

Image Resolution

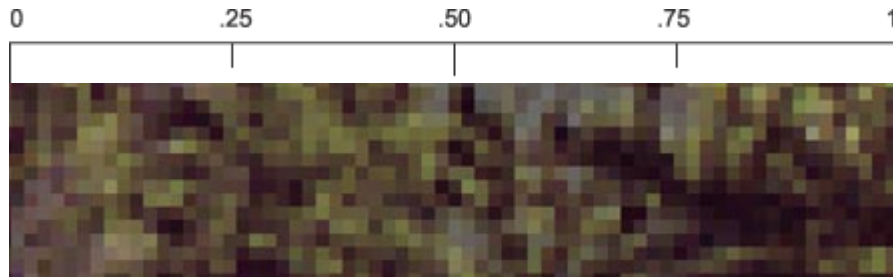
Finding Happiness at 300 dots-per-inch

Rules to remember

1. Text should be 400dpi at the final size in the layout.
2. Images should be 300dpi at the final size in the layout.
3. Resolution and size (dimensions) are inversely proportional to each other. So, if you enlarge an image, you lower its resolution. If you reduce an image, you increase its resolution.
4. How an image is originally acquired will determine its resolution, and thus the size it can print at for clear and crisp printing.
5. Low resolution images print with jagged edges and appear fuzzy.

Proper Resolution is Important for Good Printing!

Resolution is the measurement of the number of squares of color information in an inch.



The human eye cannot detect the squares of color if there are 300 or more in an inch. For clear and crisp printing, images at their final size in the layout should be at 300dpi (dots per inch = squares of color in an inch) or 400dpi if the images include text.

Resolution Resolution
= 400 dpi = 72 dpi
(Crisp) (Fuzzy)

Resolution and size of an image are in inverse proportion to each other. An image 2 inches x 2 inches in size at 300dpi increased in the layout to 4 inches x 4 inches has a new resolution of 150dpi.



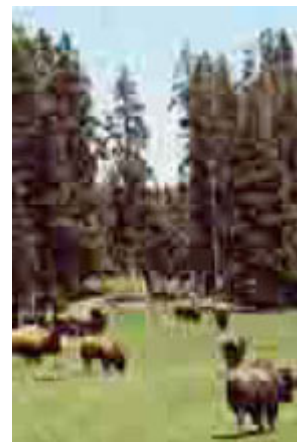
Resolution = 300dpi
Will print well



Zoom of 300dpi image
Will print well



Resolution = 72dpi
Will not print well



Zoom of 72dpi image
**This is what the whole thing
will print like. -Ugly**

Upsampling

Upsampling is when a low resolution image is saved to a higher resolution with no changes in dimensions. This process adds more pixels squares in an inch (dpi), but creates blurry images, ugly blocks of color, and high contrast in images. Upsampling will not produce clear and crisp printing results on a printing press.



72 dpi image Upsampled to 300dpi
This will not print well on press.

How the original image is acquired will determine its resolution.

Images from the Internet

Jpeg and Gif files are Internet images, saved with a compression process designed to remove color and visual quality to achieve small file sizes. Internet images are usually saved at a resolution of 72 dpi for quick screen loads and will not print clear and crisp on a printing press.

Physical dimensions of an image and resolution are in direct proportion to each other. Shrinking the physical dimensions of an Internet image by 4x will achieve decent printing results. (72dpi x 4 = 288dpi)

How to calculate the size you must reduce (shrink) an Internet image to get it to print well:

Reduce the size to 24% of its original size. (Because 72dpi is 24% of the 300dpi resolution you want)

Example:

Internet Image that is 3 inches x 3 inches, at 72dpi
You want to shrink it enough to get it to 300dpi for crisp printing
 $72/300 = 0.24$
 $3 \text{ inches} \times 0.24 = 0.72 \text{ inches}$

Zoom into your images to see the quality. Be aware of your design, purpose of your printing, and the needs of your customers before using images from the Internet.

Images from your Scanner

Know the image size required for your layout before you scan. Guess larger if uncertain. If the photo is larger than the layout size, simply scan at 300dpi. If the photo is smaller than the layout size, adjust your scanner settings.

- Adjust the scanner resolution setting

- Adjust the scan percentage size

How to calculate the resolution you must scan a photo:

Increase the scanning resolution above 300dpi by the same percentage you will be enlarging the original photo.

Example:

Photo size = 2 x 3 inches

Image layout size = 5 x 7 inches

$5/2 = 2.5$ (you will be enlarging the photo 2.5 times, or 250%)

Scan photo at 2.5x 300dpi, or 750dpi

If you need to enlarge anything larger than 300% it is best to contact your local service provider for a professional scan.

Images from your Digital Camera

Before taking a picture, determine the quality of an image and how it can be used in a layout. Use the highest quality setting available on the camera. The pixel dimensions of an image identify the resolution. Dividing the pixel width and height by 300 determines the dpi. Divide by 400 for images with text.

For example:

Digital Camera Image (with no text) = 1200 pixels x 1600 pixels

$1200/300 = 4$ inches $1600/300 = 5.33$ inches

Layout size for image = 4 inches x 5.33 inches

The image can print at this size or smaller for clear and crisp printing.

Digital cameras use the RGB color space. When RGB is converted to CMYK, images tend to darken. Brighten and sharpen your image for clearer printing. Convert the image to the CMYK color space, if possible. Professionals frequently use Adobe Photoshop for this task. [Click here](#) for instructions on doing [RGB-CMYK](#) conversions in a variety of programs.

Images from stock photography companies

Know the image size required for your layout before you purchase stock photography online. Please read their information prior to purchase as it will determine, price, color, file size, copyrights, resolution and quality. Each image should be at a resolution of 300dpi for the final size in your layout. Reminder: get the image in CMYK color mode (rather than RGB) if possible. If you get it in RGB, [Click here](#) for instructions on doing [RGB-CMYK](#) conversions in a variety of programs. Here are some guidelines for you to follow:

2 inches x 2 inches @ 300dpi = 600 pixels x 600 pixels = 1.38 MB

4 inches x 4 inches @ 300dpi = 1200 pixels x 1200 pixels = 5.5 MB

8.5 inches x 11 inches @ 300dpi = 2550 pixels x 3300 pixels = 32.2 MB

Images from a friend

How your friend originally acquired the image will determine resolution and printing clarity. Ask your friend where the image came from and refer to the options listed above.

Preferred File Formats

Photographic images can be saved in different file formats. The format of choice is one that does not lose color quality, contrast or file size. TIF or EPS files are examples of lossless file formats. They are designed to print clear and crisp at a resolution of 300dpi at their final size in the layout. JPEG/JPG or GIF files are examples of lossy file formats. They were originally designed for easy file transmission and internet use, not for printing.

When a lossy file format is saved over and over again, the jagged edges are exaggerated. The process creates extra pixel garbage that you do not want printed. Therefore, if you start with a JPEG file that then needs edits, save it as an EPS or TIF file. This way, additional information will not get lost and the quality of the original JPEG image will be maintained.



Extra Pixel Garbage



Original Quality Maintained