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## FILE FORMAT

The preferred file format for graphics is EPS (Encapsulated PostScript).

## RESOLUTION REQUIREMENTS

In digital images, resolution refers to the amount of pixel information per inch. A pixel (short for picture element) is a square of color arranged on a grid. Resolution refers to the amount of pixel information per inch. If the resolution or pixels per inch (PPI) is too low, the image will appear “jagged”.

### Vector vs. raster images

Vector images are created in “drawing” programs. A vector-based graphics program uses points connected with curved or straight lines, like connect-the-dots. The advantage to using vector art is that it is resolution independent: It can be enlarged and will never lose quality.

Raster or bitmapped images are created in “paint” programs which use pixels to define images. For this reason it is extremely important that resolution be set according to the following guidelines.

### Figure types

#### Line art—600 PPI at 100%

Purely black and white figures with no shades of gray. Best if created and saved as a vector graphic. If not, the resolution must be 1200 PPI.

#### Halftone—300 PPI at 100%

Figures or photographs with shades of gray. Also referred to as grayscale.

#### Combination halftone—600 PPI at 100%

Halftones that contain line art, such as labeling or outlines. Can be photographic or lines filled with shades of gray.

NOTE: If you must scale your graphic, be sure to compensate by making the resolution higher. A 300 PPI graphic scaled at 200% becomes a 150 PPI graphic. Graphics with resolutions below 300 PPI will look jagged.

## SIZE OF GRAPHICS

- Create graphics at 100% of the size at which they will be printed.

## NAMING FILES

- File names should be no longer than 20 characters, including an extension.
- Use only lowercase letters, numbers, a dash, or an underscore in the file names.
- File names should be specific and descriptive, not generic: *smith-fig-3.eps* is better than *fig3.eps*.

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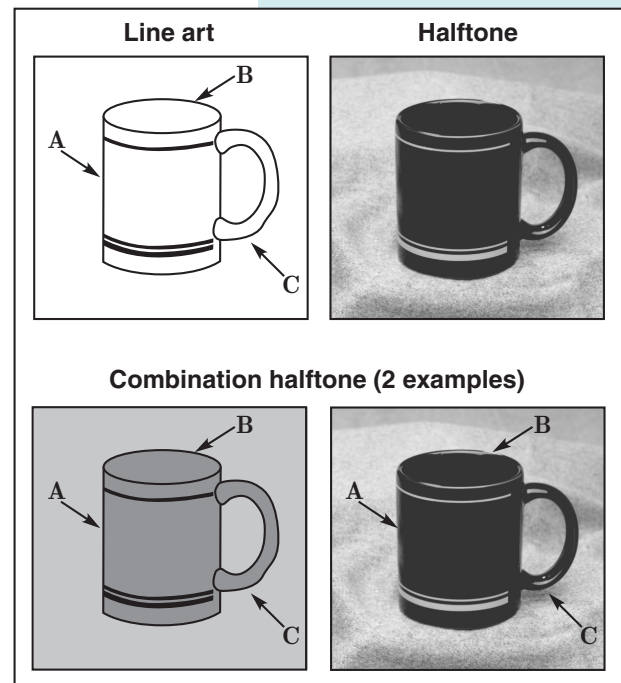


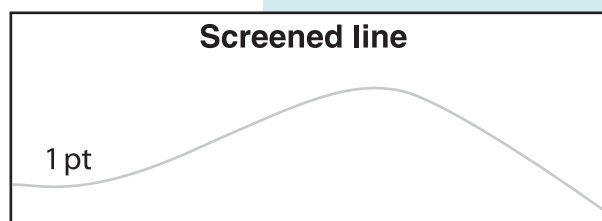
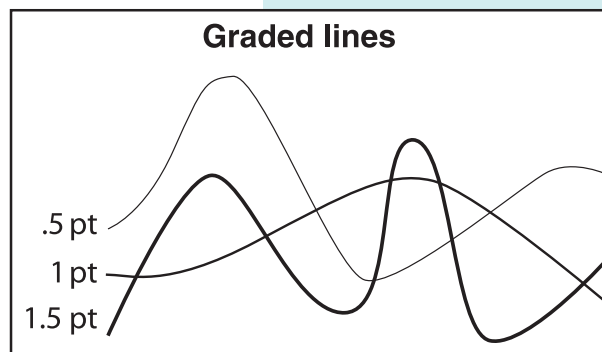
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## PLACING GRAPHICS IN YOUR PAPER

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- **Use a standard TeX graphics inclusion macro package.**  
The recommended graphics inclusion package for LaTeX2e is `graphicx`. Be sure that commands used to include graphics in TeX are compatible with Radical Eye Software's `dvips`.
- **Do not place graphics for use in TeX files in subdirectories.**
- **Number figures consistently throughout the paper.**
- **Use an in-text reference.**
- **Set figure captions in TeX.**
- **Set figure captions below the figure.**
- **Make sure figures are sized correctly and do not extend into the margins of the paper.**

If the figure is too large, resize the figure in a graphics program, not in TeX.



## LINES AND RULES

- **Do not use a line/rule weight less than half a point (.5) at 100%.**  
If you must scale your figure, be sure that you compensate by making line weights thicker. A .5 point line scaled at 50% becomes a .25 point line. Lines with weights less than half a point MAY disappear during the printing process.
- **Increase graded lines in half-point increments (i.e., .5 point, 1 point, 1.5 point).** Otherwise, the lines will not appear as distinctly different lines.
- **Give lines that are a shade of gray (screened) or color a line weight of at least 1 point at 100%.**

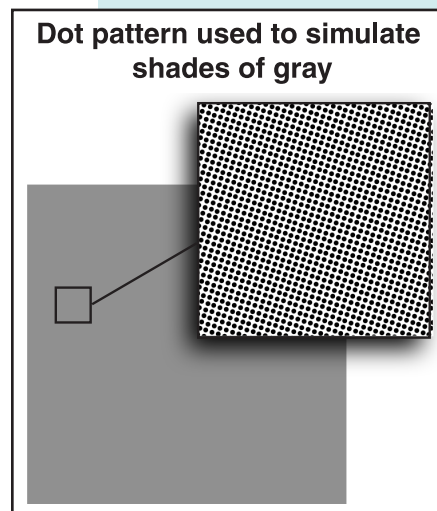
Gray and color lines with weights less than 1 point look broken and jagged because of the small dot pattern used to simulate a shade of gray or color tone.

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## SHADES OF GRAY (SCREENS)

A screen is a pattern of small black and white dots used to simulate shades of gray.

- **Screens should not be lower than 10% or higher than 85%.**  
Screens outside this range are either too light or too dark to print correctly.
- **Screens should increase in increments of no less than 10%.**  
Screen variations of less than 10% are not distinguishable.
- **Do not put type on a screen darker than 35%.**  
Type on a screen that is above 35% is not legible.
- **White type can be used only on 100% black.**  
White type on a gray background looks broken and jagged because a small dot pattern is used to simulate shades of gray.



## TYPE SIZE

- **Point size should be no smaller than 10 point at 100%.**

If you must scale your figure, compensate by making the point size larger: 10-point type at 50% becomes 5-point type, which is not readable.

## FONT USAGE

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- **Whenever possible, fonts used in graphics should match those used in text.**
- **Fonts should be fully embedded in your graphic.**

If the fonts are not embedded in your graphic, it is possible that the font will be replaced with a default font such as Courier and the characters will not print properly. If you are unable to embed the fonts in your graphic, convert the fonts to paths (or outlines) prior to exporting the file to EPS. The fonts can be converted in the program you used to create the graphics. (For assistance, consult your graphics program's documentation.)

- **Use Type 1 outline fonts instead of bitmap fonts.**

Type 1 outline fonts are vector based. These fonts do not lose quality when they are output to high-resolution printers.

- **Do not subset fonts included in your graphic.**

It is imperative that the full font set be included in your graphic. If only a subset of a font is included, a font error can occur, which may cause characters to disappear in both the graphic and the DVI file.

- **Avoid using fonts with city names such as Chicago, Monaco, Geneva, etc.**

## MULTIPLE-PART FIGURES

- **Multiple-part figures should be configured as one figure in a graphics program, not in TeX.**

Aligning multiple-part figures is very difficult in TeX. It is easier and more cost-effective to do so in a graphics program.

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## CROPPING AND BOUNDING BOXES

When using a smaller area of a larger graphic, clip or crop within the graphics application to delete all but the desired portion.

- **Do not crop by pasting areas of white over portions of the graphic.**

Doing this will make the bounding box larger than it should be and will cause problems when the graphic is included in TeX.

- **If possible, verify that bounding box information is correct.**

If the bounding box is not correct, graphics might be clipped off in unexpected ways.

## COLOR GRAPHICS

Color graphics should be used in the print product only if color is mathematically essential to the paper. Authors of journal or proceedings articles may be requested to pay for the cost of color in the print product.

### Requirements for graphics to be published in color

#### Dual product (print and electronic) or print-only journals: CMYK format.

CMYK is an acronym for cyan, magenta, yellow, and black—the standard ink colors used in four-color process (full-color) printing. (NOTE: If you submit RGB files, they will be turned into CMYK, and the AMS cannot guarantee that color reproduction in the print product will match the RGB file.)

#### Electronic-only journals: RGB format.

RGB is an acronym for red, green, and blue—the color model used for computer monitors and video output systems.

#### Books: CMYK format.

(NOTE: If you submit RGB files they will be turned into CMYK, and the AMS cannot guarantee that color reproduction in the print product will match the RGB file.)

### Color graphics to be printed in black and white or grayscale

- **Color graphics to be printed in black and white or grayscale should be converted to black and white or grayscale before being submitted to the AMS.**

When color graphics are printed in black and white or grayscale, sometimes lighter colors, such as yellow, disappear, or darker colors, such as red and blue, appear to be the same tone. It is preferable that you convert your color graphics to grayscale and check to be sure that all the elements in your graphics print as desired.

## DUAL PRODUCT (PRINT AND ELECTRONIC) OR PRINT-ONLY GRAPHICS

- **Do not use a line/rule less than 1 point (1 pixel at 72 PPI) at 100%.**

Although a .5 point line is acceptable for print, screen resolution is 72 PPI and a .5 point line will disappear online.

- **Type point size should be no less than 12 point at 100%.**

Although 10-point type is acceptable for print, screen resolution is 72 PPI and 10-point type will be difficult to read online.

- **Do not put type on a dark background.**

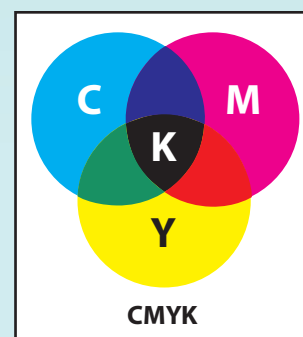
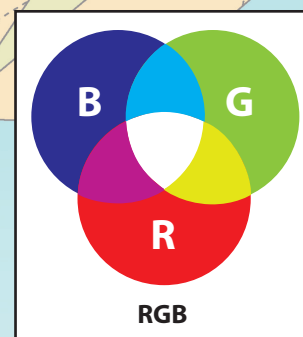
Type on dark colors is not legible.

- **Check your color figures on a black and white printer to ensure that the black and white printout of your figure is legible.**

## PHOTOGRAPHS

- **Photographs must be at a minimum resolution of 300 dpi at the actual size that the photograph will be printed in the published product. Do not scale photographs in TeX.**
- **File format can be EPS, TIFF, or JPEG.**
- **Color photographs must be saved in CMYK format. (See Color Graphics above.)**

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