

UNDERSTANDING RESOLUTION

By Michael Swartz

Here is the most important resolution information you'll need as a computer artist.

OFFSET (CMYK) PRINTING

Offset printing technology has remained largely the same for decades. Digital offset printing is practically the same, it just does the whole process extremely quickly — it still has to put dots on a page to make an image. When it comes to printing images on an ink jet printer, you can use the same image resolution formulas.

Here's an excerpt from the book "Real World Scanning and Halftones."

"...there's a relatively straightforward formula for deciding how much resolution you need: It should never be more than two times the output screen frequency.

For example, if you're printing a halftone at 133 lpi (lines per inch), the image resolution shouldn't be more than 266 spi (samples per inch, aka "pixels per inch"). Any higher resolution is just wasted information. Contrary to what you might think, it doesn't improve image quality at all (if you're looking for a solution to blurry-looking scans, increased resolution isn't it; sharpening is). And since increasing resolution increases file size geometrically, it's well worth limiting resolution.

In fact, the two-times rule has become so common that people have forgotten (or never learned) that you can usually get away with lower resolutions. We typically recommend a multiplier of 1.5 or even 1.4, and for the lower quality images 1.2 often suffices."

SOURCE: Real World Scanning and Halftones, By David Blatner and Steve Roth, Page 153 (it's an older book, 1993, but the principals still apply).

ON-SCREEN DISPLAY AND OUTPUT TO FEATURE FILM AND VIDEO

On-screen resolutions for high definition monitors and feature film is a rapidly changing business. Resolutions have quadrupled over the past 10 years and there's no end in sight (which is definitely placing a higher burden on production studios).

Final output, broadcast, standards-compliant work is always 72 ppi or "screen resolution."

If you're working on a movie for a feature film, most theaters have 2k projectors or higher — that's 2,048 pixels across by 1,556 pixels down. 4k Projectors at higher frame rates are becoming more and more common, some even use dual projectors for stereo 3D). Then, there's IMAX at 18k.¹

There are two main resolutions found in High Definition (HD) televisions and monitors; HD720 (1280x720 ppi) or HD1080 (1920x1080 ppi).

¹According to IMAX, 35mm film has a digital equivalent of 6000 lines of horizontal resolution (6K), while 70mm film has the equivalent of 18,000 lines of digital resolution (some claim it's closer to 12,000). IMAX film cameras are heavy, loud, take a long time to reload film, and have limited mounting options on camera rigs, which is also what makes them unique.

VECTOR SHAPES AND TEXT

Vector objects such as shapes and text you might create in Adobe Illustrator, are resolution independent and are infinitely scaleable with no degradation in quality. This is because their contours are described by mathematical points in space with attributes for sharp / smooth tangents, tangent direction and tangent length to name a few. You can easily convert a block of text to a vector path in Illustrator using the Command-Shift-O to Create Outlines from the editable selected type. Once converted to outlines, or paths, you will not be able to "edit the type" unless you plan on moving elements word by word or letter by letter.