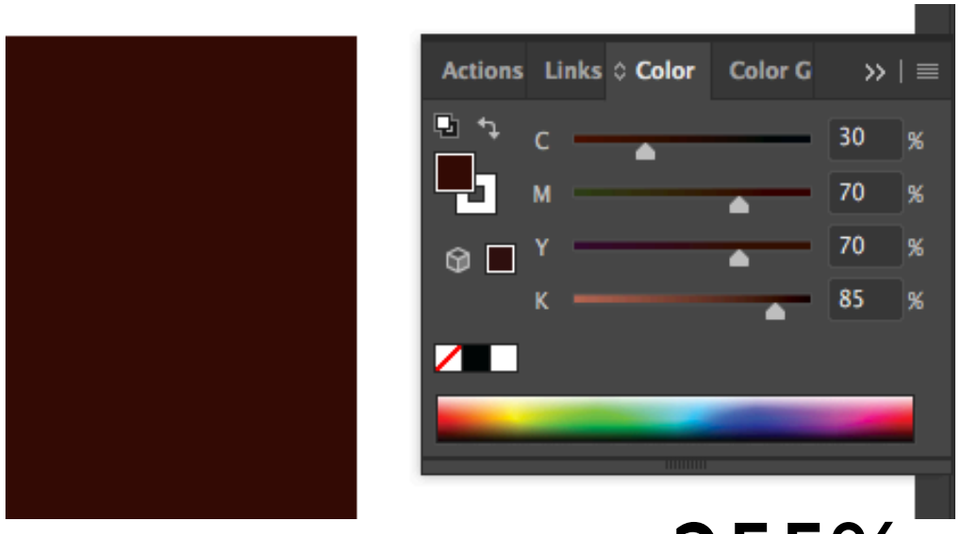
Total amount of ink on paper

- 100% Cyan = 100%
- 100% Green
  (100% C + 100% Y) = 200%

- Maximum of 240% –300% is industry standard
- Excessive density can muddy print and cause drying issues.
- Amount depends on printing method, paper, coating, etc.



330%

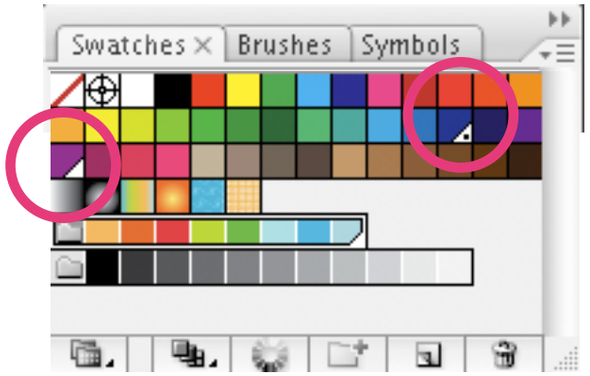


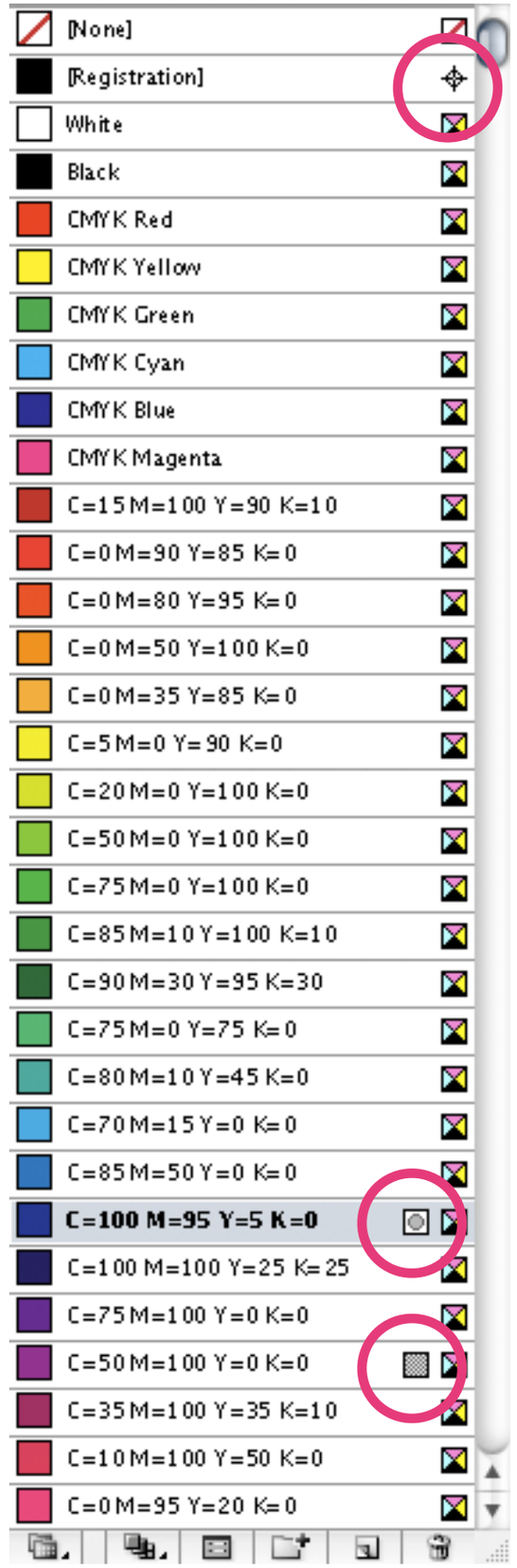
255%

Color Swatches

- Process
  (Local & Global)
- Spot (always global)
- Registration

Global Swatch: when the swatch is changed, all vector objects using that swatch are also updated.





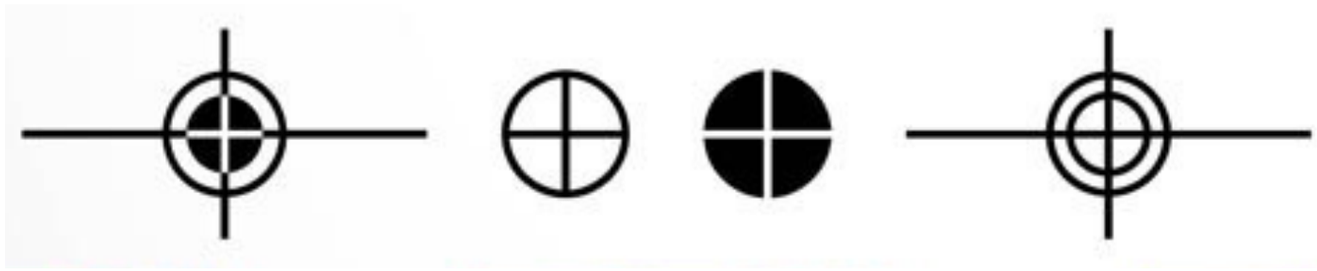
Registration, Trapping & Printers Marks

Registration

Registration is the method of correlating & aligning the overlapping colors (CMYK) into one single image.

Registration Marks

- Help pressman align all the colors
- Marks appear in the same place on all plates
- Different printers use different styles



Registration:

Figure 2.13 Even slight misregister in a two-color logo can be fairly ugly. (Here, bad register is exaggerated for dramatic effect.)

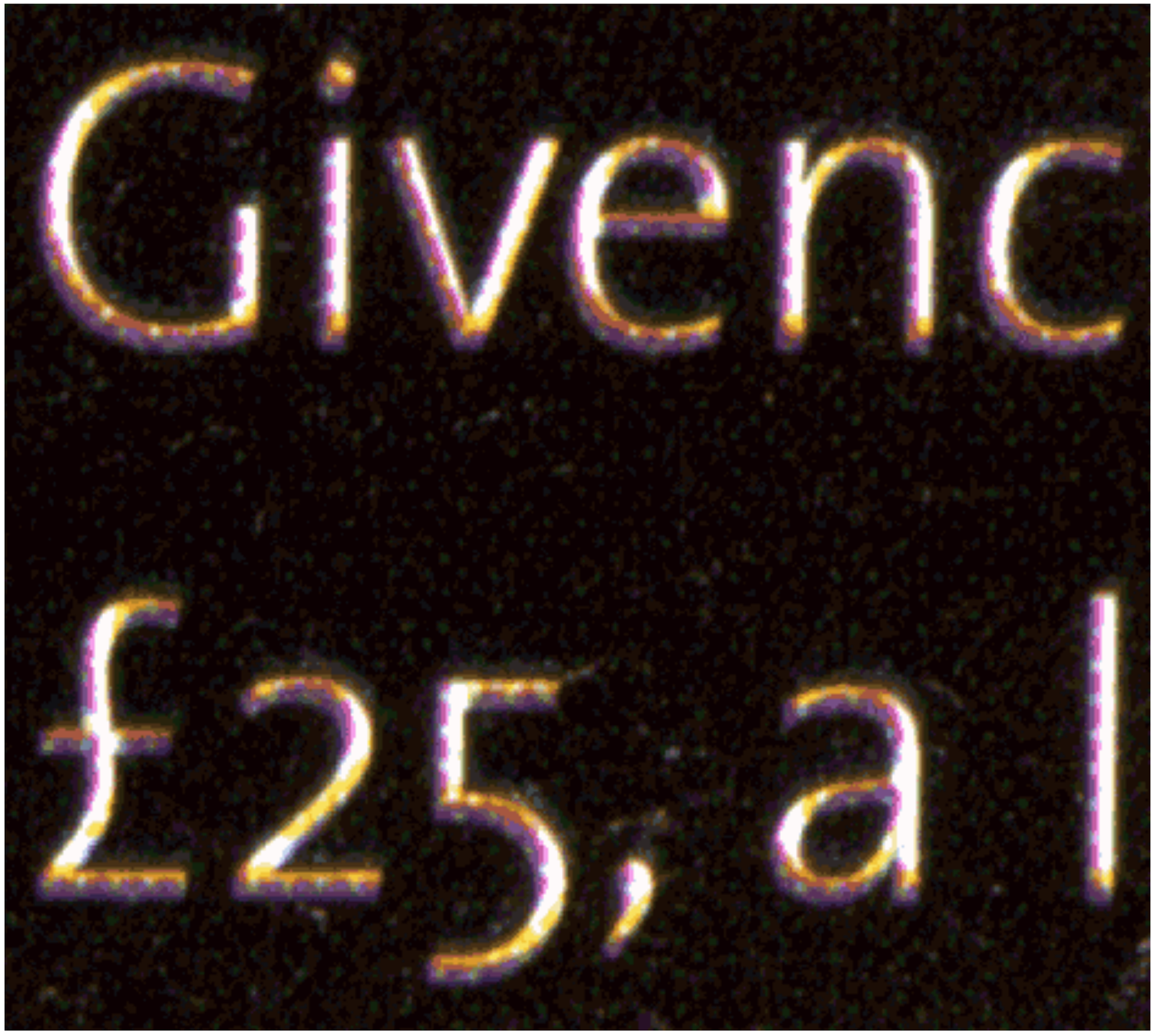
Figure 2.14 One solution to registration challenges: Print the logo in a single color.

Registration:

Small type or type reversed out of a CMYK color is difficult to maintain accurate registration.

Mis-Registered CMYK graphic with reversed out text:

Mis-Registered Rich Black graphic with reversed out text:



Trapping:

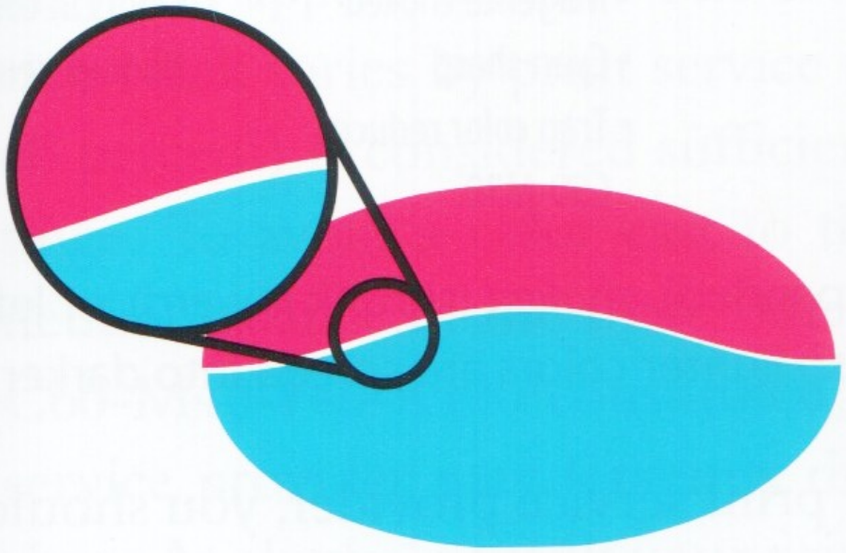


Figure 2.15 Misregistration can cause gaps between color areas that don't have an ink in common.

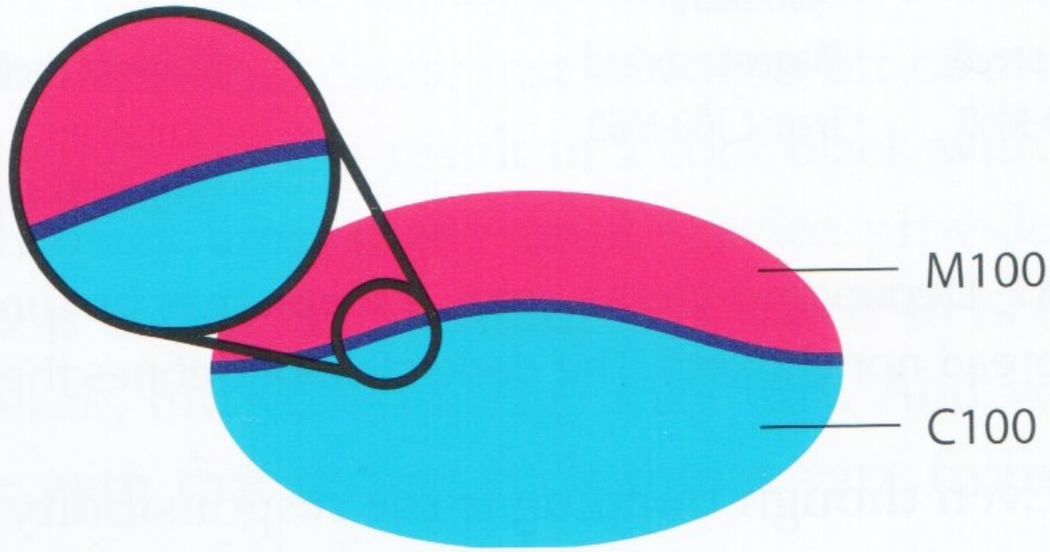


Figure 2.16 Trapping between two dissimilar colors (here, greatly enlarged).

THIS IS WHAT YOU SEE ON SCREEN.

TRAPPED GRAPHIC

GRAPHIC WITH NO TRAP - OUT OF REGISTER

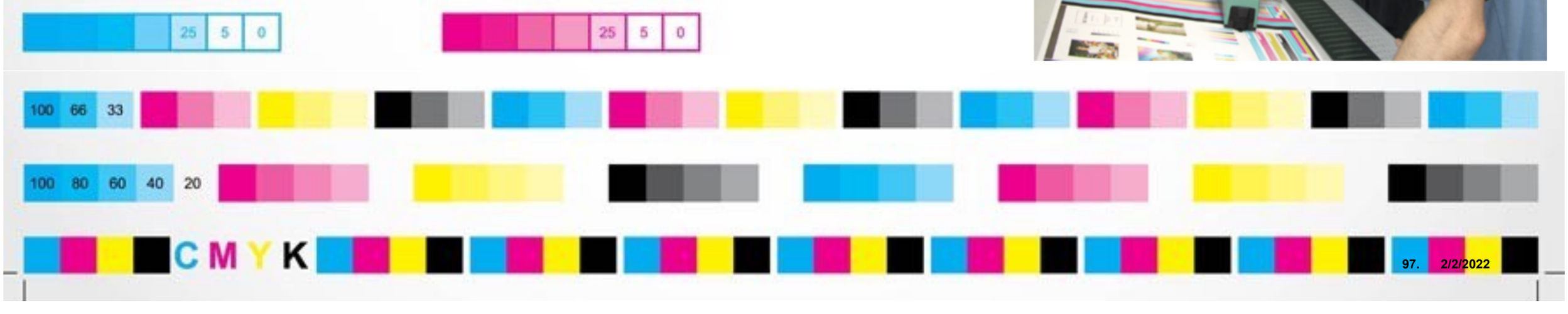
TRAPPED FILE - OUT OF REGISTER

THIS IS WHAT YOU SEE ON SCREEN.

TRAPPED GRAPHICS

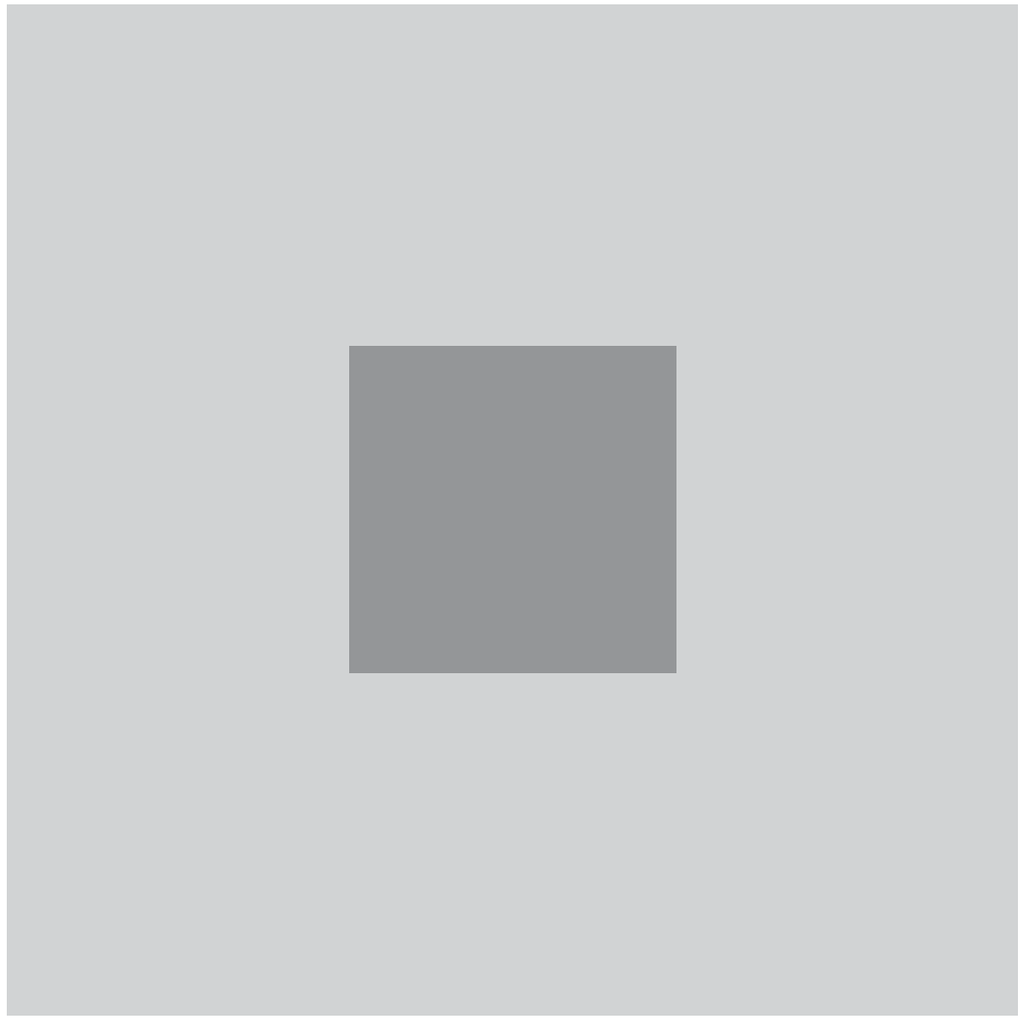
Color Bars

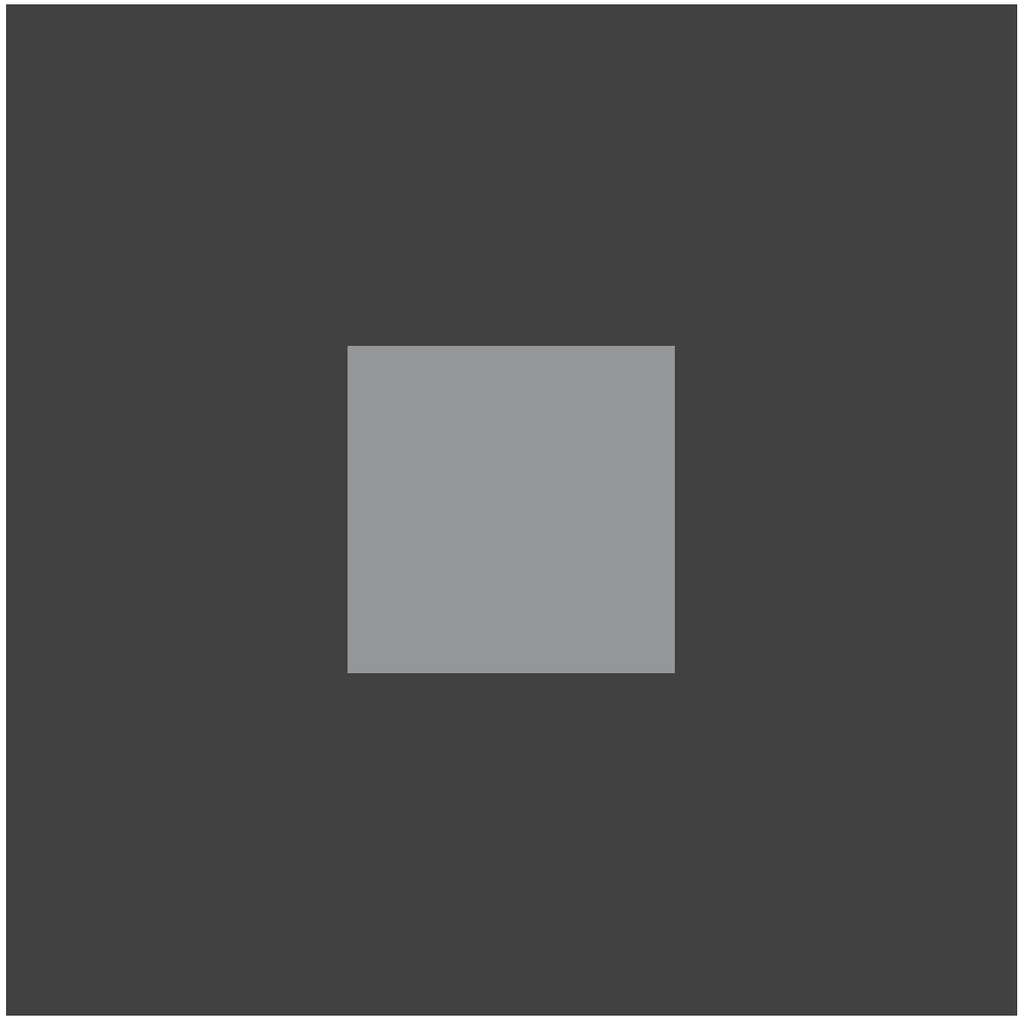
- Used during printing to check the density of each color using a Densitometer
- Different printers use different styles
- Usually cut off the finished product
  - Sometimes it's left on a hidden flap
  - Can see how many colors used to print the job



Color Viewing & Light Temperature

Which center is square is darker?





They are the same!

The other colors, tones & lighting around a color affect how our brain perceives color.

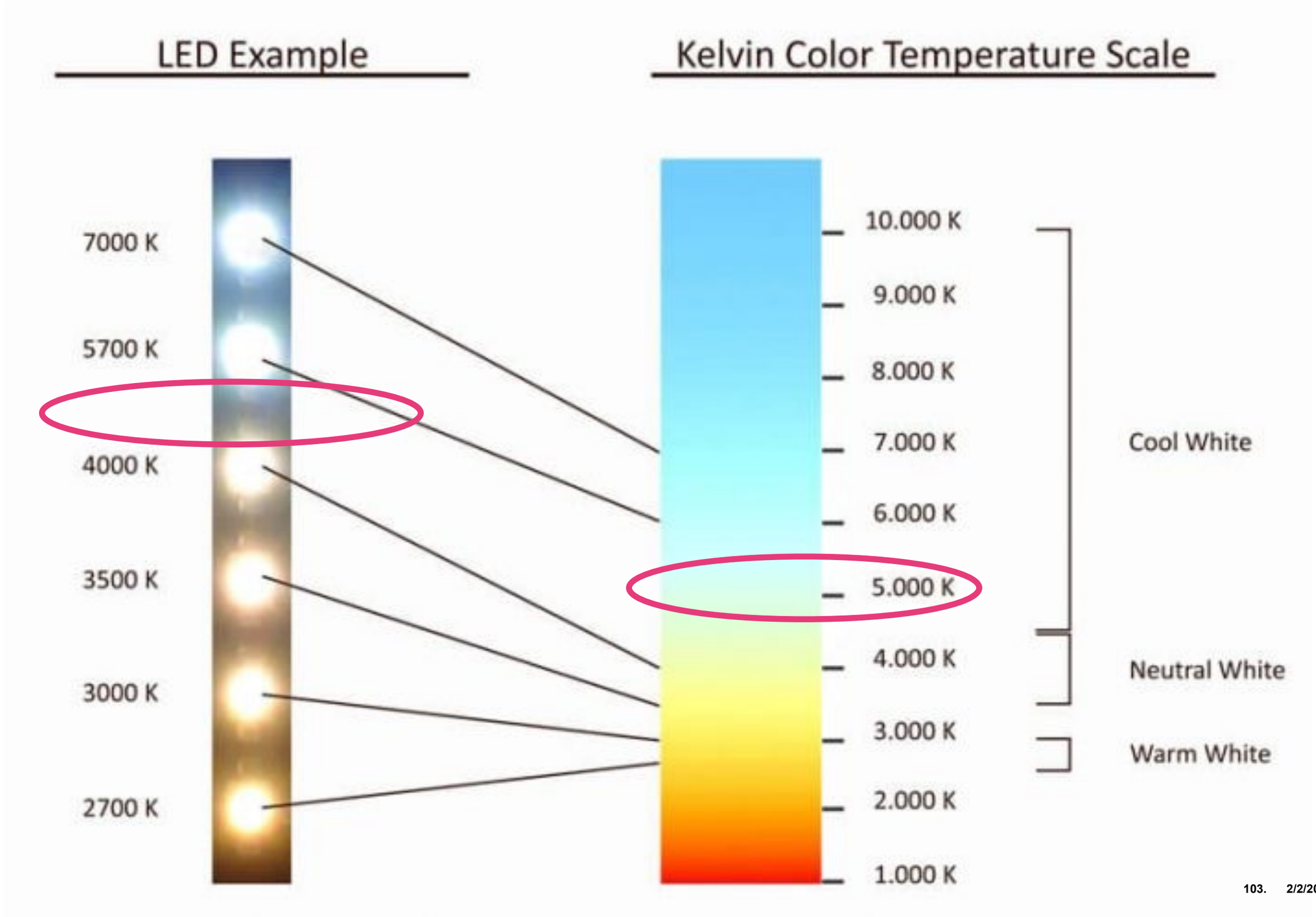
Because our eyes and brain can do some adjusting to color temperature, we need our cameras to do the same in order to make things look like they do to our eyes.

The same color viewed under different lighting conditions can look completely different.

- Proofs
- Ink Swatches
- Photographs
- Products/Labels/Packaging

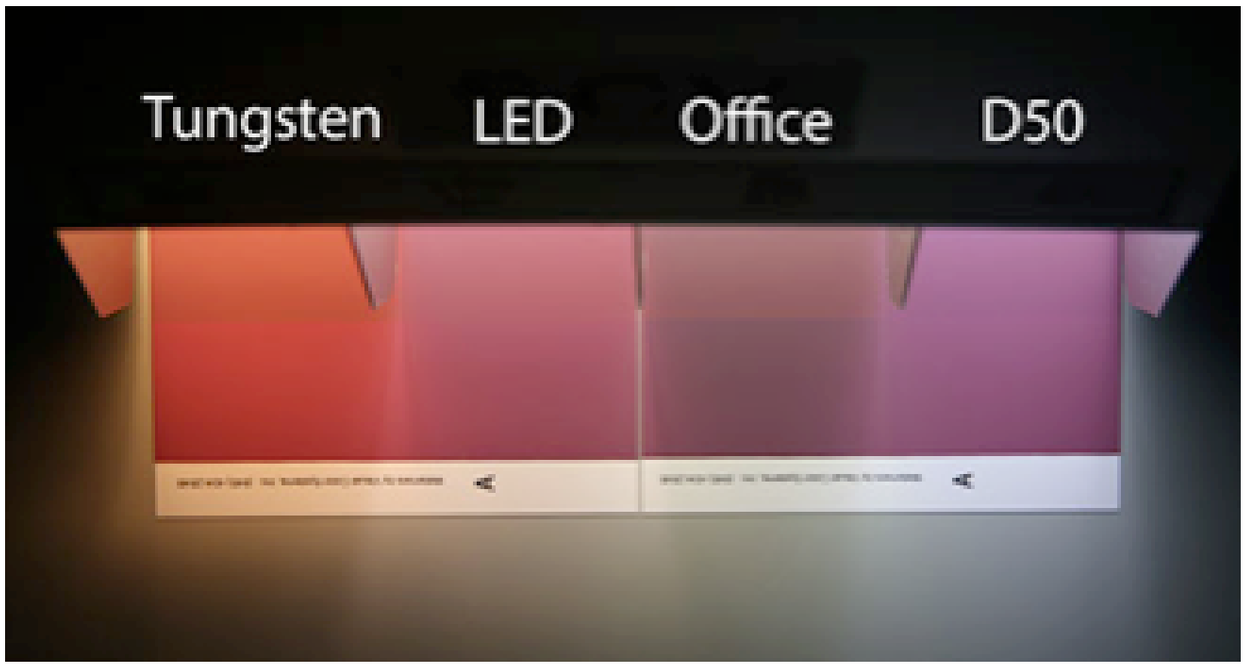

Compare Color Temperatures – CFL to Incandescent
Compare las Temperaturas de Color – Bombilla CFL a Incandescente
energy smart
Bright from the Start • 7 Year Life
SAVE
DAYLIGHT
PHILIPS

Light is measured in Kelvins

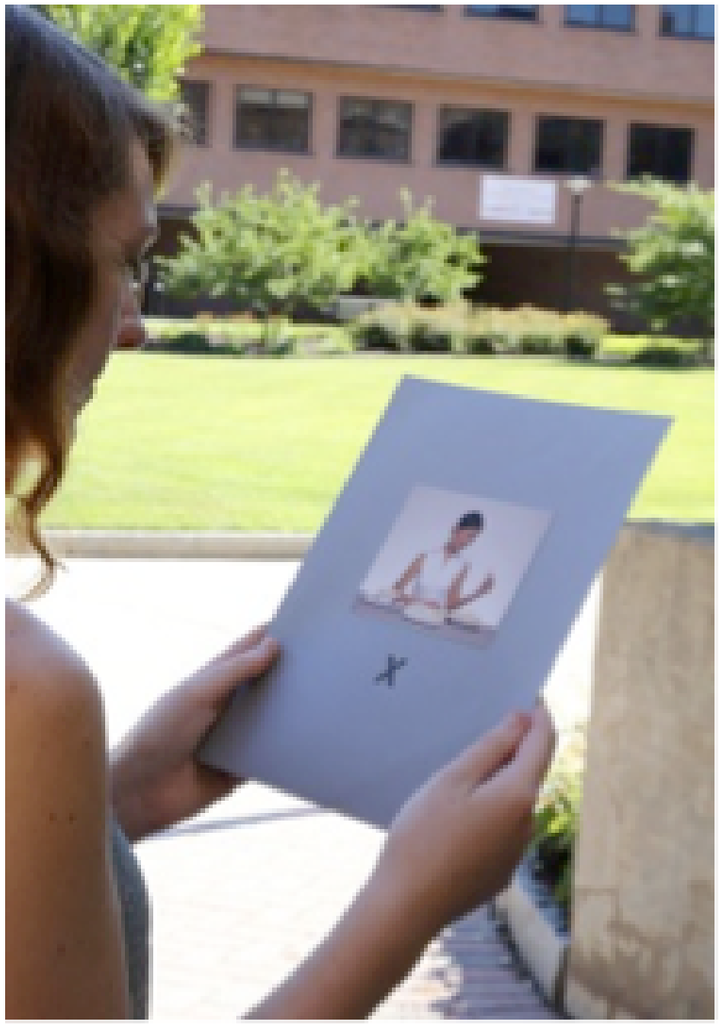


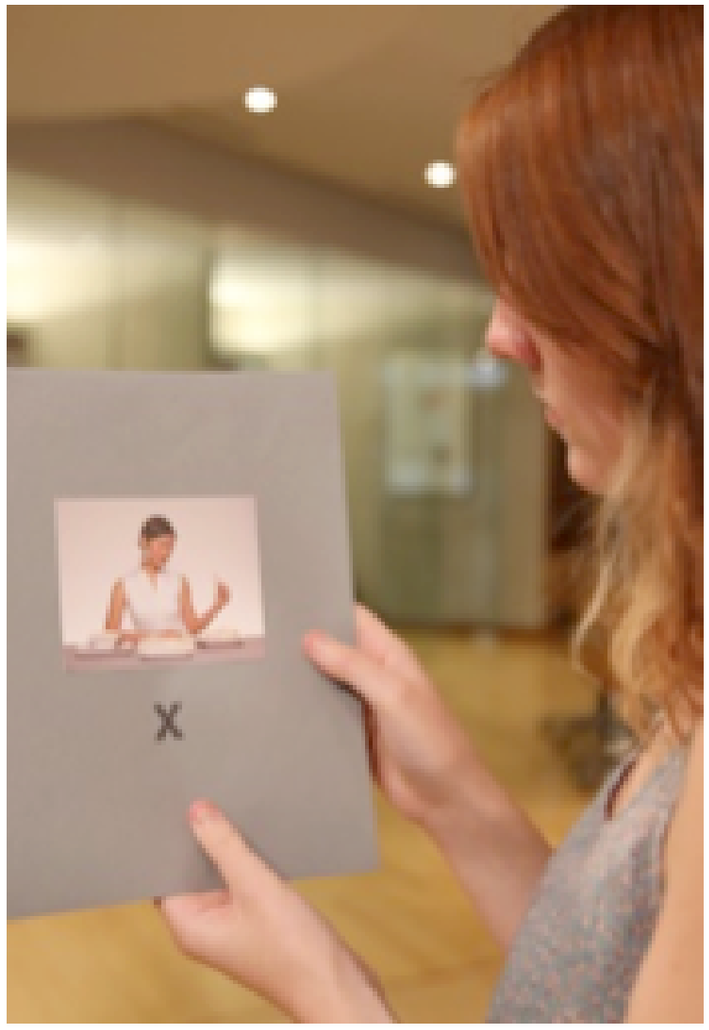
Consistent Industry Standard Lighting

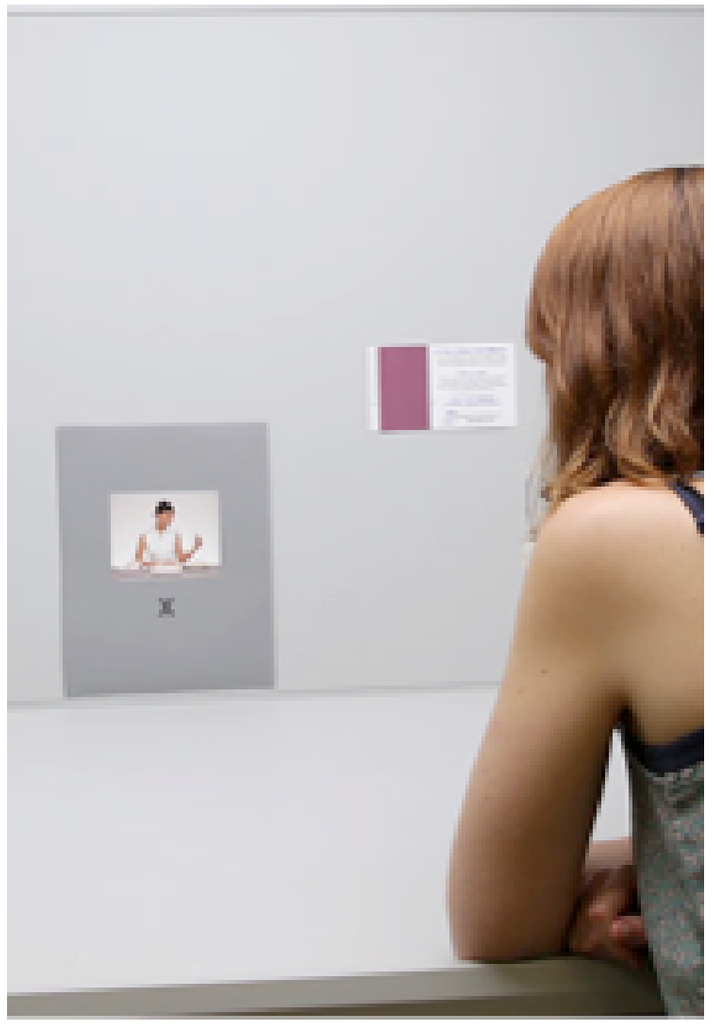
- D50 (5000k daylight) is best for evaluating printed products
  - Proper lighting is critical to ensuring color accuracy.
  - When lighting is poor or inconsistent it is impossible to get accurate results as proofs, prints, monitors & objects may have significantly different appearance under varying light sources.
  - Ambient studio, office and printroom lighting can affect how color looks.



Example of the same color viewed under 4 different light temperatures.


X


X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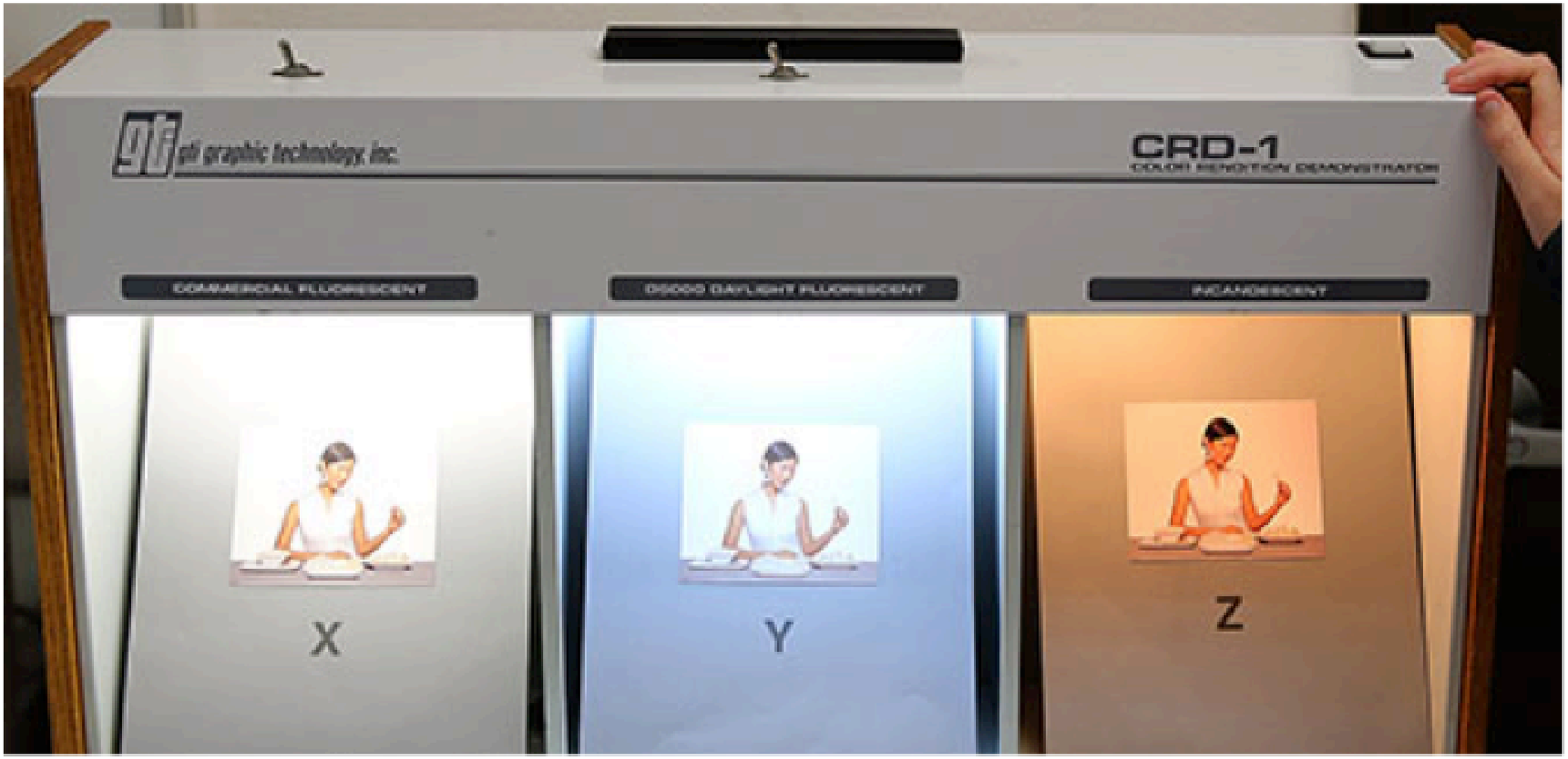
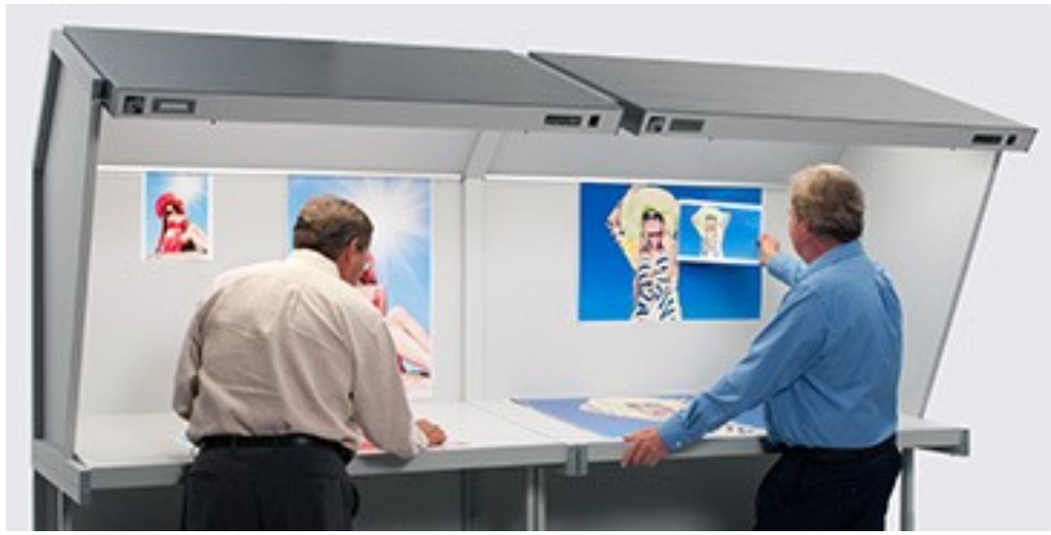
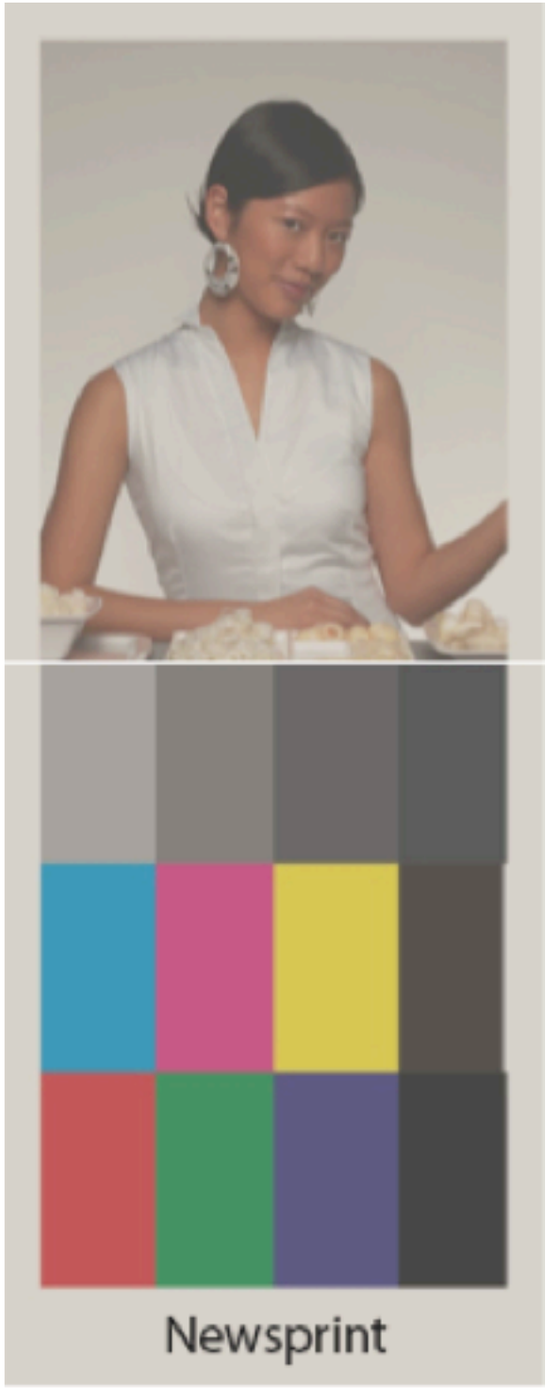

gti graphic technology, inc.
CRD-1
COLOR RENDITION DEMONSTRATOR
COMMERCIAL FLUORESCENT
DELUXE DAYLIGHT FLUORESCENT
INCANDESCENT
X
Y
Z

How to get Industry Standard Lighting

- **Use a Light Booth**
  - Fitted with special 5000k lightbulbs
  - Usually installed at printshop for press-operators to check color.

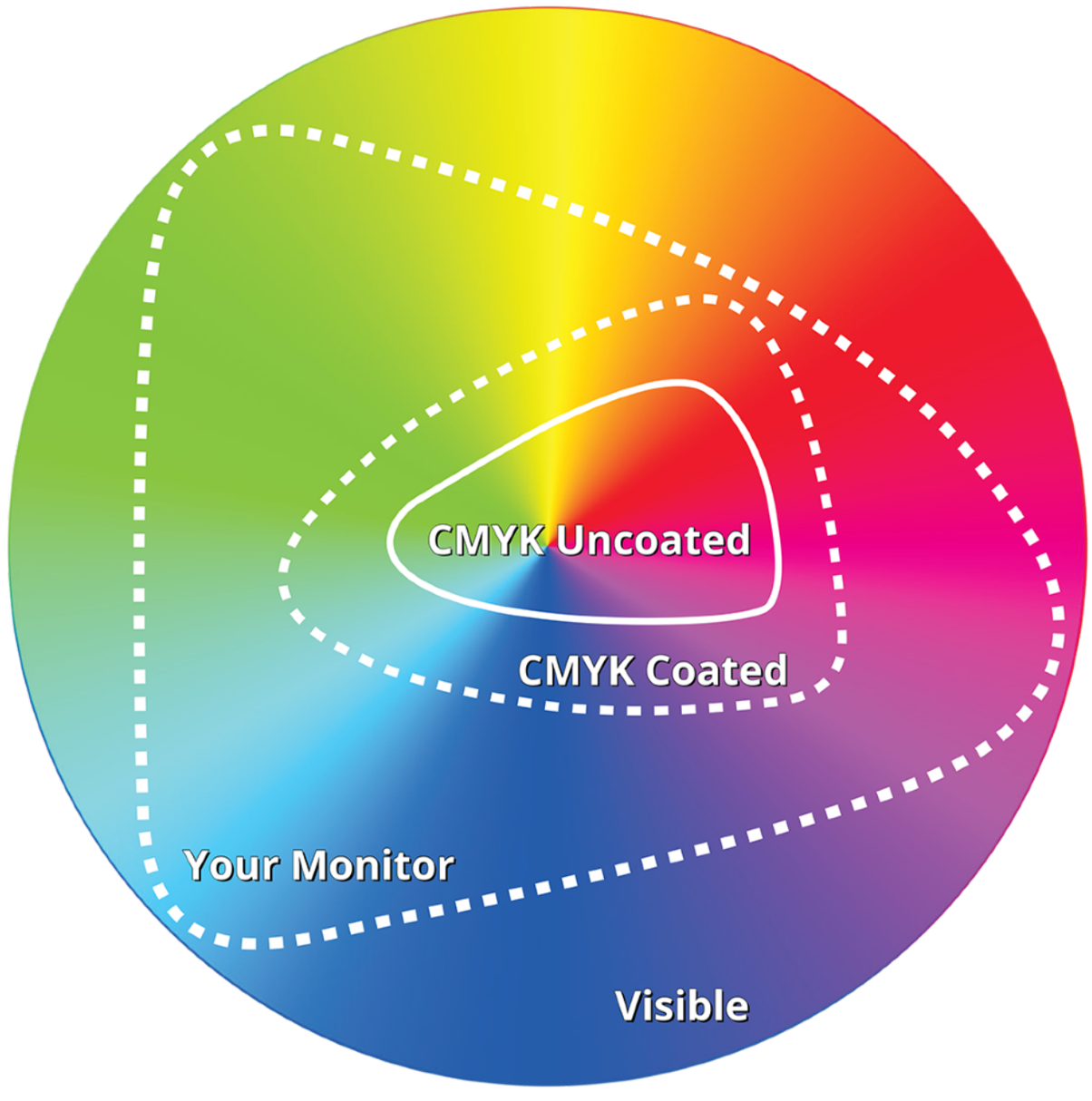


- **Using a Lighting Indicator Sticker**
  - Two different light-sensitive patches react to the lighting in your environment
  - If your ambient lighting conditions are not acceptable for evaluating color the patches will appear different in color – the worse the light, the more drastic the contrast.
  - Attach stickers to proofs & ink swatches to ensure you and your teams make accurate color decisions



Newsprint

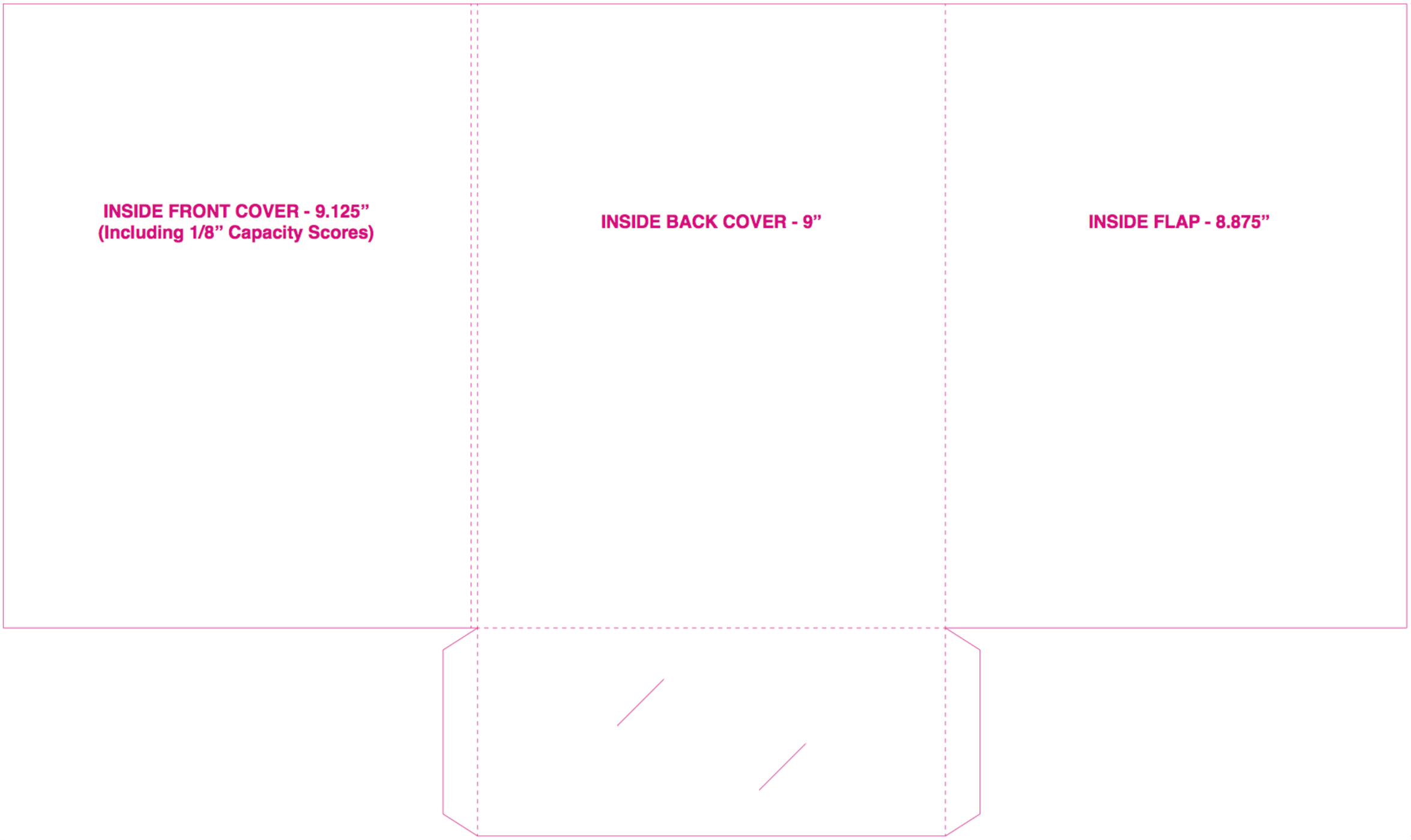
Premium Coated



Dielines, Mockups, & Finishing

Anatomy of a Die-Line

- Cut-Line
- Score or Fold Line
- Trim Marks
- Bleed
- Tabs for Glueing
- NIC area (or where the glue/tabs will be applied)



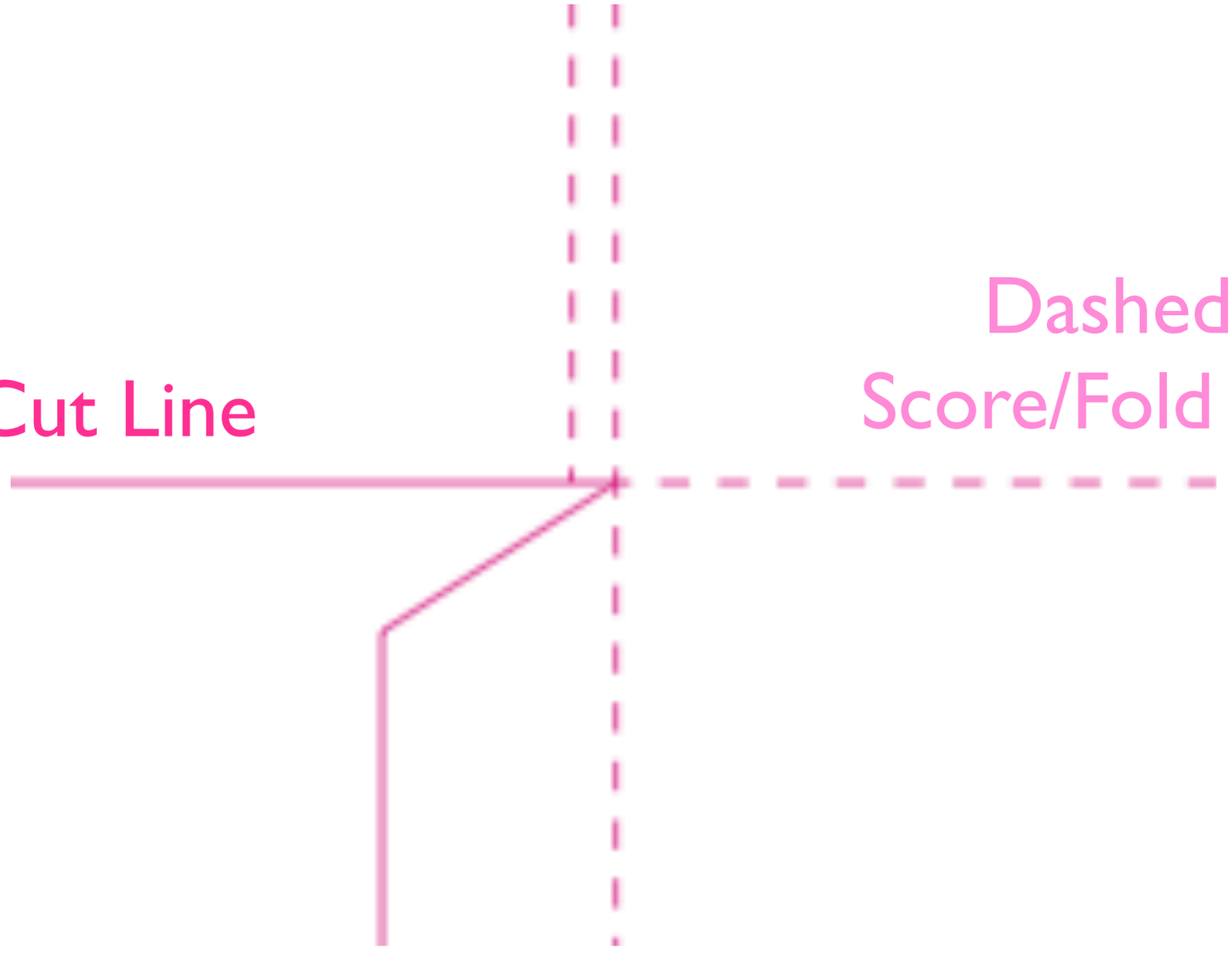
Flat Size: 27 x 16

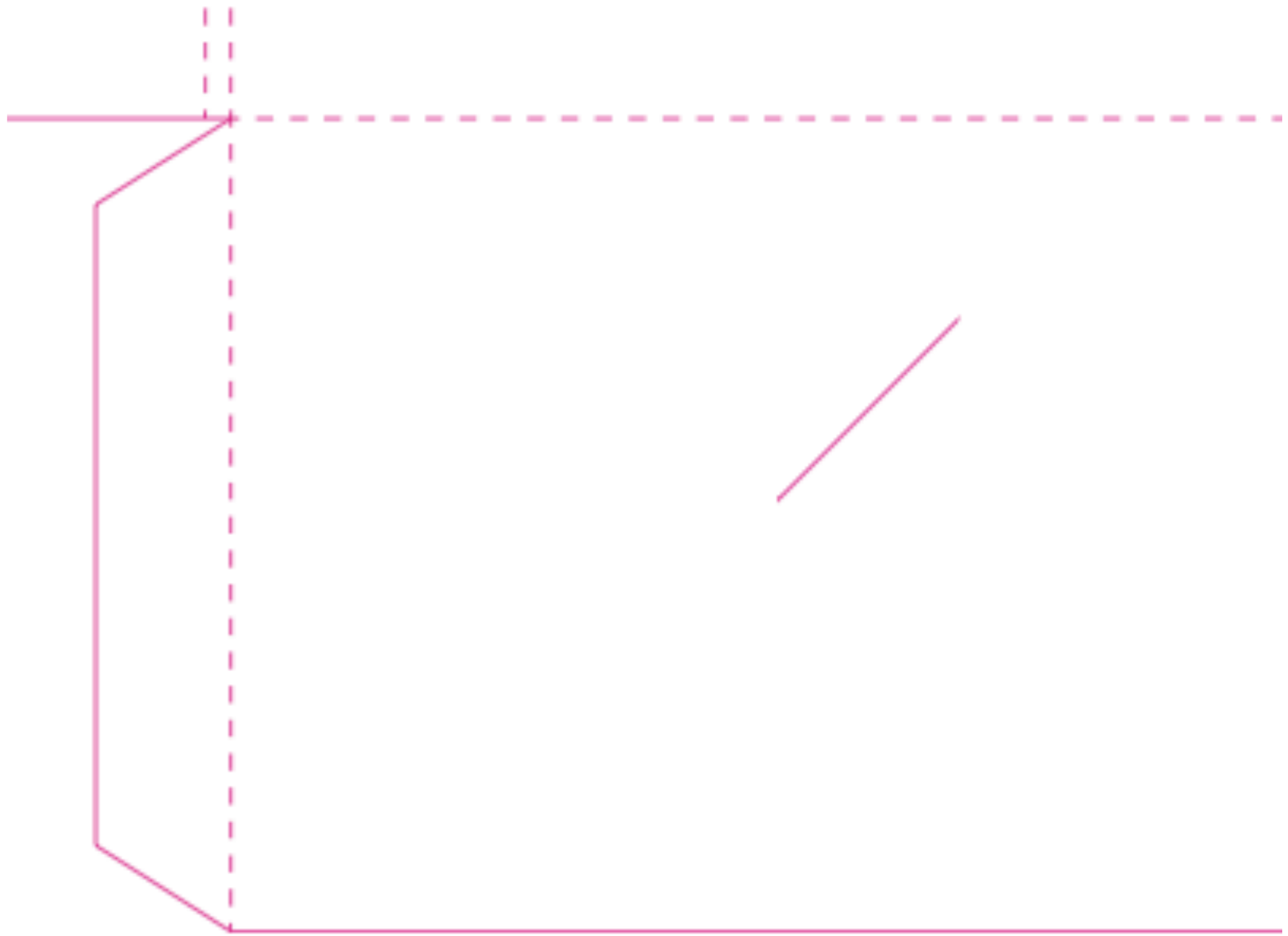
INSIDE BACK COVER - 9”

Finished Size: 9 x 12

Solid: Cut Line

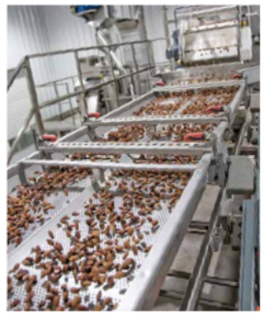
Dashed:
Score/Fold Line





Our Facility

INSIDE FRONT COVER - 9.125"
(Including 1/8" Capacity Scores)



STATE OF THE ART FACILITY

Nut Up Industries has a new state of the art facility built by Borrell USA. In-house processing capabilities include TERP Certified Steam Pasteurization, Blanching, Roasting and more.

- HACCP Certified & Trained
- In-House Lab Testing
- Nitrogen Vacuum Packing

INSIDE BACK COVER - 9"

Our Products

CHOPPED
ROASTED ALMONDS

Nut Up Industries **"CHOPPED" Products** brings variety to the way you snack. Whether it be on the go with our single-serve pouches or enjoying it from our larger packaging for salad or ice cream toppings we are sure you will enjoy our CHOPPED almonds.

WE CURRENTLY HAVE FIVE DELICIOUS FLAVORS:
Sea Salt & Caramel Flavor
Caribbean Jerk
Zesty Ranch
Sea Salt
Natural Roasted

"CHOPPED" almonds come in a 1.5oz snack pack or 16oz. resealable bag and are currently available for purchase

PACKAGING:
Rip Top Folding Carton
12 – 1.5oz bags per Folding Carton
5 Folding Cartons per box = 60 1.5oz bags

Loose Pack
150 loose 1.5oz bags per box

Clip Strip
12 – 1.5oz bags to a Clip Strip
12 Clip Strips to a box = 144 1.5oz bags

INSIDE FLAP - 2.875"

BUTTER
ROASTED ALMOND BUTTER

Our **Natural Almond Butter** has no other ingredients other than ALMONDS. Its a perfect snack to keep you fueled and healthy, and contains 7 grams of protein per serving.

The Sea Salt Caramel Flavor Roasted Almond Butter is the perfect combination of sweet and salty.

Both the Natural Roasted Almond Butter and the Sea Salt Caramel Flavor are available for purchase through our online store in 12oz. and 16oz. jars.

PACKAGING:
Individual Jars
12oz. or 16oz. jars

Bulk Box
24 Jars per box

SEA SALT CARAMEL FLAVOR
ROASTED ALMOND BUTTER

Our line of **My Almond Addiction** Products is perfect for those looking to incorporate a gluten free or clean eating lifestyle into their everyday cooking. Whether it be a flour substitution for your breads and cakes or creating amazing meals such as Almond Crusted Chicken your creations will have a healthy spin that are sure to please.

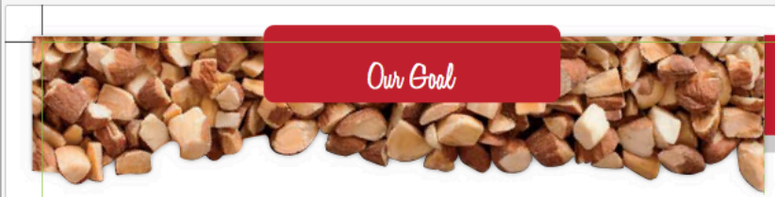
My Almond Addiction is a delicious, healthy, and protein packed alternative to flour, breadcrumbs and more!

Currently this brand consists of Roasted Almond Meal and Blanched Almond Flour, with more products on the way.

My almond addiction comes in a 16oz. resealable bag and is currently available for purchase on our online store.

PACKAGING:
Display
27 – 1 lb. bags per display
Displays come in a packer box
Pre-assembled

Individual Packaging
10 units per master carton



Our Goal

FAMILY VALUES

Nut Up Industries was created by two local families in the heart of the Central Valley. Each almond has been farmed, processed and hand-inspected at our facility in Escalon, California. We take great pride in our full circle process. Nut Up Industries manufactures everything from Blanched and Roasted Almonds to Flavored Diced snacks.

It is the goal of Nut Up Industries, Inc. to set the standard of quality in custom tree nut processing and packaging. With our dedication to creativity and hard work, we will bring innovative products and services to the market. We value our employees, customers and suppliers, and consider them partners in creating rewarding and beneficial relationships.

FLAP - 8.875”

All of our delicious products are locally made in Escalon, California!

OUTSIDE BACK COVER - 9”

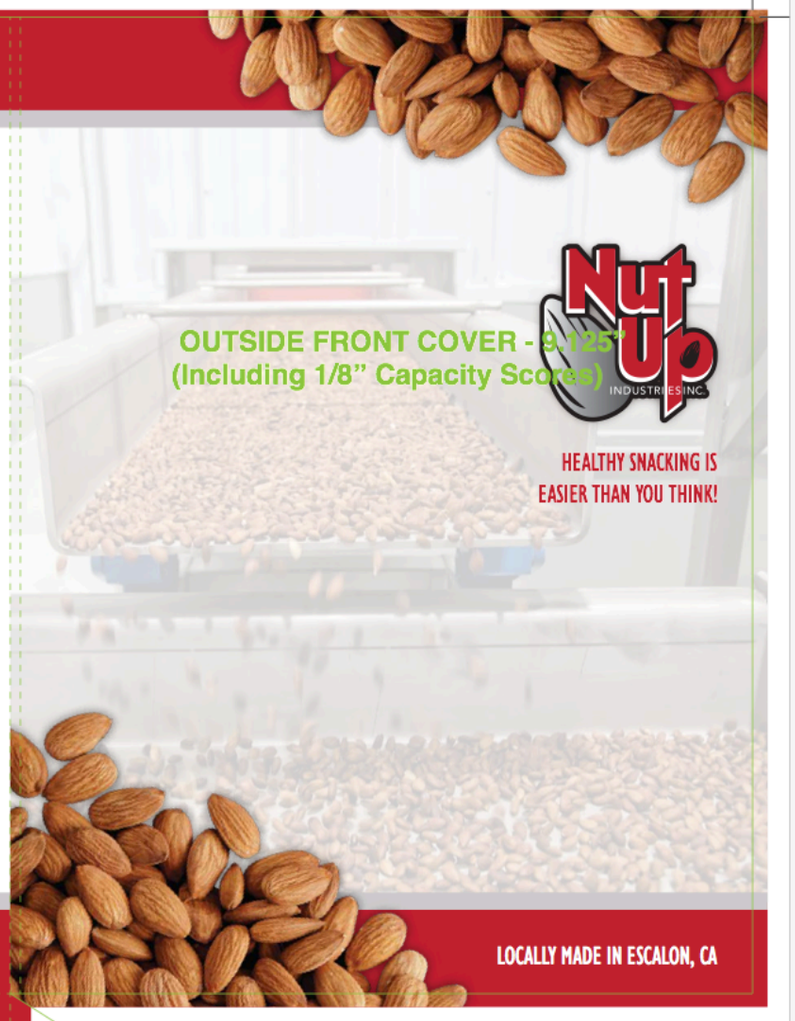
Nut Up Industries Inc.
P.O. Box 216 Escalon, CA 95320
209-838-3055
www.nutupindustries.com
orders@nutupindustries.com

FOLLOW US ONLINE:
nutupindustries.com

nutupindustries.com
FOLLOW US ONLINE:

OUTSIDE FRONT COVER - 9.125”
(Including 1/8” Capacity Scores)

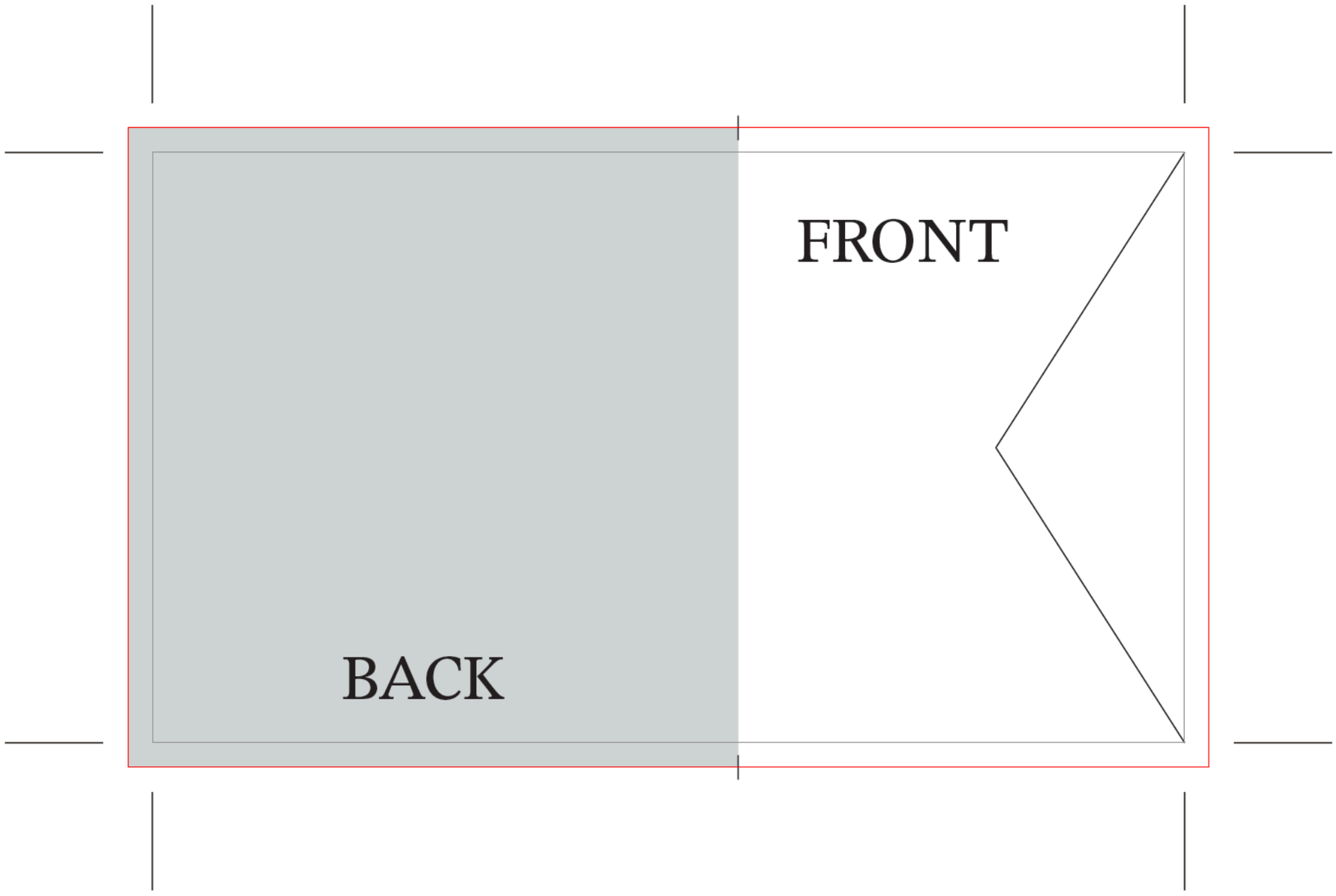
HEALTHY SNACKING IS
EASIER THAN YOU THINK!



LOCALLY MADE IN ESCALON, CA

Best Practices when creating
1-Off Projects, Proofs, Comps & Dummies

1. Set crop marks far enough away from artwork

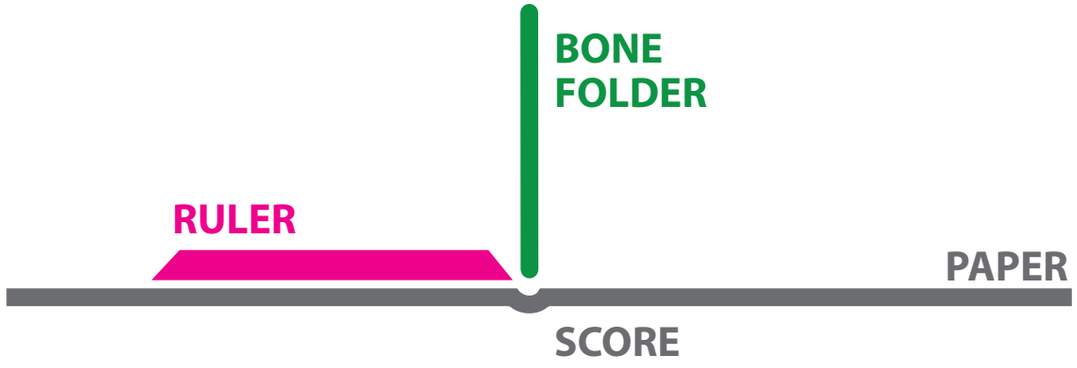


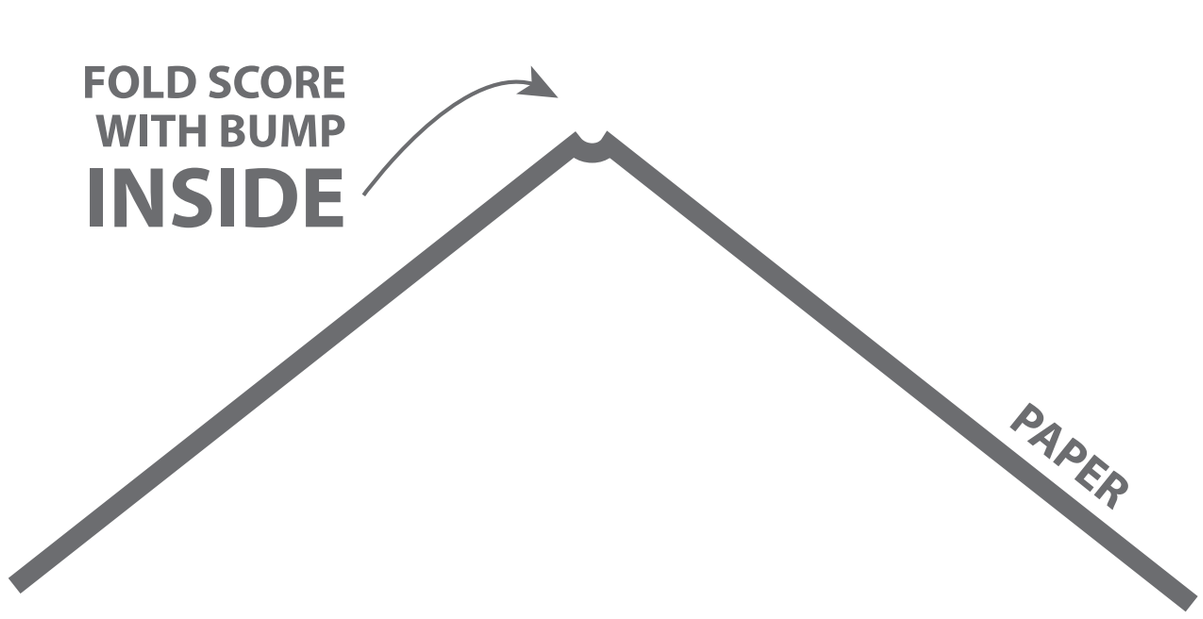
Best Practices when creating 1-Off Projects, Proofs, Comps & Dummies

2. Leave only the bare minimum of the die line - you don't want to have fold lines and die lines showing printed on your final piece.

Best Practices when creating
1-Off Projects, Proofs, Comps & Dummies

6. Score the correct side of the document.





Steps for Neat & Clean Mock-up Assembly:

1. Set up document correctly according to the paper size you're printing on.
2. Print a low res test proof (use 'draft mode') or laser printer to check size/folds, etc.
3. Leave only the "bare minimum" dieline or use crop marks instead if possible.
4. Print Final copy using good paper and correct PPD setting
5. Align & glue back to back using trim marks (or print double sided)
6. Score & cut carefully
7. Fold

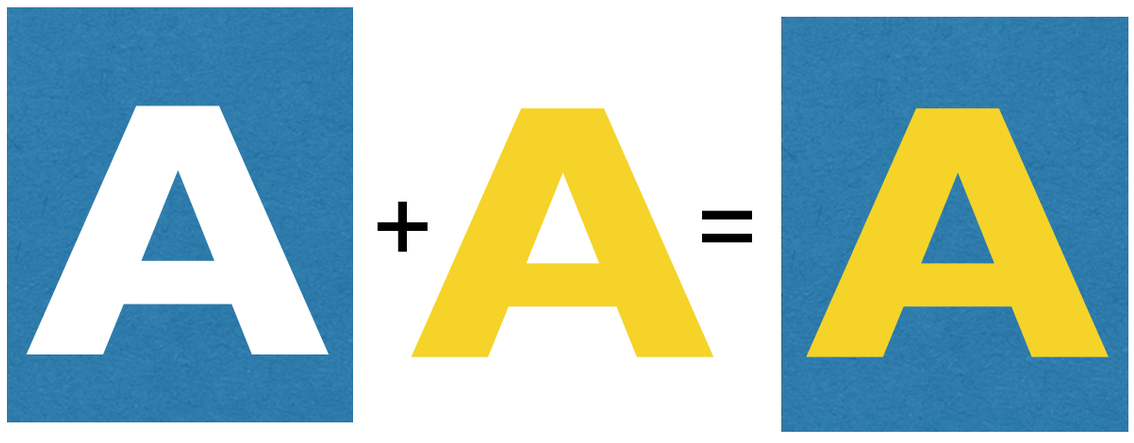
Best Practices when creating Final files for commercial printing:

1. Set up document size (artboard) correctly
2. Print a low res test proof (use ‘draft mode’) or laser printer to check size/folds, etc.
3. Use correct crop marks or the printer supplied dieline if possible.
4. Export PDF according to Printer’s Specs

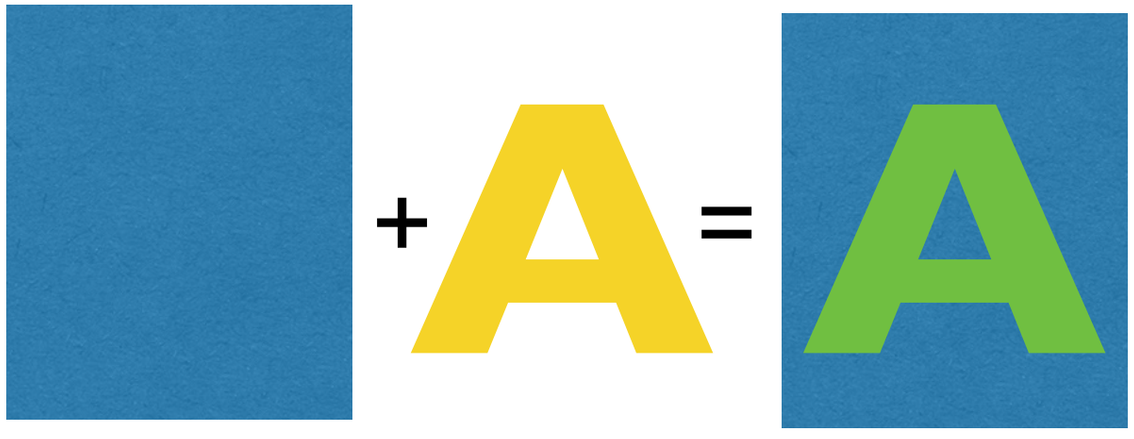
Knockout vs. Overprint

Knockout vs. Overprint

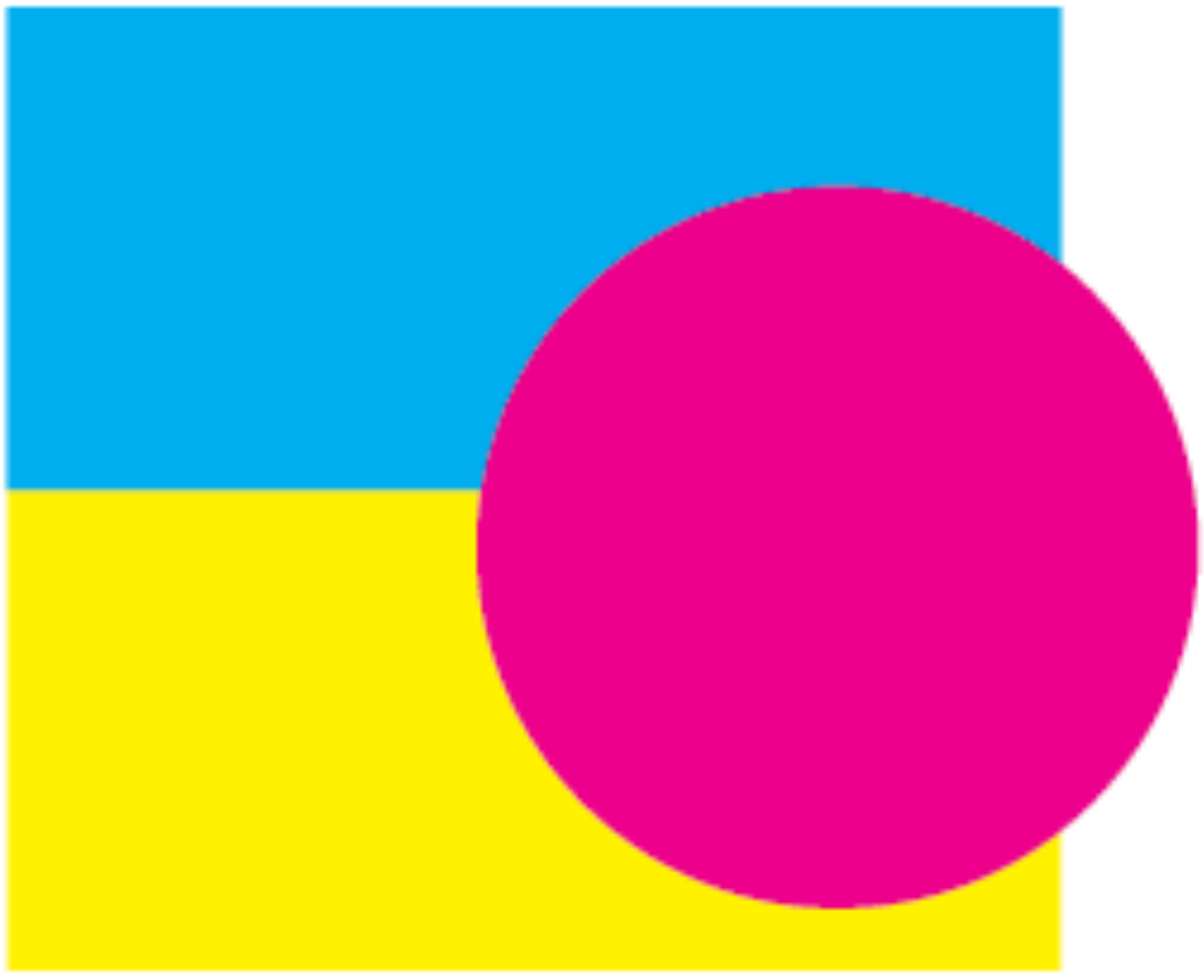
- Most commercial inks are **TRANSPARENT**
- **Overprint** is when the two ink colors overlap creating a third color.
- **Knockout** is the process of removing a portion of the ink so that it doesn't effect the color of the ink on top.



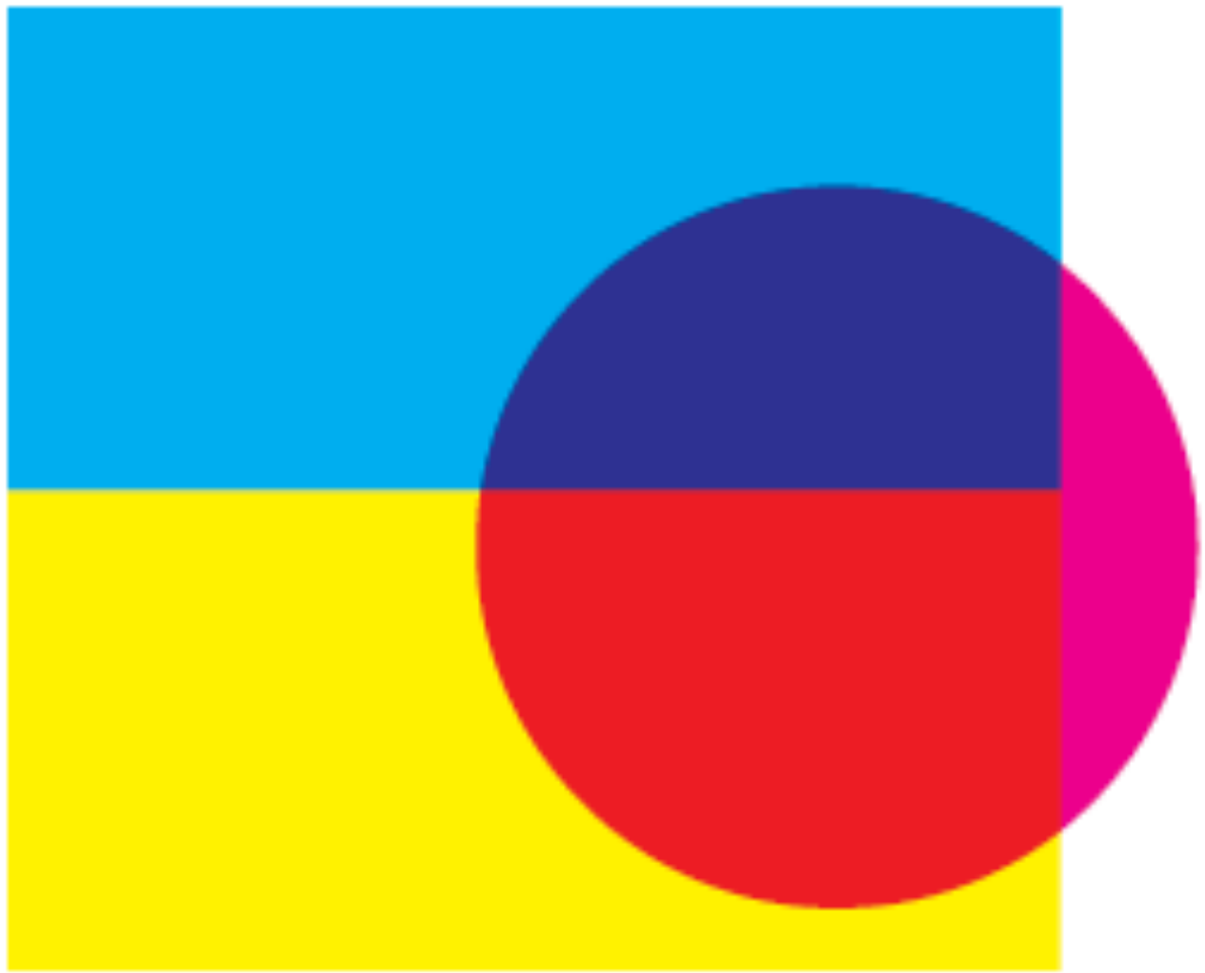
Knockout



Overprint



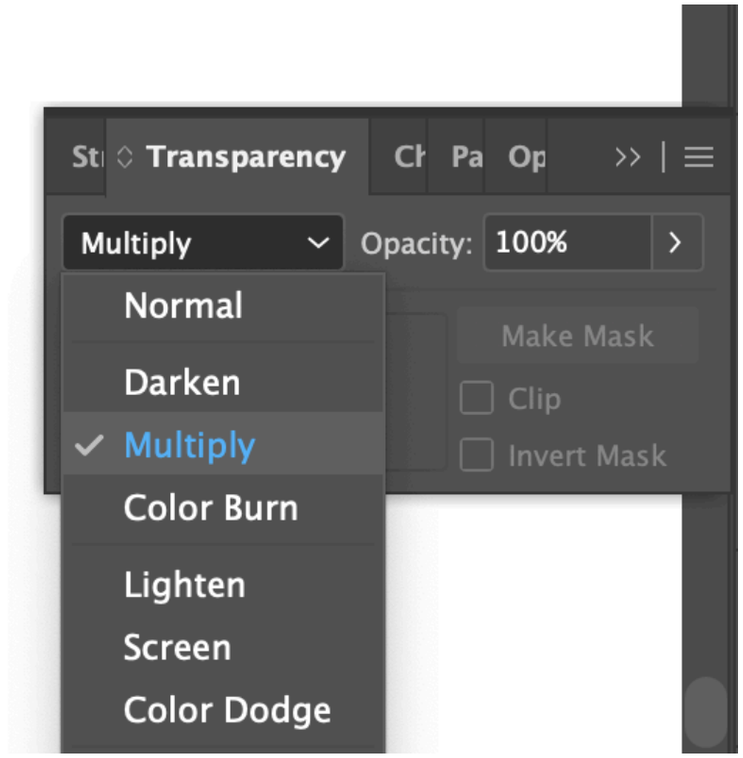
Knockout



Overprint

Knockout vs. Overprint

- Most of the time knockouts and trapping is done automatically by your design software or is set up by the pre-press department at the printer.
- HOWEVER - sometimes you may need to communicate your intention to the printer.
- Transparency is a form of overprint.

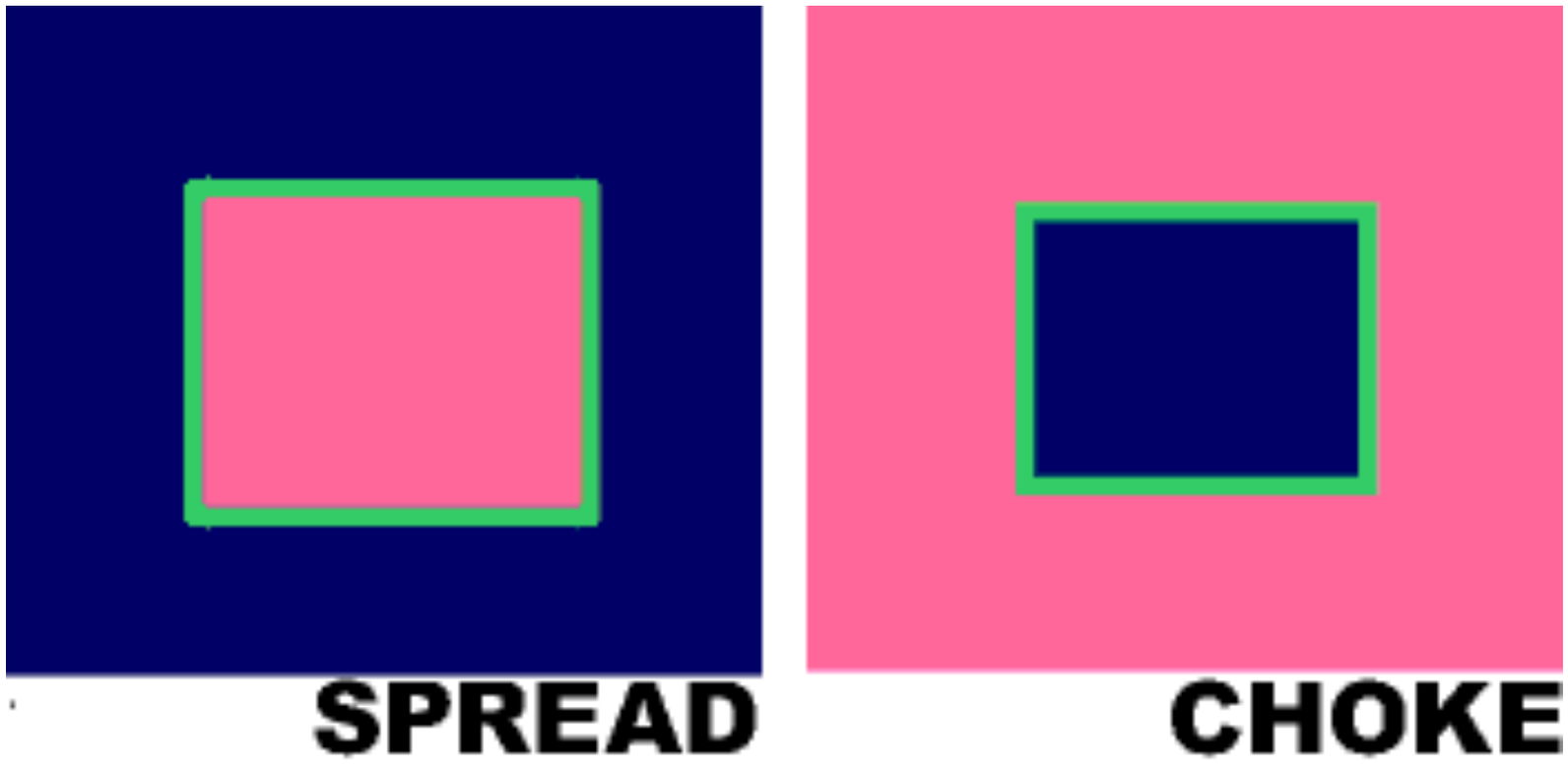


Knockout + misregistration = need for trapping

Misregistration with no trap (left) and with trap (right)

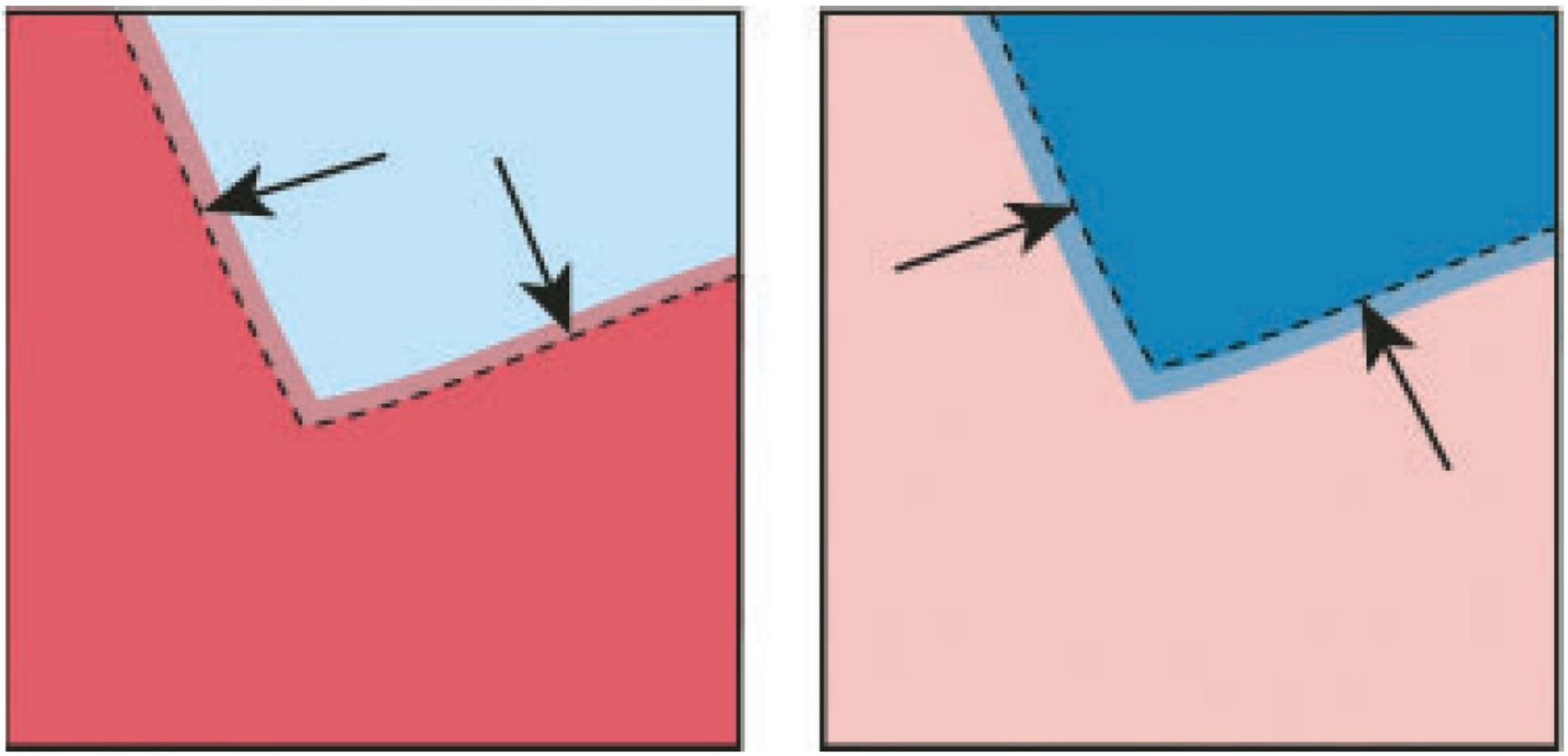
Types of Trapping

Depending on the color, a shape may
be **spread** (expanded) or **choked** (shrunk inward).



Green represents the overlapping of the lighter color (pink).

Trapping: Spread & Choke



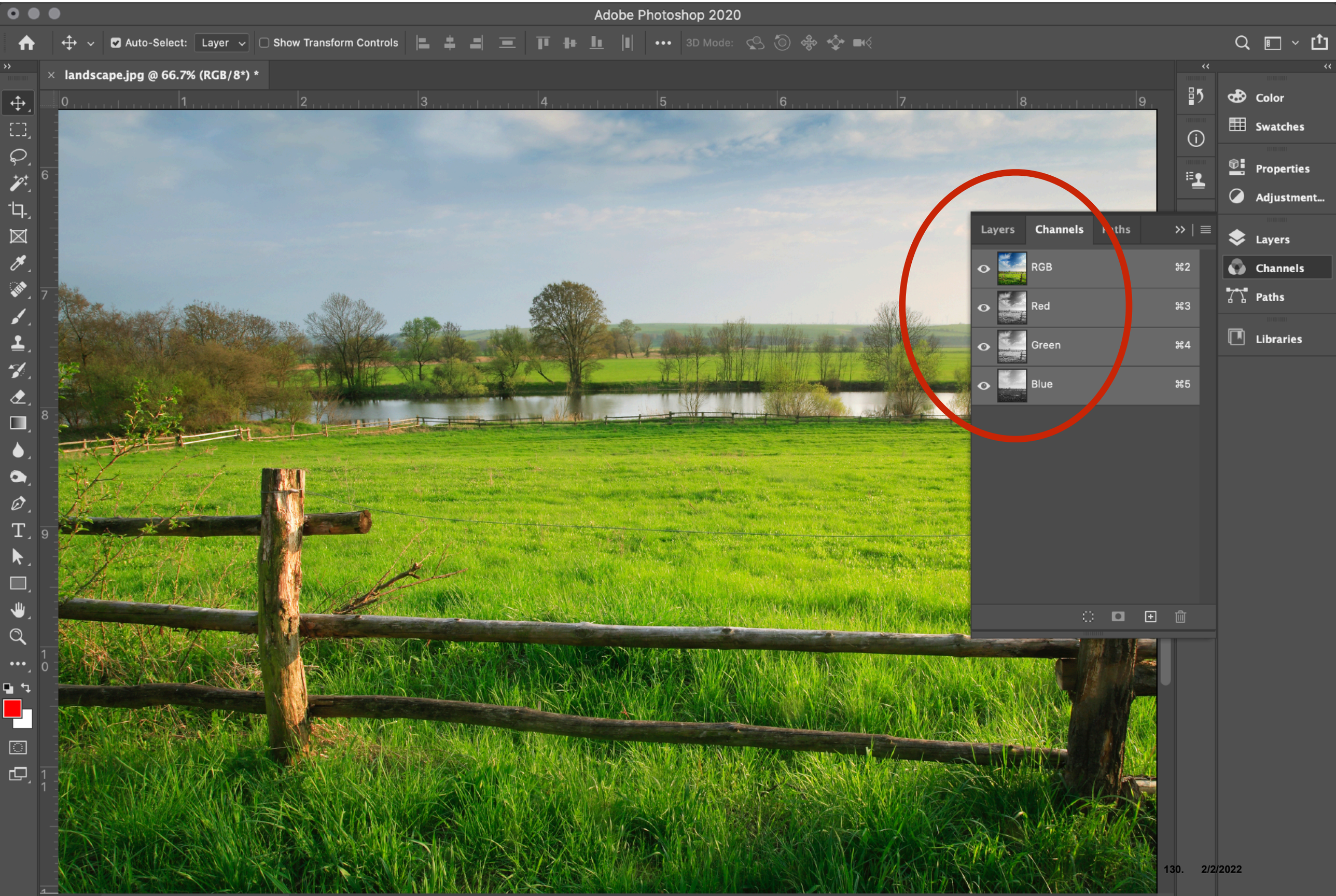
SPREAD (object overlaps background) compared to CHOKE (background overlaps object)

1. **A spread,** in which a lighter object overlaps a darker background and seems to expand into the background; and

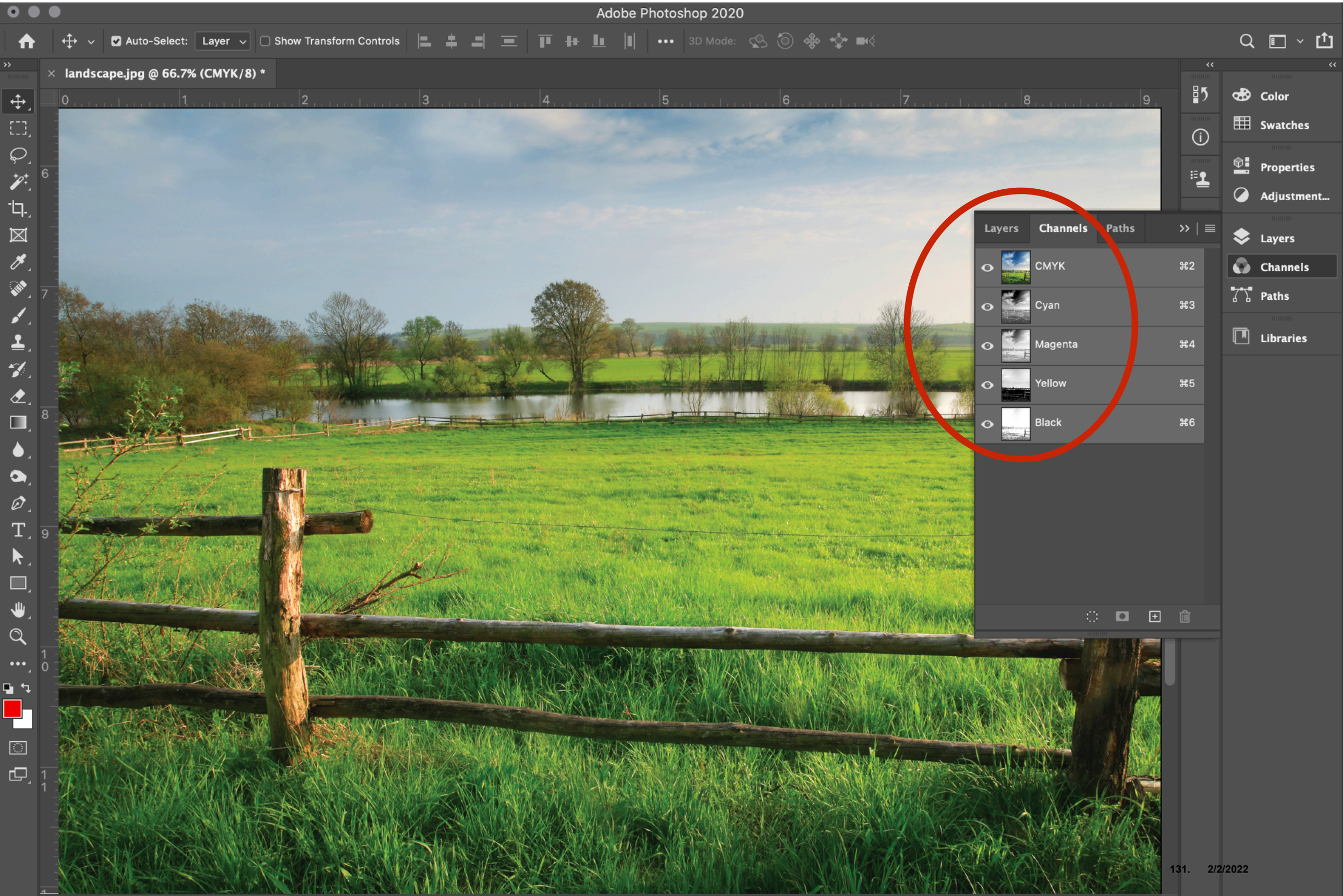
2. **A choke,** in which a lighter background overlaps a darker object that falls within the background and seems to squeeze or reduce the object.

CMYK & Duotones

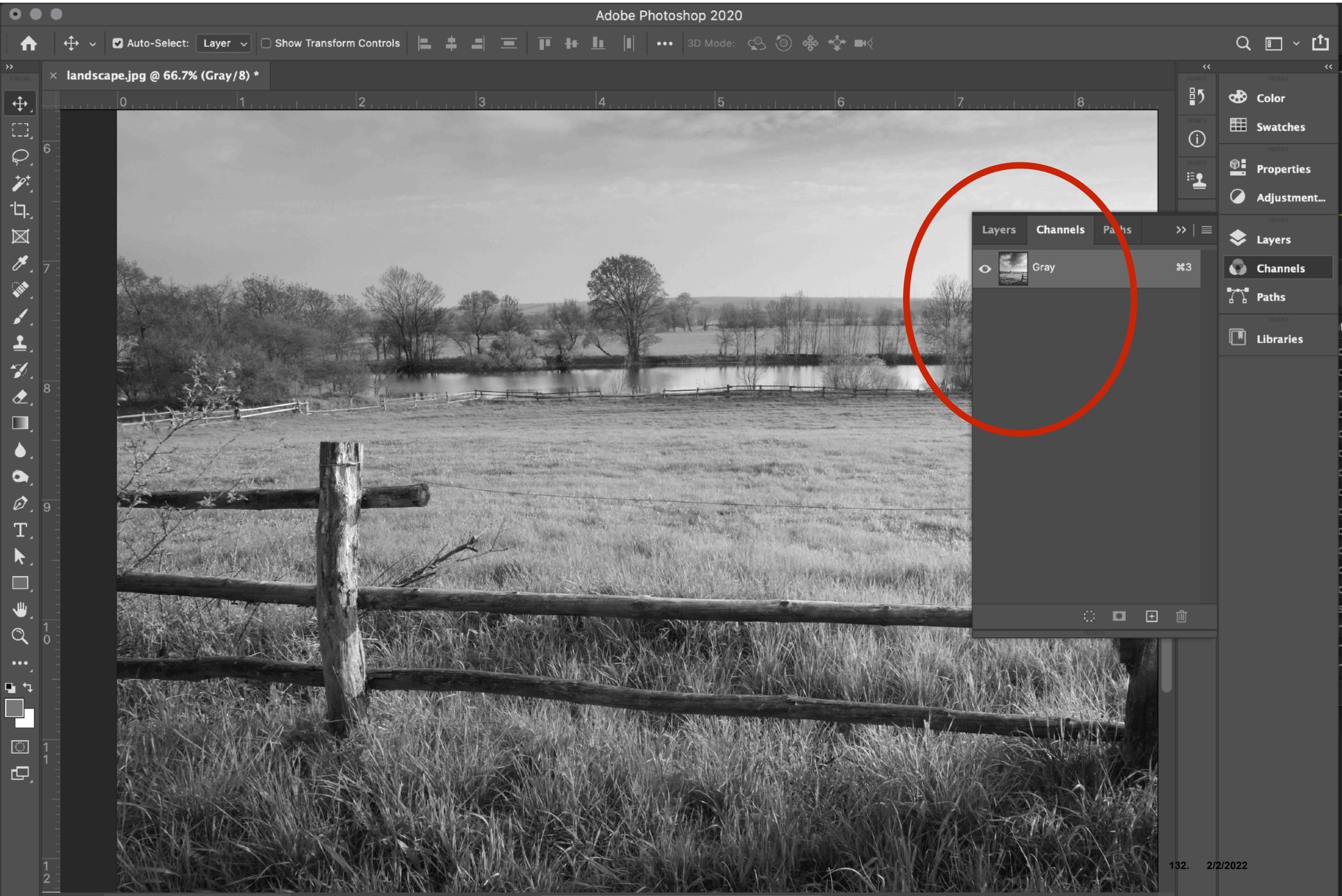
RGB photo - 3 channels

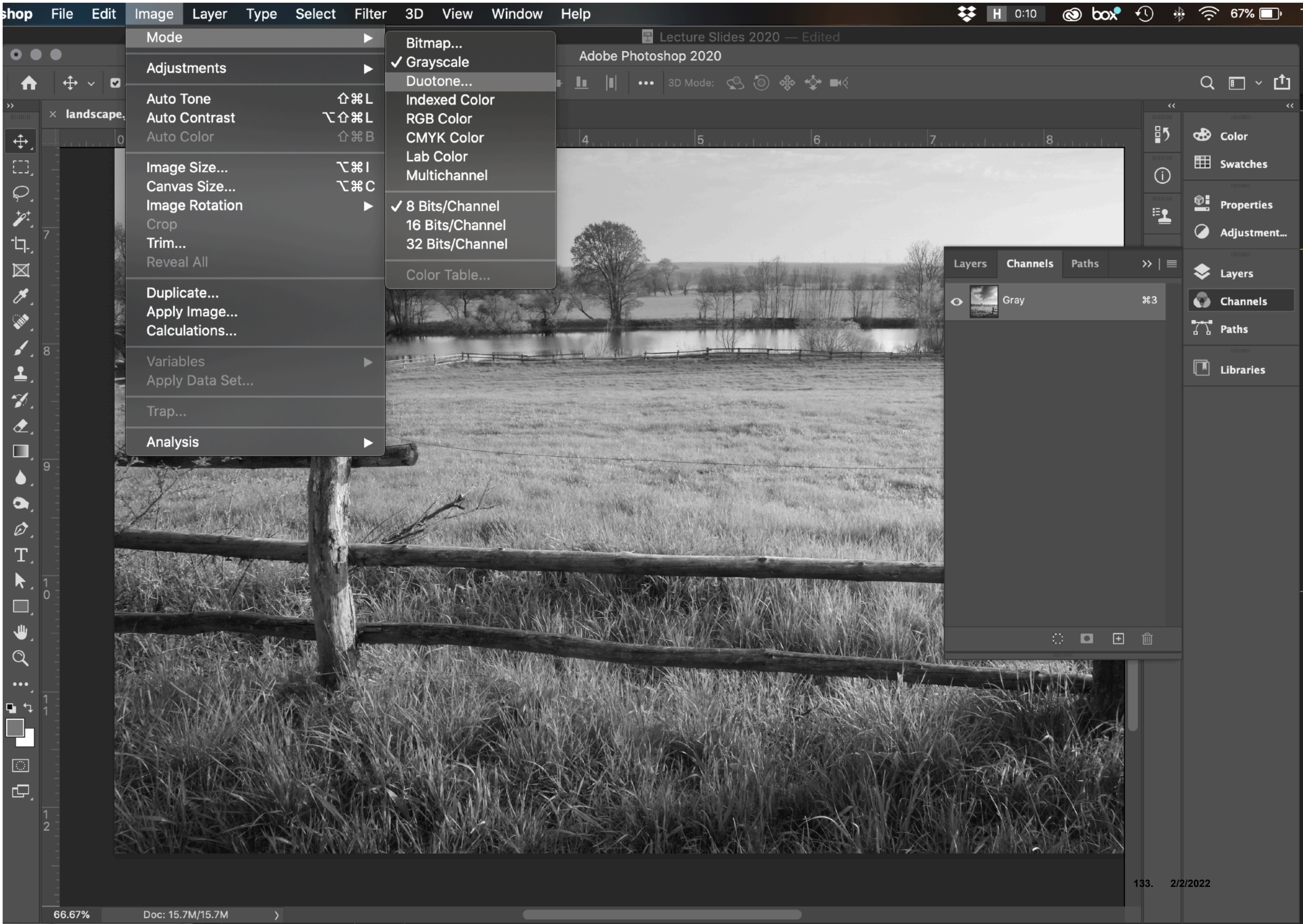


CMYK photo - 4 channels



Black & White - 1 channel




shop File Edit Image Layer Type Select Filter 3D View Window Help
H 0:10
67%
Lecture Slides 2020 — Edited
Adobe Photoshop 2020
3D Mode:
landscape.
Mode
Adjustments
Auto Tone ⇧⌘L
Auto Contrast ⌥⇧⌘L
Auto Color ⇧⌘B
Image Size... ⌥⌘I
Canvas Size... ⌥⌘C
Image Rotation
Crop
Trim...
Reveal All
Duplicate...
Apply Image...
Calculations...
Variables
Apply Data Set...
Trap...
Analysis
Bitmap...
✓ Grayscale
Duotone...
Indexed Color
RGB Color
CMYK Color
Lab Color
Multichannel
✓ 8 Bits/Channel
16 Bits/Channel
32 Bits/Channel
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Channels
Paths
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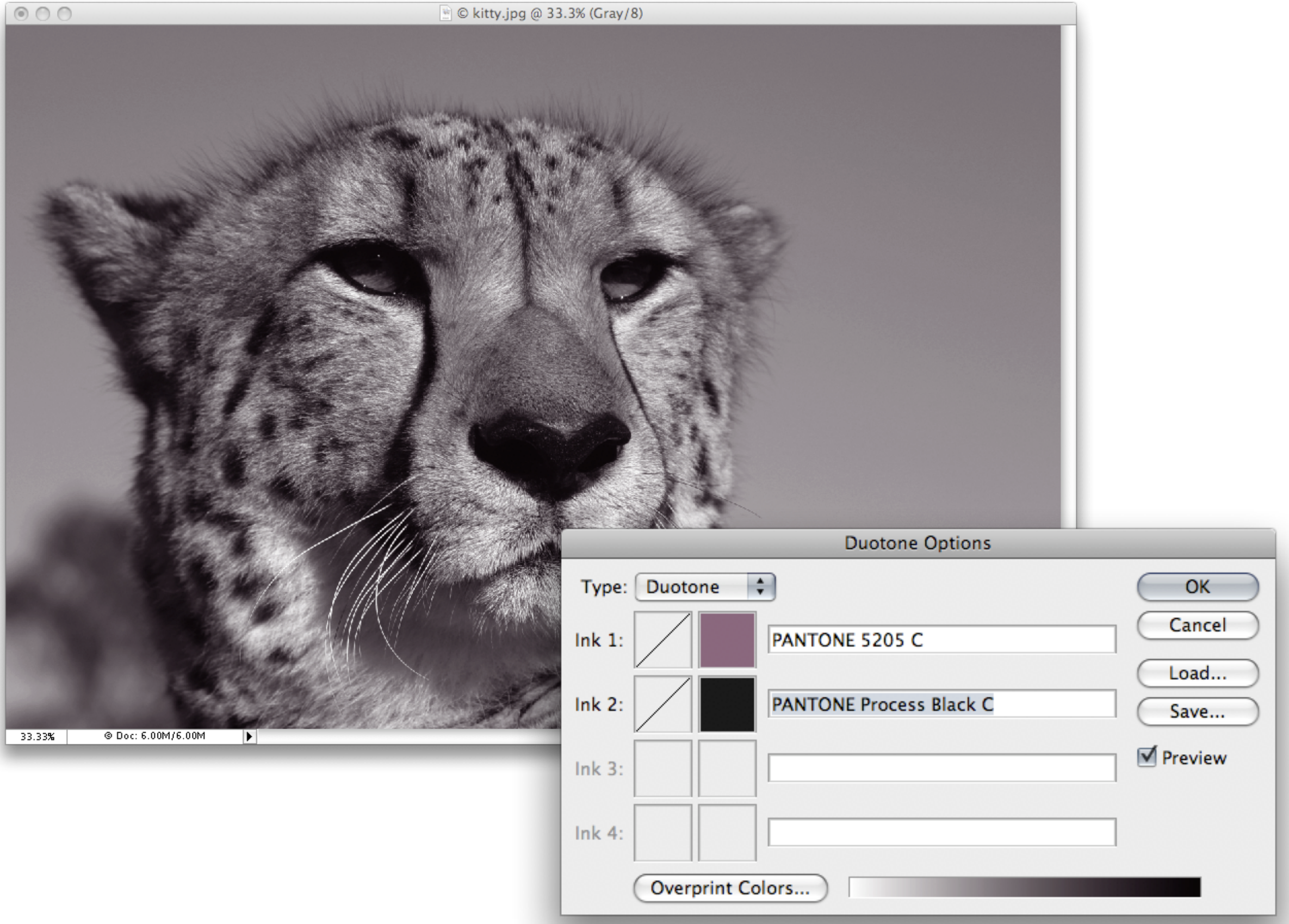
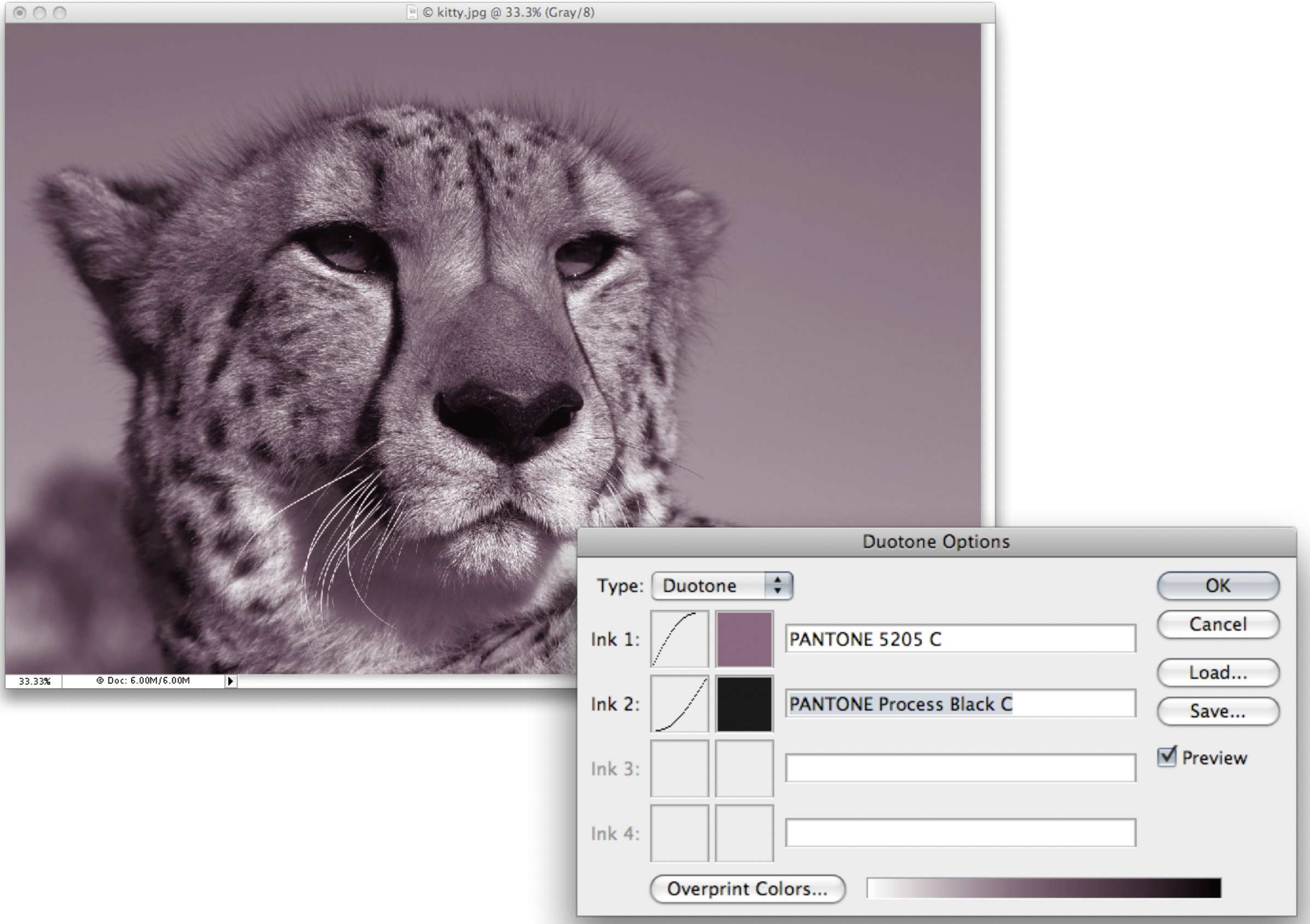

© kitty.jpg @ 33.3% (Gray/8)
33.33%
Doc: 6.00M/6.00M
Duotone Options
Type: Duotone
Ink 1:
PANTONE 5205 C
Ink 2:
PANTONE Process Black C
Ink 3:
Ink 4:
Overprint Colors...
OK
Cancel
Load...
Save...
Preview


© kitty.jpg @ 33.3% (Gray/8)
33.33%
© Doc: 6.00M/6.00M
Duotone Options
Type: Duotone
OK
Cancel
Load...
Save...
Ink 1:
PANTONE 5205 C
Ink 2:
PANTONE Process Black C
Preview
Ink 3:
Ink 4:
Overprint Colors...

Cyan

Magenta

Yellow

Black

CMYK Red

CMYK Green

PMS 206C

PMS 2985C

Separations Preview

Overprint Preview

CMYK
Cyan
Magenta
Yellow
Black
PANTONE 206 C
PANTONE 2985 C
PANTONE 3005 C

Show Used Spot Colors Only

File Types:
Raster vs. Vector

Raster images

Pixel-based graphics
Resolution dependent
Photos & web graphics

JPG
Web & print photos and quick previews

GIF
Animation & transparency in limited colors

PNG
Transparency with millions of colors

TIFF
High quality print graphics and scans

RAW
Unprocessed data from digital cameras

PSD
Layered Adobe Photoshop design files

Vector images

Curve-based graphics
Resolution independent
Logos, icons, & type

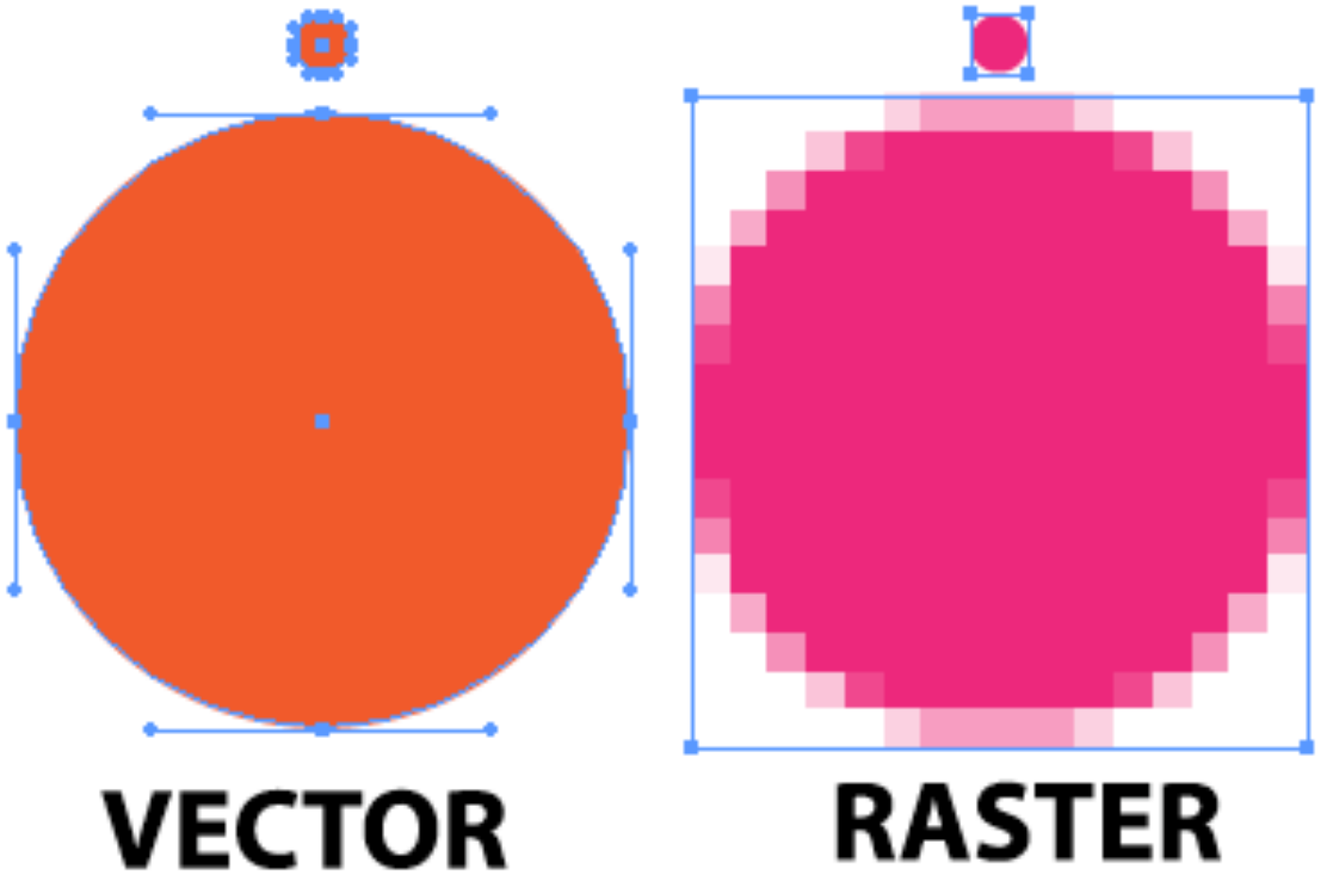
PDF
Print files and web-based documents

EPS
Individual vector design elements

AI
Original Adobe Illustrator design files

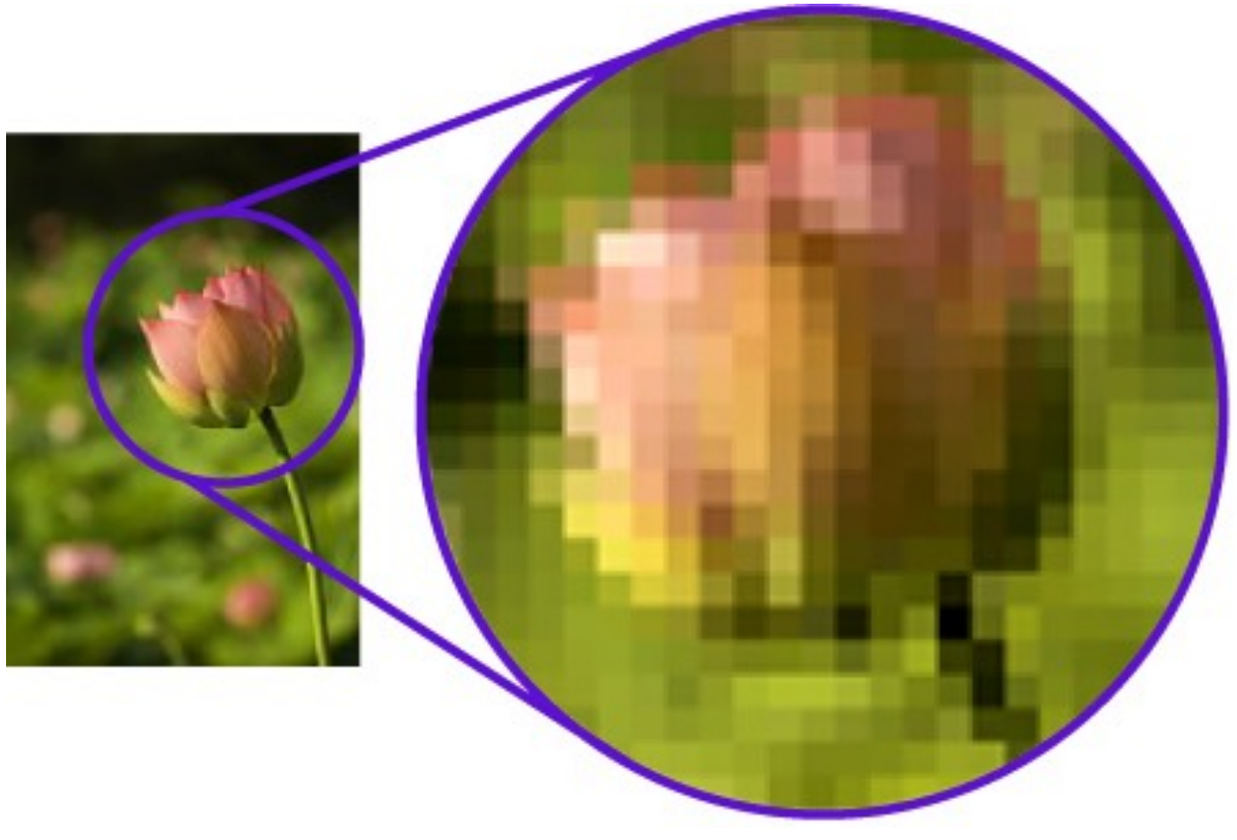
These vector image formats can also incorporate raster elements.

Vector vs. Raster Files



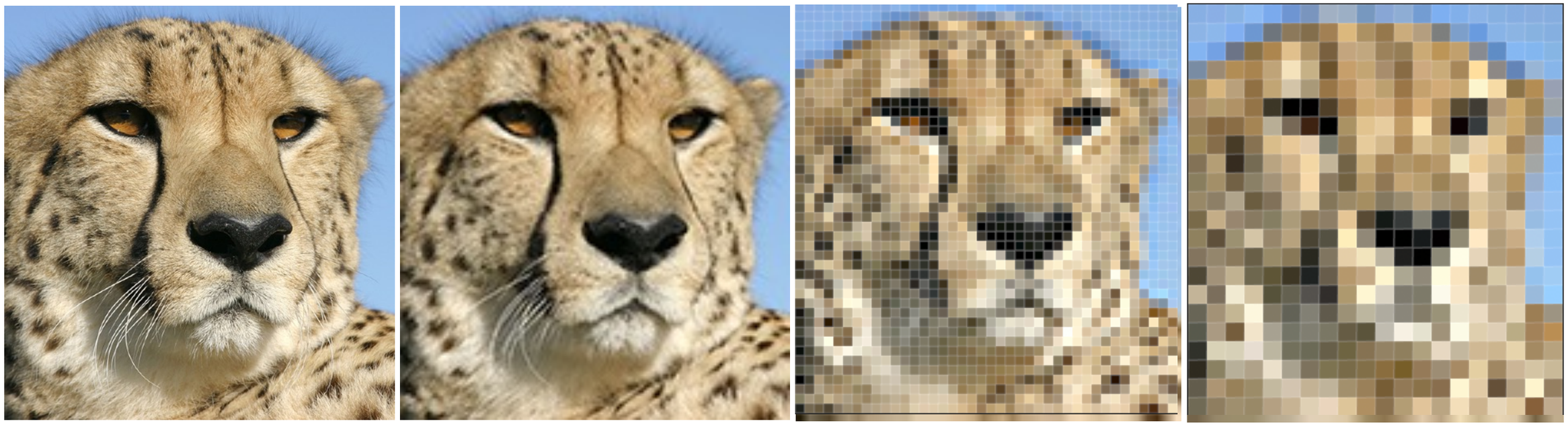
Raster Files

- Photographs or scanned artwork
- Made up of tiny pixels
- Think of pixels as mosiac tiles — each pixel or tile is assigned a color value
- Image resolution is the number of Pixels Per Inch (PPI)
- Raster Files DO NOT scale up very well — as you enlarge you will start to see the pixels.



Raster File: Zoomed In

Pixels Per Inch



300 PPI

72 PPI

20 PPI

10 PPI

Types of Raster Files

Files that are appropriate for print:

- TIFF
- Photoshop EPS (EPS files can be raster or vector depending on software that generates it!)
- Photoshop PDF
- PSD (Native Photoshop – ask your print vendor)
- Bitmap (In some cases)

NOT appropriate for print:

- Camera RAW
- PNG
- GIF
- JPEG
- GIF

Differences in Raster Files

Compression:

- Lossy compression: when file is compressed (saved) information is LOST — Smaller file size
- Lossless compression: When file is compressed, information is retained – Larger file size

Color:

- Some formats only support RGB (not CMYK), or are limited to 256 Web Colors.

Other

- Only some file formats support transparency, animation, layers

Transparency:

Lossless Compression

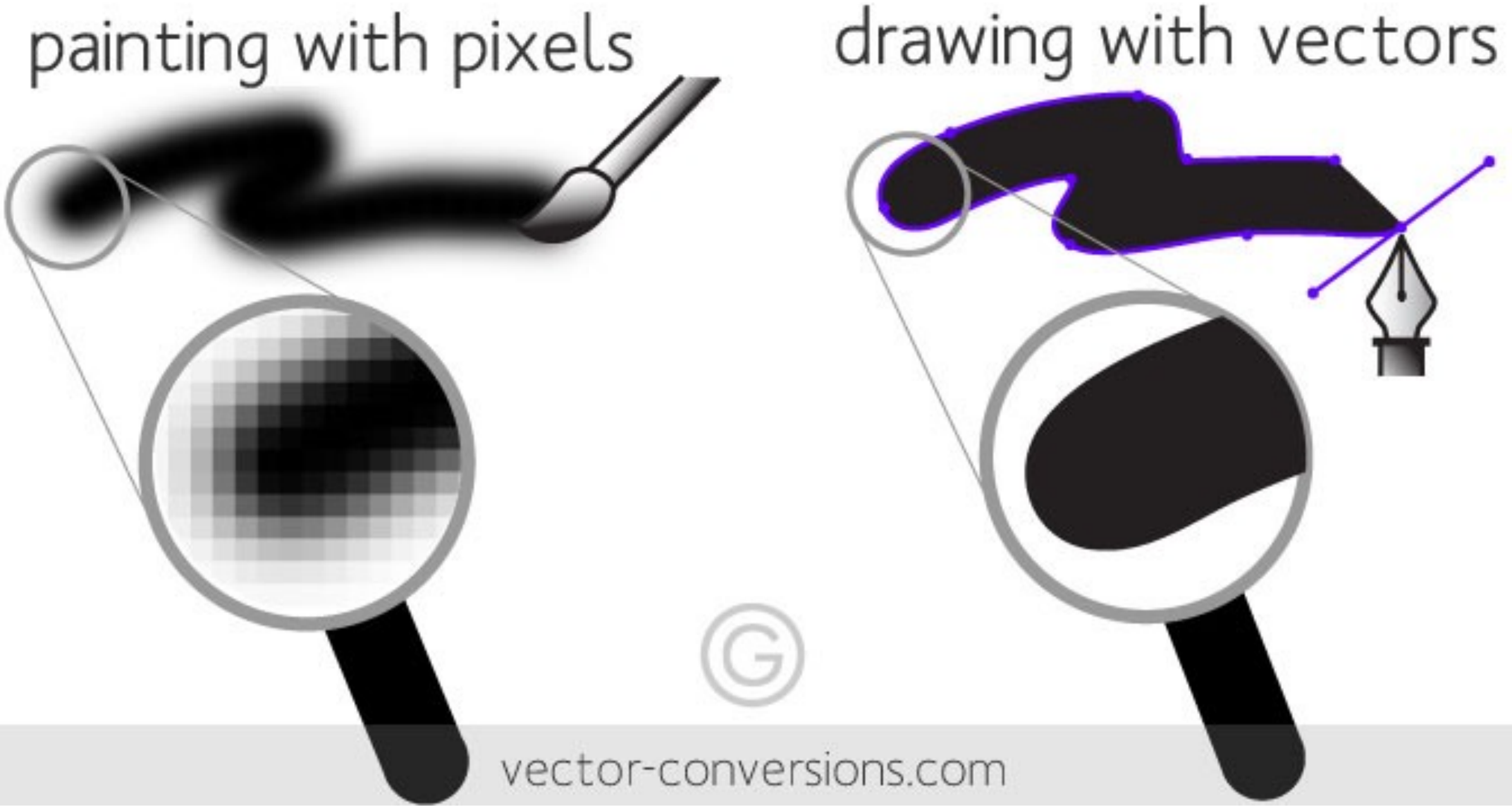
ABC

Lossy Compression

ABC

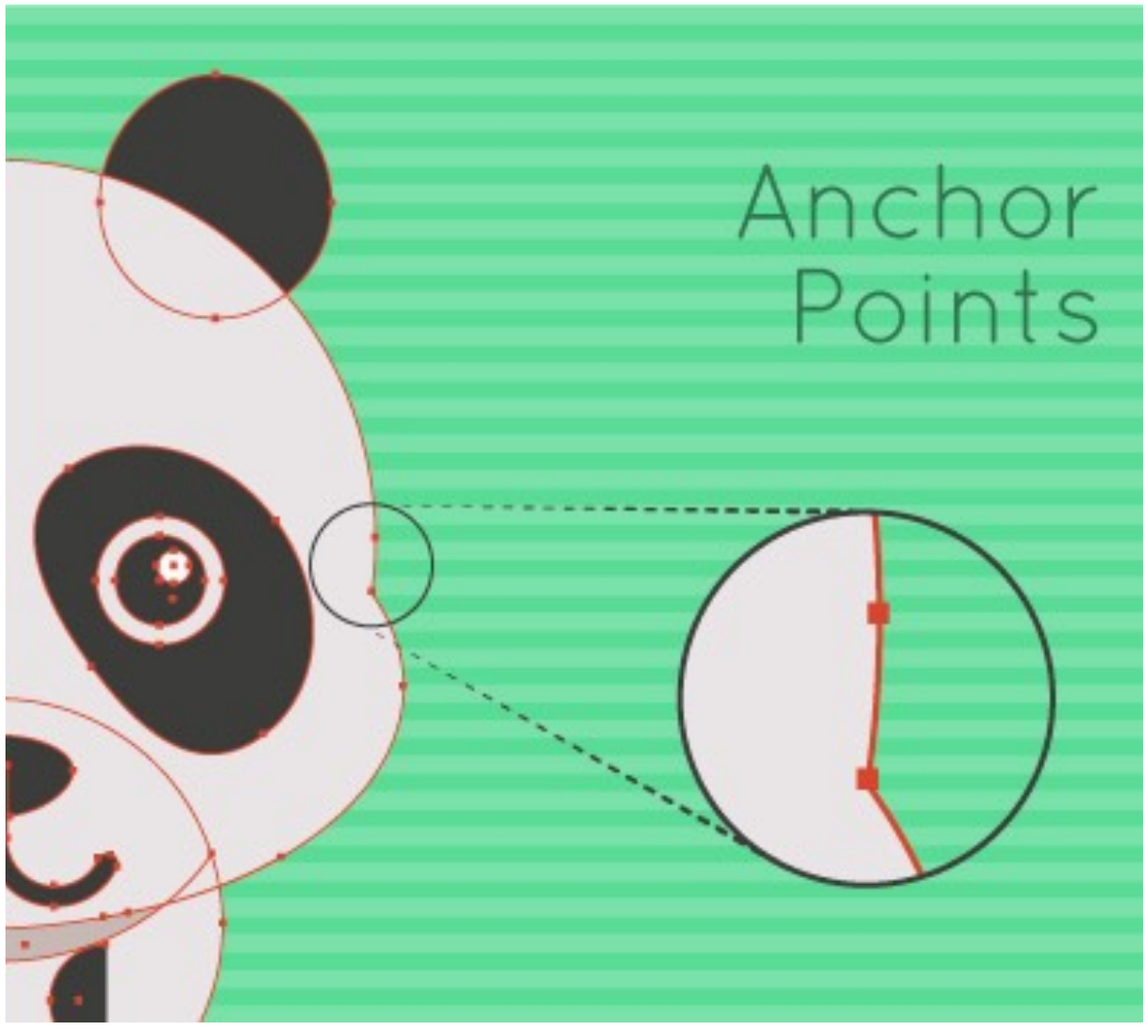
Prepping raster images for commercial print

- Choose an appropriate file format
- Images should always be provided to your print vendor at the actual print size and resolution
  - Crop or Re-Size Image, and set Resolution
  - Web = image resolution 72 ppi (not high enough for print)
  - 85 LPI = image resolution **150 ppi**
  - 150 LPI (ex. offset litho) = image resolution **300 ppi**
- Always convert to CMYK **UNLESS:**
  - you are printing to a digital ink jet printer
  - your print vendor says to leave as RGB


painting with pixels
drawing with vectors
vector-conversions.com

Vector Files

- Lines/Shapes created in a drawing program like illustrator
- Made up of anchor points, lines, & filled objects
- Not pixel based, vectors are mathematical representations of lines, shapes
- Vector files can be enlarged to any size without loosing quality.
- Fonts are examples of vector files



Types of Vector Files

- Native Illustrator Files*
- Illustrator EPS*
- Illustrator PDF*

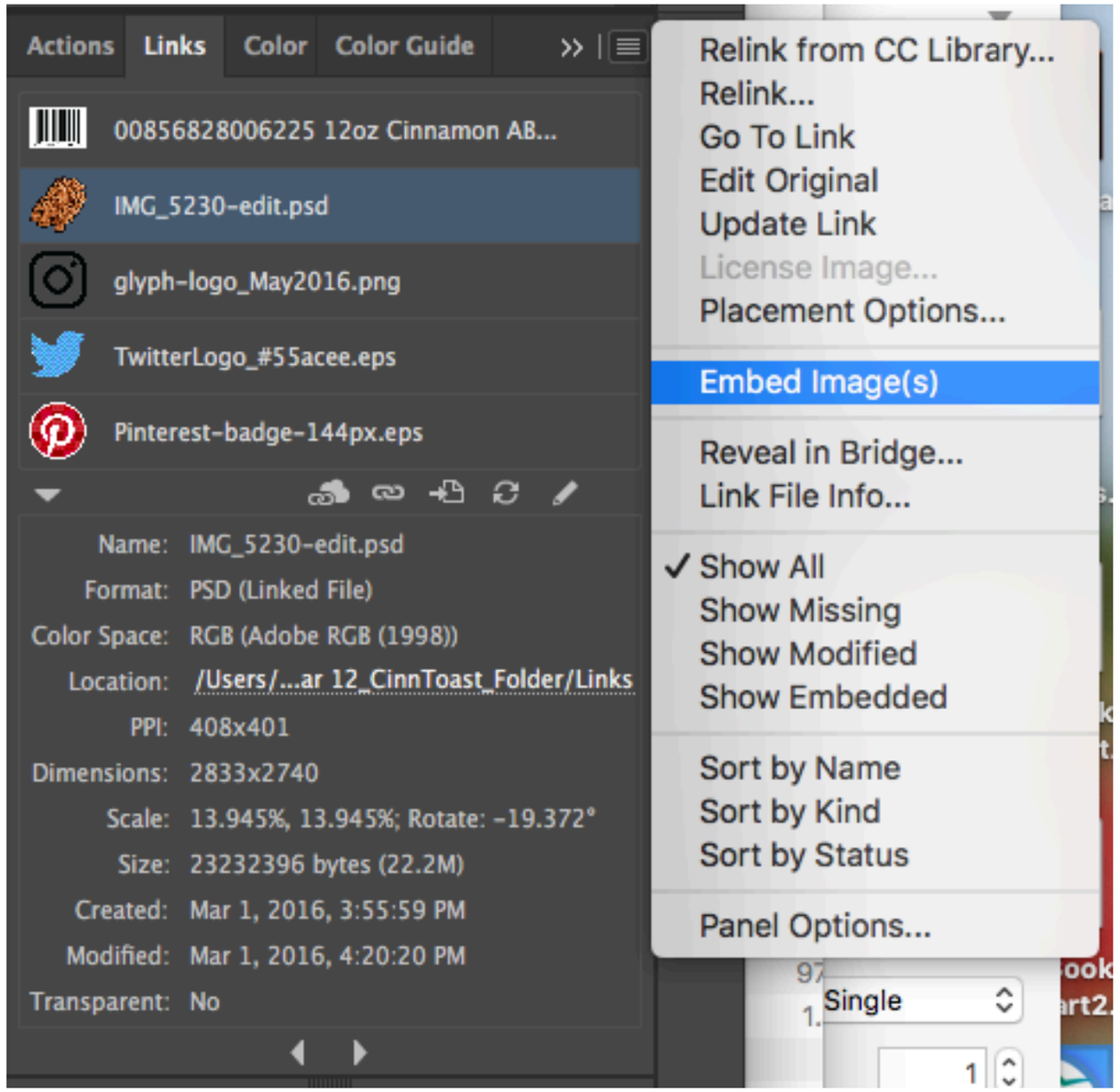
*NOTE: If you have placed a raster file like a photo in the illustrator document, that part of the file will NOT be converted to vector.

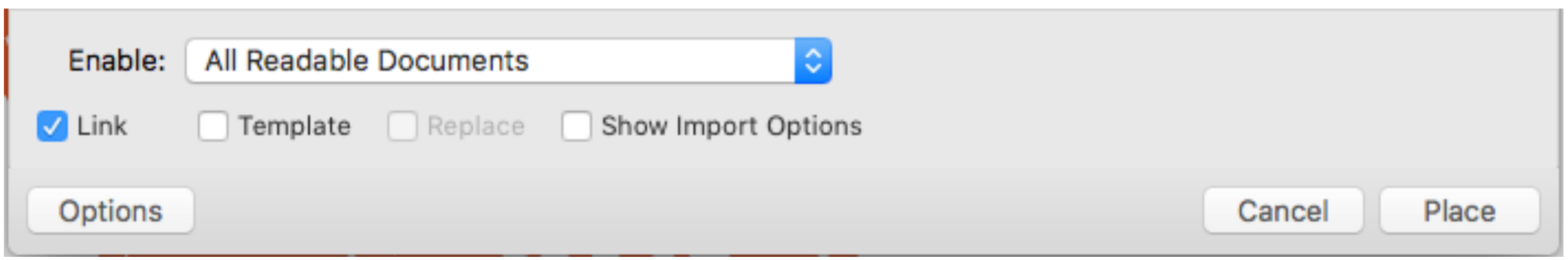
Working with Vector Files

- Outline text (still vector)
  - Fancy display type, when to sending to print
  - Modify typeface / individual letters
- Simplify overly complicated paths
  - Reduce the number of points — reduce file size
- Illustrator: Place photos — choice to link or embed file
  - Link: creates a link to the original photo, edits made to original image will link back to the file
  - Embed: adds the data to the file, increasing file size

Illustrator: Embedding Images

- In the “Place” dialogue box (under options)
- In the “Links” pallet drop down menu

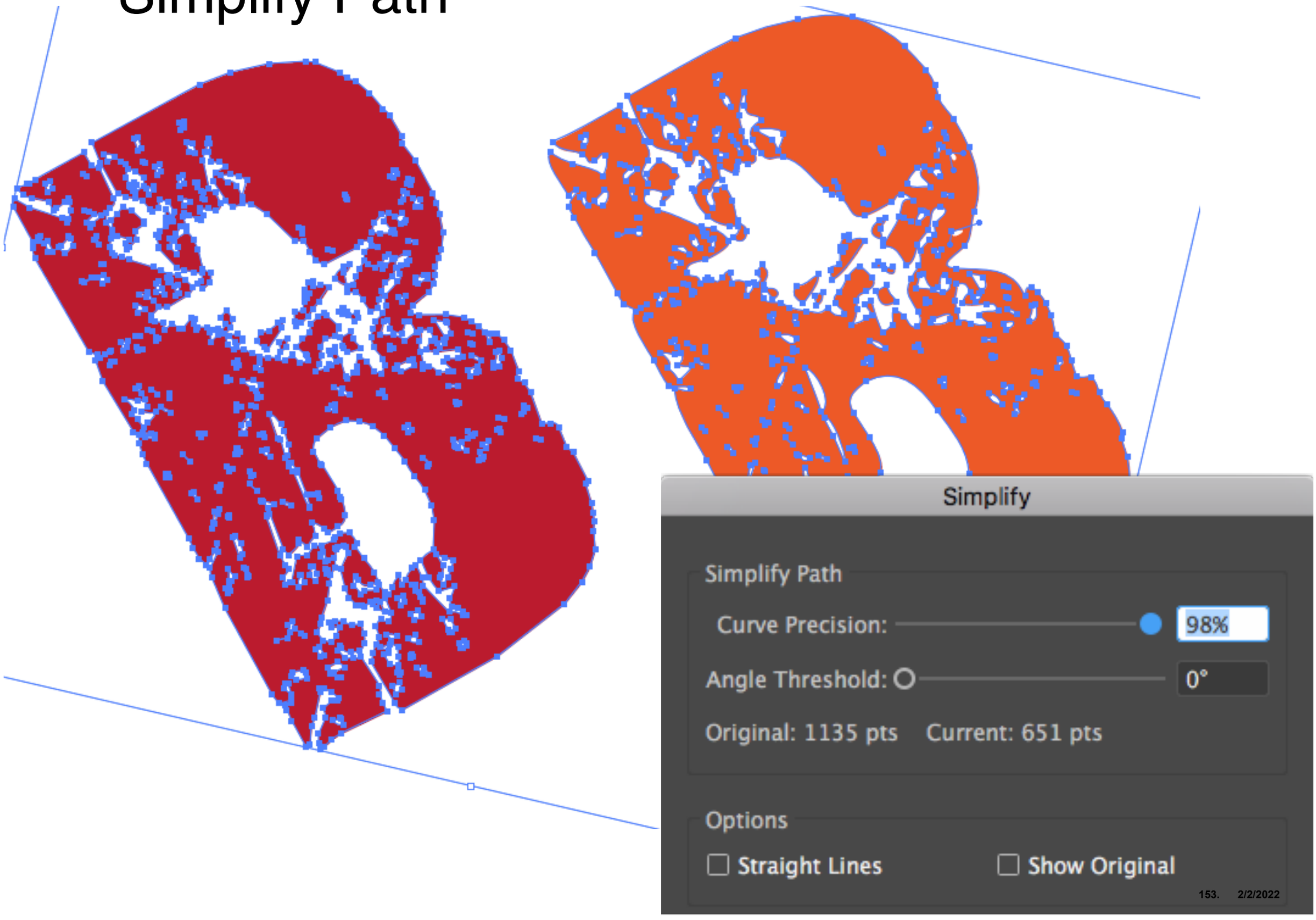




Outlining Type

Shawna

Simplify Path

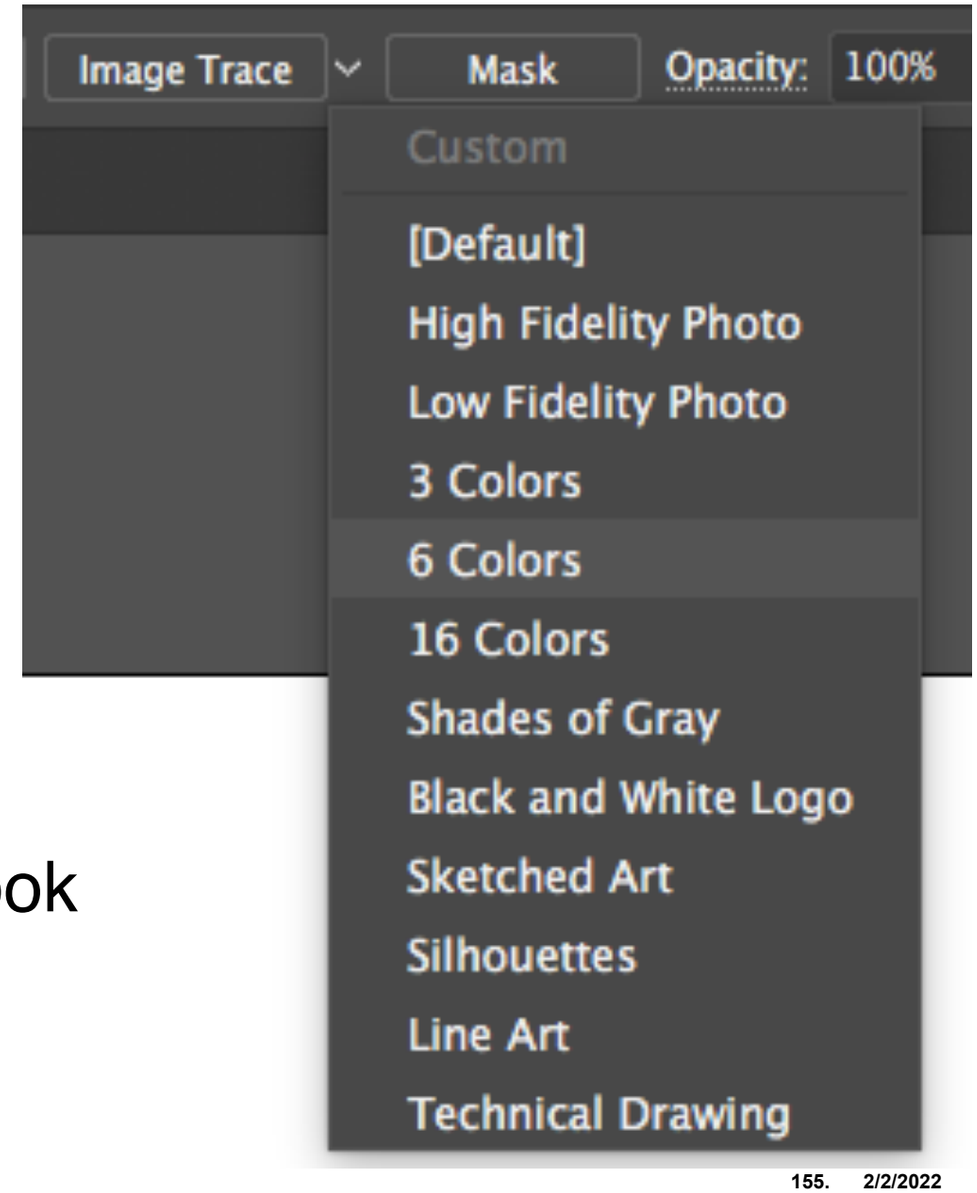


Blurring the Lines:
Converting Raster images to Vector,
or Vector images to Raster

Trace Artwork feature in Illustrator

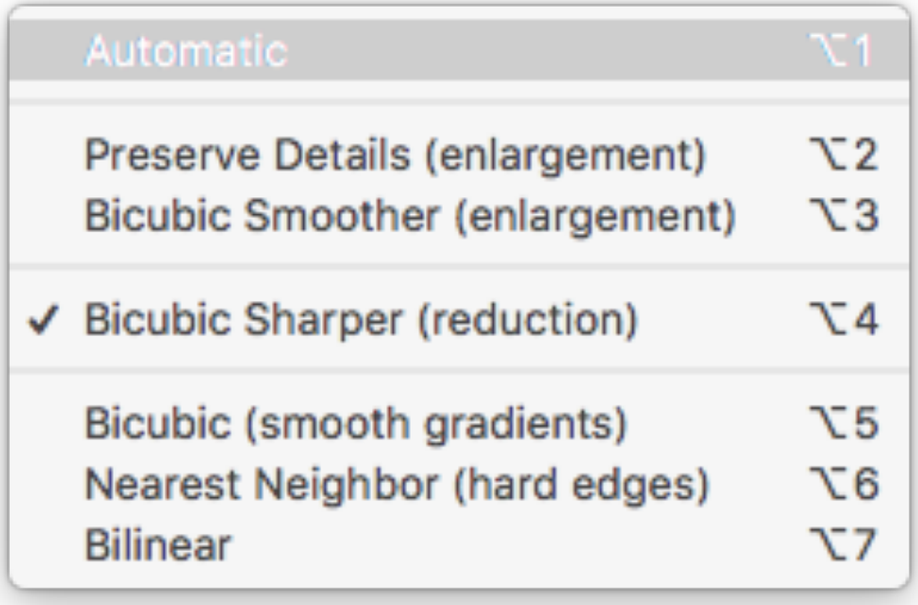
To convert a raster image to a vector file, you will need to use a tool like the "trace artwork" option in illustrator.

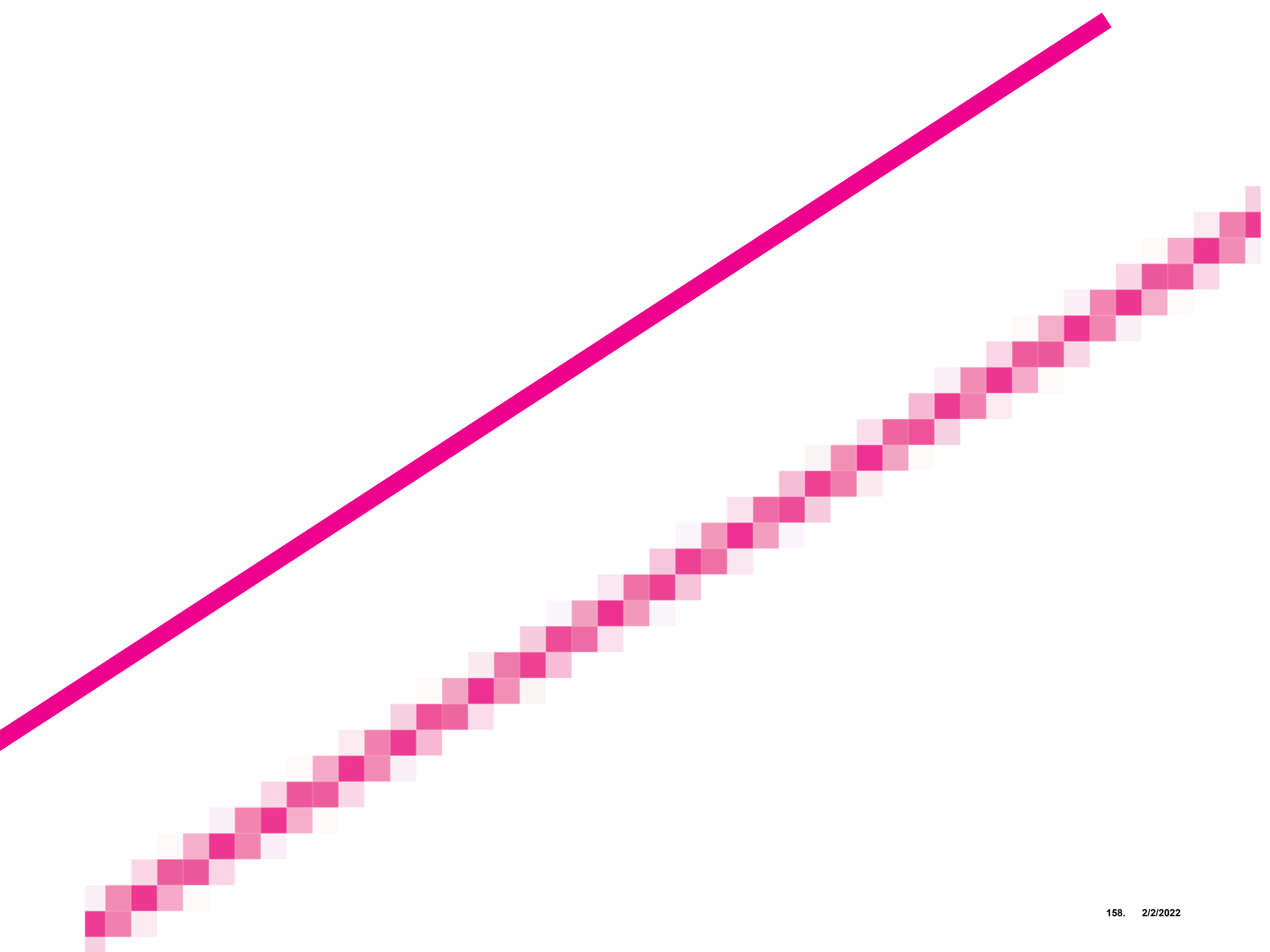
- Converts the pixel data into a series of filled objects.
- Sometimes this works great, but not always a good idea
- Computer is creating "line" data based on the "pixel" data available
- May not give the results you expect
- ALWAYS manually clean up the points to create a professional look



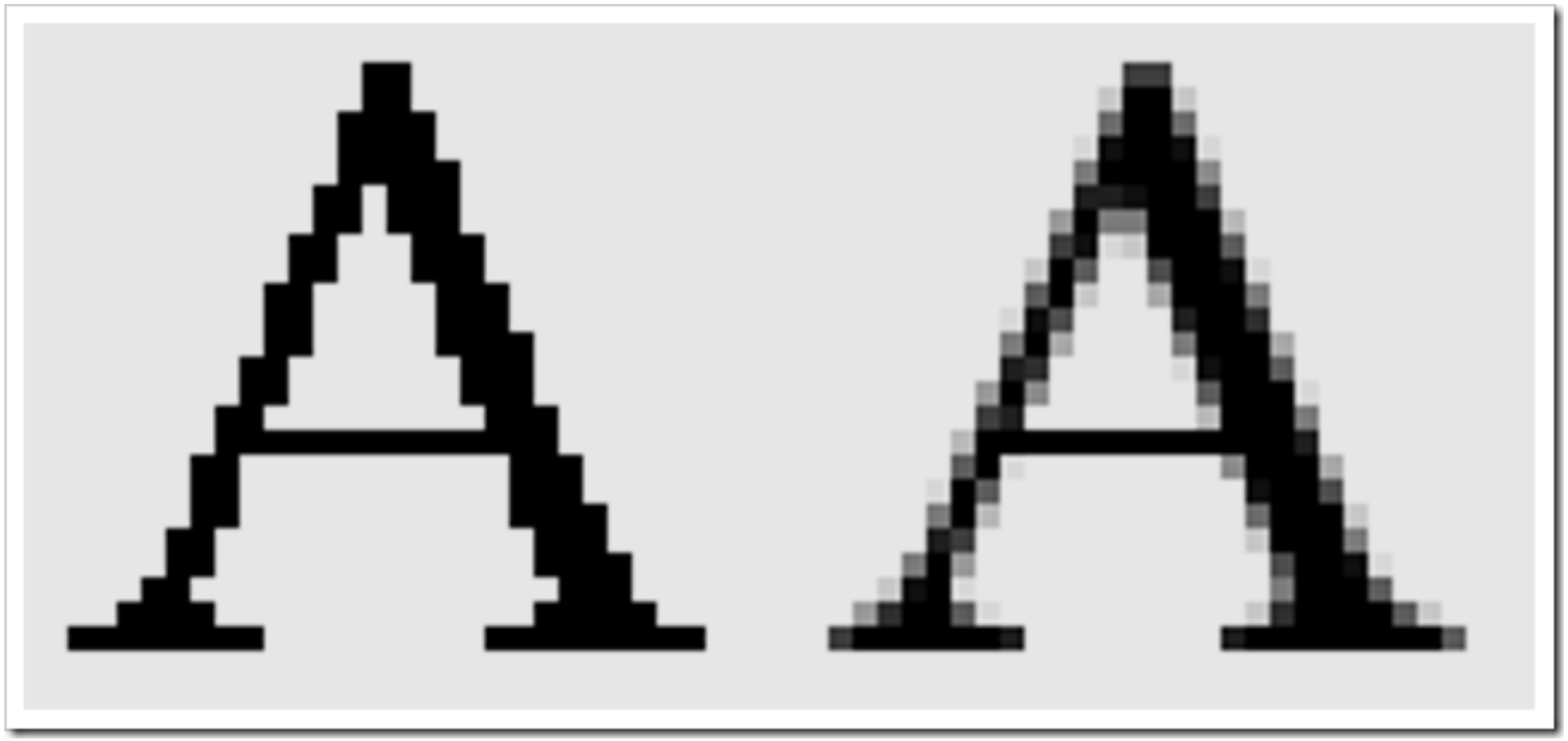
Anti-Aliasing

- Computer Screen is a raster environment – Vectors are represented on screen using an “alias”.
- Anti-Aliasing makes them look smoother.
- Used to better approximate how human eyes (and cameras) perceive light
- Softens edges
- Helps when re-sizing images
- Used when converting text (or other vector images) to a raster environment like photoshop
- Photoshop gives you a few options for aliasing when resizing— “resampling button”





Converting a Font to a Raster Environment (Photoshop)



Aliased

Anti-Aliased

Vector

Raster

Light orange are areas that are “smoothed” using Anti-Aliasing

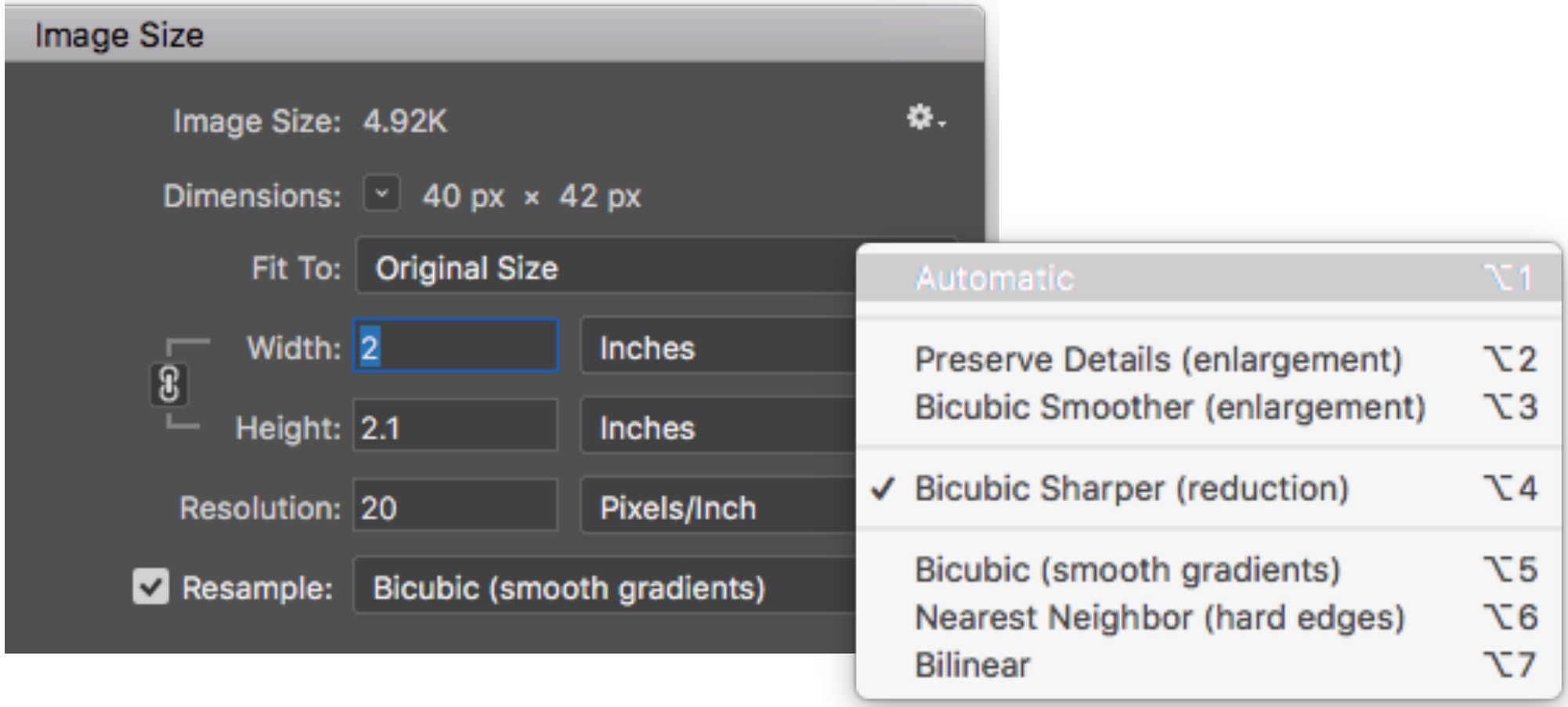
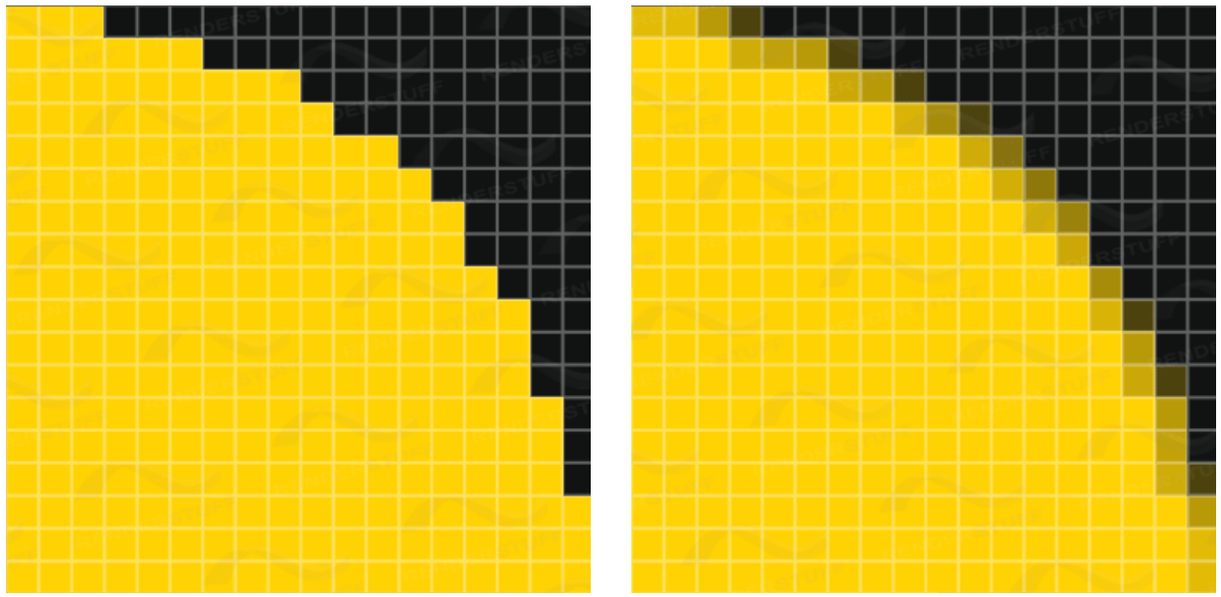
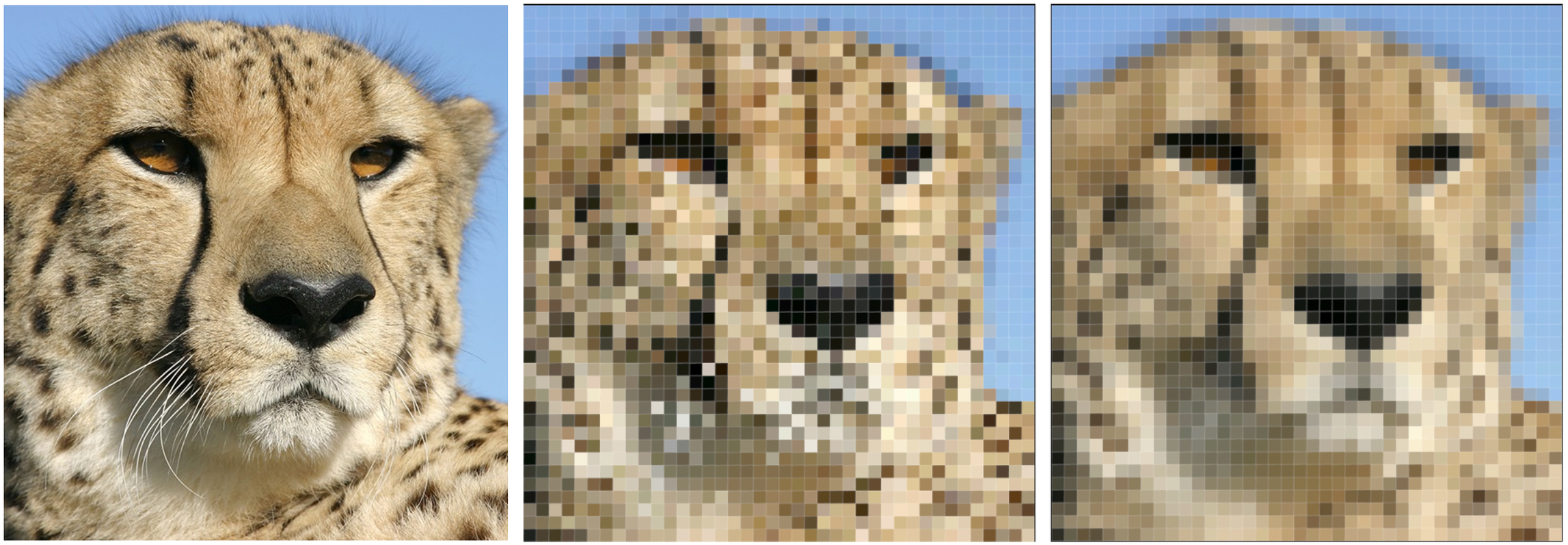


Image Size
Image Size: 4.92K
Dimensions: 40 px × 42 px
Fit To: Original Size
Width: 2
Inches
Height: 2.1
Inches
Resolution: 20
Pixels/Inch
Resample: Bicubic (smooth gradients)
Automatic ⌥1
Preserve Details (enlargement) ⌥2
Bicubic Smoother (enlargement) ⌥3
✓ Bicubic Sharper (reduction) ⌥4
Bicubic (smooth gradients) ⌥5
Nearest Neighbor (hard edges) ⌥6
Bilinear ⌥7



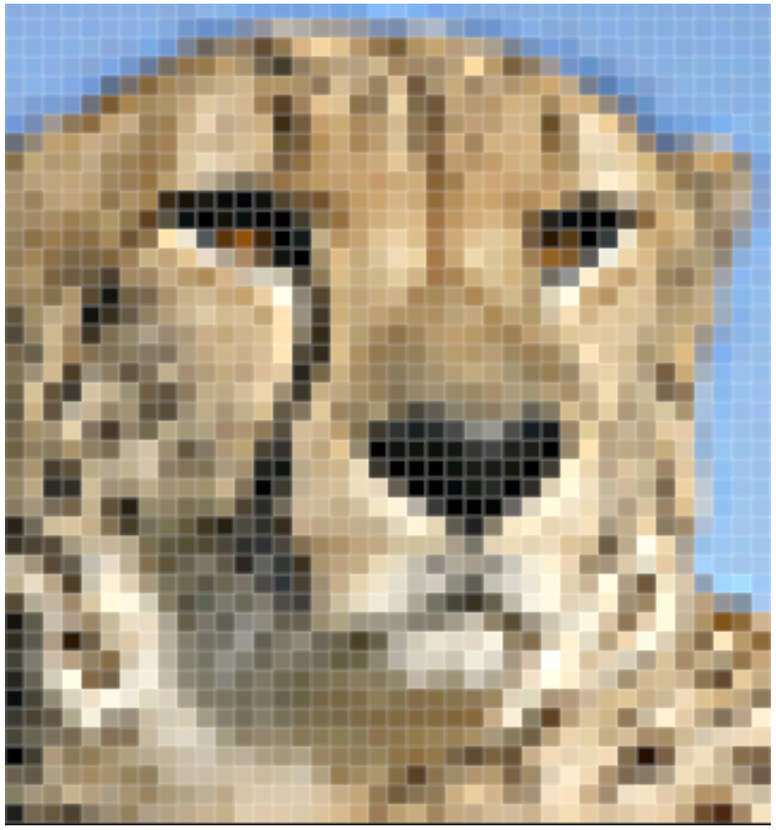
Re-sampling

- When images are resized (enlarged or reduced) the software makes assumptions to create data.
- Takes samples of the data that exists in the original image document to create the new document.

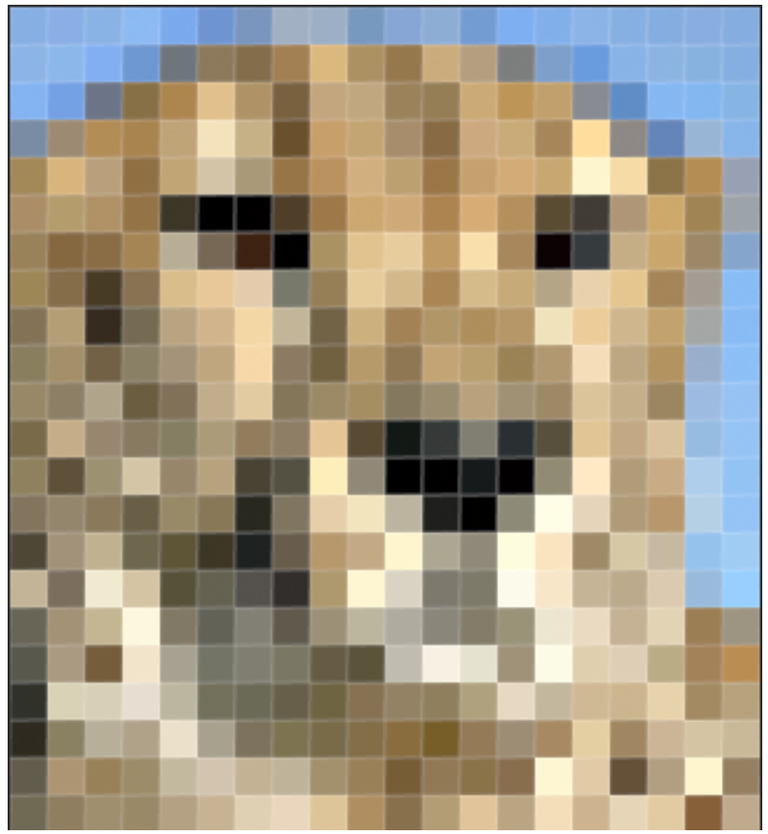


original | **“nearest neighbor” resampling** | **“bicubic” resampling**

20 PPI

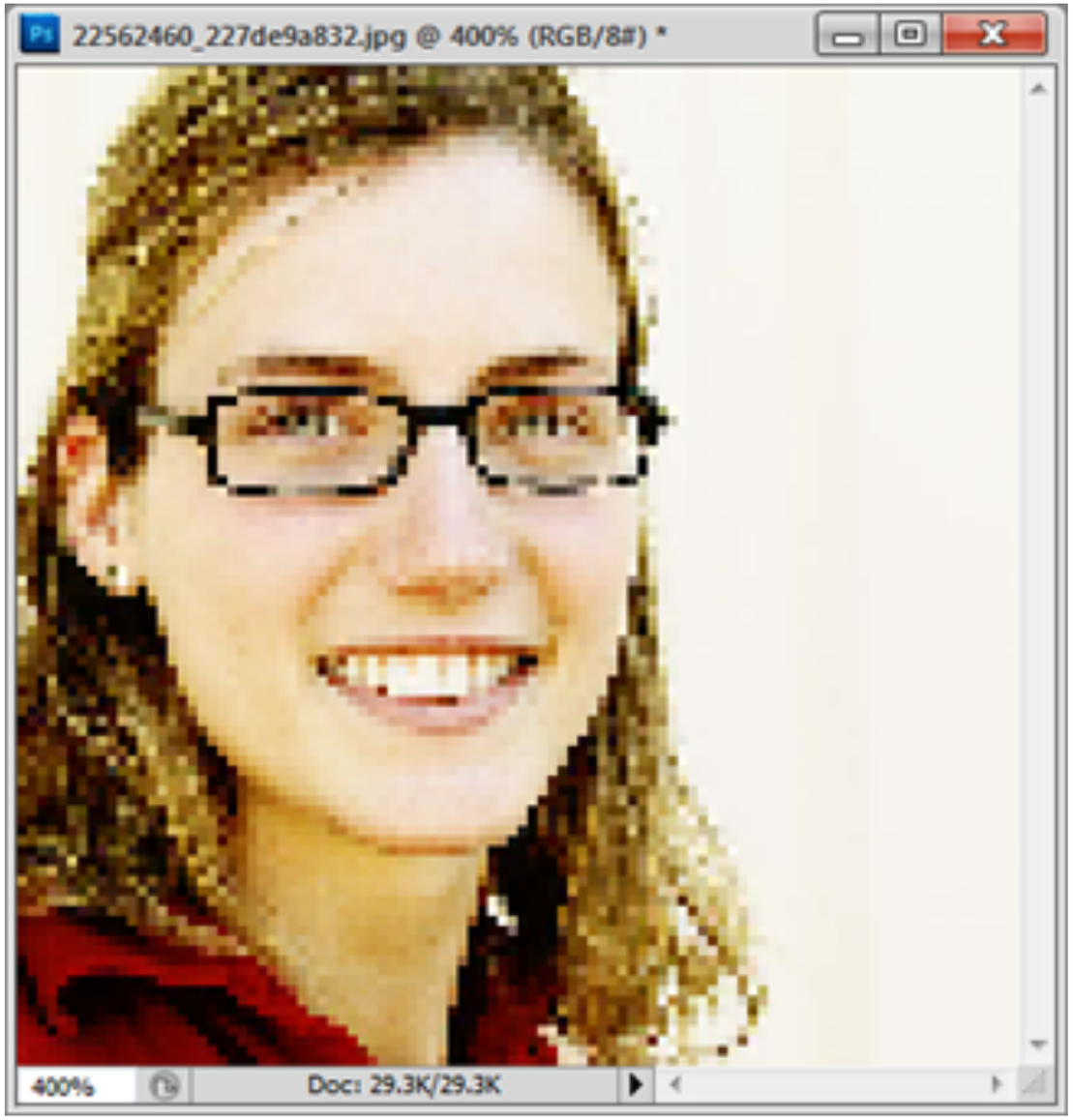


10 PPI

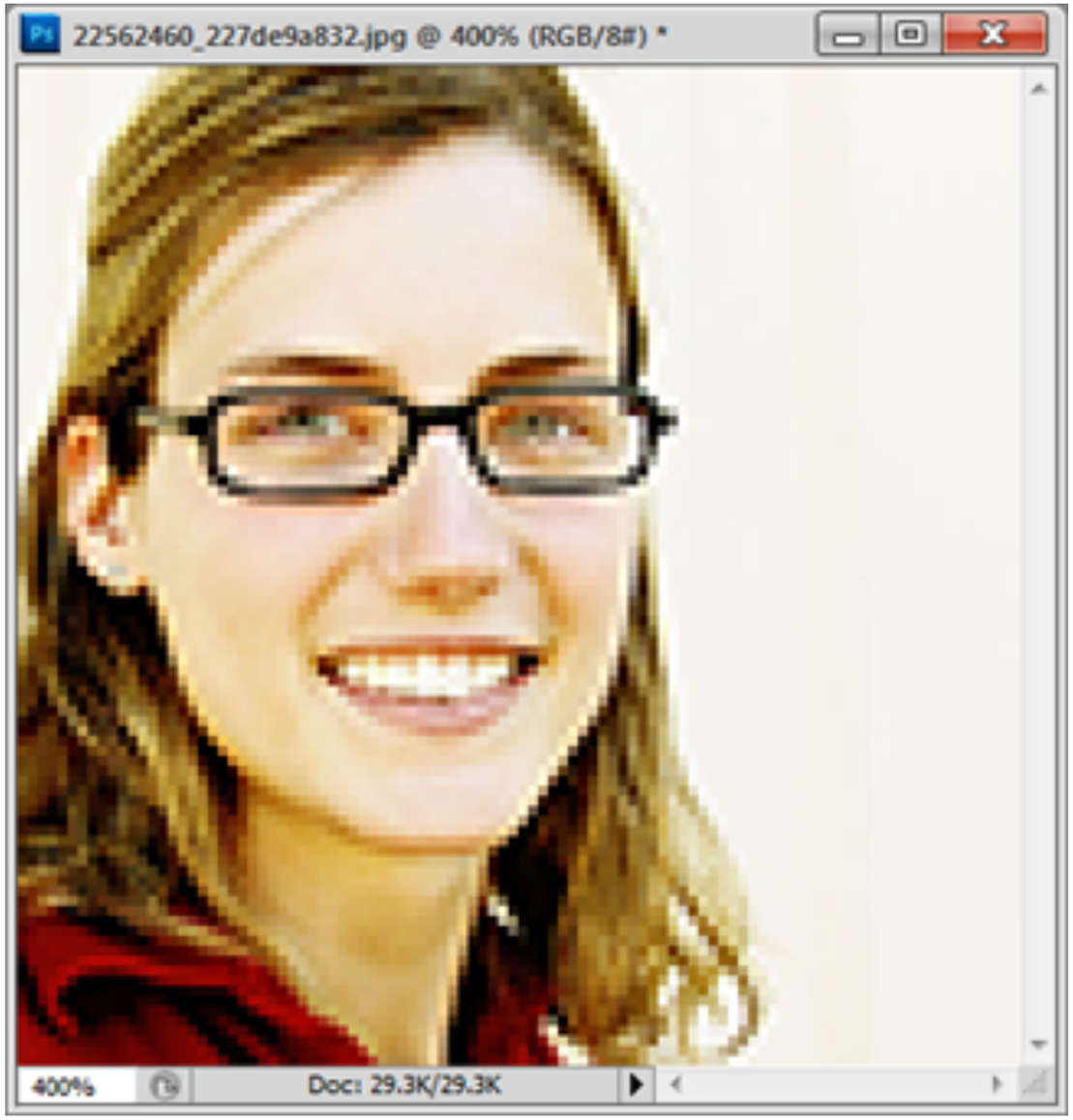


Original Pixel Data

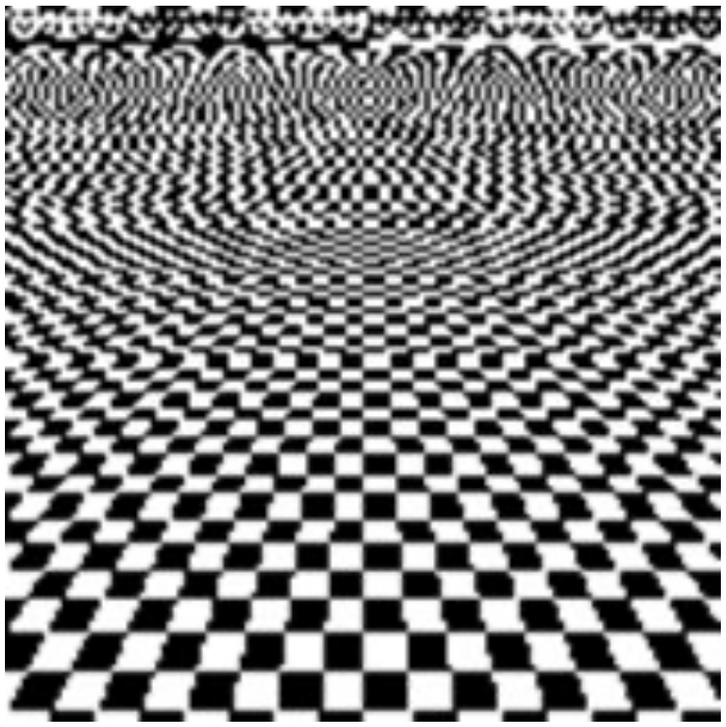
Anti-Aliased:
Edges softened using anti-aliasing, creating a better image at small size



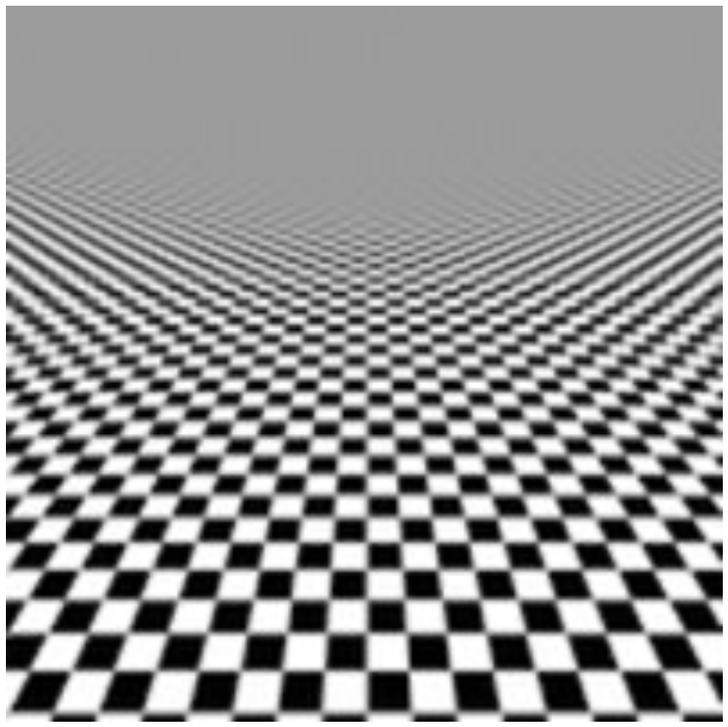
Aliased:
Image reduced using the “nearest neighbor” resampling in Photoshop

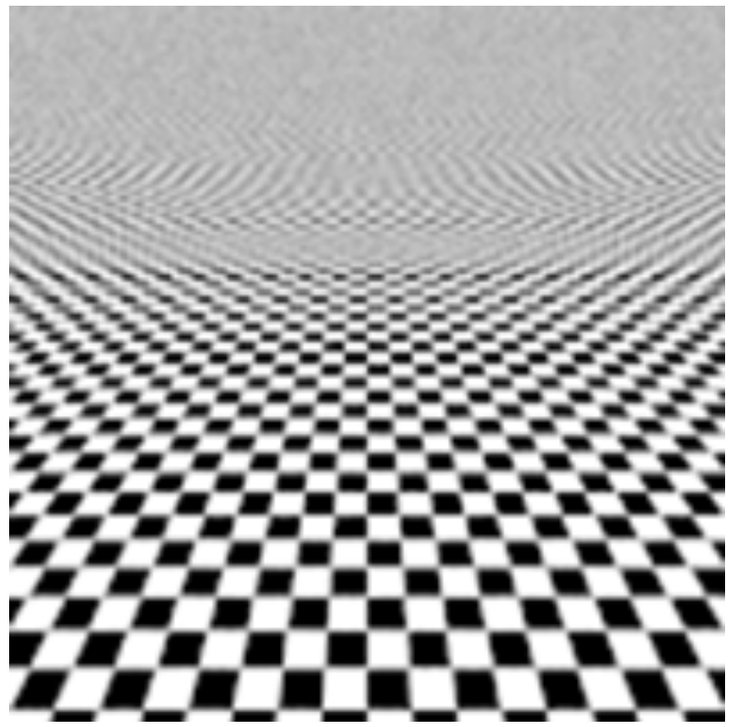


Anti-Aliased:
Image reduced using anti-aliasing, creating a better image at small size



Aliased:
No interpolation of data





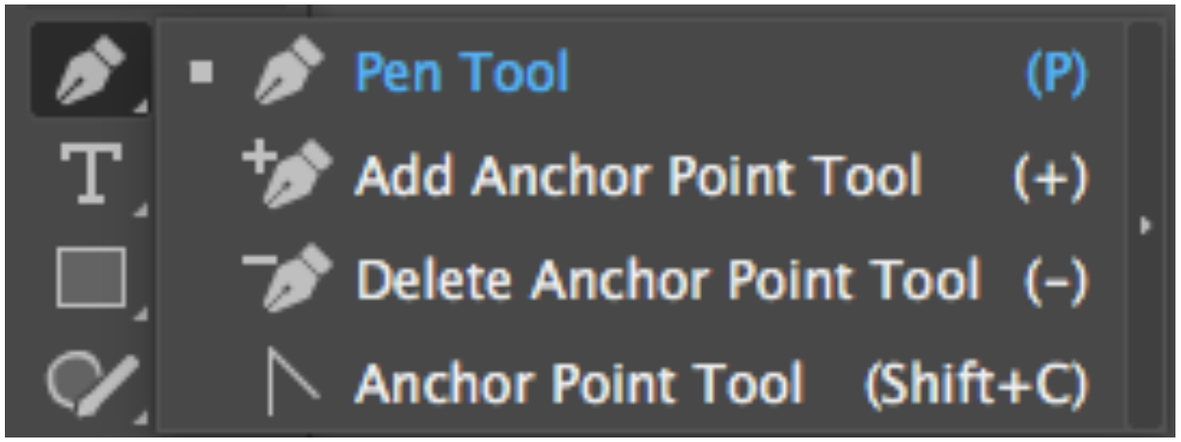
anti-aliasing

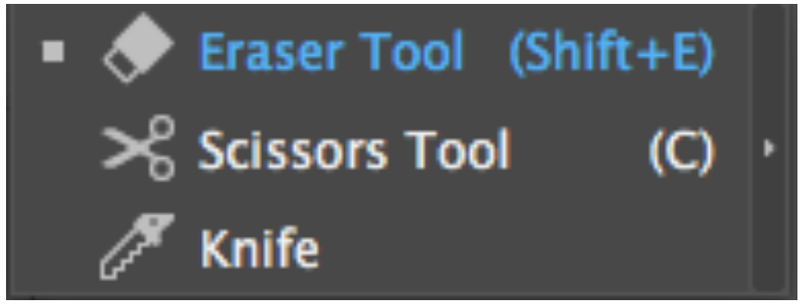
Shortcuts

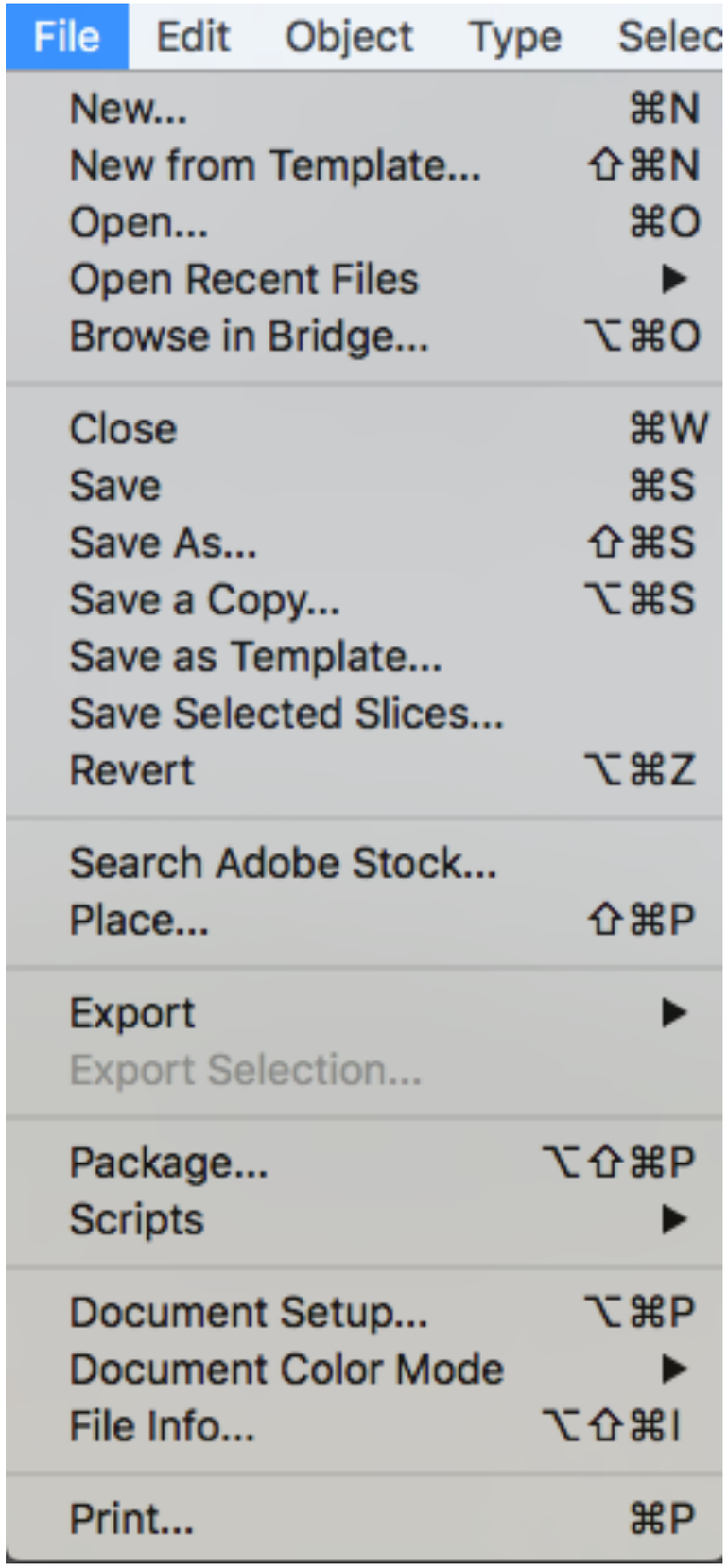
What is a shortcut?

- Keyboard command to do something that would otherwise require your mouse.
- Example: Copy + Paste = cmd+C, cmd+V
- Increase your speed & productivity
- Reduces fatigue on your mouse hand
- Gets you more connected with your work by engaging both hands.
- Allow the software to work for you instead of fighting against it.

- Different shortcuts are available at different times based on what tools you have selected.
  - Using the Pen Tool:
    + = Add Anchor Point
    - = Remove Anchor Point
    C = Scissors Tool (to cut a line segment at that point)
    Shift + C = Convert Anchor Point
- Some Shortcuts are a single letter
- Some Shortcuts require additional keys (Shift, Alt, Control, Command)
- Many shortcuts are listed in the menu
- You can create your own shortcuts if there isn't one available
- Many shortcuts are shared between programs, some are not.
- Look online for additional shortcut listings
- It can be overwhelming to try to memorize and remember a ton of new shortcuts at once, instead choose a few at a time and try to incorporate them into your daily work habits.


Pen Tool (P)
Add Anchor Point Tool (+)
Delete Anchor Point Tool (-)
Anchor Point Tool (Shift+C)


Eraser Tool (Shift+E)
Scissors Tool (C)
Knife


File
Edit
Object
Type
Selec
New... ⌘N
New from Template... ⇧⌘N
Open... ⌘O
Open Recent Files
Browse in Bridge... ⌥⌘O
Close ⌘W
Save ⌘S
Save As... ⇧⌘S
Save a Copy... ⌥⌘S
Save as Template...
Save Selected Slices...
Revert ⌥⌘Z
Search Adobe Stock...
Place... ⇧⌘P
Export
Export Selection...
Package... ⌥⇧⌘P
Scripts
Document Setup... ⌥⌘P
Document Color Mode
File Info... ⌥⇧⌘I
Print... ⌘P

Basic Illustrator Shortcuts

- Command + C = Copy (P = Paste, V= Cut)
- Command + N = New Document
- Tab= Show/Hide Tools
- Command + N = New Document
- Command + R = Show/Hide Rulers
- Command + O = Create Type Outlines
- Command + G = Group selected items
- Command + 2 = Lock position of selected items
- Hold Space Bar down to move around art board
- Command + 0 = Zoom out to see whole art board
- Command +/- = Zoom in or out
- Command + 7 = Create Clipping Mask
- Command + D = Duplicate previous action
- Command + Shift + </> Decrease or Increase Text Size

Shortcuts for special characters

- = Option 8 (PC: Alt 0149)

é = Option e then letter (á = Option e then a)

– = Option -

— = Shift Option -

® = Option + R

https://www.youtube.com/watch?v=K3qhmoegBgQ

http://www.creativeblog.com/illustrator/shortcuts-5132938

https://steemit.com/adobe/@maxburnside/10-useful-adobe-illustrator-keyboard-shortcuts

Packaging 101

Great packaging has a way of making or breaking the consumer experience – so much so that some of us buy on impulse.

(No pressure or anything.)

Comparing Folding Cartons & Set-up Boxes

Folding Cartons

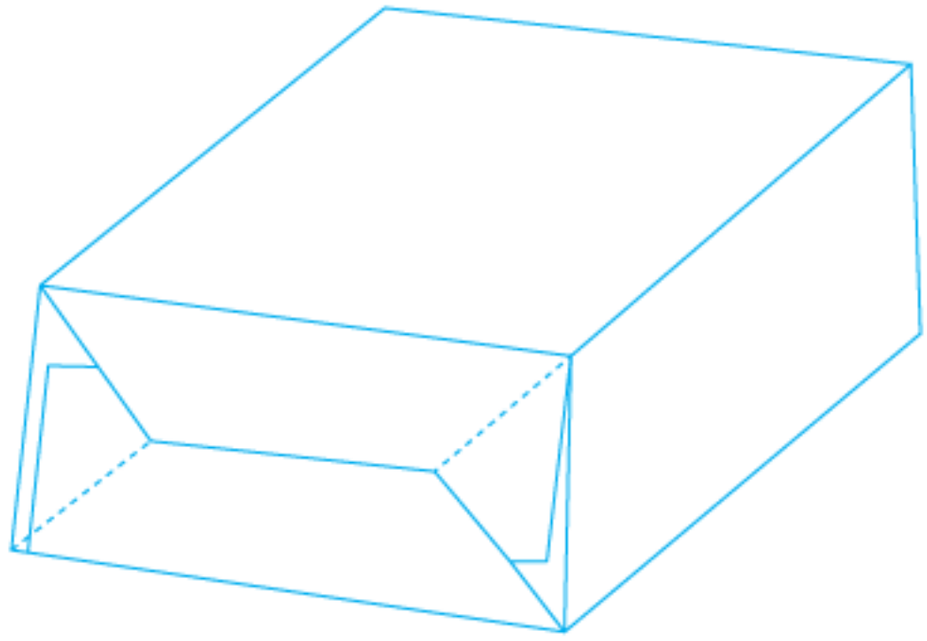
- found literally everywhere.
- They are typically printed, die cut, and folded
- paperboard stock ranging from 8 pt. to 24 pt.
- take less time to produce than set-up boxes
- tend to cost less.
- savings in transportation costs
- folding cartons are collapsed
- shipped flat
- reassembled in product fulfillment.

Set-up Boxes

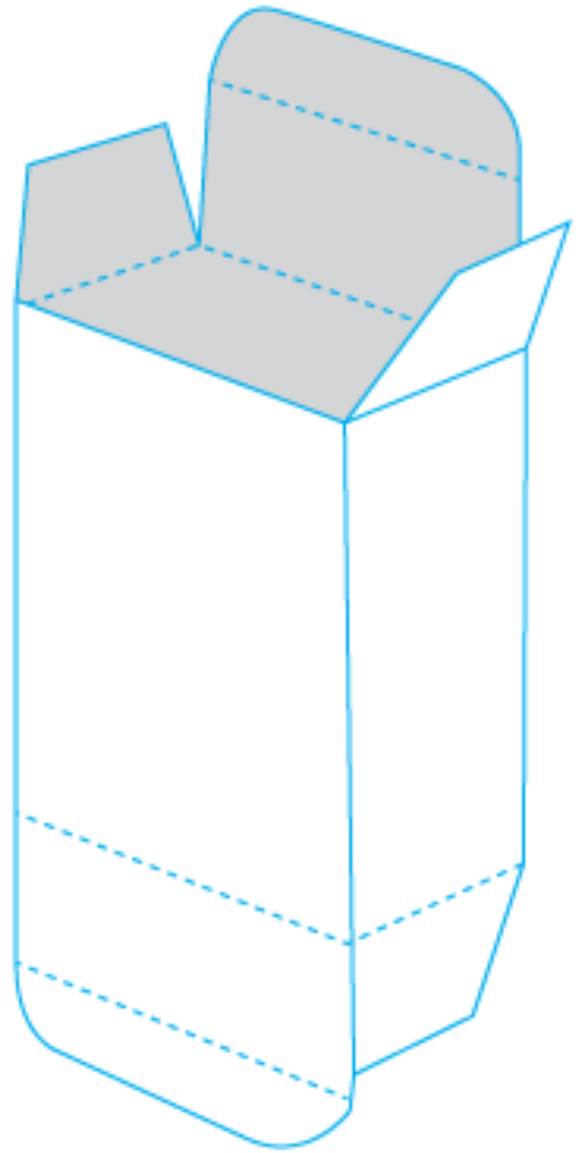
- also known as rigid boxes
- formed by putting together flat sheets of paperboard or chipboard
- thick board (40 pt. – 100 pt.)
- thin wraps are printed and adhered to the outside of the rigid box
- create a higher *perceived* product value.

Folding Cartons

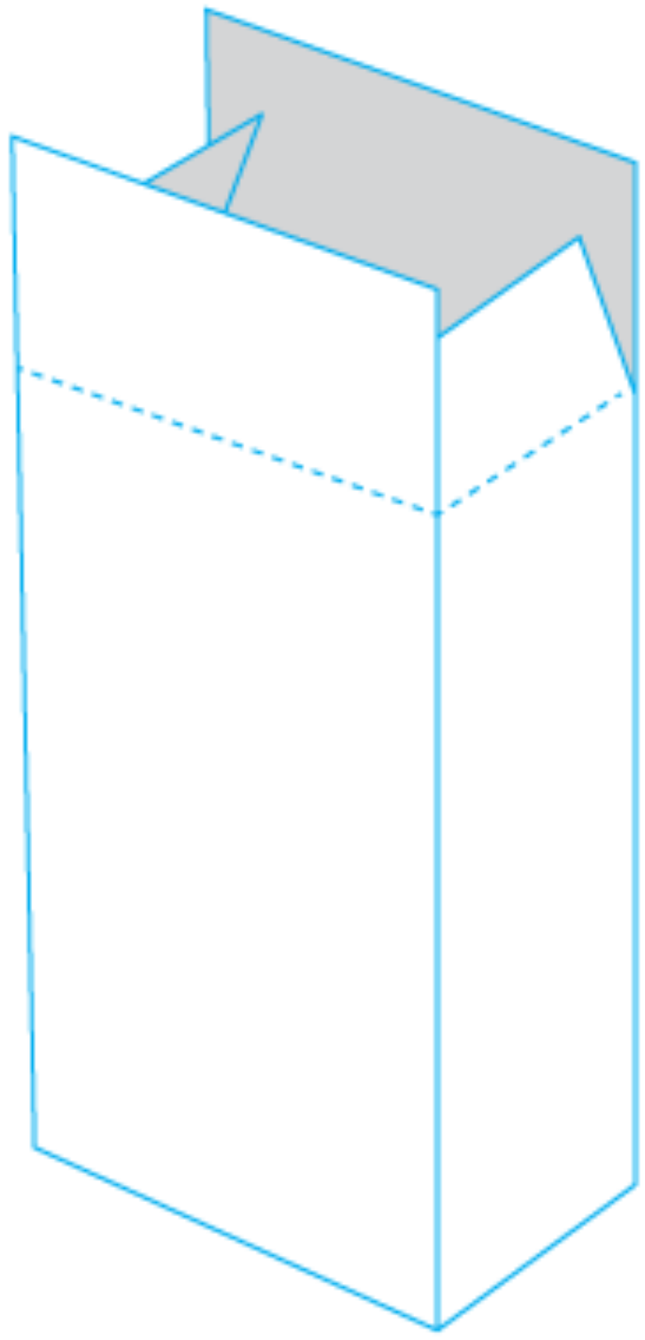
- **Auto-bottom** boxes can do wonders to increase effi ciencies and save money in reduced labor costs.
- Pre-glued flaps are positioned in such a way that a solid bottom panel forms when the carton is erected.



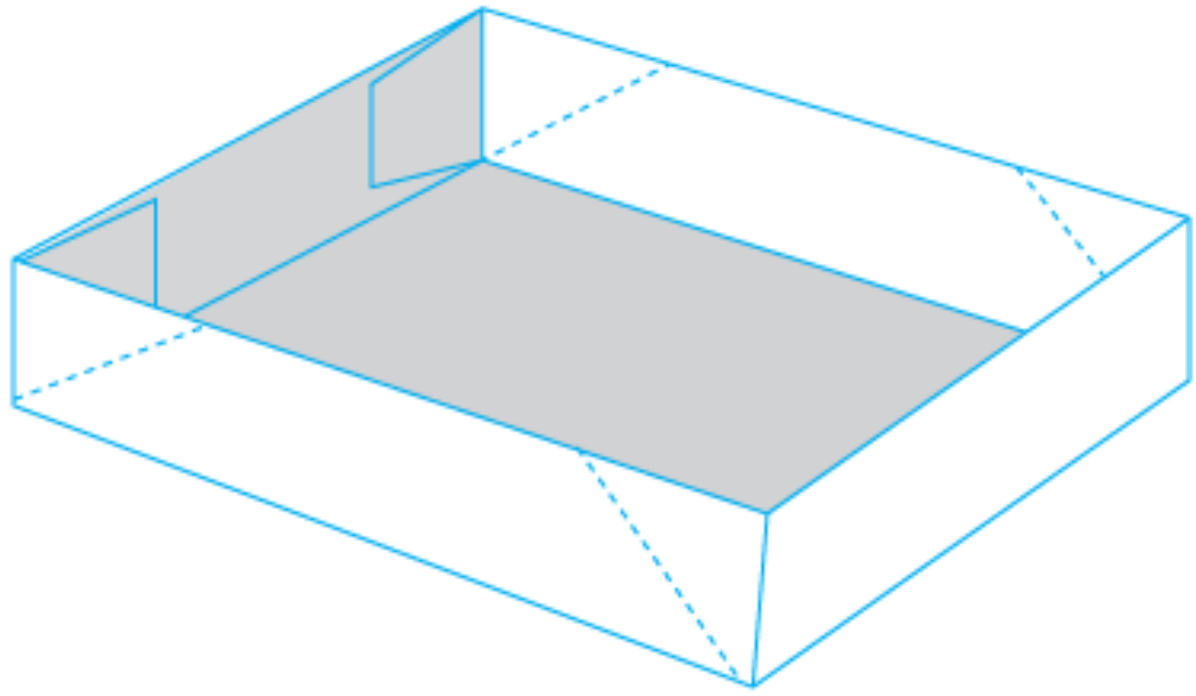
- **Tuck-end** cartons are one of the most basic boxes, and one of the most widely used. There are two variations: straight and reverse. Reverse tuck ends – where one tuck flap is joined to the front panel and the other attached to the back panel – tend to be less expensive than the straight tuck ends where the tuck flaps are both attached to the front panel. This slight variation allows for nesting, or ganging, on the press sheet to be maximized.



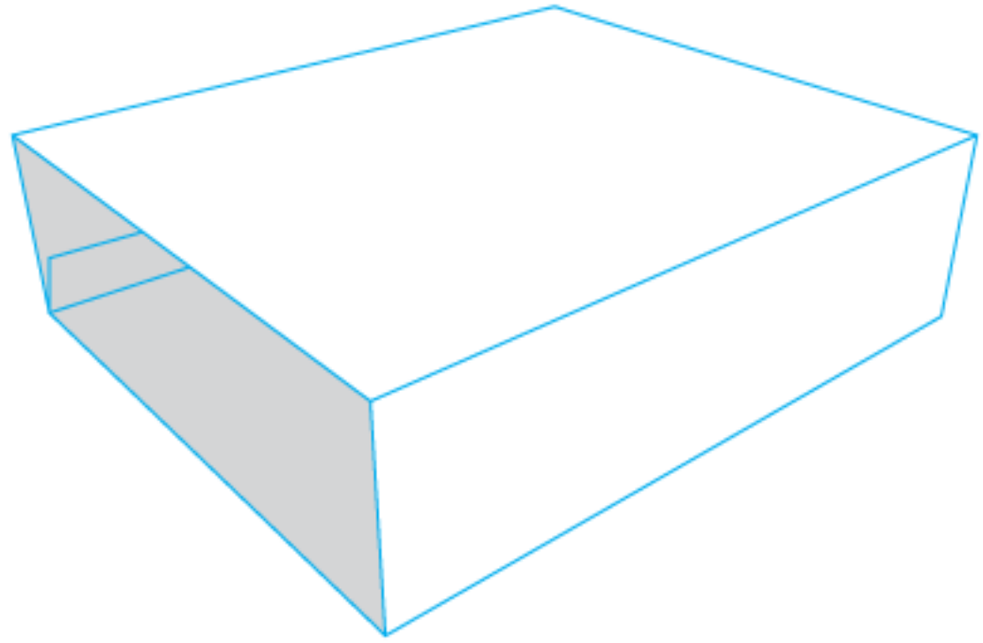
- **Seal-end** cartons are ideal for automated lines. Prior to product fulfillment, the cartons are glued along the depth of the box. Once the carton is filled with product, the ends are then sealed with glue making them tamper evident on the shelf.



- **Tray folding** cartons come in a wide array of formats, including both glued and non-glued corners. Tray cartons are typically used as custom food boxes, medical boxes and pharmaceutical packaging.

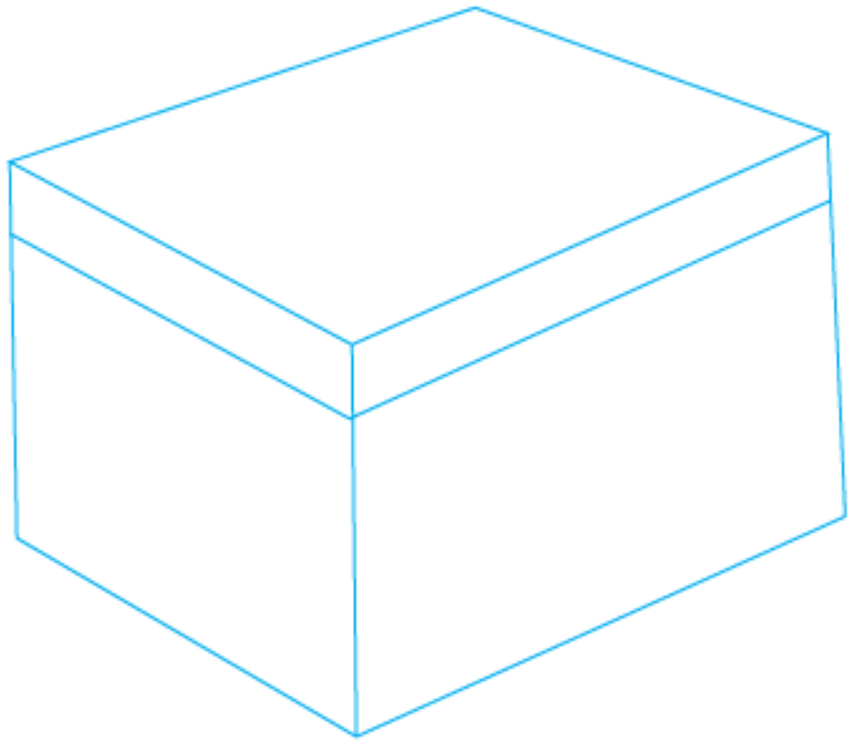


- **Sleeves** are commonly used as slip covers for trays, or even directly over products. They are glued along the depth of the carton in manufacturing, and often feature a cover similar to those you’d find on custom software boxes.

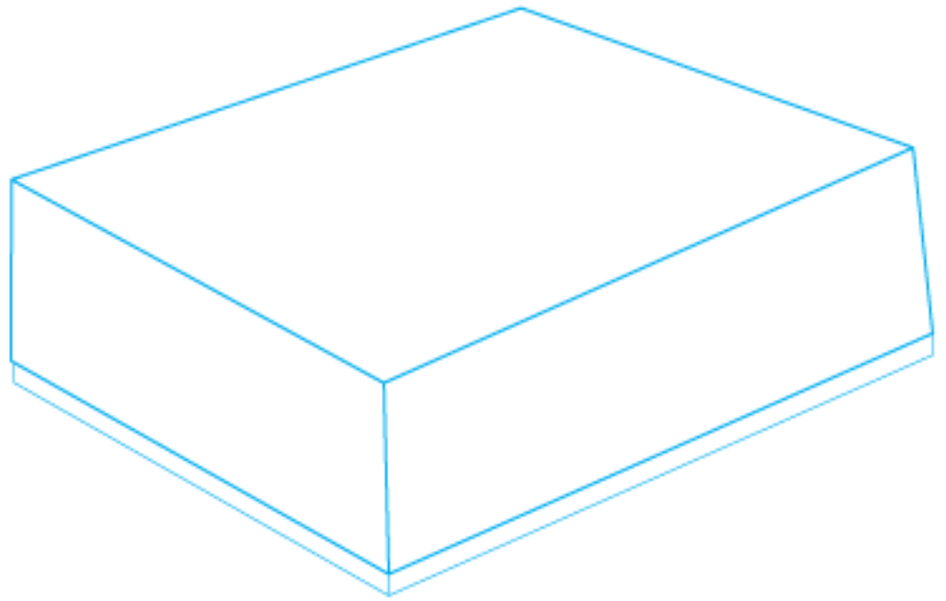


Set-up Boxes

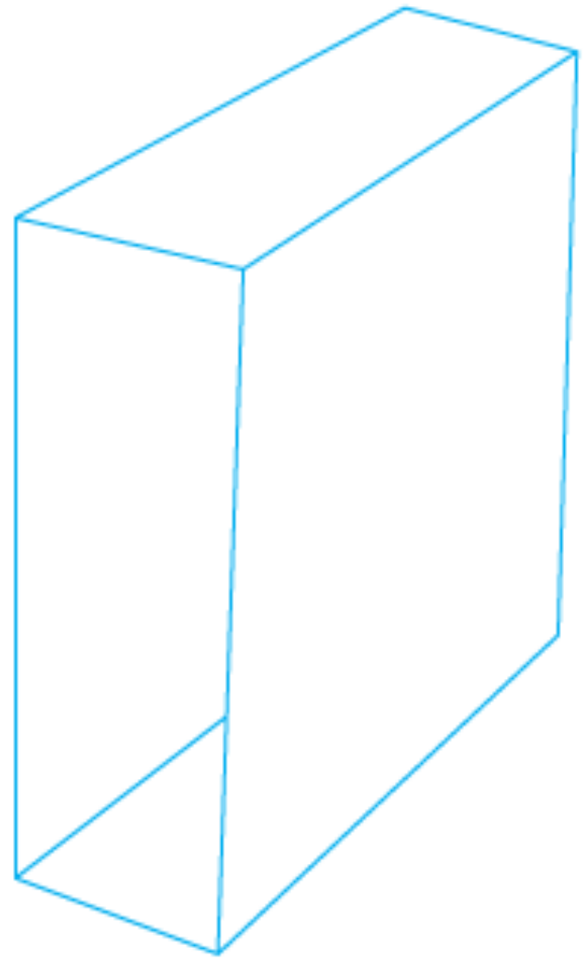
- **Shoebox lids** offer easy opening, making them ideal for packages that are opened and closed frequently. Shoebox style lids are always 1” deep, regardless of the box’s base size.



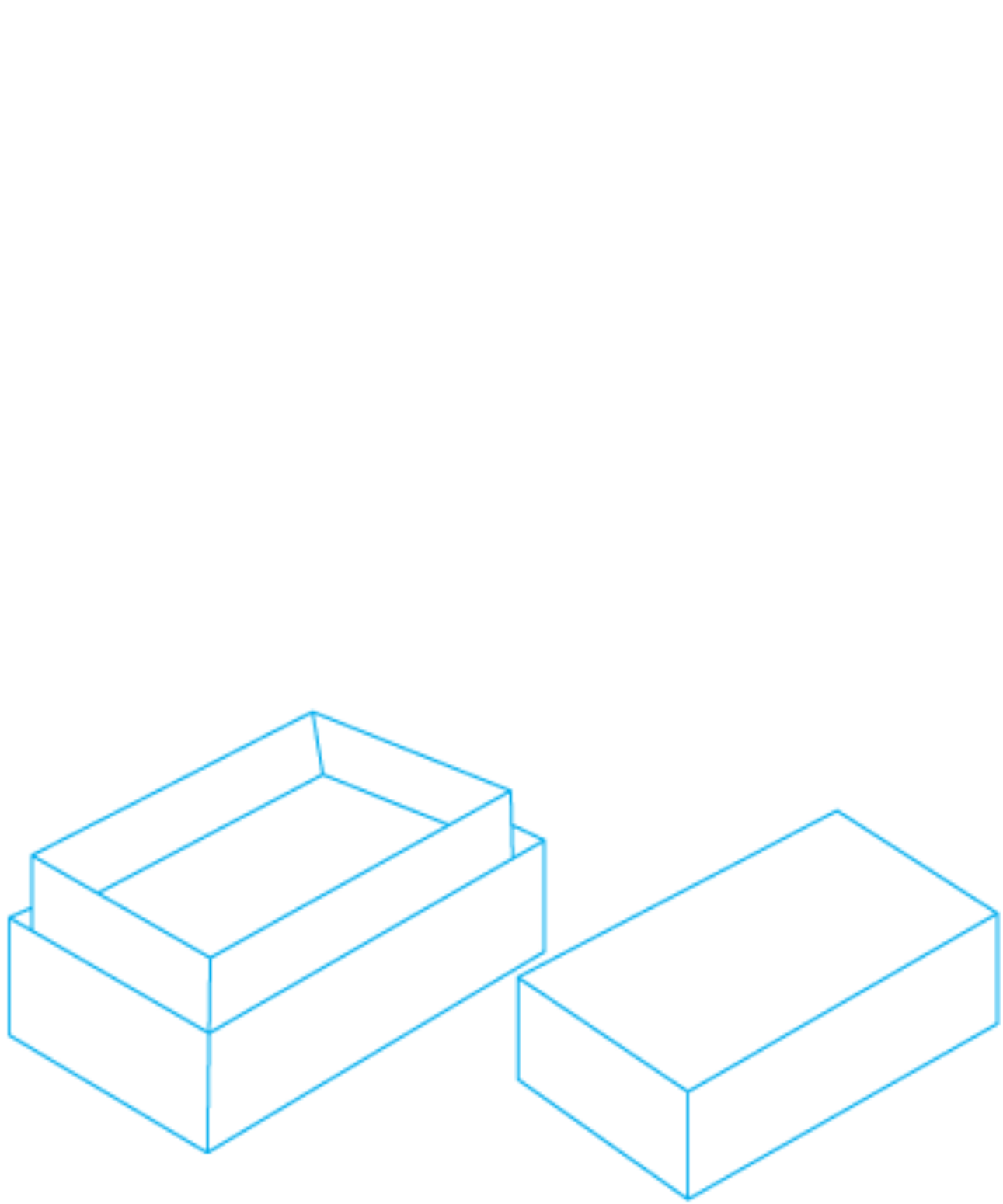
- **Telescoping lids** refer to boxes whose lid covers the entire depth of the base it’s covering, similar to those used in chocolate stores. They provide a little more protection when you know the carton won’t be opened and closed too frequently.
- may need thumb notches to help the boxes open more easily.
- Jewelry and gift boxes typically feature “partial telescoping lids”

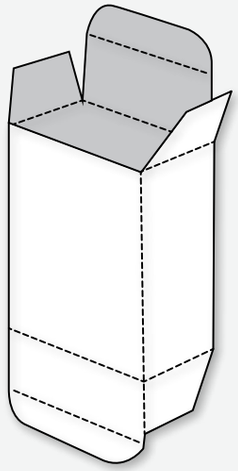


- **Slipcases** are typically paired with an inner tray. Slipcases are protective boxes that feature one or more open ends and are often used to protect DVDs and books.



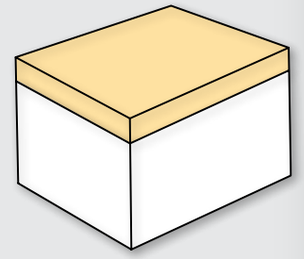
- **Shoulder/Neck Boxes** incorporate a raised neck that enables the lid to fall flush with the base of the carton. They are often used in high-end beauty and spirit packaging.





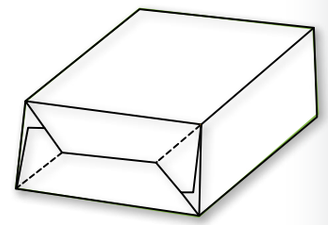
TUCK ENDS

Tuck-end cartons are one of the most basic boxes, and one of the most widely used. There are two variations: straight and reverse. Reverse tuck ends – where one tuck flap is joined to the front panel and the other attached to the back panel – tend to be less expensive than the straight tuck ends where the tuck flaps are both attached to the front panel. This slight variation allows for nesting, or ganging, on the press sheet to be maximized.



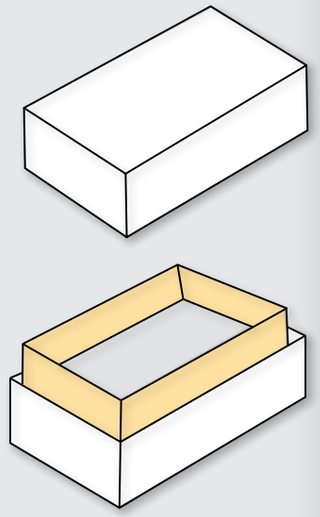
SHOEBOX LIDS

Shoebox lids offer easy opening, making them ideal for packages that are opened and closed frequently. Shoebox style lids are always 1" deep, regardless of the box's base size.



AUTO BOTTOMS

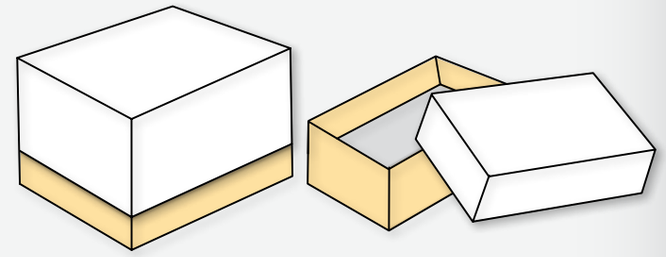
Auto-bottom boxes can do wonders to increase efficiencies and save money in reduced labor costs. Pre-glued flaps are positioned in such a way that a solid bottom panel forms when the carton is erected.



SHOULDER/NECK

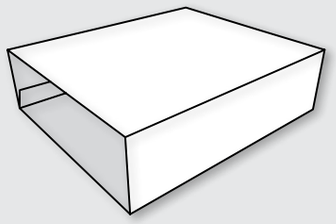
Shoulder/neck boxes incorporate a raised neck that enables the lid to fall flush with the base of the carton. They are often used in high-end beauty and spirit packaging.

Design Tip: There are many directional changes with neck boxes. For maximum impact, carefully consider the placement of design elements on the inside & outside of the neck.



TELESCOPING LIDS

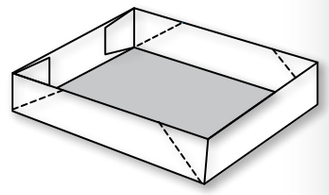
Telescoping lids refer to those boxes whose lid covers the entire depth of the base it's covering, similar to those used in chocolate stores. They provide a little more protection when you know the carton won't be opened and closed too frequently. If you prefer the look of the telescoping lid but know the package will be opened repeatedly, you may want to incorporate thumb notches to help the boxes open more easily. (Partial telescoping lids are available when you need a lid deeper than 1", but don't want it to completely cover the base. Jewelry and gift boxes are well known for this as they offer practicality and charm in an easy to open carton.)



SLEEVES

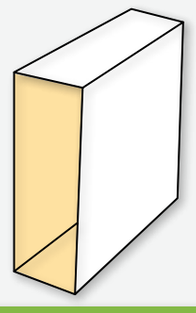
Sleeves are commonly used as slip covers for trays, or even directly over products. They are glued along the depth of the carton in manufacturing, and often feature a cover similar to those you'd find on custom software boxes.

Design Tip: Knockout is required for proper adhesion along glue flaps. Consult with your service provider to ensure adequate space is accounted for.



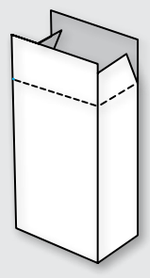
TRAYS

Tray folding cartons come in a wide array of formats, including both glued and non-glued corners. Tray cartons are typically used as custom food boxes, medical boxes and pharmaceutical packaging.



SLIPCASES

Slipcases are typically paired with an inner tray. Slipcases are protective boxes that feature one or more open ends and are often used to protect DVDs and books.



SEAL END

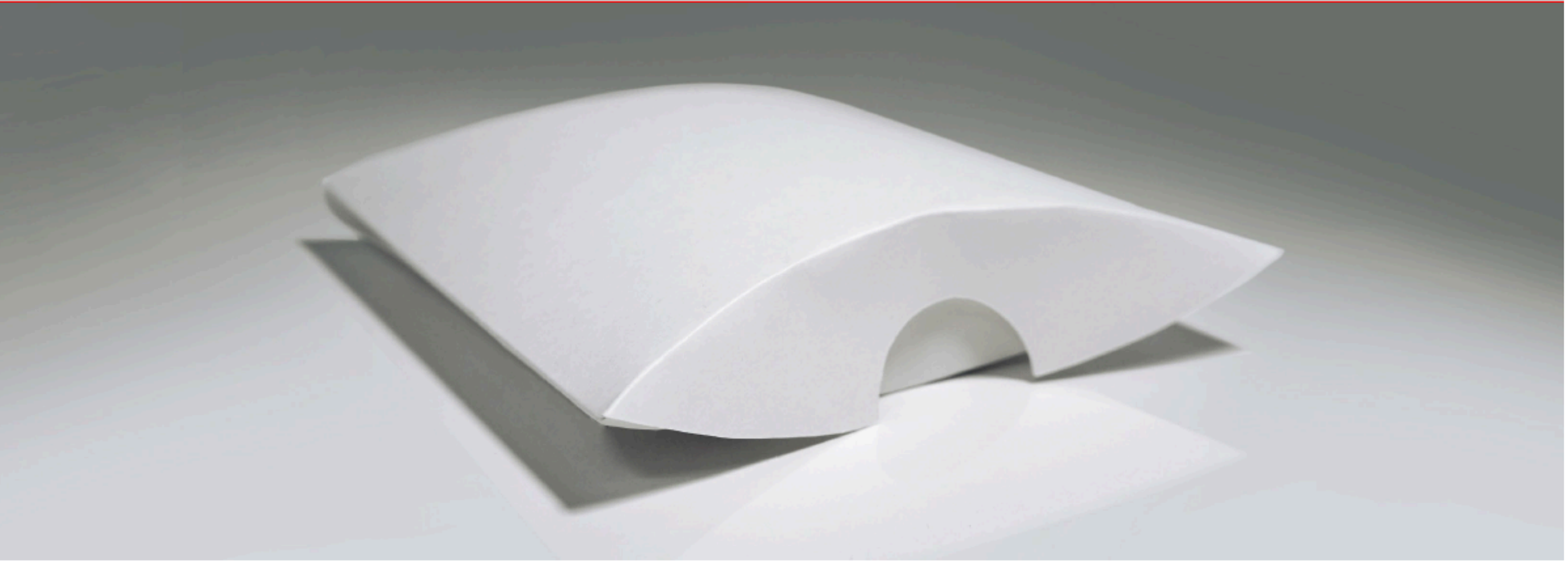
Seal-end cartons are ideal for automated lines. Prior to product fulfillment, the cartons are glued along the depth of the box. Once the carton is filled with product, the ends are then sealed with glue making them tamper evident on the shelf.

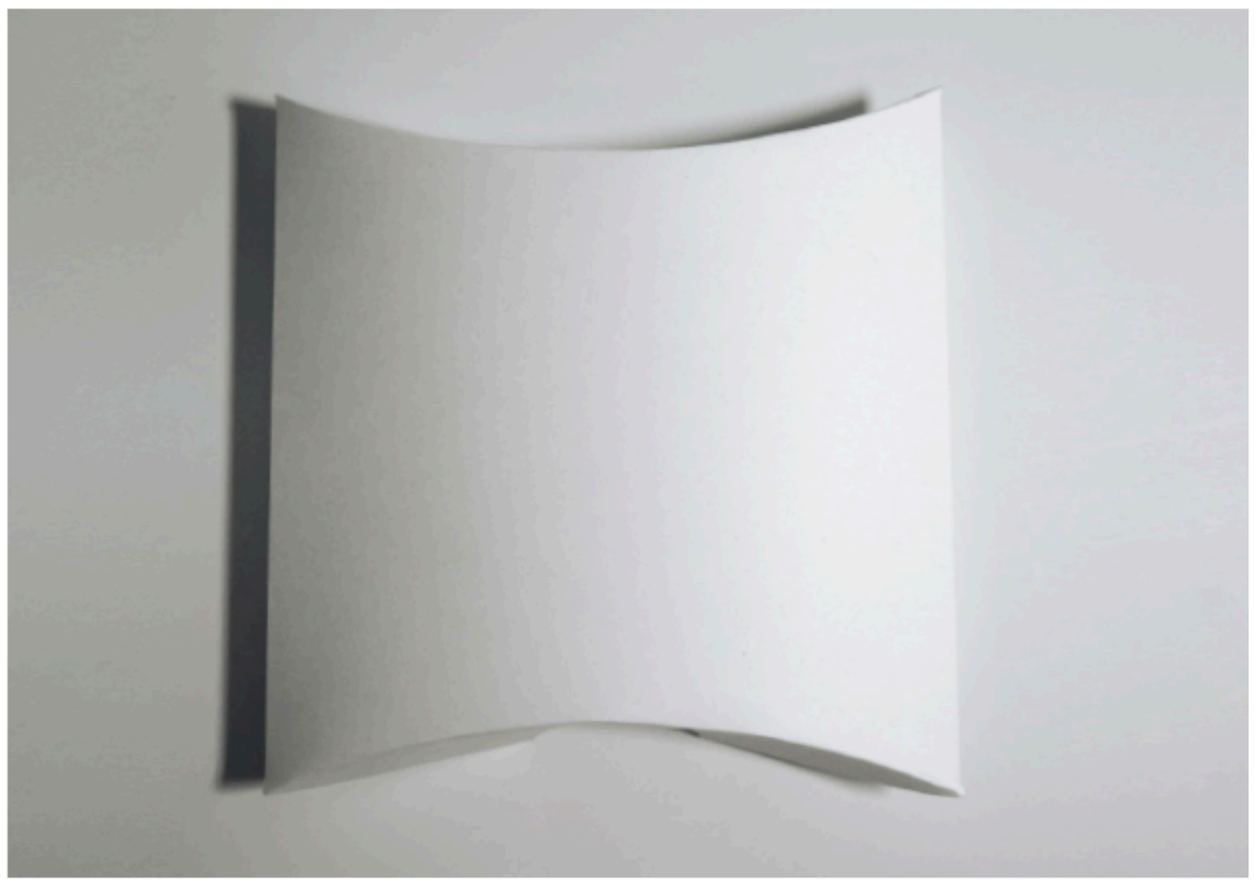
GET FURTHER INSIGHTS

into the packaging world – including behind the scenes glimpses into world-class packaging designs, substrate showcases, and more.

bit.ly/Packaging-Tips

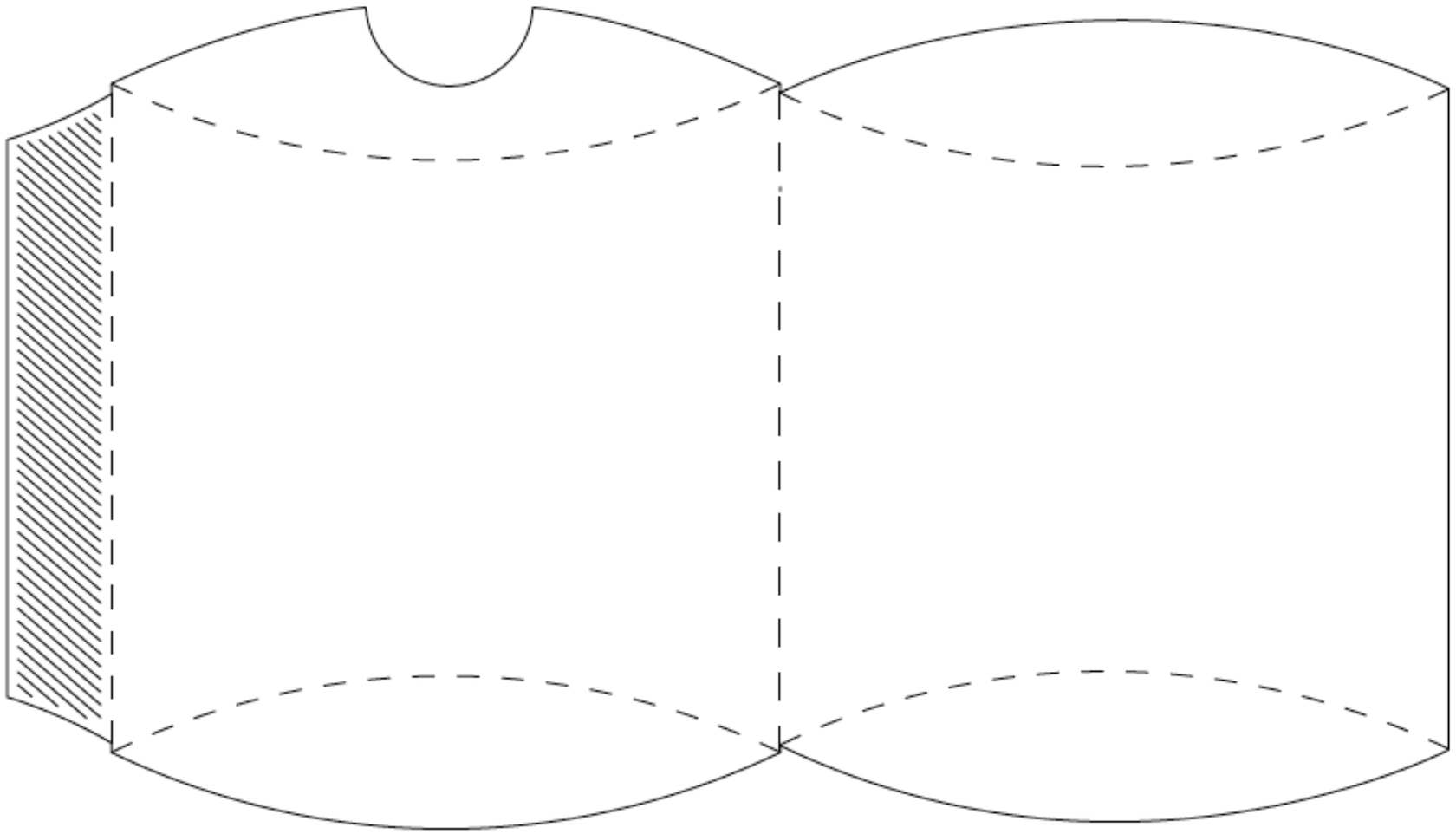
PAPER SPECS®
PAPER INFORMATION, INSPIRATION & INSIGHTS





PILLOW BOX

The pillow box is a standard container that remains flat until the side flaps are closed, which creates the convex pillowy structure this construction is known for.



1. Define the product

- How many SKUs are you being asked to design?
- What are the products made of? How delicate are they?
- What is the weight of the packaged product?
- Does the packaging have to sell, warn, or display?
- What legal/Required information must be represented? Nutrition? Barcode?

2. Define pricing expectations

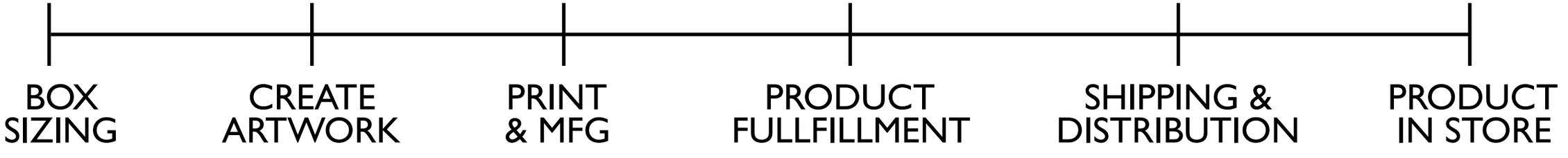
- What is the budget per SKU for packaging manufacturing?
- Retail pricing helps to establish this.
- Packaging budget will help to select or eliminate materials and manufacturing processes.

3. Understand economies of scale.

- What will the initial order quantity be per SKU?
- Similar to budgets, quantity allows you to eliminate materials and processes
  - many specialty materials and processes have minimums.
  - Work with the printer - ask questions!
  - Design within the realities of manufacturing and client budgets

4. Define Timelines.

- What is the launch date?
- What is the fulfillment timeline?
- How much time has been allotted for transportation?
- Understanding each step of the process allows you to “backwards map” a schedule



5. Define the fulfillment process

- What is the packaging process? (Filling: Hot or Cold, automated/by hand, filling speeds)
- What are the machine requirements?
- What is the transpiration process, trays, pallets, etc?
- Well-designed packaging can reduce fulfillment costs.
- Request sample product to test when you begin the prototype phase.

6. “End of life” discussion.

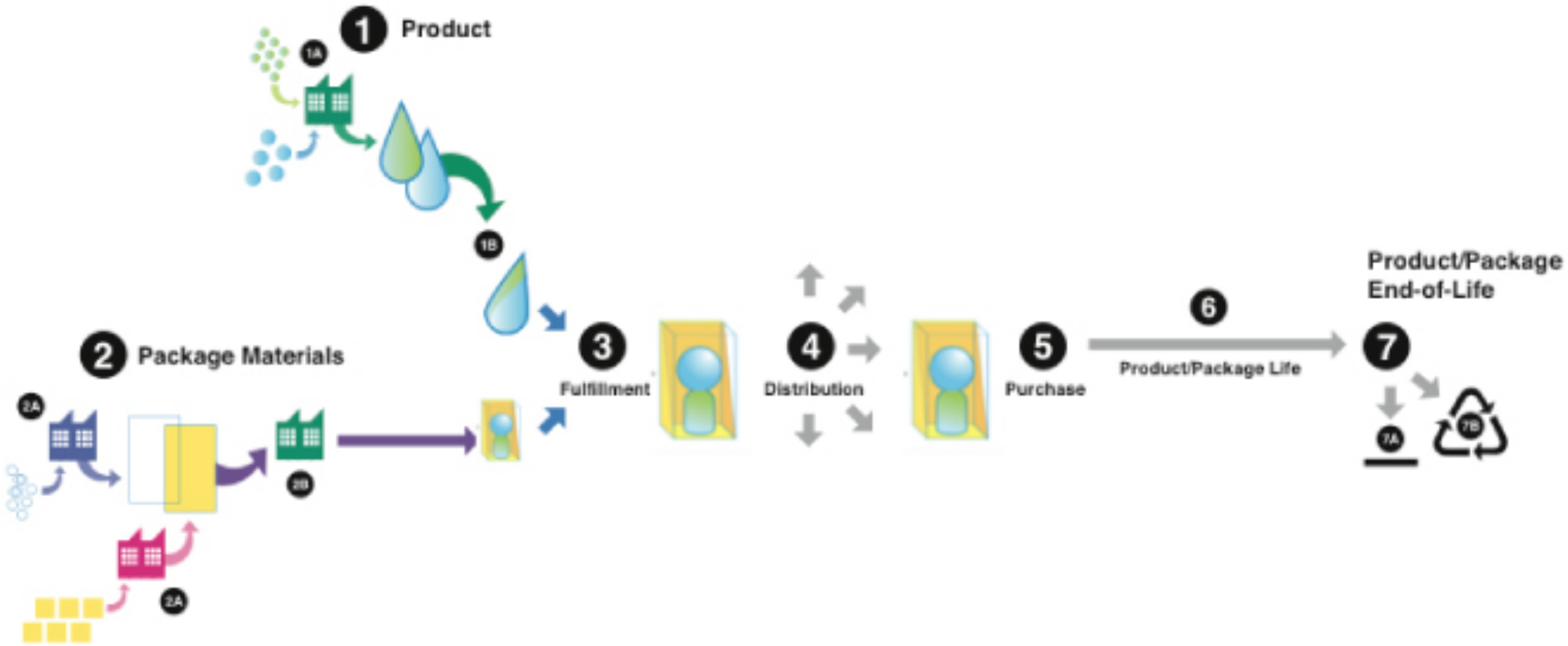
- Your packaging will not live forever, early consideration must be given to its end of life, this includes understanding the recycling process, disassembly design, compostable materials, and reusability.
- Is a display window necessary?
- Does the packaging have to be easy to dispose of, is it a keepsake, or both?
- Does it need to be reusable and/or recyclable (The more materials you combine the harder it becomes to recycle.)

What Are Some Key Factors of Good Packaging Design?

- Good packaging makes the product easily understood by the consumer
- Good packaging makes the product clear to the consumer.
- Logos and branding should be easily recognized and seen.
- The product shouldn't be confusing
- A consumer should be able to pick up the package, look at it, and understand everything the creator wants them to know.
- Bad packaging will make it difficult for the consumer to understand what is inside and how to interact with it.

Is your package sustainable?

A sustainable package represents a fully optimized use of environmental resources throughout its entire life cycle.



Creating More Sustainable Packaging

- Optimize the cycle of industrial production
- Design products and packages in such a way as to reduce or eliminate our need to extract new resources, and reduce or eliminate the pollution we create.
  - Raw Materials
  - Transportation
  - End of Life

Raw Material

Kraft: By coming up with a more efficient design for the zipper on their cheese packaging, they're **saving more than a million pounds of packaging** per year.

Just the zipper. On one product line.
A million pounds of packaging saved each year.

Transportation

Student Concept:
For a square coca cola bottle nests and ships more tightly and efficiently than the conventional round bottle.

When more efficient shipping translates into fewer truckloads, big savings in greenhouse gas emissions can result.

End of Life

Pangea Organics: Plantable packaging, this line was developed several years ago and could literally grow another package (in 50 years or so!).

FDA LABELING REQUIREMENTS

Nutrition Facts

Serving Size 2/3 cup (55g)
Servings Per Container About 8

Amount Per Serving

Calories 230	Calories from Fat 72
	% Daily Value*
Total Fat 8g	**12%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 160mg	**7%**
Total Carbohydrate 37g	**12%**
Dietary Fiber 4g	**16%**
Sugars 1g	
Protein 3g	
Vitamin A	10%
Vitamin C	8%
Calcium	20%
Iron	45%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily value may be higher or lower depending on your calorie needs.

	Calories:	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Nutrition Facts

8 servings per container
Serving size **2/3 cup (55g)**

Amount per serving
Calories **230**

	% Daily Value*
Total Fat 8g	**10%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 160mg	**7%**
Total Carbohydrate 37g	**13%**
Dietary Fiber 4g	**14%**
Total Sugars 12g	
Includes 10g Added Sugars	**20%**
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Standard Vertical

Nutrition Facts

8 servings per container
Serving size **2/3 cup (55g)**

Amount per serving
Calories **230**

	% Daily Value*
Total Fat 8g	**10%**
Saturated Fat 1g	**5%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 160mg	**7%**
Total Carbohydrate 37g	**13%**
Dietary Fiber 4g	**14%**
Total Sugars 12g	
Includes 10g Added Sugars	**20%**
Protein 3g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 8mg	45%
Potassium 235mg	6%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Tabular Format

Nutrition Facts

10 servings per container
Serving size
2 slices (56g)

Calories per serving **170**

Amount/serving	% Daily Value*	Amount/serving	% Daily Value*
Total Fat 1.5g	**2%**	**Total Carbohydrate** 36g	**13%**
Saturated Fat 0.5g	**3%**	Dietary Fiber 2g	**7%**
Trans Fat 0.5g		Total Sugars 1g	
Cholesterol 0mg	**0%**	Includes 1g of Added Sugars	**2%**
Sodium 280mg	**12%**	**Protein** 4g	

Vitamin D 0mcg 0% • Calcium 80mg 6% • Iron 1mg 6% • Potassium 470mg 10%
Thiamin 15% • Riboflavin 8% • Niacin 10%

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Tabular Display for Small Packages

Nutrition Facts

5 servings per container
Serving size
1/6 cup (28g)

Calories per serving **90**

Amount/serving	% DV	Amount/serving	% DV
Total Fat 2g	**3%**	**Total Carb.** 15g	**5%**
Sat. Fat 1g	**5%**	Fiber 0g	**0%**
Trans Fat 0.5g		Total Sugars 14g	
Cholesterol 10mg	**3%**	Incl. 13g Added Sugars	**26%**
Sodium 200mg	**9%**	**Protein** 3g	

Vitamin D 0% • Calcium 6% • Iron 6% • Potassium 10%

For more information on FDA labeling regulation, check online:

https://www.fda.gov/food/guidanceregulation/guidancedocumentsregulatoryinformation/labelingnutrition/ucm385663.htm

Packaging Design Articles:

So You Want to be a Packaging Designer?

The Beginners Guide to Packaging Design

10 Top Tips for Designing Awesome Packaging and Labels

Emerging Package Design and Consumer Shopping Trends of 2017

Neurodesign: How Science Plays a Part in Superb Packaging

A Brief History of Packaging Regulations and How They Affect Designers Today

thedieline.com

Packaging & Dieline Resources:

Folder Dielines:
https://www.neenahpaper.com/resources/design-resources/dielines-and-templates/pocket-folder-dielines

Folders, boxes, hang tags, table tents, bottle gift tags, door hangers and more!
https://www.neenahpaper.com/resources/design-resources/dielines-and-templates/short-run-dielines

Envelopes
https://www.neenahpaper.com/resources/design-resources/dielines-and-templates/envelope-dielines

Box Dielines:
https://pacificgraphicdesign.files.wordpress.com/2016/02/packaging-dielines-free-book-design-packaging-thedieline.pdf

Box Dielines (Part 2)
https://pacificgraphicdesign.files.wordpress.com/2016/02/packaging-dielines-free-book-design-packaging-thedieline20ii20.pdf

File Setup - Commercial Printing

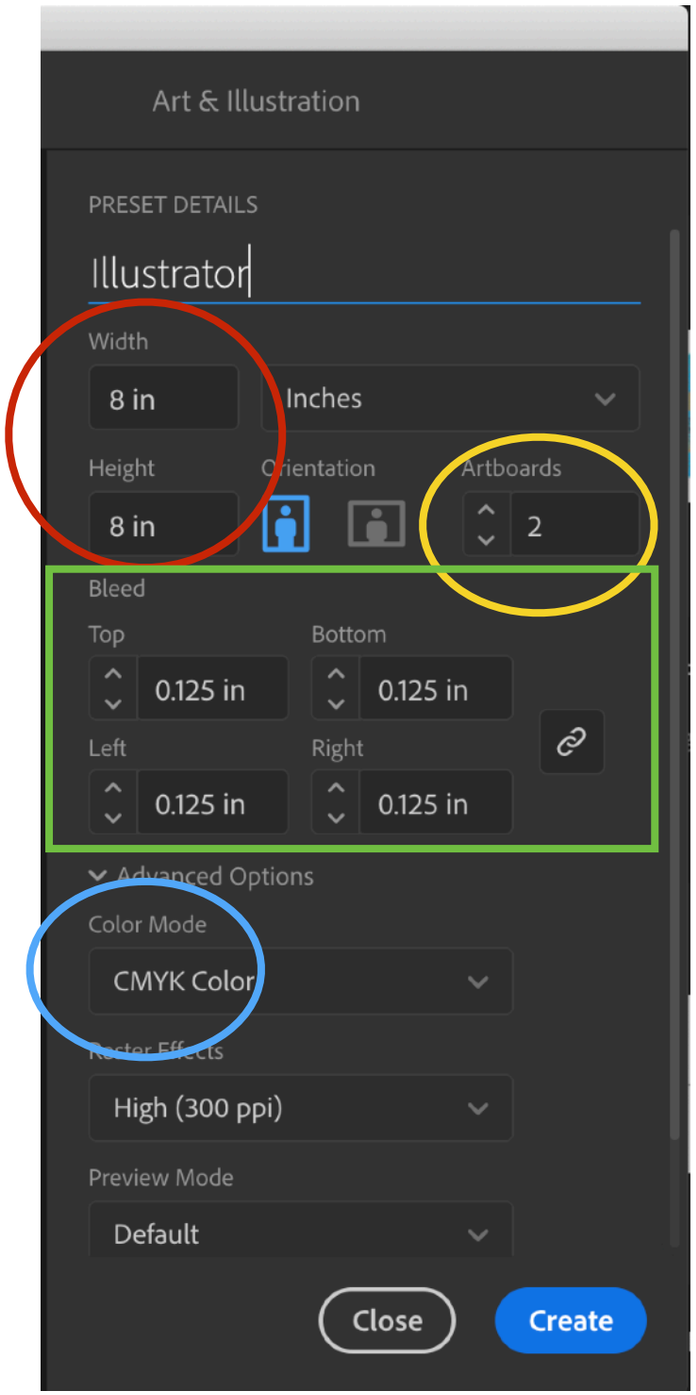
HOW TO: Prepare a file for commercial printing:

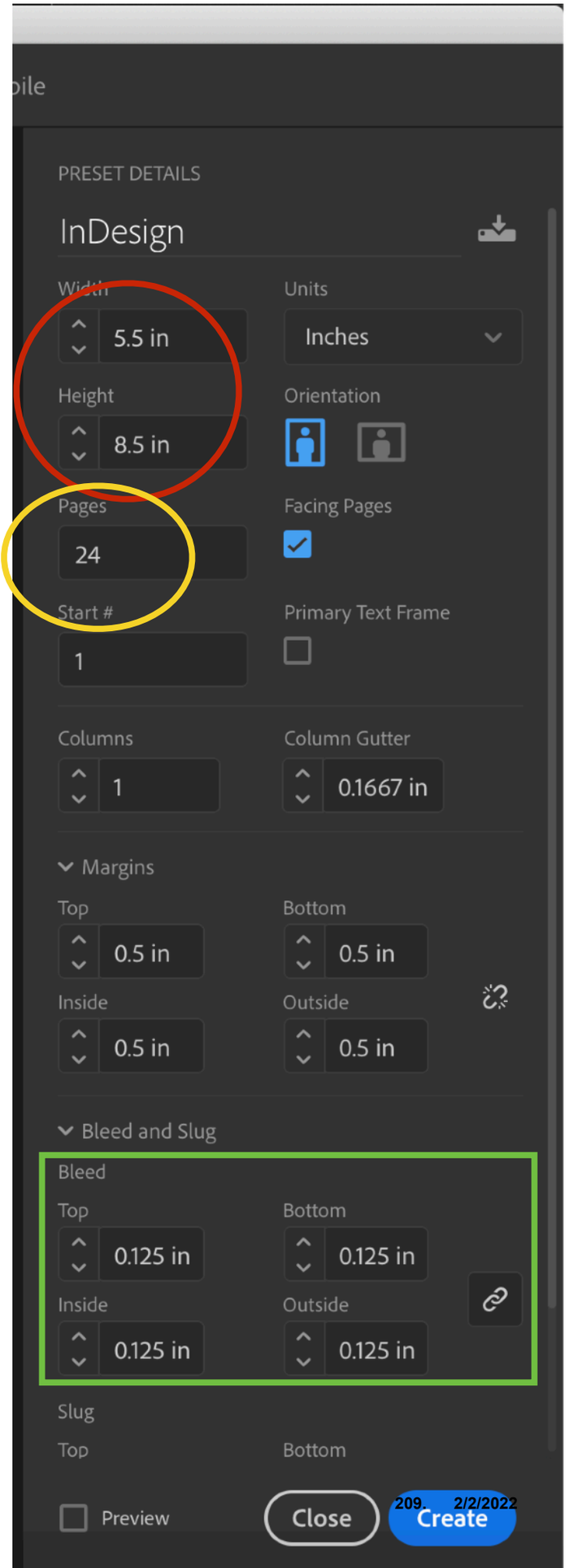
1. Use the correct software:
    1. Illustrator: Single page documents like brochures, flyers, boxes etc. or items with unique shapes, folds, die-cuts
    2. InDesign: Multi-page documents like booklets, magazines, or a set of cards that are all the same size.
2. AI Artboard or InDesign Page should be set as your “trim size” for square items and just large enough to accomodate die line for odd shaped items.
    1. Include a Dieline for any cuts that are not the edge of the “artboard”
    2. Bleed amount should be set in Document Setup and all bleed elements should extend out to red line (usually 1/8 inch or .125 inch) CONFIRM WITH PRINTER.
3. Use Correct Color Mode (CMYK, correct number of spot colors if applicable.)
    1. Document color mode
    2. Swatches used in file
    3. Any linked images
4. Use the “Package” feature to collect fonts & links.
5. Provide Native file, PDF file, Fonts & Links (Some printers also want an illustrator file with text outlined & images embedded - check with printer.)

Choose Correct Software

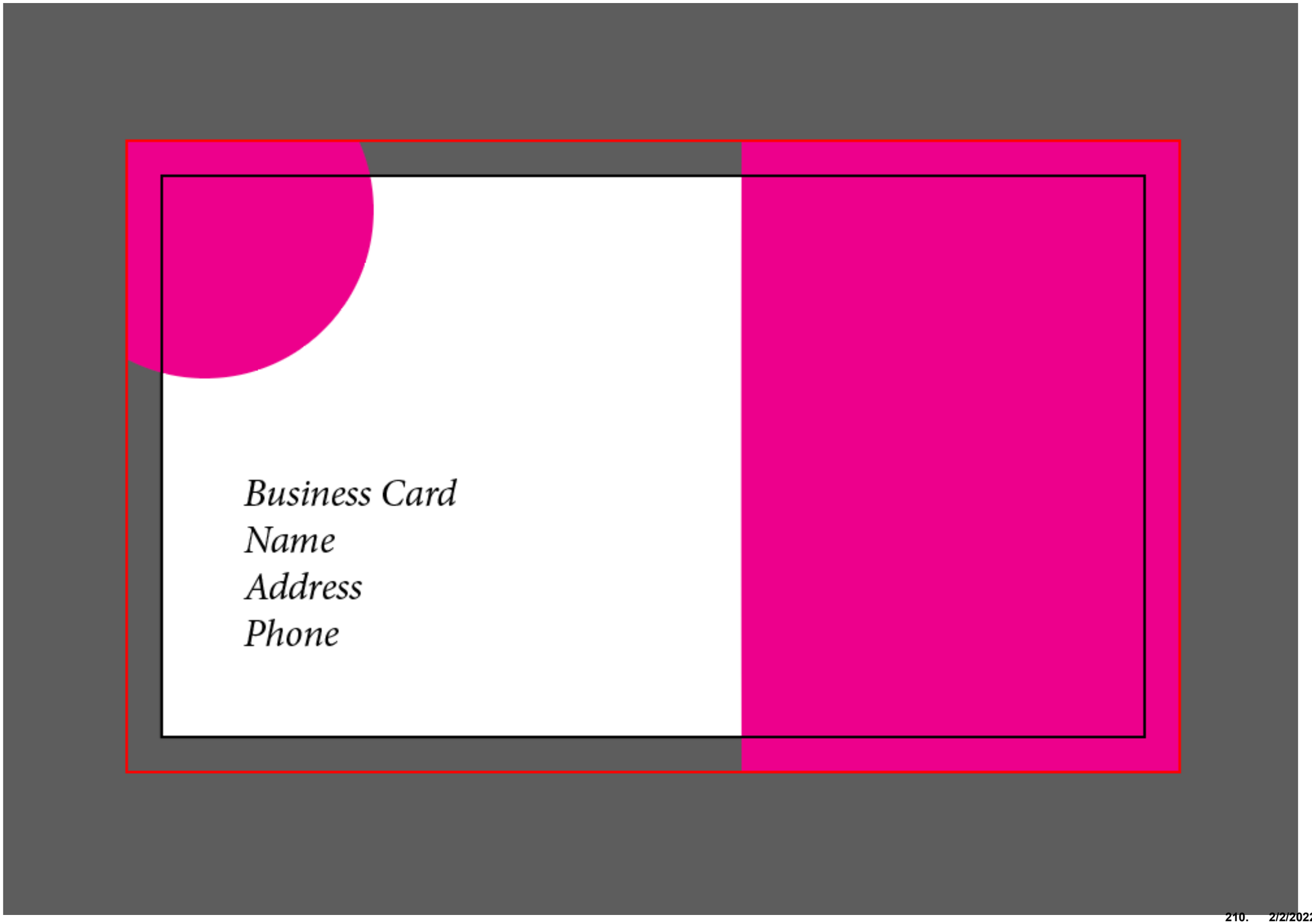
File Set Up

- Set Trim Size
- Number of Pages
- Bleed
- Color Mode





Provide bleed (usually 1/8 inch or .125)

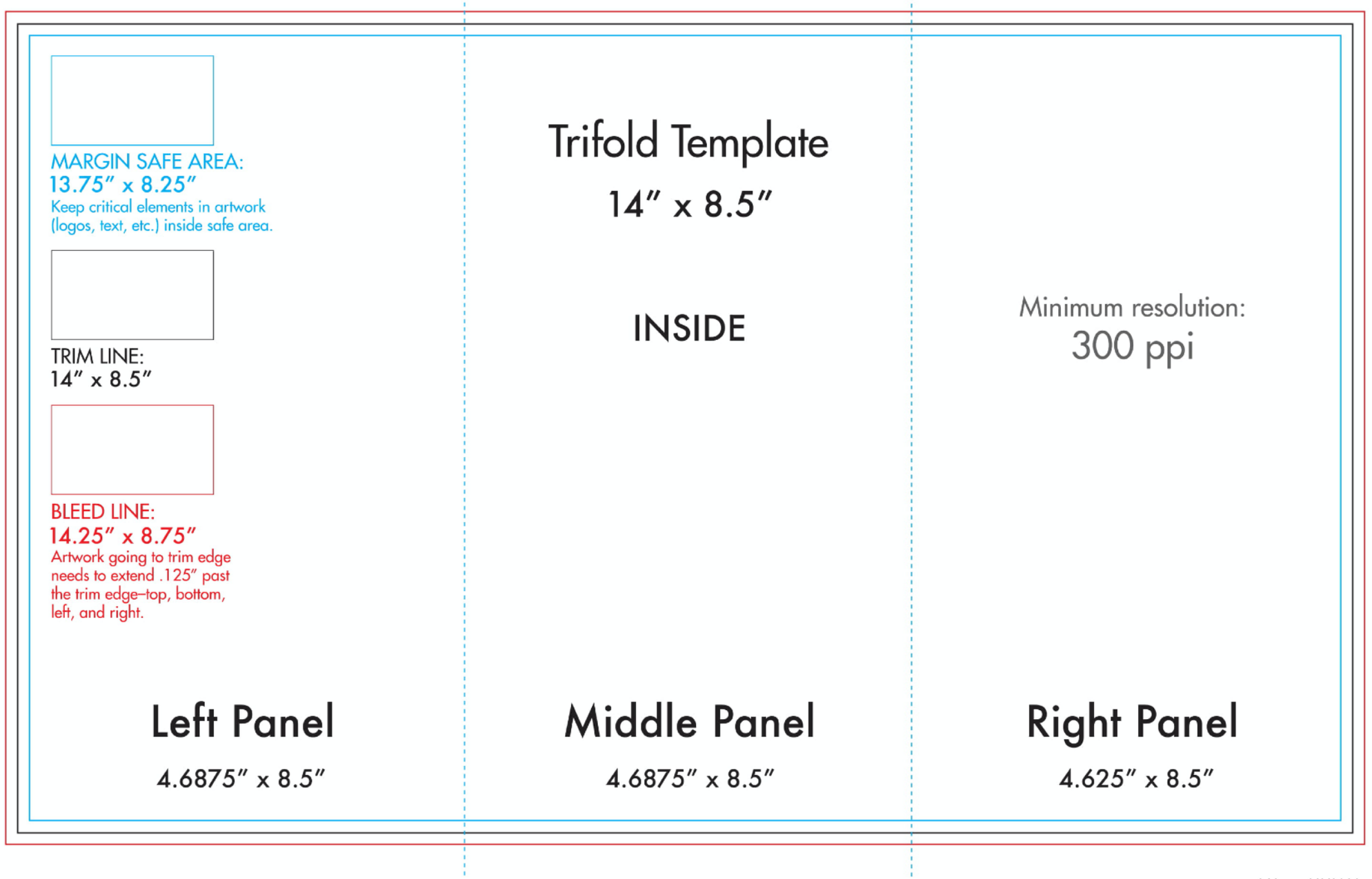



Nut Up
INDUSTRIES INC.
CHOPPED
Sea Salt & Caramel flavor
ROASTED ALMONDS
NET WT. 1.5OZ (43g)
FOLLOW US ONLINE:
nutupindustries.com
INGREDIENTS: ALMONDS, CANE SUGAR, CANOLA OIL, MOLASSES POWDER (MOLASSES, MALTODEXTRIN), SEA SALT, NATURAL CARAMEL FLAVOR. PEANUT FREE.
MANUFACTURED BY:
NUT UP INDUSTRIES INC.
P.O. BOX 216
ESCALON, CA 95320
Nutrition Facts
1 servings per container
Serving size 1 Package (43g)
Calories 270 per serving
Amount/serving % DV
Total Fat 22g 28%
Saturated Fat 1.5g 8%
Trans Fat 0g
Cholesterol 0mg 0%
Sodium 125mg 5%
Amount/serving % DV
Total Carb. 10g 4%
Fiber 2g 7%
Total Sugars 4g
Incl. 3g Added Sugars 6%
Protein 9g
Vitamin D 0% • Calcium 8% • Iron 6% • Potassium 6%
BEST BY:
LOT#:
8 56828 00602 7


Nut Up
INDUSTRIES INC.
CHOPPED
Sea Salt & Caramel flavor
ROASTED ALMONDS

Be aware of **print-to-cut registration** tolerance:

- Stay away from edges
- Know your “Safe” area



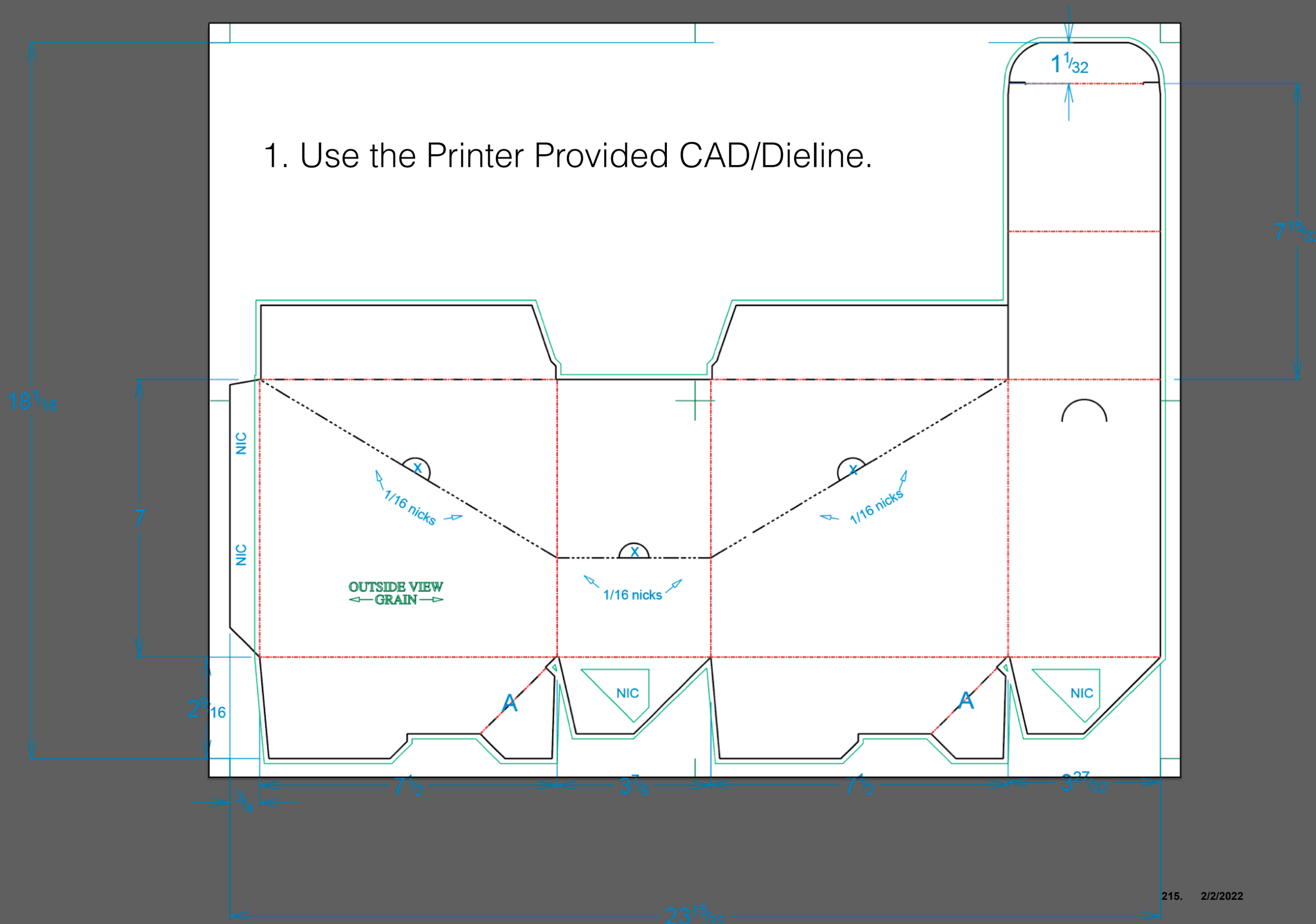
Which will look better if print-to-cut registration is slightly off?

The mis-registration is the SAME on both designs.

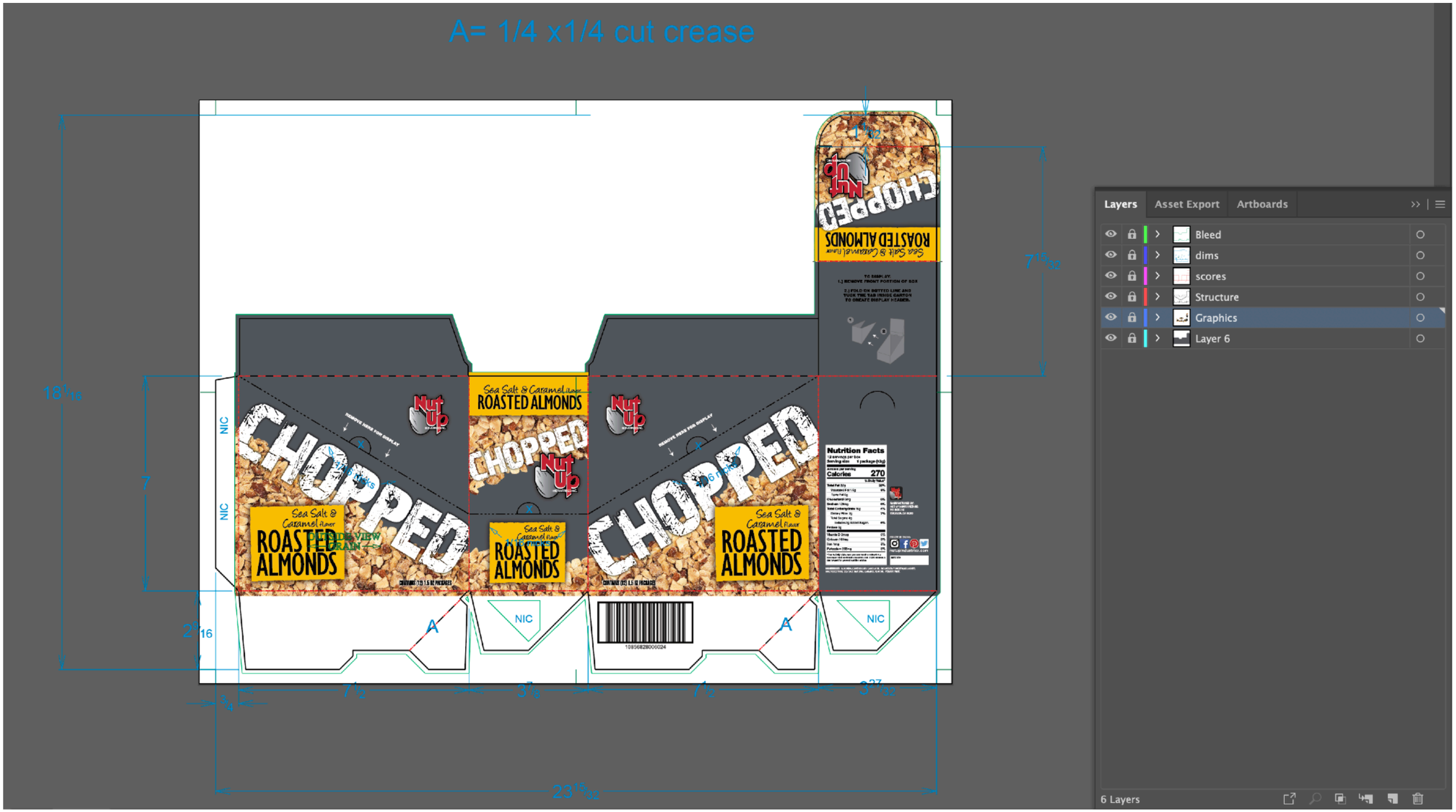
How should this file be set up for the printer?

A= 1/4 x1/4 cut crease

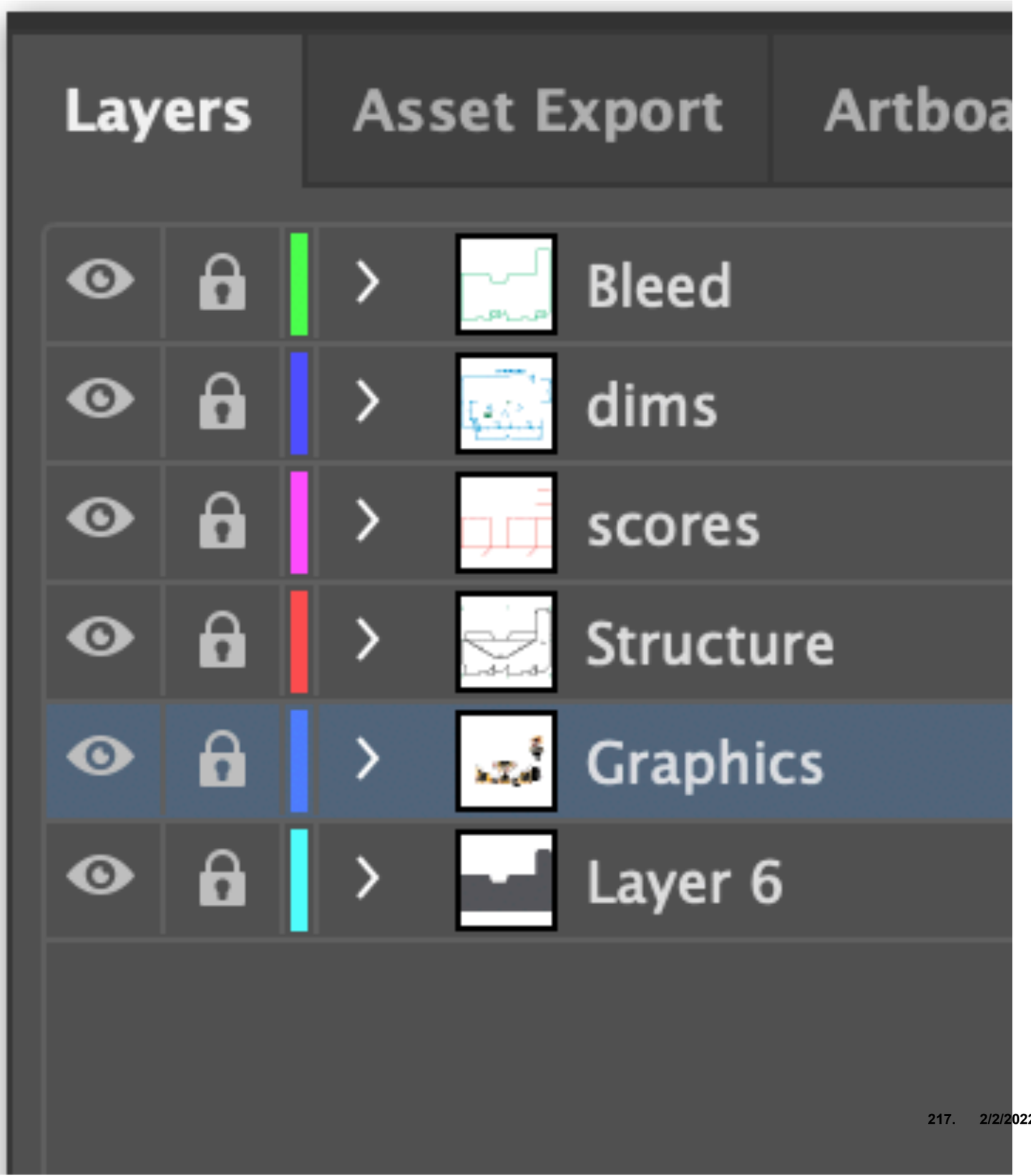
1. Use the Printer Provided CAD/Dieline.



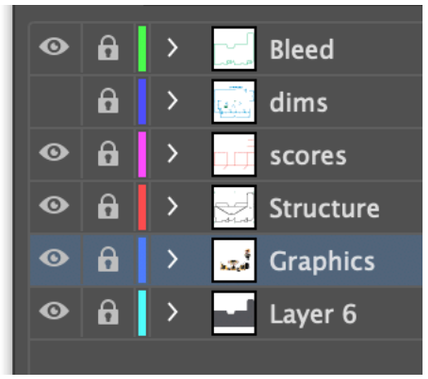
2. Use layers to keep information organized.

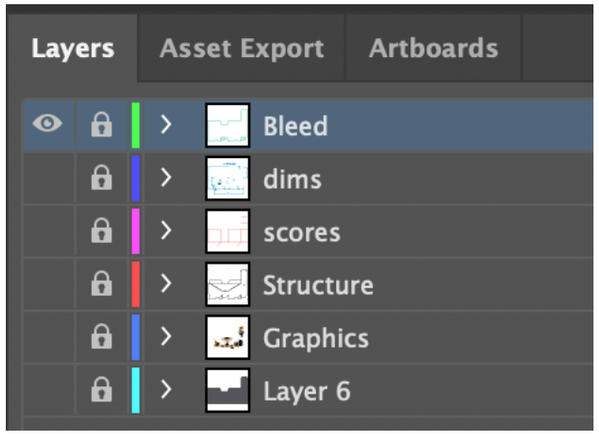


Layers:
Bleed
Dimensions
Scores
Structure
Graphics
Background

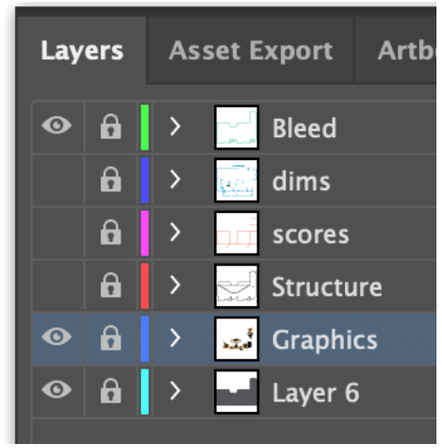


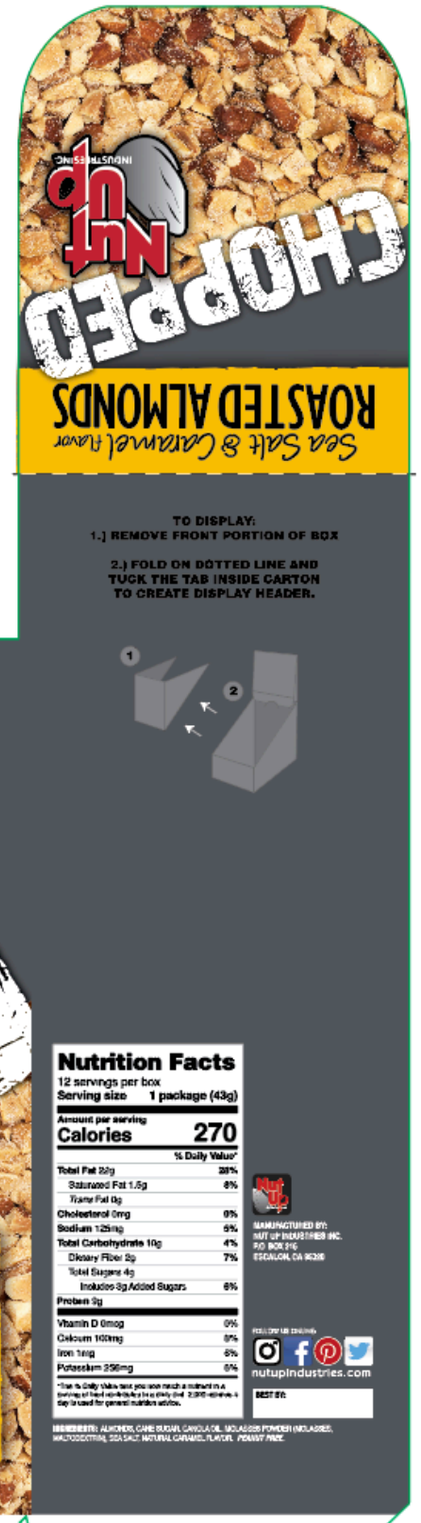
Can’t use the Illustrator setting for “bleed” since it’s irregular shaped. You must create a layer with the shape.



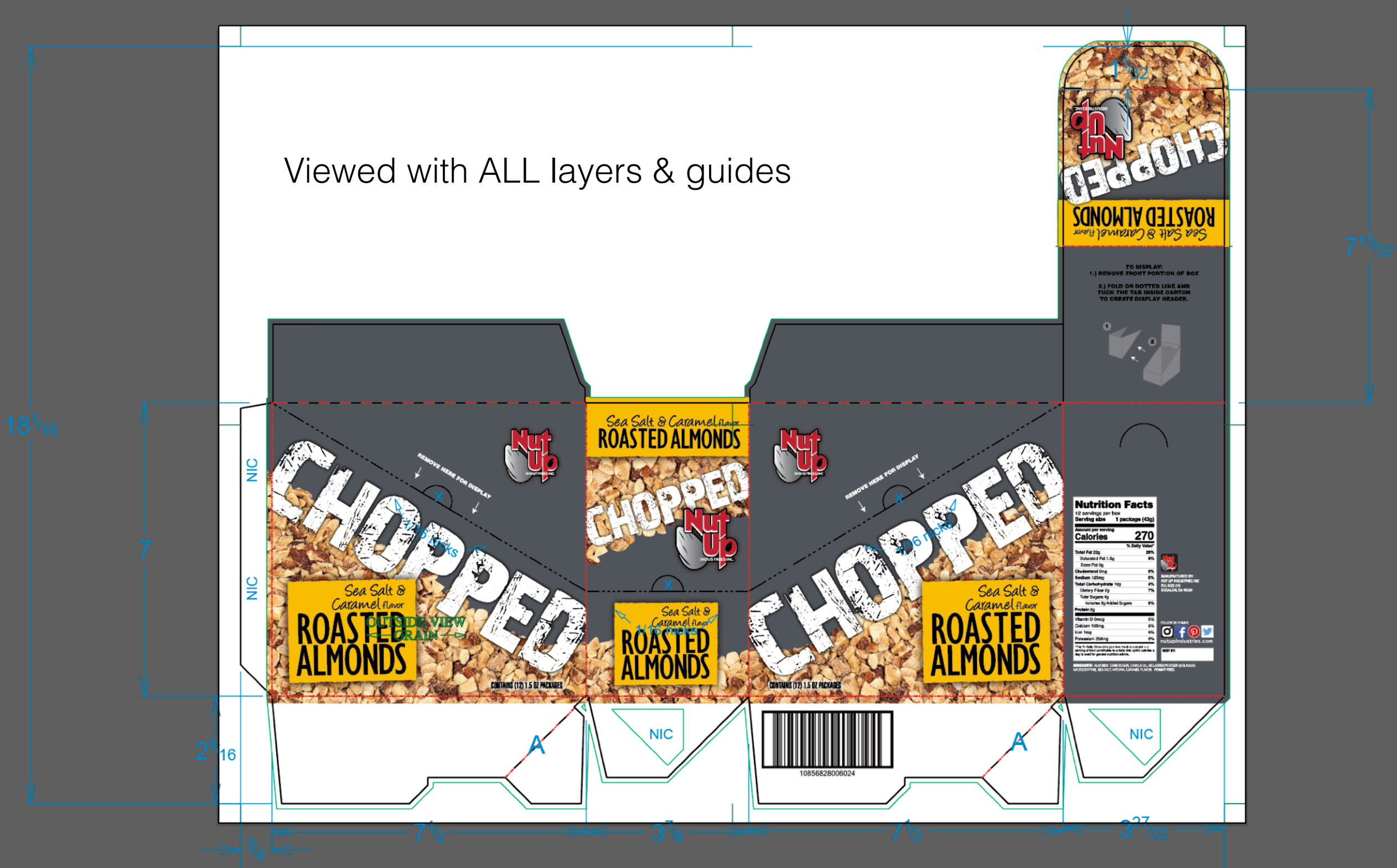

Layers
Asset Export
Artboards
Bleed
dims
scores
Structure
Graphics
Layer 6

- Separated the “dimensions,” “bleed,” and “structure” into their own layers
- Graphics are pulled out to the “bleed” line & extend past the scores on the bottom.





Viewed with ALL layers & guides



Setting up Bleed

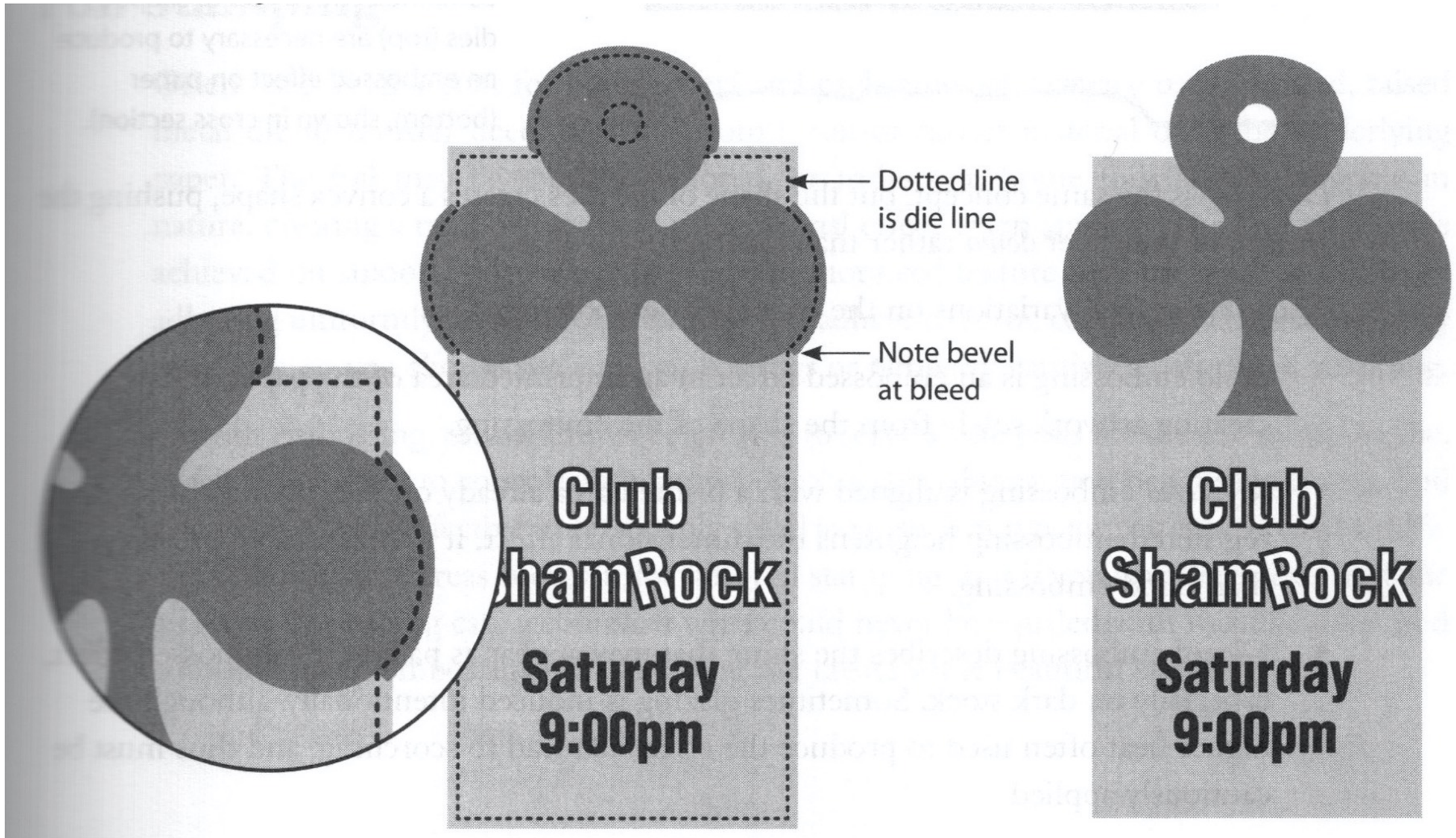


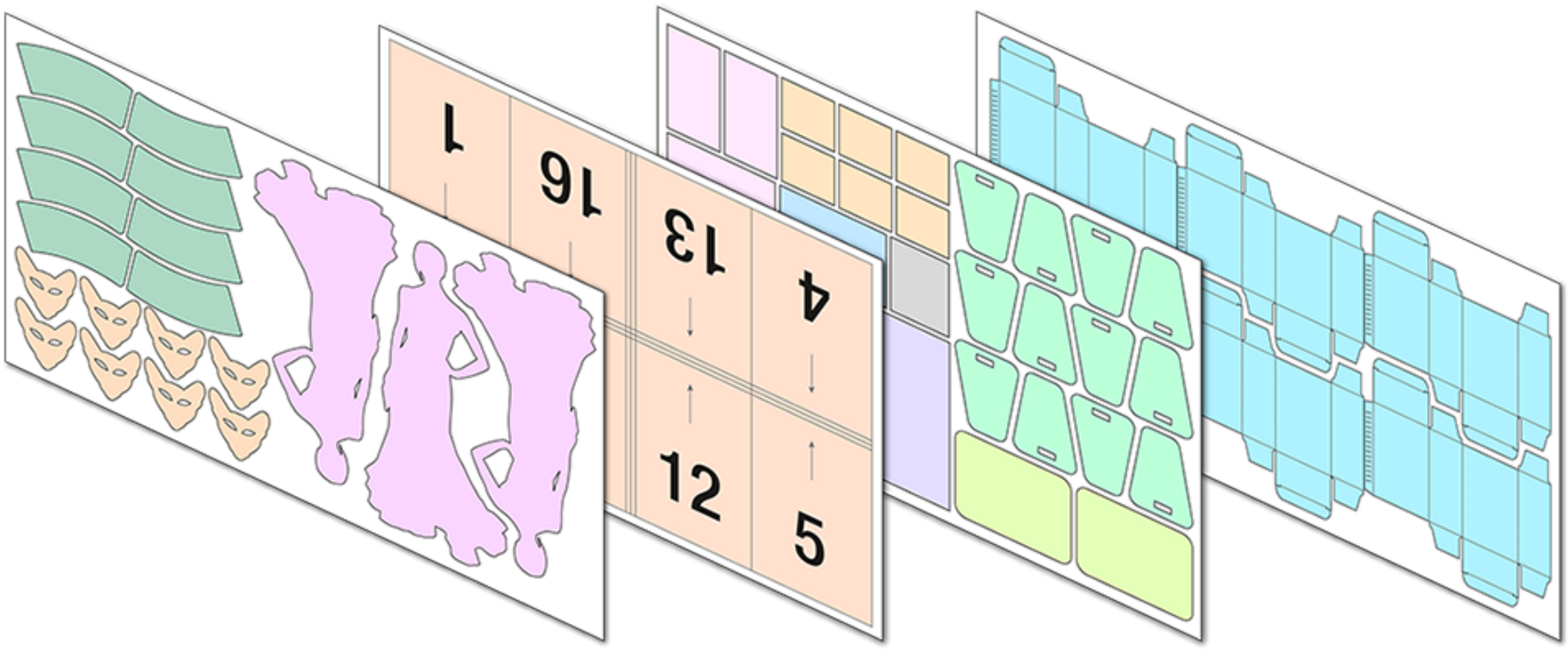
Figure 3.31 Die-cut pieces like this hang tag may require complicated bleed construction. Note beveled treatment where two colors meet (left). Finished piece (right).

Imposition

Figure 3.13 Simple, ten-up imposition for homemade business cards. Looks easy enough (dashed lines indicate trim).

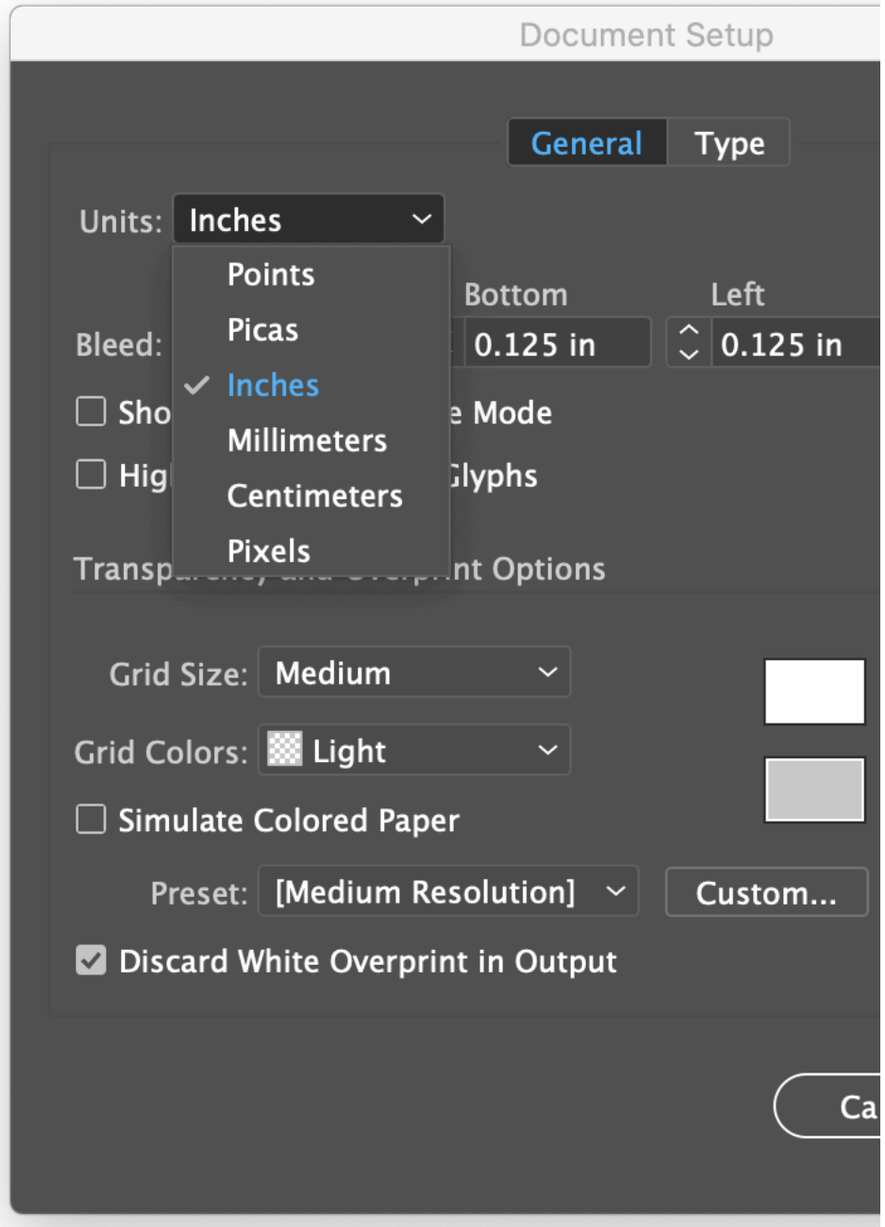
Imposition/Gang Printing

- Also known as the “number up”
  - “This is printing 10 up” means there will be 10 of them on the press sheet.



Which Measurement to use?

- It depends!
- Ask your printer if they have a preference
- Points/Picas traditionally used for page layout/newspaper
- Pixels - web/media
- Metric - international
- I like Inches *(that's what my brain is used to!)*



Resizing Images

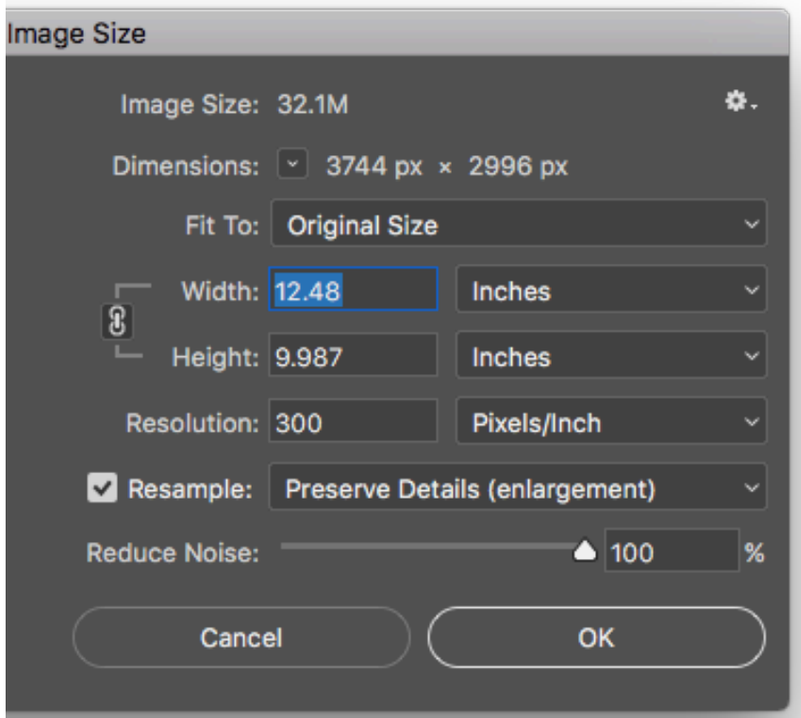
Prepping images for print: Steps

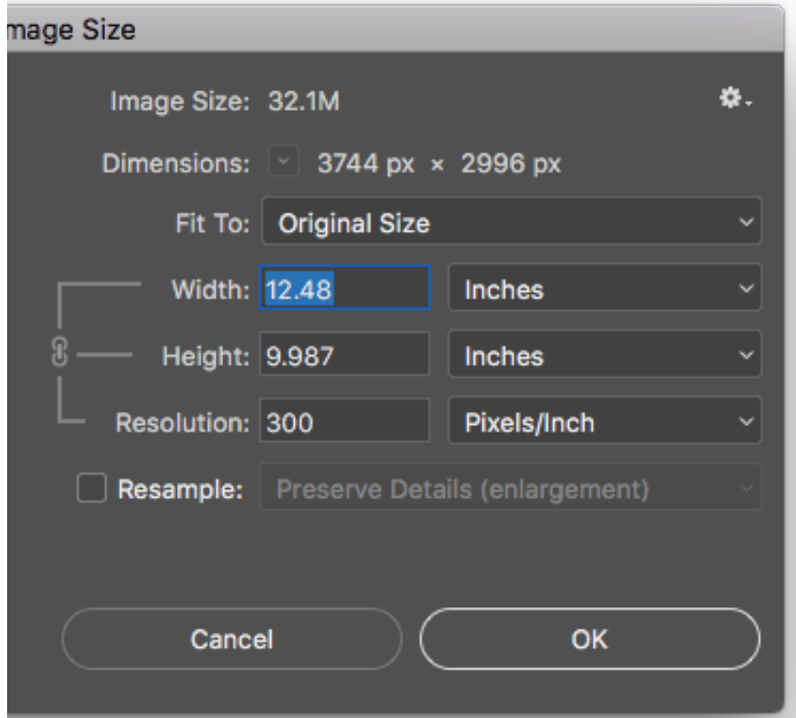
- Adjust Size/Resolution (if needed)
  - Scaling has limitations
- Crop
- Make any color corrections
- Convert to CMYK
- Save As – use appropriate file type
- Place image in InDesign or Illustrator AT THE APPROXIMATE PRINT SIZE

Prepping images for print (Recommended Resolution)

- Images should be provided at the correct size and resolution
- Web = 72 ppi
- 150 LPI = image resolution 300 ppi
- 85 LPI = image resolution 150 ppi

Resizing Images: Resample Check Box





- **Checked** Resample: Change image size or PPI without affecting the other, *(will reduce or enlarge amount of data in the file)*
- **Unchecked:** Do Not Resample: If you change the image size, the resolution will change proportionally. *(No change to file size, the amount of data remains the same).*