PPI (Pixels Per Inch)

PPI stands for Pixels Per Inch. The term PPI clearly refers to the actual clarity of an image, as a virtual image, on a monitor. Pixels are the small square units that make up the image, and generally, the higher the number of pixels per inch, the higher the image quality will be.
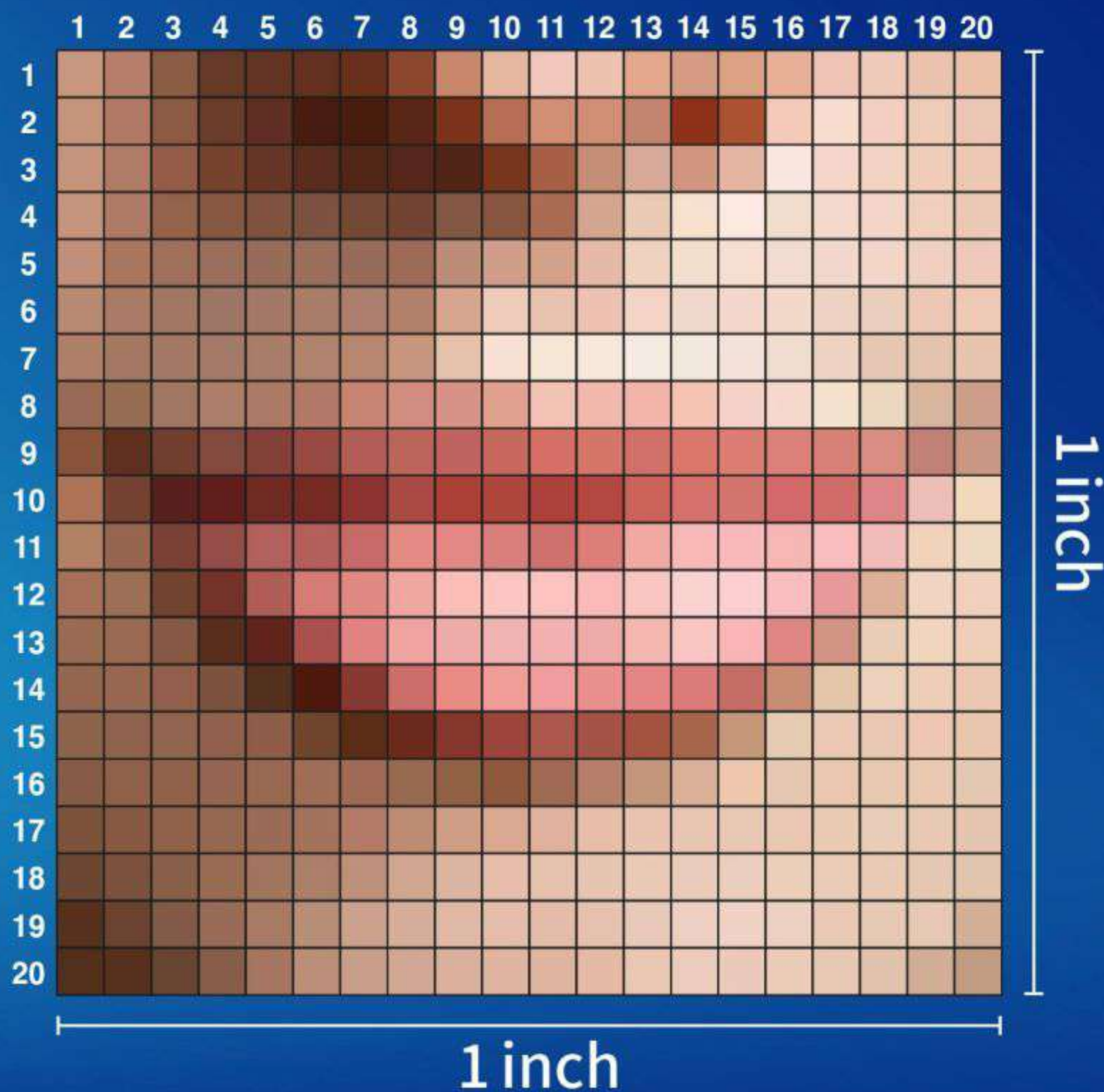
**40 PPI**   **100 PPI**   **300 PPI**

Most designers who work with Photoshop mistakenly identify the resolution of their files as DPI. In software and computing, there is no such thing as DPI, and we only work with PPI. The image below is an example of a 20-pixel image. 20 times 20 pixels equals 400 pixels per square inch.

1 inch

1 inch

DPI (Dots Per Inch)

The term DPI stands for Dots Per Inch. DPI refers to the number of dots in each square inch. For reproducing an image from the virtual world to the physical world using an output device such as a printer, we need to convert the unit from PPI to DPI. This is because output devices use dots to reproduce pixels. In fact, DPI is a measure of the quality and capability of output devices.
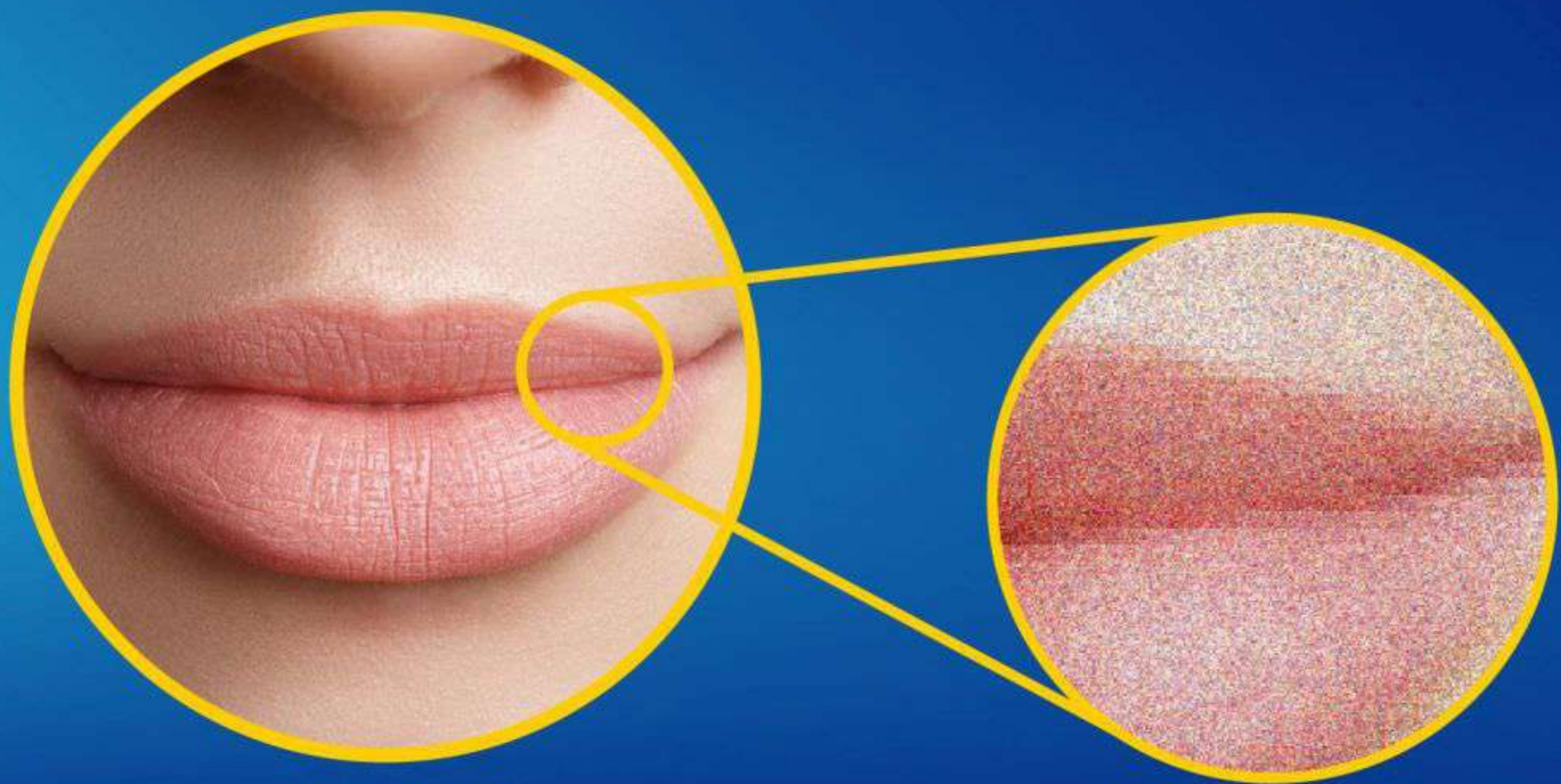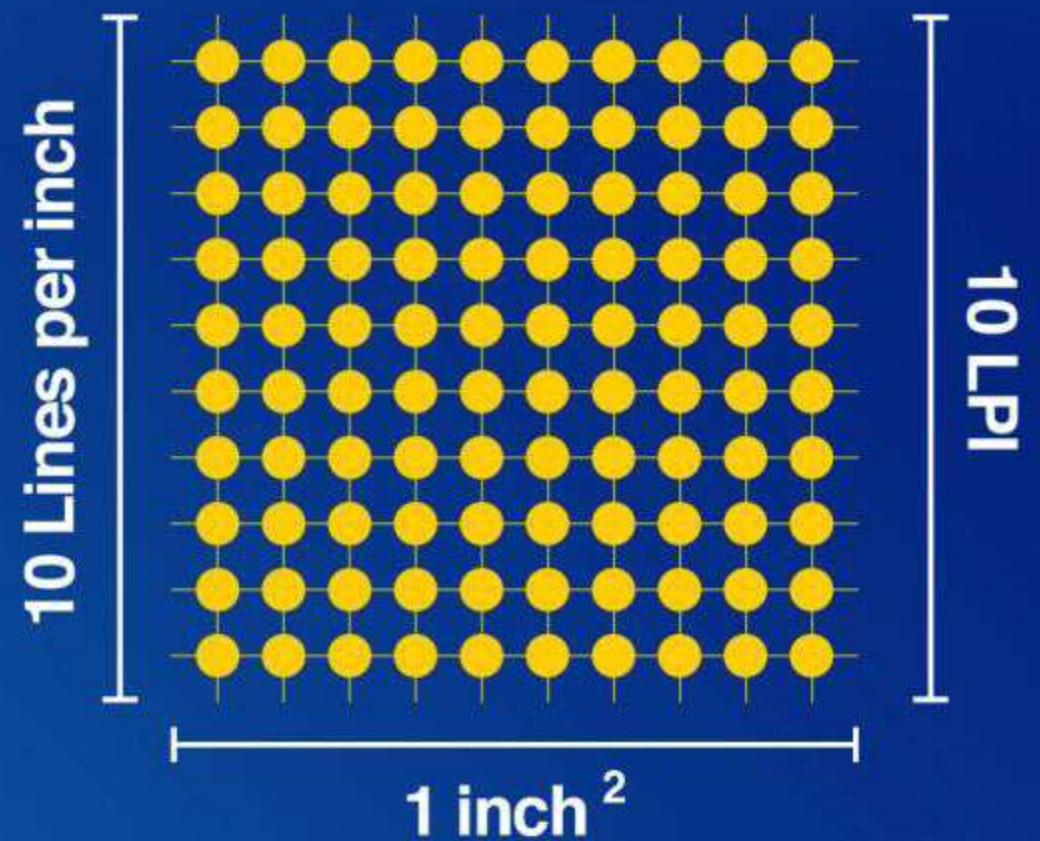
LPI (Lines Per Inch)

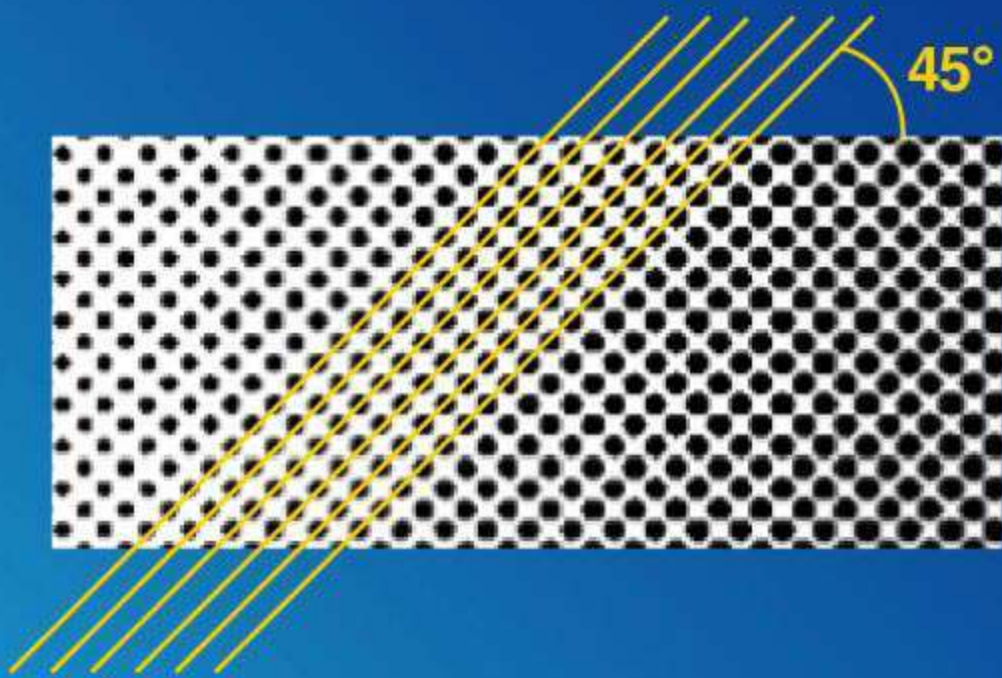LPI stands for Lines Per Inch. Industrial printing devices use this unit for printing images. In RIP software, images are halftoned or screened, and these dots or screens are placed next to each other using patterns at specific angles, creating lines known as Lines per Inch in printing terminology. The LPI unit is widely used in the printing industry, from plate making to flexography, and all utilize this unit.
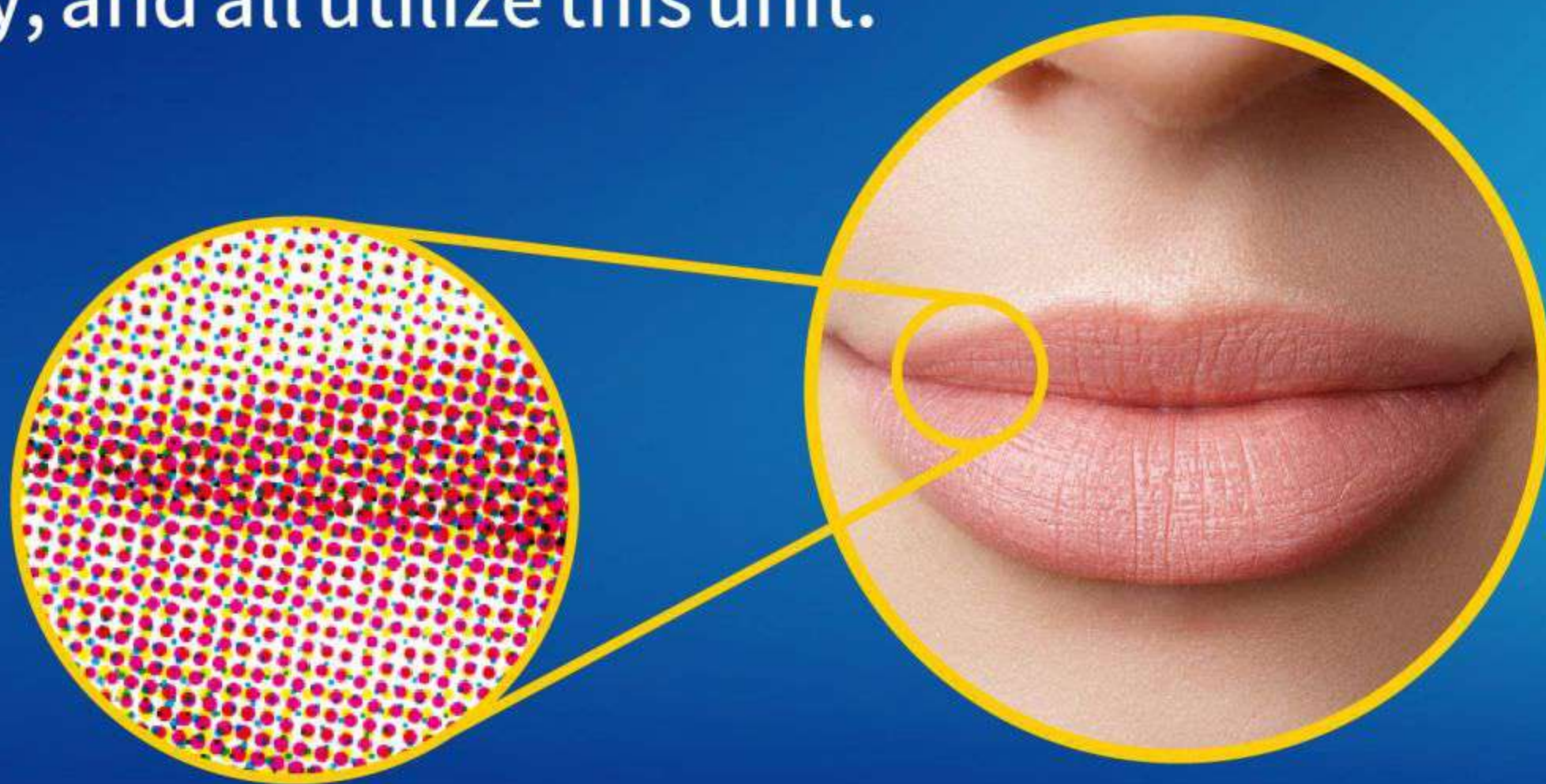
When a file is ripped at 10 LPI, it means that there will be 100 halftone dots per square inch. Just like PPI and DPI, in LPI, the higher the number of halftone dots per inch, the higher the quality of the printed image will be, and more details will be visible in the print.

45°

10 Lines per inch

10 LPI

1 inch²

8 LPI	16 LPI	50 LPI	150 LPI

Increasing quality with more image screens

All of these units explained, due to converting a digital and virtual image to a physical and printable image, are interconnected based on specific formulas. For example, a designer prior to printing based on the LPI of the target print shop must adjust the resolution or PPI of their file. Similarly, each laser engraving device has a specific power for engraving and processing on the plate, which is determined based on DPI. And its DPI value has a direct relationship with the maximum LPI it can produce. The following specific process is followed to print an image with a precise relationship between them.

PPI DPI LPI

| File preparation in software | Quality of the laser device | Quality of the Flexo Printing Machine |

As mentioned on the previous page, there are specific formulas between these units. To determine the PPI of a file for printing, we must adhere to the specified LPI by the print shop.

$$\text{Print } LPI \times 2 = PPI \text{ File}$$

For example, if the LPI declared by the print shop is 124 LPI, the file resolution should be approximately 250 PPI. Increasing the resolution of the file will only make it bulkier and waste time in the RIP plate-making process, and will not have any effect on improving the quality.Additionally, each laser device has a specific power for producing the LPI that print shops have, with the following formula.

$$\text{Laser Device } DPI \div 16 = LPI \text{ Print}$$

For example, if the power of a laser device is 2400 DPI, this device has the capability to produce a maximum of 150 LPI.

There are other formulas regarding these units which we will address in the following posts.

Pay attention to the following points :

*As the numbers related to PPI, DPI, and LPI increase, we will see an increase in quality.

*Exceeding LPI limits in printing can cause problems such as Dot Gain, printing control issues, etc.

*The relationship between PPI and DPI is generally 1:1 or higher. This means that PPI can be equal to or higher than DPI.

8

Arian Jamshidi

Specialist and instructor of Flexo Prepress

Every graphic designer should know this.
Share it !

ARIAN JAMSHIDI
FLEXO PREPRESS SPECIALIST