

# Halftones

Image Types [Halftones](#) [Screen Frequency](#) [Resolution](#) [Exercise](#)

This tutorial contains:

- definitions and examples of image types:
  - line art
  - continuous tone
  - halftone
- standard halftone screen frequencies
- Image resolution required for halftones

## Image Types

There are two basic types of images:

**Line art** images contain only *black* and *white* (no shades of gray).



Line art image.

**Continuous tone** images contain *shades of gray*, or a *range of colors* and *shades of color*.



Continuous tone black and white image.



Continuous tone color image.

Line art and continuous tone images can be in different forms:

### Reflective

- Color or black and white photographs
- Drawings, illustrations or paintings

### Transparent

- Film negatives
- Transparencies (35mm, 2-1/4, 4 x 5, 8 x 10)

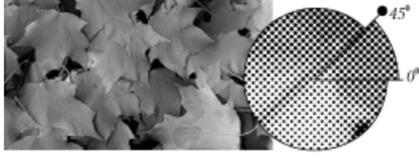
### Digital

- grayscale image files
- rgb image files
- cmyk image files

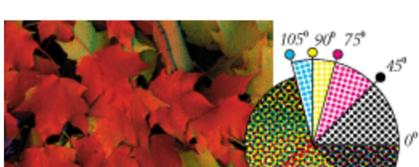
[Image Types](#) [Halftones](#) [Screen Frequency](#) [Resolution](#) [Exercise](#)

## Halftones

In order to print a continuous tone image on a conventional printing press, it must be converted to a halftone: a screen pattern of variable size dots which create an impression of tone values with one ink color.



Enlarged detail of halftone dot pattern for a grayscale image.



Enlarged detail of halftone dot pattern for a color image. Note that a separate halftone is generated for cyan, magenta, yellow and black. Each halftone screen is rotated to form a pattern called a "rosette".

Halftones are generated by the **output device** when a file is printed.

- Desktop laser printers have default settings for halftone frequencies based on printer resolution.
- Inkjet printers do not use halftone screens, but use a spray of ink.
- Imagesetters produce industry-standard halftones on negative film for use on commercial printing plates.

Note: Some imagesetters and 600-dpi laser printers use screening technologies other than halftoning. If you are printing an image on a nonhalftone printer, consult your service provider or your printer documentation for the recommended image resolutions.

[Image Types](#) [Halftones](#) [Screen Frequency](#) [Resolution](#) [Exercise](#)

## Screen Frequency

Halftone screens are measured in **lpi** (lines per inch). This refers to how many *rows*, or *lines*, of *dots* fit in a linear inch.

The number of lpi in a halftone screen is called the **screen frequency**. It is also referred to as *screen ruling* or *line screen*.

The appropriate halftone frequency depends on the paper stock and type of press used for printing. **Newspapers** commonly use an **85-line** screen. **Magazines** use higher resolution screens, such as **133 lpi** and **150 lpi**.

**Note: Always check with your print shop for correct screen frequencies.**

[Image Types](#) [Halftones](#) [Screen Frequency](#) [Resolution](#) [Exercise](#)

## Image Resolution for Halftones

The relationship between **image resolution** and **screen frequency** determines the **quality of detail** in the printed image. To produce a halftone of the highest quality, you generally use an image resolution that is from 1.5 to at most 2 times the screen frequency. But with some images and output devices, a lower resolution can produce good results.

Formula for **standard quality** halftones (image fine detail of nominal importance):

Image resolution = screen frequency x 1.5

Example using 150 lpi halftone screen:

$$150 \times 1.5 = 225$$

The correct image resolution is **225 ppi**.

Formula for **high quality** halftones (image fine detail of great importance):

Image resolution = screen frequency x 2

Example using 150 lpi halftone screen:

$$150 \times 2 = 300$$

The correct image resolution is **300 ppi**.

To determine your printer's screen frequency, check your **printer documentation** or consult your *service provider*.

[Image Types](#) [Halftones](#) [Screen Frequency](#) [Resolution](#) [Exercise](#)

[top of page](#)

Student Name: \_\_\_\_\_

## Halftone Quiz

*Step one: Read the [Halftone Tutorial](#).*

*Step two: Print out this page (Print only page 2 of 2 in the print dialogue box).*

*Step three: On the printout, answer the following questions and turn in to your technology instructor to receive credit for this exercise.*

For the following halftone screen rulings, give the appropriate image resolution:

1. Standard quality; newspaper (85 lpi)
2. High quality; newspaper (85 lpi):
- 3 Standard quality; magazine (150 lpi):
4. High quality; magazine (150 lpi):
- 5 Standard quality; newsletter (150 lpi):
6. Standard quality; premium print (175 lpi):
7. High quality; showcase print (200 lpi):