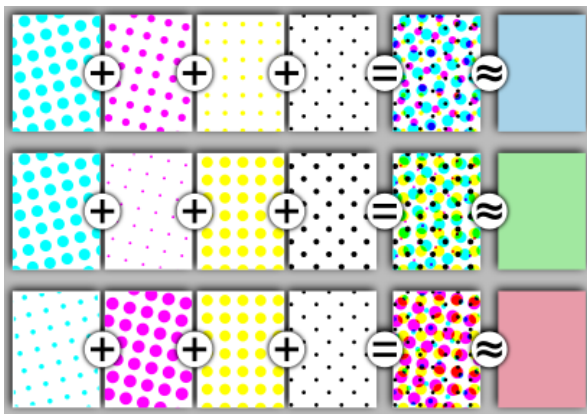


Line Art and Halftone Images

In printmaking, we work with lines. In intaglio we etch fine lines into metal and the ink adheres to these recessed lines and prints. In relief process such as wood cuts we cut around the lines we want to print. The remaining raised lines and shapes are what accept the ink when we roll a brayer over the block. These high contrast images have no real tonal effects. To achieve the illusion of a tone or shades of grey, artists have used effects like crosshatching or aquatints to fool the eye into thinking there is tone.

Photography on the other hand is a medium rich in tonalities. Photography is referred to as continuous tone medium. To be able to print photographic images the use of halftone photography was developed to achieve the effect of tonality in printing. The process breaks the tones of a picture into small, dense dots that trick the eye into seeing what appear to be various tones. Today we use digital halftone technology to create halftone patterns digitally.



What is a Halftone dot?

Halftone is the reprographic technique that simulates continuous tone imagery through the use of equally spaced dots of varying size. Halftones can also be used to refer specifically to the image that is produced by this process.

Where continuous tone imagery (film photography, for example) contains an infinite range of colors or greys, the halftone process reduces visual reproductions to a binary image that is printed with only one color of ink. This binary reproduction relies on a basic optical illusion—that these tiny halftone dots are blended into smooth tones by the human eye.

Just as color photography evolved with the addition of filters and film layers, color printing is made possible by repeating the halftone process for each subtractive color—most commonly using what is called the ‘CMYK color model.’ The semi-opaque property of ink allows halftone dots of different colors to create another optical effect—full-color imagery. To print a half-tone dot you need a postscript printer.

Resolution of halftone screens

A halftone screen is a film of repeated dots. Halftone screens come in different densities of dots. An 85 line screen has 85 dots in one line or row of dots. A 133 line screen has 133 dots per line. Because there are more dots in the same line length, the dots in a 133 lpi are smaller than those in an 85 lpi screen. The higher the number lpi the smaller the dot, the more detailed an image will appear to be.

The resolution of a halftone screen is measured in lines per inch (lpi). This is the number of lines of dots in one inch, measured parallel with the screen’s angle. Known as the screen ruling, the resolution of a screen is written with the suffix lpi; for example, 150 lpi.

Some printmaking techniques have limits to the resolution you can use. For instance screenprinting images need to have a fairly coarse screen ruling, because there are limitations in how fine the mesh can be and still allow ink to pass through.

Typical Halftone Resolutions

Screen Printing	0–45 lpi
Pronto Plates/ xerox lithography	65–85 lpi

Dot shapes

Though round dots are the most common used, there are different dot types available, each of them having their own characteristics. Generally, the preferred dot shape is also dependent on the printing method or the printing plate.

- * Round dots: most common, suitable for light images, especially for skin tones. They meet at a tonal value of 70%.
- * Elliptical dots: appropriate for images with many objects. Elliptical dots meet at the tonal values 40% (pointed ends) and 60% (long side), so there is a risk of a pattern. Elliptical dots are the standard shape used in screen printing.

Screen Angles

To improve print quality and reduce moiré patterns, the screen for each color is set at a different angle. While the angles depend on how many colors are used and the preference of the press operator, typical CMYK process printing uses any of the following screen angles:

C	100°	15°	105°
M	15°	45°	75°
Y	0°	0°	90°
K	45°	75°	15°

Using Appropriated Images

If you would like to use appropriated material from the web you may run into some problems. First, images taken from the web are usually low resolution. When you try to enlarge a low resolution images they will become pixilated and blurry. Always try to find highest resolution images possible.

If you use photographic images from a book or magazine they already have a halftone screen in them. It is best to scan these images using a descreen filter in the scanner interface. This will give you the freedom to impose a halftone pattern on the image without getting a moiré pattern. A moiré pattern is a noticeable pattern that occurs when dot screens collide at incorrect angles.

Bitmap Functions: 50% Threshold

The 50% Threshold bitmap function will turn a grayscale image into a black and white image. This function takes all tonal information that is 50% gray or lighter and changes it to white and all tonal information that is 51% gray or darker into black.

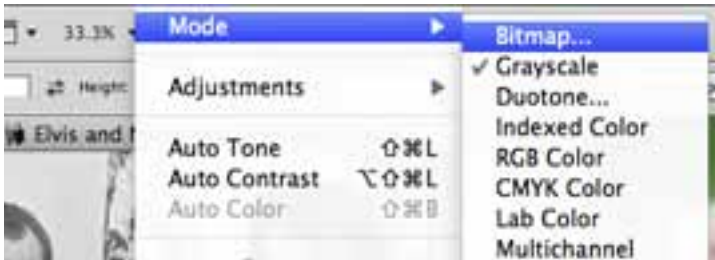


Grayscale

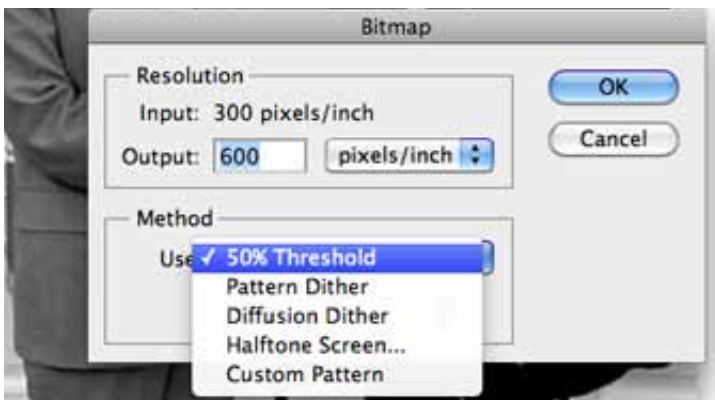


Bitmap using
50% Threshold

Start in photoshop with a well balanced grayscale image. You may want to adjust the tonal range by using Levels under Image/Adjustment. When you are satisfied with your image, go to Image Mode and choose Bitmap.

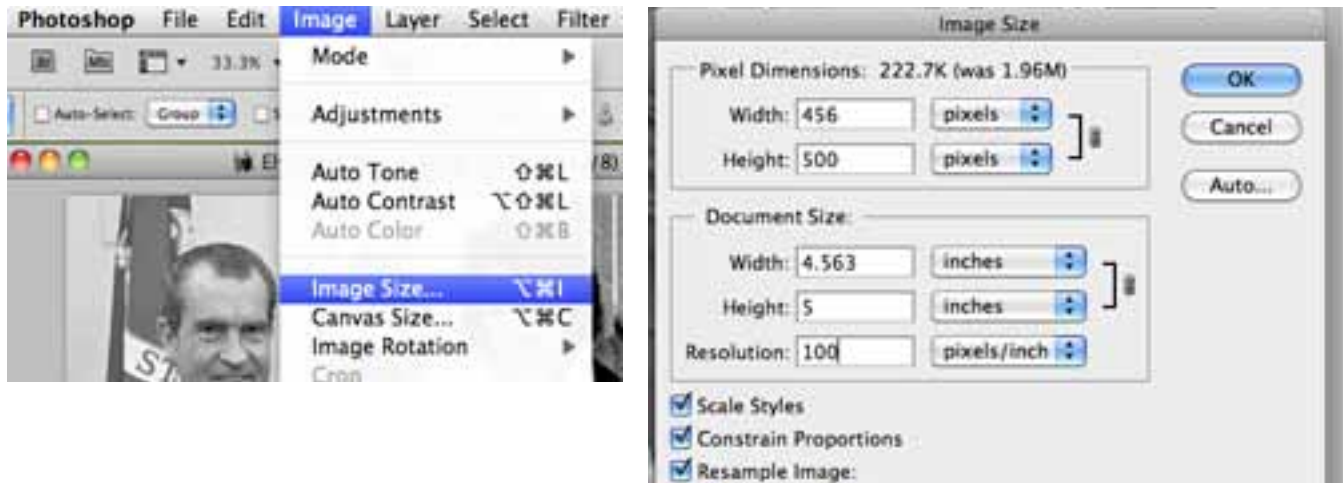


A new Bitmap menu bar will pop up. In the output box enter the resolution of your printer. In this case it is 600 ppi. Under Method choose 50% threshold. Hit OK and you are done.



Bitmap Halftones

You can use the bitmap function in Photoshop to create a halftone image. You need to start out with a grayscale image. The next step is to decide what screen frequency you want to use for your halftone. If you screen printing you need to have a screen ruling of 65 lpi or lower. For beginning screenprinters a lpi of 45 or lower is recommended. Once you have decided on the screen frequency you need to multiply that number by 2.5. For example, if you want to use a 40 lpi screen frequency you would multiply 40×2.5 which is 100. This number will become the resolution of your image. The next step is to go into Photoshop and change your resolution to 100.



The next step is to change your image into a bitmap. Go to Image/Mode and choose Bitmap. A pop-up menu will appear. Once again you must enter the resolution of your printer (600 in this case). Under Method choose halftone. Another menu will appear and you can set the options for screen frequency and angle. An angle of 22.5 or 45 are commonly used angles for one color halftones. Hit OK and your are done and can print your image. If you wish to send this image to a large format printer on the 8th floor it cannot be saved as a pdf. You will need to save your image as a tiff or a bmp.

