

Image File Formats

There are two major graphic types; **Vector** and **Bitmap**. Bitmap images (also known as raster images) are made up of pixels on a screen. Pixels are picture elements; tiny dots of individual color that make up what you see on your screen. If the image is enlarged, you will see pixels. All crispness will be lost. Vector images are composed of multiple objects and work from the principal of PostScript code.

VECTOR IMAGES

EPS stands for **Encapsulated PostScript**. These files can contain either vector or bitmap images.

Vector EPS

- Common vector formats include, **AI** (Adobe Illustrator), **EPS** (Encapsulated Post Script), **CDR** (Corel-DRAW!), **CMX** (Corel Exchange), **CGM** (Computer Graphics Metafile), **DXF** (AutoCAD) and **WMF** (Windows Metafile).
- Vector images are made up of **scalable objects** that are constrained by mathematical equations and not by pixels.
- Vector images are **independent of resolution (unlimited)**. Consequently, vector images print at the resolution of the output device.
- Size of vector images can be **increased or decreased to any degree** without adversely affecting the quality of the images, both on screen and in print. For this reason, most logos are created in vector format mainly because of the vast uses and media that such images appear on.
- Size of vector image files are **much smaller** than the equivalent raster images. This is because mathematics of vector art allow very large shapes to be described using extremely small amount of data.
- Vector images are **unsuitable** for producing photo-realistic imagery.
- Vector images can be **rastersized** or converted to bitmap images.
- When vector images are rastersized, the images **lose** all the properties/qualities/advantages of vector format.
- Also, when a vector image is opened in a bitmap editing program (i.e. Photoshop) the images **lose** the vector properties/qualities/advantages and are converted to raster data.

Advantages of the Vector file format:

Images can be printed in 1, 2 and 3 **SPOT** Colors. (Offset printing)

Images can be printed in Full Color **CMYK** (4 Color printing process)

Each design element can be edited separately.

File size is small enough to fit on a floppy disk.

Note: There is a caution warning to be made here about EPS images: most printers won't have any trouble working with this format but your computer's printer might if it is older. EPS files use PostScript code this means that the printer must be what is called PostScript enabled in order to print an EPS image clearly. Most recent printers have PostScript interpreters. It's a feature to consider when shopping for a printer. EPS images will work on both Macintosh and Windows platforms.

PDF - Portable Document Format.

- When saved from Illustrator, there is an option to "Preserve Illustrator Editing Capabilities". Checking this will allow a PDF to be used as a hi res image. Once it is opened in Illustrator it can be broken apart, colors changed or elements altered just like a native AI or EPS file.

BITMAP IMAGES

TIFF (also TIF) stands for **Tagged Image File Format**. It is strictly used for bitmap data and doesn't contain text nor vector data.

- The standard universal format for high quality images, especially photos.
- The most universal and widely supported format across all platforms (Windows, Mac or Unix).
- TIFF images can contain just about anything, such as: Line-art (pure B/W), grayscale, RGB or CMYK
- At a high resolution, their file size can be HUGE, which can present problems with transferring via e-mail or saving to floppy disk.
- Optimal printing resolution is at least 225 dpi at final output.

JPEG (also JPG) stands for **Joint Photographic Experts Group** (the original name of the committee that wrote the standard) and is a standardized image compression mechanism.

- JPEG images are small, often compressed by up to 90%.
- JPEG does not handle black-and-white (1-bit-per-pixel) images, nor does it handle motion picture compression.
- This is common format for those photo images that must be very small files, such as for websites or e-mail.
- The JPEG format is “lossy”, meaning “with loss”. The image you get out of decompression isn't quite identical to what you originally put in. You lose detail every time you “Save As” a JPEG.
- Optimal printing resolution is at least 225 dpi at final output.

GIF is the abbreviation of **Graphics Interchange Format**.

- GIF is a file format that should not really be used for prepress, it is far more suited for web design or to exchange images through e-mail or newsgroups.
- Each color in the GIF color table is described in RGB values, CMYK colors are not possible in GIF.
- Although GIF does not require a specific resolution, most GIF images have a resolution between 72 and 90 dpi, ideal for on-screen viewing but insufficient for prepress use.

Bitmap EPS

There are times when bitmap files are saved as EPS images. Files with clipping paths in Photoshop (an image which you have outlined or clipped so that only certain parts of that image shows and prints when imported into a page-layout program) can only be saved as EPS files.

- If opened in Photoshop, a vector EPS image will be **'rasterized'**, which simply put, is the process of changing a vector image into a bitmap image.
- Optimal printing resolution is at least 225 dpi at final output.

PDF

- When “Saved As” from Photoshop or “Exported” from InDesign, the PDF is rasterized and therefore won't have the Illustrator editing capabilities (layers, colors, etc.), but can still be used as a graphic in InDesign for example provided it has high enough resolution.

Other common bitmap formats include: BMP, PNG, PICT (Macintosh), PCX and PSD (Adobe Photoshop). Popular bitmap editing programs are: Microsoft Paint, Adobe Photoshop, Corel Photo-Paint, Jasc Paint Shop Pro, Ulead PhotoImpact.

Image Scaling

Vector EPS

100%



200%



300%



400%



500%



300 dpi TIF

100%



200%



300%



400%



500%



225 dpi TIF

100%



200%



400%



72 dpi JPG (from website)

100%



200%



200%



Image Resolution

Resolution is a **measurement of the output quality** of an image, usually in terms of samples, pixels, dots, or lines per inch. The terminology varies according to the intended output device. **PPI** (pixels per inch) refers to screen resolution, **DPI** (dots per inch) refers to print resolution, **SPI** (samples per inch) refers to scanning resolution (which equals 1/2 DPI), and **LPI** (lines per inch) refers to halftone resolution.

Often images are referred to as high resolution (hi-res) or low resolution (low-res). High resolution would be an image intended for print, generally having 300 samples per inch or more. Low resolution refers to images only intended for screen display, generally having 100 pixels per inch or less.

Image resolution and dimensions are proportional. When one goes up the other goes down, and vice versa. The prior section on image scaling illustrates this. You can't just hit that magic button on your keyboard and add resolution to an image. The graphic has what it has when it is created.

Color Modes

RGB Color - Colors are formed with a mixture of **R**ed, **G**reen and **B**lue. Mostly used for web purposes. Your monitor is also RGB. **Keep in mind, PDFs can vary 10-15% in color depending on monitor settings.** For this reason, a PANTONE color fan is a must in any marketing person's office.

CMYK Color - Colors are formed with a mixture of **C**yan, **M**agenta, **Y**ellow and **B**lack. Otherwise known as Full, Process or 4-Color printing. Generally this is the most expensive printing process.

SPOT Color - 1 or more (PANTONE) inks. 1 plate is made for each color. Less expensive than full-color printing.

Grayscale - Black and white images with half tones (grays).

Black and White - Black and white images, no half tones.

Software, Layout & File Submission

Creative Suite by Adobe. This software package includes full versions of **InDesign** (desktop publishing), **Photoshop** (raster art - TIF, JPG, GIF, etc.), **Illustrator** (vector art), **Acrobat** (PDF) and **GoLive** (web publishing). If you are a do-it-yourselfer this investment will pay for itself within a year.

Publisher and Word documents will be re-laid out, at least by us. However, this is fine to submit so we can get an idea of what you are looking for, but won't necessarily save you any money. They aren't compatible with high-end RIP systems (output devices that produce film for printing).

“Native Formats”

Almost every software program has a file format that is native to that program, and that program alone. Photoshop's is PSD; InDesign's is INDD; and so on. When submitting a graphic, don't place it into Word and send that. If you lay out a project yourself, collect it, either internally or with a third-party software program (i.e. Markzware's FlightCheck) and then ZIP (WinZIP) or stuff it (Stuffit). This will ensure that all files and fonts will be included for the vendor. This will compress all the files so they can be e-mailed or sent via FTP with less of a chance of getting corrupted.

Fonts

Fonts probably cause the biggest problem in prepress workflows.

- On Macs, PostScript fonts consist of a file containing the outline fonts (the printer font) and one containing a bitmap representation of the font in at least one point size. This bitmap file is called the screen font and it also contains the metrics data.
- On the Windows operating system, two files are used as well: one uses the file name extension “.PFB” file and it contains the outlines. The other file carries the extension “.PFM” and contains the metrics data.
- GaramondBold IS NOT the same as Garamond Bold. There are a million fonts that look the same but have a different name. Don't assume wherever you are sending your file has the font you used.

Regardless of platform, it is best to include all font files when collecting a job to send on to a vendor. If not, you run the risk having another font substituted and possible mistakes on the printed piece, such as text run-ons.

Project Sizes

Insert - Dimensions are usually anywhere from 3.5” x 6” to 3.5” x 8.5”, can either be one or two-sided, no fold.

Letter - 8.5” x 11”, 2-Page

Legal - 8.5” x 14”, 2-Page

Tabloid - 11” x 17”, 4-Page

Postcard - 5.25” x 8” and up (provided it meets a certain postal ratio)

DMP - Direct Mail Piece. Can be any of the above sizes. Requires an outgoing mail panel.

Helpful Websites

PANTONE Inc. - www.pantone.com - Go here to find help on color issues and to purchase your very own color fan. A very important marketing tool!

Adobe Systems Inc. - www.adobe.com - This is the place to buy your version of the Creative Suite (InDesign, Illustrator, Photoshop, Acrobat and GoLive). Also to download the latest version of Acrobat Reader, which is version 7.

The Peachpit Press - www.peachpit.com - A great place to find all kinds of books about color, design, software, the Internet and technology tips & tricks.

About.com - www.desktoppub.about.com

About.com - www.graphicsoft.about.com

My Prepressure Page - www.prepressure.com - A great reference for those do-it-yourselfers. Has a lot of technical (and not-so-technical) information about everything I talked about and more.

www.suzannecooper.com/classroom/colorwheel.html

www.webwhirlers.com/colors/wheel.asp

➤ References for help on color selections and color wheels.