

type Basics

9. Type measurements:

The printing industry uses its own measurement system based on the points system. In this system type size, spacing and other elements can be measured. It will be necessary to acquire a ruler that can measure inches, pica, and points to be productive in the graphics industry. Other systems such as ciceros, used in Europe, are used and are available with most software. It will be necessary to be familiar with points and how they equate to inches and fractions. The advantage of points is that they are so small that there is hardly a need for fractions. Also, with most software you can set a page up in inches and then convert it to points/pica or vice versa.

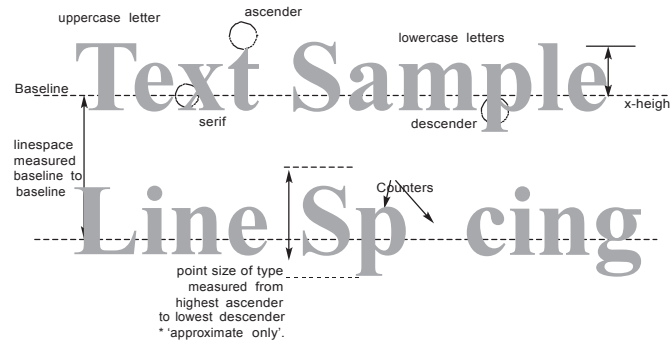
12 points = 1 pica

72 points = 6 picas or 1 inch

Calculate the following inches/point conversions.

- 9-1. 2" to points
- 9-2. 2" to pica
- 9-3. $8\frac{1}{2}$ " to points
- 9-4. $8\frac{1}{2}$ " to pica
- 9-5. 11" to pica
- 9-6. 11" to points
- 9-7. 33 pica to inches
- 9-8. 504 points to inches
- 9-9. 2" x $3\frac{1}{2}$ " to pica
- 9-10. 144 points x 252 points converts to what inch dimensions?

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10. Type terms:

Type is specified in points but this does not reflect its visible size. Type is measured from the highest *ascender* character to its lowest *descender* character. A common tool to measure type size is an '*E*' scale. A PDF file has been provided with this booklet for your use. If the type is too large to be measured with an e-scale then it can be measured with a ruler that has point increments (from ascender to descender). This may not be exact but it is an effective beginning.

Leading is the space between lines of type measured from baseline to baseline. 'Standard' leading is two points more than the type size, but this is by no means a rule. If the point size is 10 points then leading of 12 would be acceptable. Size and leading can sometimes be written like a fraction such as; **10/12**; this would mean size=10, leading=12. The point size is top (or first) and the leading last or bottom. In some cases leading of just one point over the type size is acceptable and can create more room for text, though it may be difficult to read over a long article. The use of a numerical leading setting is known as absolute leading as the leading will stay the same no matter what point size is used.

If no extra space is added for leading then this is known as *set solid* (12/12). Set solid can work for headlines to add impact or when there are no descending characters to get in the way. With certain fonts it may be possible to have leading below the point size. This can create a compressed appearance which can be helpful with headlines. Set solid should be avoided for large amounts of body copy.

Headline
Set 18/20

Headline
Set Solid 18/18

Headline
Set 22/18

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11. Measuring with an E-scale; What are the point sizes of the following:

11-1. Sample # 1

11-2. Sample # 2

11-3. Sample # 3

11-4. Sample # 4

11-5. Type

11-6. Sample # 6

11-7. Sample # 7

11-8. Sample # 8

11-9. Sample # 9

11-10. Type

Note: Not all fonts measure the same when using an E-scale. Several samples may be needed to get a match.

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12. Measuring with an E-scale; Calculate the leading of the following paragraphs.

12-1. Measure the distance between lines of type to determine the linespacing or leading that has been used. Remember that this space assists in legibility.

12-2. Measure the distance between lines of type to determine the linespacing or leading that has been used. Remember that this space assists in legibility. It prevents descending type from interfering with ascending characters.

12-3. Measure the distance between lines of type to determine the linespacing or leading that has been used. Remember that this space assists in legibility. It prevents descending type from interfering with ascending characters.

12-4. Measure the distance between lines of type to determine the linespacing or leading that has been used. Remember that this space assists in legibility. It prevents descending type from interfering with ascending characters.

12-5. Measure the distance between lines of type to determine the linespacing or leading that has been used. Remember that this space assists in legibility. It prevents descending type from interfering with ascending characters.

12-6. Measure the distance between lines of type to determine the linespacing or leading that has been used. Remember that this space assists in legibility.

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13. Measuring with an E-scale; Measure the thickness of the following rules & borders.

In the case of borders and/or rules the thickness is also measured in points. The amount should be a specific number and not a term such as “Hairline”.

A hairline rule may be much too thin to hold on press and can appear broken. Also, hairline rules may vary in thickness from one software to another. In fact, hairline thicknesses have been known to change from one version of the software to another.



type Basics

14. Type and measure review.

- 14-1. Point size is measured from what area to what area on a piece of type?
- 14-2. Define, LEADING
- 14-3. What is a “common” amount of leading?
- 14-4. How many points equal 1 pica ?
- 14-5. 1 inch equals points?
- 14-6. 1 inch equals picas ?
- 14-7. 8 1/2 inches equals how many picas ?
- 14-8. 8 1/2 inches equals how many points ?
- 14-9. Convert these dimensions to inches; 30 picas X 504 points
- 14-10. What is the purpose of an E-scale

Working with text

When working with text there are certain elements that need to be remembered in order to make the transition from standard typing to typesetting/design. The first element is the type itself. In the past type characters were all the same size, same weight and same sized. This was know as *mono-spaced*, mono-weight, mono-sized. In this the letter 'i' takes up the same space as a letter M. With computers the text is proportionally spaced. Each letter has its own spacing. Certain fonts used on the computer, however, still have mono-spacing. Examples of these fonts include Monaco and Courier. Normally these fonts are rarely used unless the typewriter effect is intended as part of the design.

Different styles of type are known as *fonts*. A font is a complete set of characters (or *glyphs*) in a given style. There are thousands of different fonts from many manufacturers and many designs depend on just the right font to convey their message. There are many other issues that effect font use both technically and artistically and more experience will be needed for proper font usage. When working with typesetting there are some issues that determine professional technique. Many of these conflict with traditional typing rules and there can be some conflict in changing peoples mind set. A useful book for these issues is *The Mac is not a Typewriter*.

1. There are three primary brands of fonts, *Adobe Type 1, OpenType, and TrueType*. *Type 1* fonts are made up of two files, the screen and the printer. Both files must be present for the font to work properly. These fonts are unique to either Mac or PC. *OpenType* fonts have just one file but a chief feature to OpenType is that the files are cross platform in that they will work on Mac or PC. In the past even the same named font would flow type differently when moved between Mac and PC. TrueType fonts have only one file. *TrueType* fonts are older and have fallen out of favor. If used they should be tested to be sure that they don't cause output errors. TrueType icons show as three A's stacked behind one another, Type 1's as a single A. Opentype use an O icon. Most printers prefer Type 1 fonts and discourage the mixing of types. If there is doubt, a sample sheet should be prepared and output to avoid problems later. The earlier a problem is found the quicker a solution can be found. Missing fonts or partial font files are still the number one problem with electronic files among printers.

The computer itself uses what have been called 'City' or System fonts. These are not recommended for use with files that are to be professionally output and printed.

2. The first technique that should be learned is that there should be only one space after a period. Indeed, there should be only one space after any punctuation. This will involve retraining for many clients but remember that computer fonts now are proportionally spaced. In most page programs it is possible to see

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the invisible key-strokes used by the original typist and unfortunately time is sometimes spent undoing all the extra keystrokes.

3. Another issue is line spacing and the *return key*. The standard return key is used, of course, to move to the next line. On the computer the text will flow to the next line as it is typed. If a new paragraph is desired the return key is struck. This is known as a *hard return*. A hard return also controls certain computer functions. When the return key is struck whatever commands are in place are stopped. Another method to return and not change commands is the *soft return*. A soft return is done by holding the shift key while striking the return key. This returns the type but leaves the computer instructions in place. Many users still use multiple returns to add space between lines of type.

4. An important issue when working with fonts is the use of *font effects*. Some software allows one to make text bold by selecting a bold key or italic by selecting an italic key. These are known as font effects and are artificial. This procedure is not recommended in the industry due to the fact that the actual printer font to make the bold or italic may not exist and will output incorrectly. Use the actual font (Helvetica Bold or Helvetica Bold Italic) not its effect. InDesign and does not even contain these features.

5. Quote marks or “*true quotes*” should be used whenever quotes are used. In most case operators will use the key to the right of the semi-colon. This is also the key to provide the marks for feet' and inches". These are not the same characters. Some software allow for a preference to be set that will allow for “smart quotes”. There are keyboard methods to create a correct open and closed single or double quote. For a double open quote “use; option and the open bracket key (to the right of the P key). For the close double quote” use shift-option open bracket. For the single open quote use option and close bracket. To close single quote, shift-option and close bracket.

6. Fonts are **NOT** part of the document! Fonts reside on your computer. When the file is saved and moved to another location such as your printer, the fonts are not included with the file. To insure that the fonts are provided correctly be sure to perform a package or collect for output (depending on the software). This will copy the fonts used in the document and create a folder for all the components of the job.

7. Do not copy font files, this is illegal. Packaged fonts may only be used for the customer’s work for which they were provided, not everyone else.

Kerning is the adjusting of space between two characters. This can be used to create greater impact by moving letters closer together. It is helpful with headlines or when letters appear too far apart. When creating type on a curved path the characters can appear pushed together, so kerning can be applied to improve readability. Software preferences can do some kerning automatically.

Kerning Kerning

Tracking is adjusting of space between multiple characters, words, or even entire paragraphs. It too can be used for headlines or when the type overflows and no more room is available. Too much tracking can make type difficult to read and may be noticed if just one paragraph out of several is tracked.

Tracking is adjusting of space between multiple characters, words, or even entire paragraphs.

Tracking (-40) is adjusting of space between multiple characters, words, or even entire paragraphs.

Baseline shift allows type to be moved above or below the invisible baseline. This can be used for fractions, footnotes, or just interesting effects.

Bas^eline^e Shift_t

ALL CAPS can be created by using the all caps font setting. This is not like using the font effect for bold or italic so it can be used without creating output issues. It is easier than typing with CAPS LOCK on in that it can be removed if someone changes their mind. If typed with CAPS LOCK on the type would have to be re-typed.

“TRUE QUOTES” versus inches " and feet ' symbols

These are settings commonly set in the preferences.

1. Indent here is created by inserting a command backslash character where the indent is needed. The indent will continue until a hard return is typed.

To create a line break use the soft return of shift return.

This feature is very useful with numbered items and creates a cleaner appearance.

type Basics

15. Fun with fonts test.

- 15-1. Define, FONT
- 15-2. What is leading?
- 15-3. List the 3 primary brands of fonts.
- 15-4. Which brand of fonts is characterized by having two files?
- 15-5. Which brand of fonts is characterized by being cross platform?
- 15-6. What is the difference between kerning and tracking?
- 15-7. What are font effects?
- 15-8. What is the concern for using font effects?
- 15-9. What is a common or standard amount of leading?
- 15-10. Are fonts used in a document saved with the document?

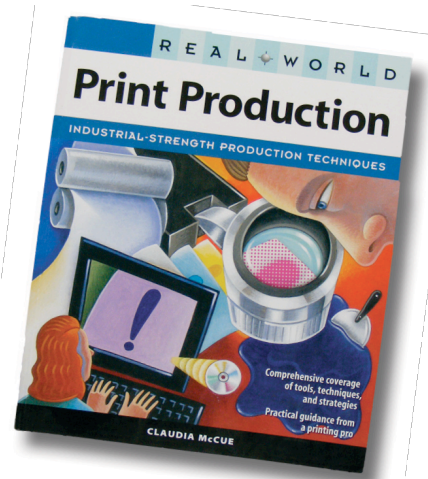
Overview

The computer has dramatically changed the workflow of a design job. Many functions can be done by one person or by the customer prior to supplying the job. A traditional design workflow could begin with the customer and involve *designers, photographers, and copywriters* all using various software. The job (file) would then be submitted to a print company, perhaps directly by the customer or designer or by way of a *print broker*.

Once *“at the printer”* a *salesperson* might get involved and submit the job to an *estimator* for a price quote. The estimate would consider such things as the amount of finished pieces needed, the type of paper, numbers of colors needed (single color, 2-color, or CMYK, or spot colors), type of bindery, shipping etc. With customer approvals, the job can be shifted to a *Customer Service Representative* (CSR). The CSR will monitor the job through the production process working with the customer or the production staff to insure that no errors or problems occur with the job. From here the job may be turned over to the production staff and/or a *scheduler* to schedule presstime and bindery time. This area may begin with a *preflight technician* to insure that the file meets the technical requirements for printing.

Preflighting may be the first step in *prepress* process which prepares or if needed, repairs the file prior to output. Prepress prepares the file for output and may make necessary corrections to insure a quality result. In a digital workflow the file may be in PDF format (if it was not delivered this way) by this time and ready for output direct to plate (*DTP*) by a prepress technician who may be responsible for imposing the file for the necessary press sheet.

Now that the job is plated it is checked prior to submission to the *pressroom*. In the pressroom the plate(s) are attached to the press and the paper loaded for printing. The printing may be a single color job with one or two sides of the sheet being printed or it may be a full color job involving the 4 process colors of *Black, Cyan, Magenta, and Yellow* (this is the common print ink sequence). Additionally, a more ornate design might involve additional ‘spot’ colors such as metallics, varnishes, or a specific color match. The press process may involve a crew that include the *head pressman*, a *second pressman* and perhaps



Claudia McCue has written an excellent book on the aspects of digital production. It goes into much more depth than this booklet and is a very good reference on production issues.

Overview

a *feeder operator* or *helper*. These positions are determined by level of experience and may not be specific titles. Different printers may have several types of presses ranging from smaller duplicators running 11" x 17" sheets to much larger presses running a 30" x 40" sheet. In the case of a web press the sheet is continuous and can run at speeds of feet per second.

When the job is printed it is transferred to the *Bindery* or post-press area. The *bindery person* may be responsible for the job may be cut and folded into its final form. This can include specialized equipment for folding, stitching, and trimming the job into books or brochures. Just as in the other areas, experience is necessary to prevent any last-minute error from ruining a job.

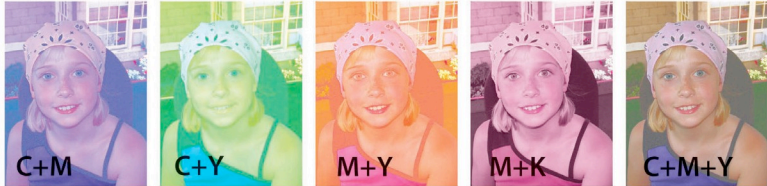
The finished job may now move to the *shipping department* for (on-time) delivery to the customer.

While not all shops are alike and not everyone has the same type of equipment, all of these areas require that everyone work together and be professional in their particular job skills. Intricate (and expensive) equipment is present in all of these departments and training and experience is necessary to insure that every job is completed effectively on time and on budget.

The client may assist in the process by being aware of the production process. Knowing which software is best for each function and what software is supported by the printer can prevent major errors later. Preflighting and packaging files can insure that all aspects of the file have been delivered. Knowing the cost of a color job may determine whether color is used in the job in the first place.

By including the printer (either salesperson or CSR) early in the design process many problems can be prevented sooner rather than later when they can be expensive to correct. Many printers offer tours to showcase their capabilities and can assist in software training as well.

FOUR COLOR PROCESS PRINTING



Four color process printing

In color printing just four inks are used to create the illusion of full color. These colors are Cyan, Magenta, Yellow, and Black. Note how the different combinations create the full range of color. Black is added to complete the process adding depth and contrast to the shadows. The usual sequence on press is Black, Cyan, Magenta, and Yellow.

COLOR Basics

Dots and screens

To create the illusion of lights and darks, different sized printing dots, called *halftone dots*, are used. The dots are created when the file is output through the *RIP* (raster image processor). If the dots all printed on top of one another the black ink dot would overpower the other colors. Therefore, the dots are printed at different angles so that only portions touch each other. Thus, when a portion of cyan dots touch a yellow dot, green is created and so on.

The size and spacing of the dots is controlled by feature known as *Line spacing* (even though they aren't lines). Lines per inch or *LPI* is the fineness of the printing dots measured along a diagonal inch. Newspapers use a coarser line screen such as 85 LPI, while books and magazines can use 150 or 175. The finer the dots the more detail.

Be careful not to confuse LPI, the printing dots, with PPI which are the pixels in the computer file.

Spot color

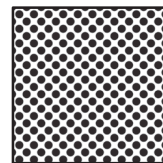
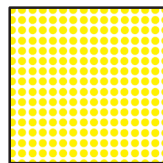
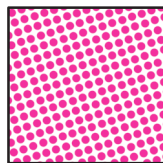
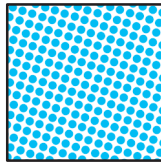
Not all colors can be created from process colors. Only about **6000** colors can be produced with the process colors. A *spot color* is when a specific ink color is used instead of the process colors. This can be just the color black as in the case of smaller single color presses, or it can be a color. Certain colors are not easily created in may be a special match for a company. Other spot inks such as gold or silver, fluorescent colors, or

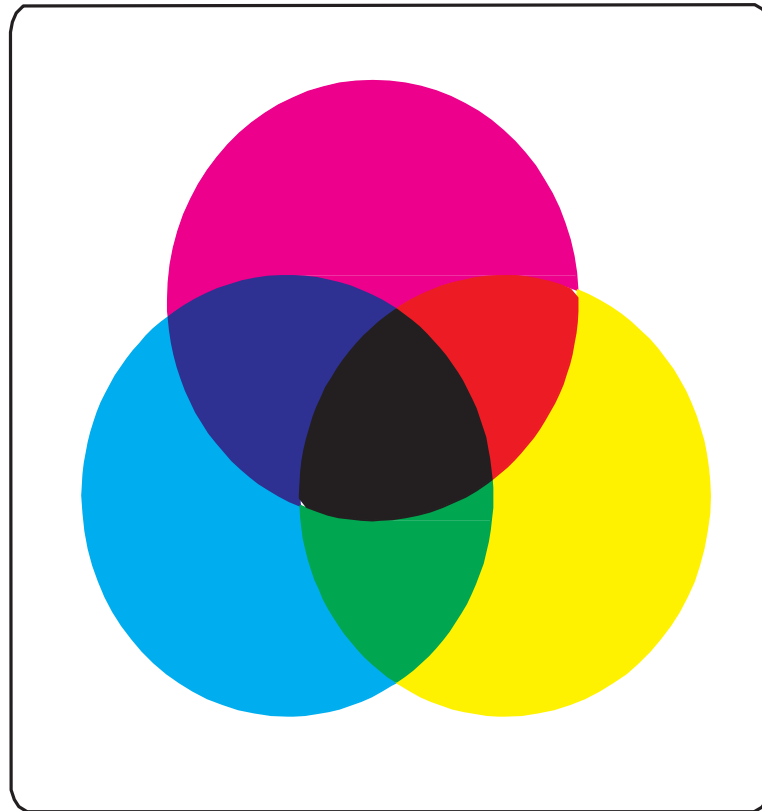


specially mixed CMYK or the color colors are metallic varnishes. It is possible

to combine a spot color within a process color job if the press has 5 or more units. Four units are used for the process colors and the remaining unit(s) can be used for spot colors. There are several color models for the creation of spot colors, a common one being the *Pantone Matching System* or PMS, although there are others. Most design software allows the creation of either spot or process colors. Photoshop allows a spot color through converting channels to spot colors.

'Common' screen angles;			
Cyan-105°	Magenta-75°	Yellow-90°	Black-45°
Note; these may alter due to certain computer output requirements			





Subtractive Color = Cyan, Magenta, Yellow.

Secondary Color: the overlapping of the secondary colors create the primary colors allowing most colors to be created.

These inks subtract light as it is reflected from the white substrate (paper).

When all three of these colors are present the color black is created. As the "black" is not sufficient actual black ink is added. CMYK can create the illusion of full color.

Color Basics



Additive Color = Red, Green, Blue (RGB).

Visible Spectrum: the primary color wavelengths visible to the human eye.

Light as it is created by nature, monitors, television, etc. When all three of these colors are present the color white is created. White can be broken into these three primary colors. When the individual colors overlap one another a secondary color is created such as cyan, magenta, or yellow.



Color Basics

Colors across from each other on a color wheel create complementary colors



Analogous colors; use 2 or 3 related colors that appear next to each other on the color wheel.

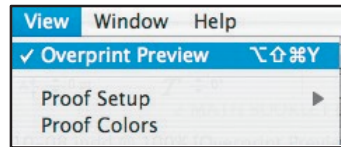
Monochromatic colors; use several shades of one color. Care should be taken when tinting colors already created from tint percentages as colors may shift.

Complementary colors; appear directly opposite or near opposite from each other on the color wheel.

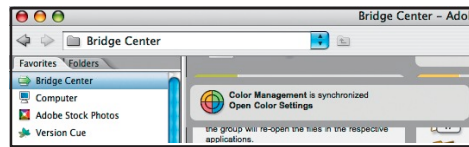
Color Basics

Color Settings

There are some other issues when it comes to color. Some of these are very useful settings within the software. The first useful setting is the use of the *overprint preview* setting. This is available in InDesign, Illustrator and Acrobat. It will preview the actual effect of the overprint or transparency settings on the monitor. Therefore, if a cyan image is set atop a yellow item, and set to overprint, the area of overlap will appear as green. This can effectively be turned on



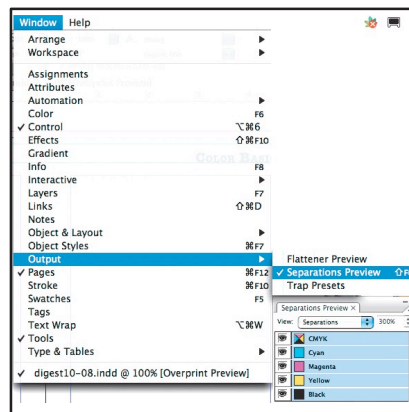
near the end of the job to proof the work, but there is an issue in InDesign that will prevent the “show hidden characters” feature from working and this can be a problem when checking keystrokes etc.



Another useful setting is for *Color management*. This can be set in Bridge and will link the setting throughout the entire CS suite, thereby allowing the color settings to

be consistent. If a different setting is used in a specific software, the circle will appear broken or segmented.

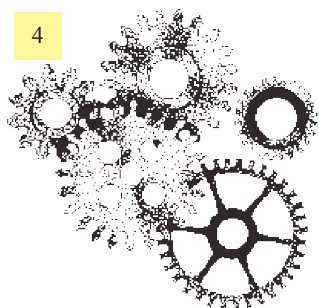
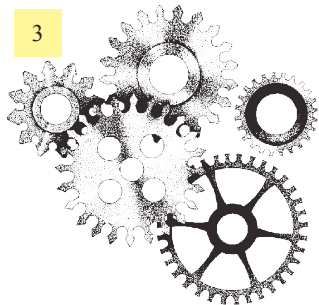
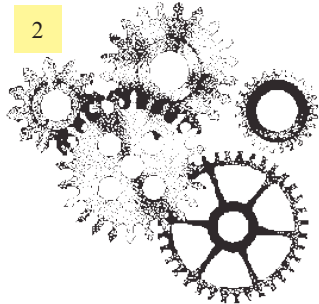
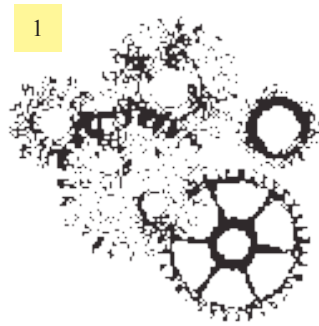
When working with color it is useful to be able to proof the colors and how they react. As most files are created digitally, and progress through a digital workflow process, usually as a PDF. It is useful to proof the file. When done on-screen this is called *soft proofing*. Within InDesign, Illustrator, and Acrobat is the ability to perform a *separation preview*. By turning off certain colors a preview can be seen. This feature is very useful in checking for *black overprints* or for checking for RGB text. If the proofing demonstrates a problem



the file may be corrected prior to converting to PDF. InDesign also allows for a high quality display to show graphics in better resolution (as does Quark).

The use of color correct lighting is also helpful. A *Kelvin* rating of *5000K* is optimum for color. Many light bulbs now come in this (daylight) rating and can be checked by carefully reading the packaging.





PPI input vs. Quality

Four examples of PPI settings for line or bit-mapped objects. *PPI stands for Pixels per inch.* In the past this was also referred to as DPI.

Artwork #1 was scanned at 72 PPI note the loss of detail regardless of the PPI of the output device. The old saying of garbage in garbage out holds true here.

Artwork #2 is the graphic scanned at 150 PPI. Note the loss of detail but for some graphics this may be enough, plus the file size is smaller.

Artwork #3 was scanned at 400 PPI, note the better detail. Even higher PPI would might improve the roundness of the edges, but remember that increased PPI increases file size. If the image is sized up more detail is needed. If sized down the extra resolution may be discarded.

Artwork #4 is a image scanned at 72 PPI but then re-sampled up to 400 PPI. Note that adding PPI after the fact does not retrieve detail.

The adjusting of resolution due to increasing or decreasing size is known as resampling. Resampling down is acceptable as it effects excess PPI that can be discarded, but resampling up should be avoided (unless the necessary PPI is present). **Resampling up simply adds pixels by averaging it does not add detail.**

Pixels is short for picture elements that make up an image. These files are also known as **raster files**. The quality of the image detail is dependant on the file resolution, that is why these types of files are known as **resolution dependent**. Resolution is set when the image is created either by scanning or by a digital camera or by setting the file resolution if creating it in Photoshop. The more resolution the better the quality (within reason) and the bigger the file size.

pixel Basics

Scanning & DPI

A general rule is that the PPI should be two times the linescreen when printed. However, this math formula can be more specific especially when enlarging.

LPI = lines per inch, printed halftone dots; screen ruling when printed.

PPI (DPI) = pixels per inch, 'dots' per inch (should not be confused with a printing dot).

Refers to the fineness of detail in a bitmapped/computer (scanned) image.

Scanning formula for factoring PPI and % and *quality level*.

$$\text{PPI} = (\text{LPI} \times \text{Q}^*) \times \%$$

Quality levels $\times 2$ = **High quality** (high detail)

$\times 1.5$ = **Medium quality** (most common setting)

$\times 1$ = **Average quality** (usable in many instances)

The quality level may vary from task to task or from original to original. It is a good idea to maintain the same level throughout a given job regardless of copy for organizational ease. Test to find which yields the best results. Higher scanning PPI means a larger file, and slower processing time, sometimes with no increase in quality.

Example: 133 line screen, medium quality, 100%

$$(133 \times 1.5) \times 1. = \text{PPI setting needed}$$

$$199.5 \times 1. = 199.5 (200) \text{ PPI}$$

133 line screen, medium quality, 200%

$$(133 \times 1.5) \times 2. = \text{PPI setting needed}$$

$$199.5 \times 2. = 399 (400) \text{ PPI}$$

150 line screen, high quality, 175%

$$(150 \times 2) \times 1.75 = \text{PPI needed}$$

$$300 \times 1.75 = 525 \text{ PPI}$$

150 line screen, high quality, 65%

$$(150 \times 2) \times .65 = \text{PPI needed}$$

$$300 \times .65 = 195 \text{ PPI}$$

To Calculate %: $I/O = P$; Divide bottom (Original) into top (Image needed) to find percentage needed.

pixel Basics

Determining proper PPI settings

Using the formula on the previous page and the formulas from earlier in this book to calculate the necessary scanning resolution.

1. 133 line @ high quality reproduced at 150% = ? PPI
2. 133 line @ high quality reproduced at 325% = ? PPI
3. 100 line @ average quality reproduced at 75% = ? PPI
4. 150 line @ high quality reproduced at 75% = ? PPI

Using these and earlier formulas. complete the following;

An 8" x 10" original is to be sized so that 8" will be 6".

5. What % is needed ?
6. What is the new size of 10" ?
7. What PPI is needed if 150 line, high quality is used?

A 4" x 6" original is sized so that 4 will equal 5"

8. What % is needed ?
9. What is the new size for 6" ?
10. What PPI setting is needed if 150 line, medium quality are used ?

To calculate the levels of grey reproducible:

To achieve the 256 levels of grey the computer creates 2^8 , or two to the eighth power. Therefore; $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 256$ levels of grey.

When you know the LPI and want to know what RIP output DPI is needed; $\text{lpi screen} \times 15.97 = \text{minimum dpi output}$

When you know RIP output DPI and LPI and want to know how many levels of grey are possible; $(\text{dpi} / \text{lpi})^2 + 1 = \# \text{ of levels of grey.}$

pixel Basics

Digital camera settings

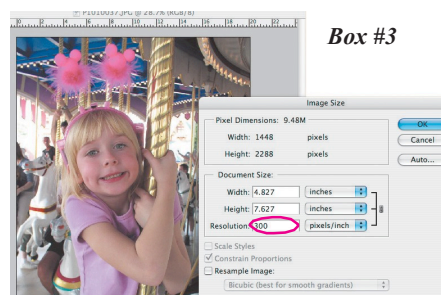
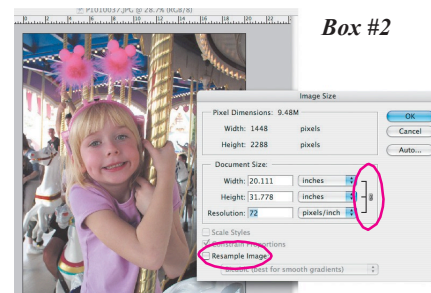
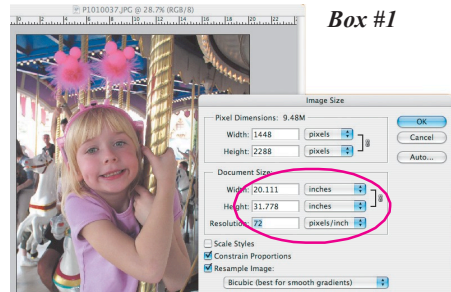
There are important settings to be made when working from a digital photo. Digital cameras capture and record files at 72 pixels per inch. This resolution must be changed into a range that is acceptable for print. That range is usually from 225 to 300 PPI @ 100%. Depending on the megapixel range of the camera a good original file can be converted.

The windows below demonstrate how to convert a camera file into a photoshop for print file. When the file is opened into Photoshop go to the Image>image size dialog box. **Box 1** indicates what the initial view will be. The resolution is at 72 and the width and height are indicated. The width and height may be different due to the megapixel rating of the camera and its quality setting. Note that the dimensions can be huge if a camera over 7 megapixels is used but the resolution will stay 72. For print it is necessary to convert this file.

Box 2 indicates what needs to be done. In the lower left corner is a resample image box. Uncheck this and it will link the dimensions to the resolution.

Box 3 indicates resetting the resolution to an acceptable print range. Note how the dimensions change drastically when this is done.

It is now possible to re-check the resample box (lower left corner). This will separate the dimensions from the PPI for the remainder of your work. The file may be resized at this point but beware enlarging it too much as the quality will decline. In order to have a large image and acceptable PPI a camera with a higher megapixel range is sometimes needed. This was a 5 megapixel camera at high quality settings and can produce an acceptable 4 x 7 image @ 300PPI. A better camera can produce a larger image @ the same 300 PPI.



Halftones in Photoshop

Photoshop is an excellent tool for the production of *Halftones*. A halftone is an optical illusion whereby a photographic (or any continuous tone) original is converted into a printable form. This printable form is accomplished through the use of dots. The dot size is dependant upon the shade of tone present in the original. Therefore, a light area in the photo will convert into a small printing dot on the substrate (paper). A dark area will reproduce as a large dot, in fact, the dots will be so large as appear to "join up". This area will appear as almost totally solid with clear dots (the paper) showing through.

Most of the tones in the originals can be categorized into three areas, *High-lights*, *Midtones*, and *Shadows*. Each area is important in reproducing the total effect of the original. The proper range of dots will result in the contrast that is necessary to producing a good halftone.

There are many outside influences that can also affect contrast and reproduction quality. The *substrate* (paper) that the halftone will be printed on can affect quality. A coated sheet will minimize dot gain since the ink does not absorb into the sheet as badly as an uncoated sheet. An uncoated sheet, being rougher, will absorb ink dots causing them to spread out creating dot gain. The color of the paper and the ink color choice will also affect clarity and contrast since a dark color is easier to see on a light background.

Press conditions and maintenance are very important to reproduction quality. There are many factors to good press operations that are the responsibility of the pressman. But, the entire process is a team effort so proper understanding of the entire process is helpful for both the prepress and press personnel.

Photoshop Tools

The halftone process begins with the original. The file is opened from the original camera file (jpeg or raw) and the resolution of the file is checked by going to the Image>image size menus. As outlined on the previous page the file may need to be converted from 72 PPI to a higher resolution of 200 to 300. If the original is in color it is possible to examine each of the RGB channels to see which has the best detail, then the file may be converted to greyscale to allow it to print in black and white.

An very important feature in Photoshop is the *Info* palette. This window allows the operator to monitor what will hopefully be the size of the printing dot when output. This is also helpful when editing as it will show the original dot and what will be the new size when edited.

The next important feature is the *curves* palette. With this panel changes can be