Electronic Artwork

We request figure files in the following format upon acceptance of a manuscript for publication:

(a) BLACK AND WHITE figures (e.g. line diagrams, bar graphs etc.) as .tiff files at 600 dots per inch (dpi) or .eps files at 600 dpi.
(b) figures containing GREY SCALE (including gel images) as .tiff (or .eps) files. These files should be at least 300 dpi.
(c) figures containing COLOUR as .tiff (or .eps) files, preferably in RGB. These files should be at least 300 dpi.

Why do we ask for TIFF or EPS files?

TIFF (tagged image file format) and EPS (encapsulated PostScript) files are compatible with most composition software and if saved at a suitable size and high resolution, should be suitable for print.

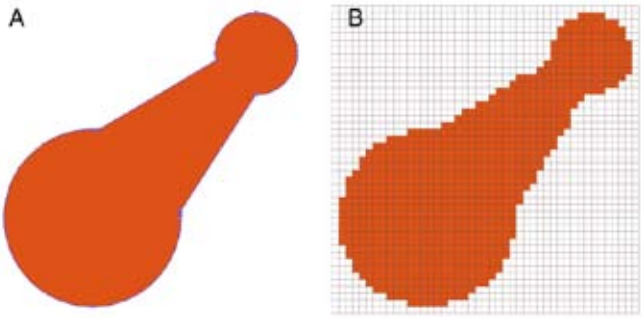
Other files (e.g. GIF, JPEG, files from MS Office applications, files from graphing applications and files created from screen captures) are not suitable unless they have been converted to TIFF or EPS format and are at a suitable resolution for print. This is because these file formats require the recipient to use the same version of the software as that in which artwork was created. In some instances, the original files from which the artwork was created are also required, as files created in some applications cannot be converted to TIFF or EPS at the correct resolution.

What is the difference between TIFF and EPS?

Digital images can generally be sorted into two distinct types: vector and raster.

A **vector** image is composed of mathematically defined geometric shapes (see Figure A) and is useful for producing high-quality images of text, drawings and illustrations. As the scale of a vector image is changed, quality is not lost because the image is made up of mathematically defined points and lines. Vector images are usually saved in EPS format, and can be created using programs such as Adobe Illustrator and CorelDraw (Save As EPS option).

A **raster** image is made up of black, white, grey and coloured pixels defined in a grid (see Figure B) and is used for photographic images. Raster images are produced by digital cameras and scanners. Raster images can be saved in both TIFF and EPS formats.



Raster images can be monochrome (typically line art), grey scale or a combination of the two. Monochrome images can be supplied as bitmaps (as each bit can be either black or white only). We request monochrome images at the higher resolution of 600 dpi (TIFF) and 600 dpi (EPS) to prevent aliasing (the jagged appearance) of diagonal lines.

What is a pixel?

A pixel is a black, white or coloured square in a grid (see Figure B). Pixels are more commonly referred to on screen, whereas dots are referred to when the image is printed (see below).

What is resolution?

Resolution is a measure of the quality of an image. It is usually measured in dots per inch (or pixels per inch on screen). The higher the resolution, the better the image.

What is dpi?

Dots per inch. The number of dots an output device is able to produce within an inch. This represents the resolution of the device.

Why does my image look OK on screen, but blurred when I print it?

Most monitors only show images at 72 dpi and many programs automatically set up files at this resolution. These images are therefore suitable for the web. However, printers output images at a much higher resolution. If your image is 72 dpi, there is not enough information contained in the image for the printer to output at a higher resolution. The image therefore will look grainy and 'pixelated'.

Please note, if you create a raster image at 72 dpi, and subsequently change it in the program to a higher dpi, the quality of the image will not increase. This is because no further information has been added to the image. It may still look OK on screen, but will be poor/unclear when printed.

The image must be created at the appropriate dpi.

I've saved my file at 300 dpi but it's still not suitable – why not?

The most likely reason is that the image you have created is far too small (height × width) to be produced at 300 dpi. For example, if you create an image at 72 dpi at 10 × 5 cm, and then subsequently change the dpi to 300, you will change the height and width to 2 × 1cm.

Beware of software that will allow you to change the dpi without changing the height and width; this means the quality of your image will be altered. Images should be supplied at the requested resolution, at the intended size (height × width) for publication.

Colour

The online version of the journal is now the 'Journal of Record'. We now prefer images to be supplied as RGB (red, green, blue) rather than as CMYK (cyan, magenta, yellow, black) format. RGB is the colour format used on screen, and CMYK is used in printing. When bright colours are converted from RGB to CMYK format, they can often look duller. Providing original electronic artwork in RGB format will ensure a better colour range for the Journal of Record. RGB files will be converted to CMYK for the archive (print) version.

Quick guide

black and white line diagram (e.g. line or bar graph)		grey scale (e.g. photo images, gels)		Colour (RGB)	
EPS	TIFF	EPS	TIFF	EPS	TIFF
600dpi	600dpi	300dpi	300dpi	300dpi	300dpi