Picture Perfect Photos for Print and Web

"There are no rules for good photographs, there are only good photographs."

– Ansel Adams

Our world is visual. From the images you see on screens to the things you read every day, photographs play an important role in conveying emotion, illustrating a point, or explaining a concept. Photographs improve our comprehension and add to our enjoyment. Because of this, they are an integral part of printed material and web sites.

As camera technology has advanced, the quality of the photography we see every day has reached new levels. Couple that with the ease of using a digital camera, and we now see businesses and organizations becoming comfortable with handling their photographic image needs without the services of a professional photographer.

Our job is to reproduce those photographs in printed brochures, sell sheets, marketing material, newsletters, direct mail pieces, signs and banners, and even business cards. Since we want the photographs to reproduce in the best possible quality, we're offering some technical tips on the characteristics of digital photo files to use for printing and web applications. These aren't tips on how to take photographs, but rather what to do once the image is captured and you're ready to submit the photo file to us.

What is a Pixel?

A pixel is a contraction of the words picture element. A pixel is a square that contains a series of numbers that describe its color (for color photographs) or intensity (for black and white photographs).

The greater the number of pixels in an area, the smaller each one is, the more tightly they are packed, and the better our eyes can blend the edges together to create a complete image. As the number of pixels decreases, each one must be larger to fill the area, and the square shape becomes more evident. If there are too few pixels in too

large an area, we will see the individual squares just as we see the individual tiles in a mosaic. One telltale sign of a low-resolution photo print is pixelation, known informally as the jaggies – a curved or diagonal line made up of stair-stepped pixels.

Pixels and Resolution

Resolution is the term for the amount of detail in an image file. You can think of resolution as pixel density. One specification of a digital camera is its resolution capability, expressed in megapixels – one million pixels. A smart phone's 8 megapixel camera can capture roughly eight million pixels of information per inch, while a 16 megapixel digital camera can capture sixteen million pixels per inch. The amount of detail is directly related to photo quality.

Likewise, the resolution of a photo file or print, whether offset, digital, or inkjet, is the amount of detail it contains. Photo file resolution is expressed as pixels per inch (ppi), while print resolution is expressed as dots per inch (dpi).

In general, the higher the ppi value, the more detail in the file and the higher the image quality. But when the number of pixels in the image equals the number of pixels that can be used by the output device – photo printer, offset printing press, digital printer, or inkjet printer – then adding more pixels does not improve image quality and may make file handling and storage cumbersome.

For offset and digital printing, the recommended resolution is 300 dpi when the photograph is in the size desired on the printed page. You can determine a printed photograph's pixel resolution that will be needed for the photo file by multiplying its size in inches by 300. For example, if you want to print an 8x10 photograph, multiply 8 x 300 and 10 x 300, yielding 2400 x 3000 pixels in the photo file.

To determine whether your camera has sufficient resolution for this size of file, multiply the two pixel dimensions (2400 x 3000 = 7,200,000). To translate into megapixels, divide by 1 million, which in this case yields 7.2 megapixels.

Resolution for Web-based Photographs

Like digital cameras, image files, and photo prints, computer screens have a resolution expressed as the number of pixels wide and high in the viewing area. As a standard, most computer screens are set to display between 72 and 96 ppi. This means that image files displayed on a computer screen do not need as high a resolution as files for print. The resolution standard for photographs on the web is 72 ppi, since any additional information contained in extra pixels is ignored. One benefit of the lower resolution requirement is that photo files are smaller, meaning they load faster on the web site.

Using Web-based Photos for Print

If your business uses product shots in its advertising and marketing materials, you may be tempted to download product photos from the manufacturer's or distributor's web site. Considering the resolution requirements for web (72 ppi) and print (300 ppi), it becomes clear that using a web-based photo will not result in a high quality photo in the printed piece when the two photos are of identical size. In fact, you're likely to see the individual pixels and the jaggies on curves and diagonal lines.

What may be possible, however, is to reduce the size of the web-based photo until the resolution nears 300 ppi. A rule of thumb is that web-based images print with acceptable quality at about half the size they appear on screen. So a photograph that measures 4 x 4 inches on screen can be printed as 2 x 2 inches.

File Formats for Photographs

File formats for photographs are a means of organizing and storing an image. The data may be stored in a compressed or uncompressed format, then rasterized into a grid of pixels whose bits define color and color depth. The grid is sometimes called a bitmap. Raster image processing (or RIPping) is a requirement for offset and digital printing. Because raster images are hard to resize and manipulate, they are best used at the size and orientation of the original. Raster images can be cropped, colorized, converted to grayscale or monochrome by using an image editing program such as Adobe Photoshop.

File compression is a way to reduce file size without compromising image quality. There are two types of image file compression. One, called lossless, keeps all the pixels of the original image, but finds more efficient ways to represent recurring patterns of pixels in the file. Another, called lossy, eliminates pixels that aren't needed to maintain quality. Lossy compression results in smaller file sizes than lossless, but may trade that for lower image quality.

For photographs, the preferred file format is Tagged Image File Format (TIFF). TIFFs can be either lossy or lossless, and some digital cameras can save in TIFF format using Lempel-Ziv-Welch (LZW) compression.

Another format for photographs is Joint Photographic Experts Group (JPEG). JPEG compression is usually lossy and produces a significant reduction in file size. Repeated opening and saving of JPEG files results in continual loss of pixels which degrades file resolution over time.

Using Photographs in Print

Our aim is to give you the highest possible quality photographs in all your printed materials. If you are uncertain as to what resolution or file format to use when taking photographs for us to print, give us a call. We'll give you advice based on what you are trying to accomplish, balancing photo quality and file size.

a vocabulary of the graphic arts

Bit: a value of either 1 or 0 (*i.e.,* either on or off).

Byte: 8 bits.

Dithering: using more than one dot to create a pixel.

DPI: an abbreviation for *dots per inch,* a measure of the resolution of a printed photograph.

File size: the amount of space an image (such as a photograph) takes up on a storage device. Expressed as kilobytes (one thousand bytes) or megabytes.

GIF: an acronym for *Graphics Interchange Format.* A graphic file format suited for flat color images and drawings. Created by CompuServ and often used for animated images on the Web.

Image size: the dimensions of the image, such as an 8x10 photograph.

Jaggies: a curved or diagonal line made up of stair-stepped pixels. The result of insufficient resolution of a photo print. More formally known as *pixelation.*

JPG, JPEG: an acronym for *Joint Photographic Experts Group.* A lossy graphics format best suited for photographs and images with a lot of colors.

Kilobyte (KB): 1,024 bytes.

Megabyte (MB): 1,024 kilobytes (1,048,576 bytes). A megabyte of storage will hold 873 pages of plain text or about 4 books.

Megapixel (MP): one million pixels.

Model release: a legal release signed by the subject of a photograph granting permission to publish the photograph. Also known as a liability waiver.

Photo resolution: the number of pixels in an image, usually expressed as the width x the height, or by the total number of pixels in the image (width in pixels x height in pixels).

Pixel: a contraction of picture element. A square containing a series of numbers that describe color or intensity.

PNG: an acronym standing for *Portable Network Graphics.* A graphics format for lossless, highly compressed, raster images.

Shutter speed: the amount of time a camera's shutter remains open allowing light to enter into the lens.

PPI: an abbreviation for *pixels per inch,* a measure of the resolution of a photo or image file.

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Importance of the Model Release

If you are taking a picture of a person to use in your promotional materials or on a web site, it is a good idea to have the person sign a model release. A model release, sometimes called a liability release, grants permission to publish the photograph and is recommended even if the person is not a professional model.

Other situations where you might want a model release include entering the photograph in a contest or posting the photograph on Facebook and other social media or photo sharing sites. Generally speaking, a model release is not needed if the person in the photograph is not recognizable, if the face is hidden in shadow,

or for editorial use (a picture of bystanders at a traffic accident or a photograph taken at a public event such as a parade). Photographing architecture is usually permitted, provided you are on publicly accessible land at the time the shot is taken.

When obtaining photos from a third party, be sure that there is a model release to cover the image. Most reputable stock photography sources have model releases for their images. Be aware that a model release does not cover use that is intended to defame, libel, or humiliate the subject (though a special release can be obtained for these purposes).

Product Photography Tips

If you are photographing products for a brochure or web site, here are a few tips to produce better results.

- *Pay attention to lighting.* Both the quality of the light and the uniformity of distribution matter. A small light source compared to the size of the product creates a hard shadow, while a large light source creates a soft shadow. For product shots, a soft shadow is preferable. You can also use a light diffuser on the flash to distribute the light more evenly.

- *Use a plain white background.* This makes the product stand out and makes shadows more effective. A cluttered or messy background takes the focus away from the product. Professional photographers use an infinity curve, made from a piece of white paper or fabric bent to create a curve, to eliminate any horizon and provide a clean view.

- *Use props to show scale and environment.* Props help viewers identify the product, show its scale, and emphasize its features.

- *Take photos from multiple angles*. You can emphasize special features with close ups and unique perspectives.

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Will I be infringing on copyrights if I download images from the web for use in my product brochure?

You might be. You are free to use images in the public domain or those published under a Creative Commons license. You can also obtain permission from the photographer, artist, or copyright holder.

But if you download an image created by someone else and use it in another format, you may be committing image theft. There is a misconception that images available on web sites are in the public domain. Usually they are not.

Intellectual property, including photographs, belongs to the person who created it. After a certain amount of time, intellectual property passes into the public domain and may freely be used by anyone. Because of a number of amendments and changes in copyright law, what is and isn't covered by copyright depend on two things: (1) when the item was created; and (2) whether it was published.