



JPEG Compression

What it is – When to Use It – And When Not To

What is JPEG Compression?

JPEG Compression is the name given to an algorithm developed by the Joint Photographic Experts Group whose purpose is to minimize the file size of photographic image files. JPEG compression is a powerful tool, and with great power comes great responsibility. While JPEG compression can help you greatly reduce the size of an image file, it can also compromise the quality of an image - and if you aren't careful, there may not be any recovery.

It is for this reason that we recommend saving your images in a lossless format such as TIFF. For instructions on how to do this, [please see page 4](#).

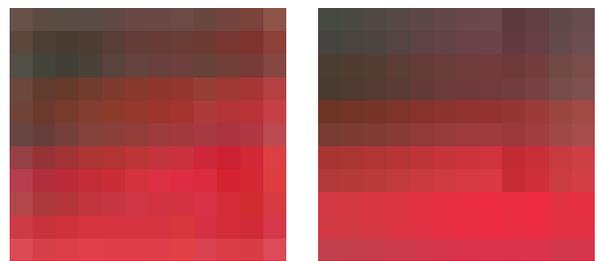
Keep in mind that for the purposes of discussion, we are talking about JPEG Compression, which is not to be confused with the .JPG file format. While all .JPG files are indeed JPEG compressed, JPEG Compression can be used in many other file formats, including EPS, PDF, and even TIFF files.

In order to understand JPEG compression better, it helps to understand how computers represent photographic images. An image file can be thought of as a grid of individual blocks called *pixels*. Each pixel has its own color value, and the larger the image, the more pixels. The more pixels, the larger the resulting file will be.



Photographic images are made up of individual blocks called pixels.

In order to reproduce the image once the file has been closed, the unique color of every pixel must be re-recorded. JPEG compression attempts to create patterns in the color values in order to reduce the amount of data that needs to be recorded, thereby reducing the file size. In order to create these patterns, some color values are approximated to match those of nearby pixels. You can almost think of it as “rounding off” the color values.



A sample of pixels pre-compression (left) and post-compression (right). Notice there are fewer individual colors and larger groupings of similar colors in the example on the right.

What does this mean for image quality? Fundamentally, JPEG compression tends to even out transitional colors: the points in an image where one color becomes a different color. This results in pixellization, where the image takes on a blocky appearance.

Moreover, the JPEG Compression algorithm is applied every time you save your file, meaning that any damage being done to your image is cumulative and, in many cases, irreversible.



Clockwise from upper left: Progressively worsening compression artifacts caused by multiple saves of the same image.



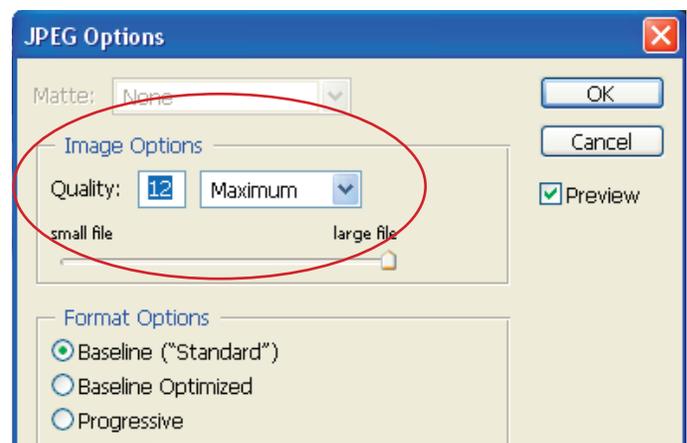
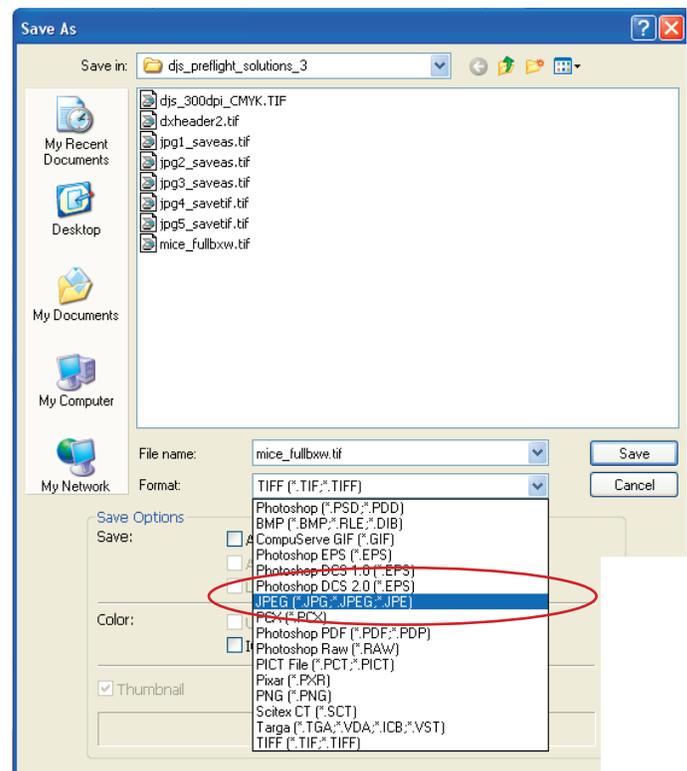
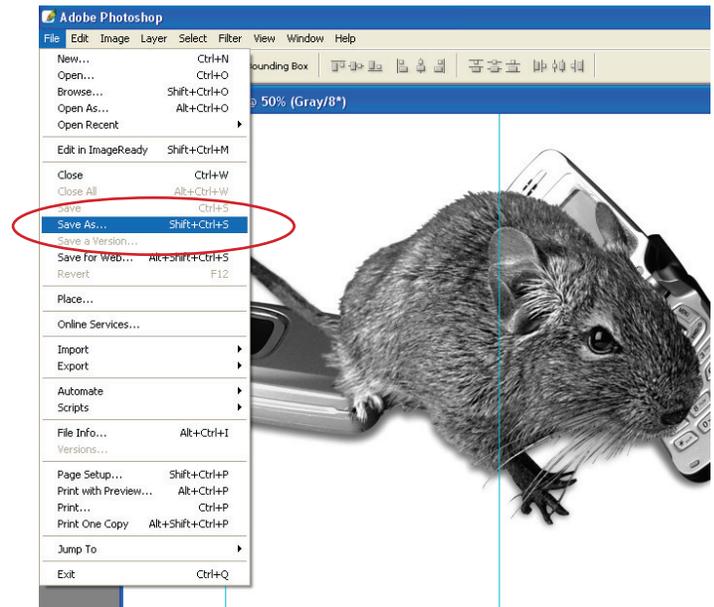
In Adobe Photoshop, files can be saved in the JPEG format and the specific compression level is selectable within a range. There are thirteen total levels of compression available in Photoshop®, numbered from (0) to (12). Choosing a lower number results in greater compression and smaller file sizes at the expense of detail and quality. Low quality compression often generates “artifacts” within an image... uglyw, blurry bits of data that affect the legibility of type and degrades image detail.

Open a file, then select (File->Save As...).

Select JPEG from the Format pull-down menu.
Select the Save button.

- The JPEG Options slider can be moved horizontally for quality level selection. In this example, “Quality: 12 - Maximum” has been chosen. Under Format Options, there are options useful for online display purposes, but these can be disregarded if using the image for print-production. Baseline (“Standard”) is chosen for best compatibility with web browsers, Baseline Optimized for a slightly smaller file size, and Progressive for gradual display of the image online as it downloads into a browser. Baseline Optimized and Progressive are not supported by all web browsers, so it is best to use Baseline Standard in most cases. Again, note these are useful when creating JPEG files for online display. The JPEG format is not recommended for files intended to be used in print production. Instead, stick with lossless TIFFs for raster based images.

As mentioned previously, high levels of compression often result in visible artifacts... data not present in the original image that blurs detail and decreases text legibility. On the following page are some visual examples of image “artifacts.”



Note the blurring of detail in the drop-shadow and cell phone areas.



Maximum quality/low compression
JPEG image saved at Level (12)



Low quality/high compression
JPEG image saved at Level (2)

Image degradation caused by high compression is typically quite prominent when there is black text on a white background.



Low quality/high compression
JPEG image saved at Level (2)

Saving a raster image file without JPEG compression

TIFF (Tagged-Image File Format) is a flexible raster image format supported by virtually all image editing and page-layout applications, therefore making it a preferable choice for saving high quality raster-based images. However, it is important to avoid introducing JPEG compression during the file save.

- Open a file, then select (File->Save As...).
- Select TIFF from the Format pull-down menu.
- Select Save button.

When saving TIFF files for print production, select None, LZW, or ZIP compression to make certain images are not degraded from their original form.

Please Note: Adobe Photoshop® CS 4 running on the Windows XP platform was used to generate the example screenshots for this tutorial. Other versions of Photoshop® may contain menus that slightly differ, however, all critical parameters and options used herein are available in previous versions.

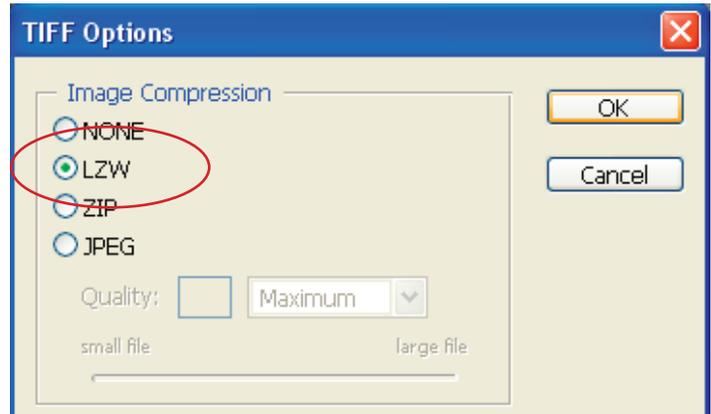
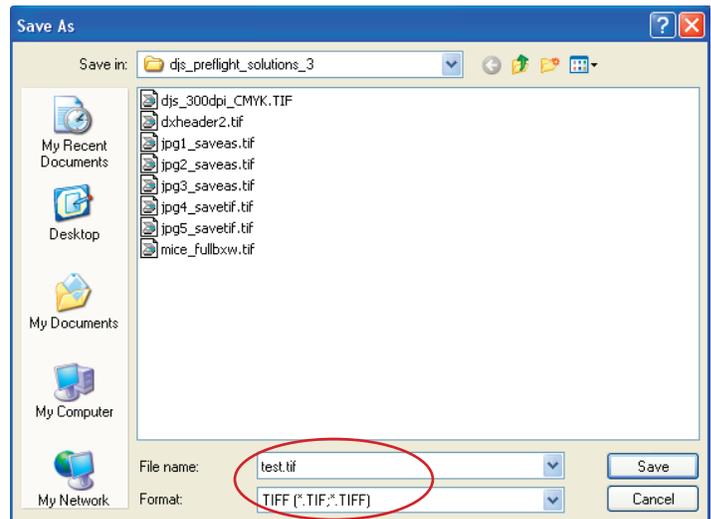
When to use JPEG Compression

JPEG Compression is very useful for images that will be viewed online, where the size of the image makes a big difference in how long it takes a page to load. Plus, the limited resolution of most computer monitors means that slight imperfections in the quality of the image will not be as noticeable.

Judicious use of JPEG Compression can also be useful when printing a publication that may have hundreds or thousands of images, such as a high school yearbook. In this case, compressing the images slightly will save a large amount of space while sacrificing little-to-no quality.

However, if you have an image with lots of crisp, sharp lines, such as a line drawing or bar graph, it's better to save using a file format that supports lossless compression, or no compression at all.

It's important to note that if you are creating a PDF document with several images, your image compression settings will apply to *all* the images in the document, so be sure to take this into consideration when exporting.



An easy way to preserve your images is to save them in multiple formats. Save one copy using a lossless format, such as TIFF, and the save a duplicate image as a .JPG. When editing images, save *only* your final image as a .JPG – remember, each time you save a .JPG, you re-apply the compression algorithm, and lose more pixels.

Don't be afraid of JPEG Compression!

As with any tool, JPEG Compression can cause damage when used improperly. But when used under the correct circumstances, JPEG Compression can help you reclaim valuable disk space without ruining your images.