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Dear Author,

Help us reproduce your artwork to the highest possible standards - in both paper and digital formats.

Submitting your illustrations, pictures, tables and other artwork (such as multimedia and supplementary files) in an electronic format helps us produce your work to the best possible standards, ensuring accuracy, clarity and a high level of detail.

These pages show how to prepare your artwork for electronic submission and include information on common problems, suggestions on how to ensure the best results, and image creation guides for popular applications.

Figure manipulation

Whilst it is accepted that authors sometimes need to manipulate images for clarity, manipulation for purposes of deception or fraud will be seen as scientific ethical abuse and will be dealt with accordingly.

For graphical images, journals published by Elsevier apply the following policy: no specific feature within an image may be enhanced, obscured, moved, removed, or introduced. Adjustments of brightness, contrast, or color balance are acceptable if and as long as they do not obscure or eliminate any information present in the original. Nonlinear adjustments (e.g. changes to gamma settings) must be disclosed in the figure legend.

Generic information

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Generic information

File formats

Recommended File Formats

Elsevier recommends that only TIFF, EPS or PDF formats are used for electronic artwork. MS Office files (Word, Excel and PowerPoint) are also accepted.

TIFF

TIFF (Tagged Image File Format) is the recommended file format for bitmap (line art), grayscale and color halftone images. TIFF supports several good compression schemes, most recommended is LZW compression, ensuring filesizes are kept to a minimum to aid easy file transfer.

TIFF is a bitmap format developed for exchanging documents between different applications and platforms. TIFF files are generally reliable for printing and cross-platform conversion, but beware, some applications will not import certain types of TIFF files. TIFF files can be saved in either Macintosh or Windows formats.

Note: Virtually all common artwork creation software is capable of saving files in TIFF format, this 'option' can normally be found under the 'Save As...' or 'Export...' commands in the 'File' menu.

EPS

EPS (Encapsulated PostScript)
For vector graphics EPS files are the preferred format as long as they are made in accordance with some common rules. Details and specifications with regard to artwork files in EPS format can be found in the next chapter about artwork guidelines.

EPS stands for the Encapsulated PostScript format from Adobe. An EPS file is an image that has been created using the language of PostScript, and is generally resolution independent.

Note: Virtually all common artwork creation software is capable of saving files in EPS format, this 'option' can normally be found under the 'Save As...' or 'Export...' commands in the 'File' menu.

PDF

Adobe Acrobat PDF format
Adobe Acrobat Portable Document Format (PDF) is an increasingly common file format used for distribution of files intended primarily for printing, this format can also be used for the submission of artwork to Elsevier.

DOC
XLS
PPT

MS Office files (Word, Excel and PowerPoint)
Microsoft® Office is essentially a family of applications that can be used to produce a variety of document types, including written documents, spreadsheets, presentations and databases. Although we prefer artwork files in TIFF, EPS or PDF format, we are also aware that a number of authors already (for convenience) submit their artwork in MS Office formats. Therefore, we will continue to support these submission types, now and in the future.

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File formats

Preferred and accepted file formats for artwork submission

Application/ format	Extension	Accepted
Tagged Image File Format	.tif	• Allowed image format
Encapsulated PostScript	.eps	• Allowed image format for vector-based images (*and embedded images)
Adobe Acrobat Portable Document Format	.pdf	• Allowed format for texts, notes, documents • Any fonts used should be embedded
Microsoft Word	.doc, .docx	• Allowed format for texts, notes, documents
Microsoft Excel	.xls, .xlsx	• Allowed format
Microsoft Powerpoint	.ppt, .pptx	• Allowed format

* check image resolution

Image from other applications

Almost all other imaging programs allow you to export graphs and images in all kinds of formats.

Normally you can either do a Save As action or an Export As | Export Images As action, and select a proper document type, such as EPS (Encapsulated PostScript) or TIFF. For TIFF export you are likely asked for an output resolution, pick the highest one from the list or fill in for a graph 1000 dpi and others 500 dpi.

For EPS export you are likely asked for postscript version, choose Postscript 3 if available, and inclusion of fonts, chose for all fonts to be embedded. Some applications may not provide you with these export actions but do allow export to PDF, or perhaps it is possible to print to the Adobe PDF virtual printer if you have that installed.

If all of the above is not possible, then please embed your image as an image object in Microsoft Word.

Generic information

Font information

Times Arial
Σψμβολ
Courier

Font information

To ensure that the final, published version (in print and online) matches your electronic file as closely as possible, make sure that you only use the following fonts in the creation of your artwork:

- Arial
- Courier
- Symbol
- Times

If your artwork contains non-Elsevier standard fonts, Elsevier will substitute these fonts with an Elsevier standard font, which may lead to problems such as missing symbols or overlapping type.

Helvetica is a very common font type but there are many variations of this font. To avoid any font problems during production we prefer to use an Arial font style instead of Helvetica.

Generic information

File naming

File naming

To enable Elsevier to easily identify author source files in terms of figure numbering and format, please ensure this information is contained in the file name.

Some examples are given below:

- *fig1.tif* = figure 1 in TIFF format
- *sc4.eps* = scheme 4 in EPS format
- *pl2.tif* = plate 2 in TIFF format

Always ensure that the file extension is present to enable quick and easy format identification.

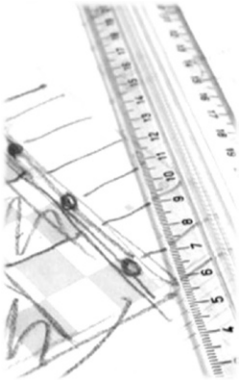
Artwork guidelines

Artwork guidelines

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Artwork guidelines

Sizing of artwork



Sizing of artwork

Elsevier's aim is to have a uniform look for all artwork contained in a single article. It is important to be aware of the journal style, as some of our publications have special instructions beyond the common guidelines given here.

As a general rule, the lettering on the artwork should have a finished, printed size of 7pt for normal text and no smaller than 6 pt for subscript and superscript characters. Smaller lettering will yield text that is hardly legible. This is a rule-of-thumb rather than a strict rule. There are instances where other factors in the artwork, (for example, tints and shadings,) dictate a finished size of perhaps 10pt.

When deciding on the size of a line art graphic, in addition to the lettering, there are several other factors to assess. These all have a bearing on the reproducibility/readability of the final artwork. Tints and shadings have to be printable at finished size. All relevant detail in the illustration, the graph symbols (squares, triangles, circles, etc.) and a key to the diagram (explaining the symbols used) must be discernible.

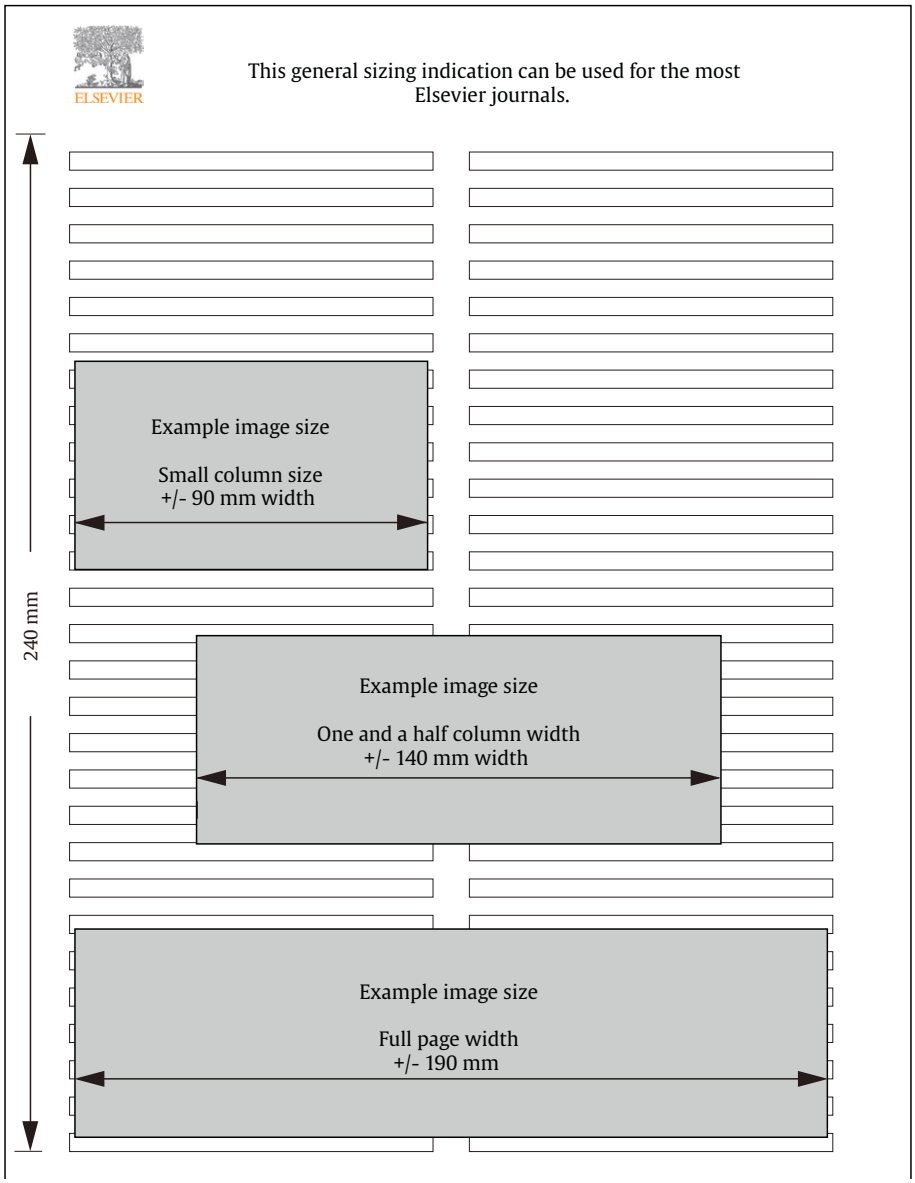
Sizing halftones (photographs, micrographs, etc.) can normally cause more problems than line art. It is sometimes difficult to know what an author is trying to emphasize on a photograph, so you can help us by identifying the important parts of the image, perhaps by highlighting the relevant areas on a photocopy. The best advice that we give to our graphics suppliers is to not over-reduce halftones. They should pay attention to magnification factors or scale bars on the artwork and compare them with the details given in the artwork itself. If a collection of artwork contains more than one halftone, again make sure that there is consistency in size between similar diagrams.

Halftone/line art combinations are difficult to size, as factors for one may be detrimental for the other part. In these cases, the author can help by suggesting an appropriate final size for the combination.

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Pixel requirements (width) per print size and resolution for bitmap images

	image width	A	B	C
Minimal size	30 mm	354	591	1181
Single column	90 mm	1063	1772	3543
1.5 column	140 mm	1654	2756	5512
Full width	190 mm	2244	3740	7480

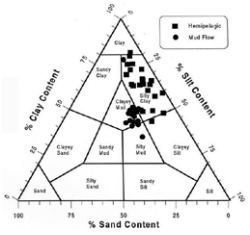
A: 300 dpi > Halftone images Gray/RGB
B: 500 dpi > Combination art Gray/RGB
C: 1000 dpi > Line art

Artwork guidelines

Line art - TIFF (bitmap)

File format: TIFF
Mode: Bitmap
Resolution: 1000 dpi

Sample of a bitmap line image, 1000 dpi



Click on image to enlarge

Line art - TIFF (bitmap)

This is the artwork type commonly used for graphs and charts. Information contained in black and white line art images is purely black and white with no tints or gradations present in the image.

An image, such as a graph or bar chart, that requires sharp edges and high contrast between areas of the image that have ink and those areas that do not have ink. These images require a higher resolution to create the sharpness that is necessary.

A bitmap is an image format that defines an image only in terms of black and white. A bitmapped image is used normally for line art because its elements can only be black and white, unlike a grayscale image.

TIFF (Tagged Image File Format)
A type of image file format, TIFF can include line, color or grayscale information. Its resolution or dpi determines the quality of the image. If the resolution is too low, the image will appear jagged or have a stair-stepped effect.

Once the resolution has been determined, either by scanning or by saving in an image-manipulation software package, it cannot be upgraded or increased to improve quality.

Requirements

Line art should comply with the following requirements regardless of the software and hardware used during the process:

- Images should be in Bitmap (black and white) mode
- Images should have a minimum resolution of 1000 dpi (or 1200 dpi if the image contains very fine lineweights)
- Images should be tightly cropped
- If applicable please re-label your artwork with a font supported* by Elsevier and ensure it is an appropriate font size
- Save your image in TIFF format with LZW compression applied

* see generic information / font information
Note: authors are responsible for the quality of their submitted artwork.

Line art images - EPS >>

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Author Artwork Instructions

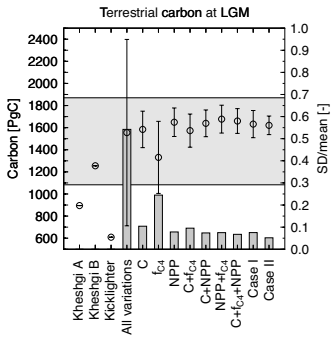
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Artwork guidelines

Line art - EPS (vector based)

File format: EPS
Document mode: RGB
Resolution: true vector files are resolution independent.

Sample of a vector based artwork.
All text, lines and bars are vector, no resolution involved



Click on image to enlarge

Line art - EPS (vector based)

Vector graphics formats are complementary to raster graphics, which is the representation of images as an array of pixels, as it is typically used for the representation of photographic images.

An image, such as a graph or bar chart, that requires sharp edges and high contrast between areas of the image that have ink and those areas that do not have ink. These images require a higher resolution to create the sharpness that is necessary.

To be able to scale line art without loss of detail and sharpness, the EPS format is usually used. Most all vector drawing programs offer an EPS “Save” option. Pure vector based images are resolution independent.

EPS (Encapsulated PostScript)
For vector graphics EPS files are the preferred format as long as they are made following the requirements listed below.

Requirements

- When color is involved, it should be encoded as RGB
- Always include a preview/document thumbnail
- Always include/embed fonts and only use the following in your artwork: Arial, Courier, Times, Symbol
- No data should be present outside the actual illustration area
- Line weights range from 0.15 pt to 1.5 pt

Note: authors are responsible for the quality of their submitted artwork.

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Author Artwork Instructions

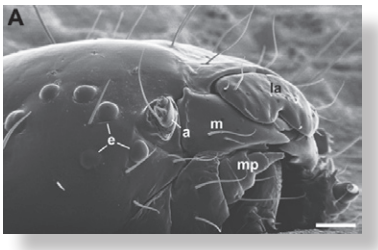
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Artwork guidelines

Grayscale images in TIFF format

File format: TIFF
Mode: Grayscale
Resolution: 300 dpi

Sample of a Grayscale image, resolution 300 dpi



Click on image to enlarge

Grayscale images in TIFF format

Grayscale images are distinct from black-and-white images, which in the context of computer imaging are images with only two colors, black and white. Grayscale images have many shades of gray in between

In computing, a grayscale image is an image in which the value of each pixel is a single sample, that is, it carries the full (and only) information about its intensity.

Grayscale is an image type that defines how the information in the image is to be stored and imaged. A grayscale image is sometimes referred to as an eight-bit image. This format is generally used for halftones because it stores the information for each pixel as a level of gray. There are 256 levels of gray in a halftone.

TIFF (Tagged Image File Format)
A type of image file format, TIFF can include line, color or grayscale information. Its resolution or dpi determines the quality of the image. If the resolution is too low, the image will appear jagged or have a stair-stepped effect.

⚠ Once the resolution has been determined, either by scanning or by saving in an image-manipulation software package, it cannot be upgraded or increased to improve quality.

⚠ **Requirements**

Grayscale artwork should comply with the following requirements regardless of the software and hardware used in the process:

- Images should be in grayscale mode
- Images should have a minimum resolution of 300 dpi
- Images should be tightly cropped
- If applicable please re-label your artwork with a font supported* by Elsevier and ensure it is an appropriate font size
- It is recommended to remove Alpha channels before submitting TIFF files.
- It is recommended to flatten layers before submitting TIFF files.
- Save your image in TIFF format with LZW compression applied

* see generic information / font information
Note: authors are responsible for the quality of their submitted artwork.

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Author Artwork Instructions

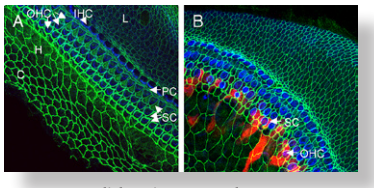
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Artwork guidelines

RGB images in TIFF format

File format: TIFF
Mode: RGB
Resolution: 300 dpi

Sample of a RGB image, resolution 300 dpi



Click on image to enlarge

RGB images in TIFF format

RGB images are made of three color channels (Red, Green, Blue). An 8-bit per pixel RGB image has 256 possible values for each channel which means it has over 16 million possible color values. RGB images with 8-bits per channel (bpc) are sometimes called 24-bit images (8 bits x 3 channels = 24 bits of data for each pixel).

TIFF (Tagged Image File Format)
A type of image file format, TIFF can include color and/or grayscale information. Its resolution or dpi determines the quality of the image. If the resolution is too low, the image will appear jagged or have a stair-stepped effect.

Once the resolution has been determined, either by scanning or by saving in an image-manipulation software package, it cannot be upgraded or increased to improve quality.

Requirements

RGB artwork should comply with the following requirements regardless of the software and hardware used in the process:

- Images should be in RGB mode
- Images should have a minimum resolution of 300dpi
- Images should be tightly cropped
- If applicable please re-label your artwork with a font supported* by Elsevier and ensure it is an appropriate font size
- It is recommended to remove Alpha channels before submitting TIFF files.
- It is recommended to flatten layers before submitting TIFF files.
- Save your image in TIFF format with LZW compression applied

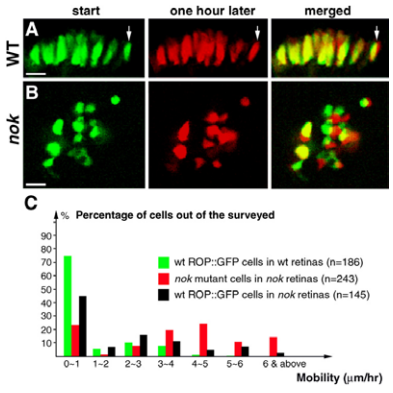
* see generic information / font information
Note: authors are responsible for the quality of their submitted artwork.

Artwork guidelines

Combination images - TIFF

File format: TIFF
Mode: Grayscale/RGB
Resolution: 500 dpi

Sample of a combination image in RGB (bitmap), image resolution 500 dpi



Click on image to enlarge

Combination Art - TIFF

This is an image that is a combination of both a halftone (gray or/and color) and line art elements.

When TIFF based images also contain photographs and line/text elements, this is called combination artwork.

The most common occurrences are images where the labelling of the image is outside of the halftone area, or where there is a graph next to the halftone area. The requirements for this particular type of image are that the text is as clear as possible, with unchanged quality of the halftone. The only way to do this is by combining the properties of the two image types, and this normally results in files that are larger.

TIFF (Tagged Image File Format)
A type of image file format, TIFF can include color and/or grayscale information. Its resolution or dpi determines the quality of the image. If the resolution is too low, the image will appear jagged or have a stair-stepped effect.

⚠ Once the resolution has been determined, either by scanning or by saving in an image-manipulation software package, it cannot be upgraded or increased to improve quality.

⚠

Requirements

Combination (line and halftone) artwork should comply with the following requirements regardless of the software and hardware used in the process.

- The tonal areas of the image should be in RGB mode for color, or grayscale for black and white halftone images
- Resolution of 500 dpi
- If applicable please re-label your artwork with a font supported* by Elsevier and ensure it is an appropriate font size
- It is recommended to remove Alpha channels before submitting TIFF files.
- It is recommended to flatten layers before submitting TIFF files.
- Save your image in TIFF format with LZW compression applied

* see generic information / font information
Note: authors are responsible for the quality of their submitted artwork.

Combination images - EPS >>

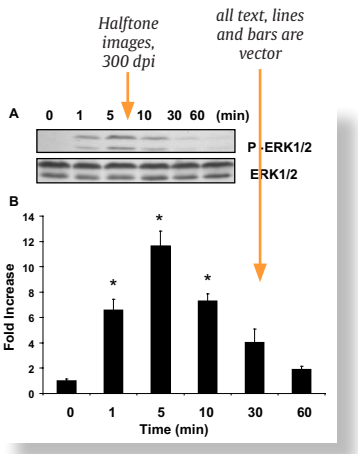
Artwork guidelines

Combination images - EPS

File format: EPS
Document mode: RGB
Resolution: dpi/pixels*

* depending on artwork type, see requirements.

Sample of a combination image, vector and halftone, image resolution 300 dpi



Click on image to enlarge

Combination Art - EPS

This is an image that is a combination of both a halftone (gray or/and color) and line art elements.

When vector based images also contain images, such as photographs, or line art images, this is called combination artwork.

The most common occurrences are images where the labelling of the image is outside of the halftone area, or where there is a graph next to the halftone area. The requirements for this particular type of image are that the text is as clear as possible, with unchanged quality of the halftone. The only way to do this is by combining the properties of the two image types, and this normally results in files that are larger.

Because the image has been created using vectors, unless it contains an 'embedded' bitmap image, like a TIFF file, then the TIFF file's resolution is restricted by its dpi. An EPS file is normally used for combination artwork or charts and graphs.

EPS (Encapsulated PostScript)
For vector graphics EPS files are the preferred file format.

Requirements

Combination (line and halftone) artwork should comly with the following requirements regardless of the software and hardware used in the process.

- When color is involved, it should be encoded as RGB
- Always include a preview/document thumbnail
- Always include/embed fonts and only use the following in your artwork: Arial, Courier, Times, Symbol
- No data should be present outside the actual illustration area
- Line weights range from 0.15 pt to 1.5 pt

Artwork in vector-based files must have a good resolution, see requirements.
- resolution for placed Line artwork must be 1000 dpi
- resolution for placed Halftone artwork must be 300 dpi

Once the resolution has been determined, either by scanning or by saving in an image-manipulation software package, it cannot be upgraded or increased to improve quality.

Note: authors are responsible for the quality of their submitted artwork.

Artwork guidelines

Checklist



Checklist

Before you submit your artwork, make sure you can answer 'yes' to the following:

- My files are in the correct format - TIFF, EPS, PDF or MS Office files (Word, PowerPoint, Excel) .
- My color images are provided in the RGB colorspace.
- It is recommended to remove Alpha channels before submitting TIFF files.
- It is recommended to flatten layers before submitting TIFF files.
- The physical dimensions of the artwork match the dimensions of the journal to which I am submitting. See Sizing of Artwork.
- The lettering used in the artwork does not vary too much in size. See Sizing of Artwork.
- I have used the recommended naming conventions. See File Naming.
- All illustrations are provided as separate files.
- All artwork is numbered according to its sequence in the text.
- Figures, schemes and plates have captions and these are provided on a separate sheet along with the manuscript, in addition all figures are referred to in the text.
- If required, I have specified the preferred magnification factor of my artwork on the sheet with filenames that accompany the submission.
- Are all the rights cleared both for print and electronic publication?

Generic color information

Generic color information

- RGB to Gray conversion
- RGB to CMYK conversion
- Monitor calibration
- What is color?

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Generic color information

RGB to Gray

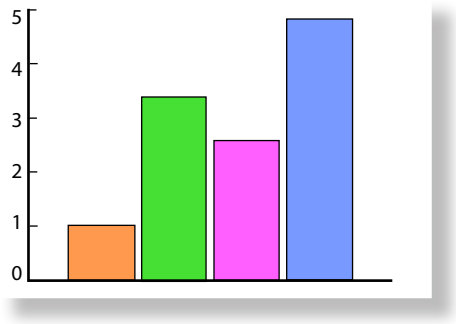
Images supplied in color will sometimes only appear black and white in print due to the additional costs involved. For this reason it is necessary to highlight what can go wrong in such a conversion. If possible, authors should check the results of such a conversion prior to submision

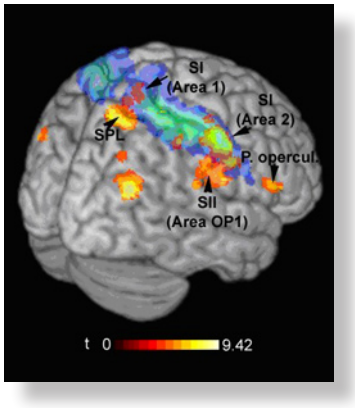
Colors that display a clear difference may appear very similar to each other when converted to gray (see samples below). This is true for both line and halftone images. Certain colors, for example light yellow lines, may not reproduce well in print.

The figures below show the result after conversion from RGB into Gray

In color all information clearly visible

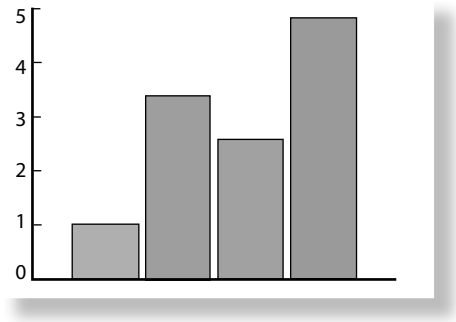
RGB

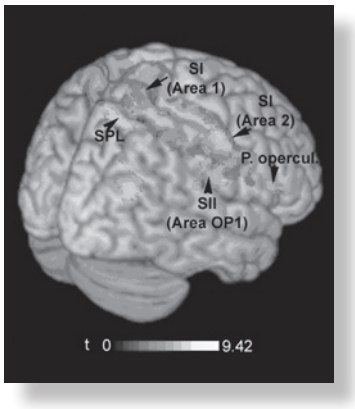




In gray all information get lost

Gray





Generic color information

RGB to CMYK

In our constant drive and focus on leading electronic products Elsevier now requires any color artwork to be supplied in the RGB (Red, Green, Blue) color space.

By supplying RGB files we publish your article and artwork online in services such as ScienceDirect.

RGB files will look good when viewed on a monitor, as they contain the largest possible range or 'gamut' of colors.

Usually, the RGB files will be converted to the CMYK (Cyan, Magenta, Yellow, blacK) color space for the print process. The CMYK color space has a far smaller 'gamut' than RGB, see figure 1.

Because of this conversion it is not possible to accurately produce all RGB colours in print (CMYK). See figures 2 and 3.

Figure 1

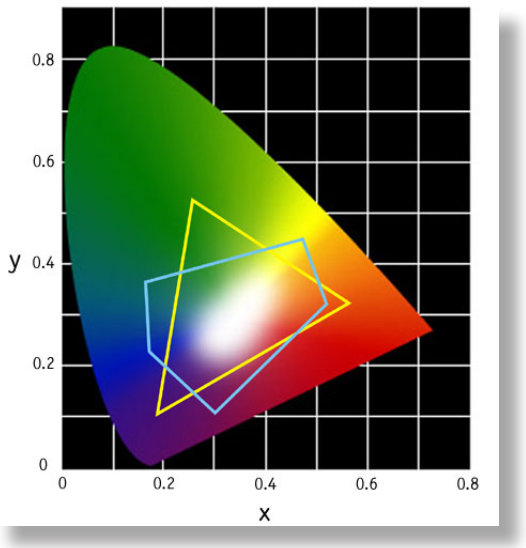


Figure 2

RGB

CMYK

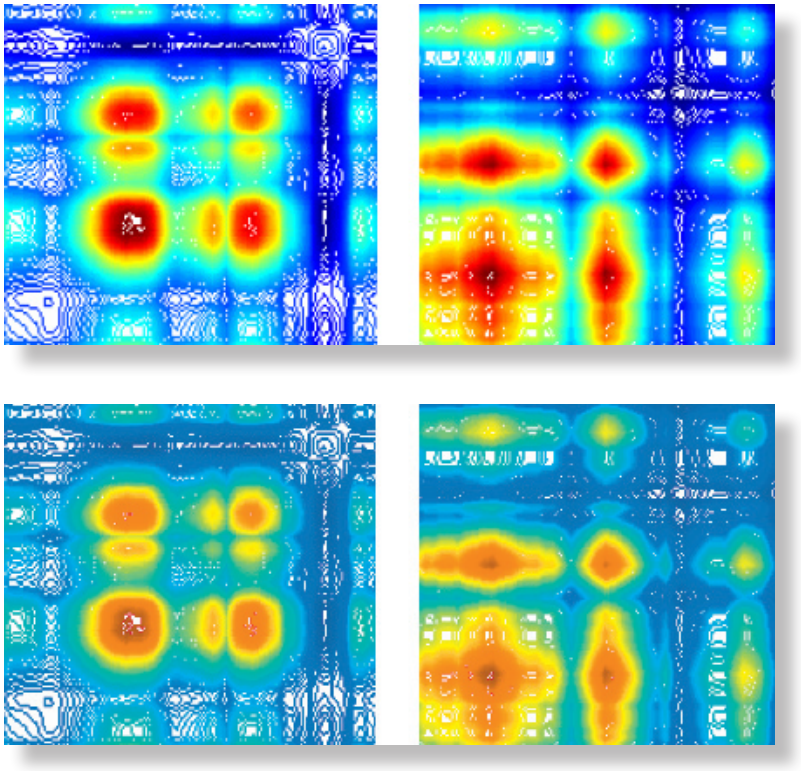
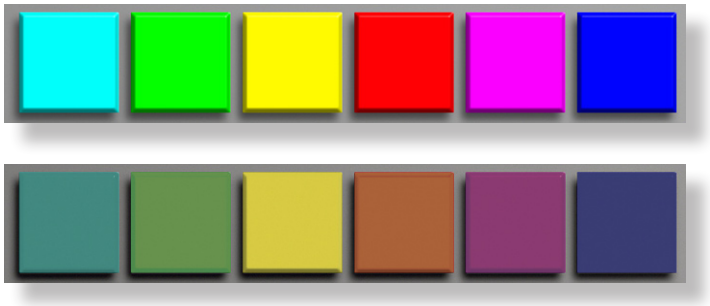


Figure 3

RGB

CMYK



Generic color information

Monitor calibration

The colours on your monitor have to correspond with the colours of the final result. The image on the screen after any colour manipulation you have made, must give you a good idea of the final result without the necessity to make a colour proof.

Your monitor is an RGB-device, which means that the colors on your monitor will be built up from red, green and blue. If you insist on a true exposure of the colors on your monitor, you have to establish a correct gray and color balance. To get this balance you need to calibrate your monitor.

Why should you calibrate your monitor? Colors can vary among individual monitors. Naturally, differences in the extent of use can lead to variations in changes over time. Even when new products have been configured identically, minor variations may occur. Monitors which are not or not properly calibrated could show wrong colors.

Figure 1



For example, on your screen an image may look perfect, but unfortunatelly the result in print does not look like what you had expected, see figure 1.

For this reason, calibration is important when adjusting colors to uniform levels, to absorb these individual differences.

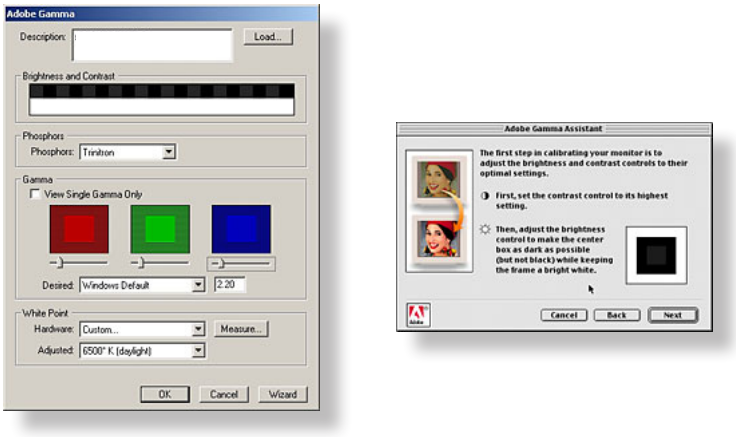
Until recently most users calibrated their monitors using ‘subjectively’ based software programs such as the Adobe Gamma program that came with Photoshop or slightly more advanced programs of the same nature. These programs created a monitor profile by asking the user to make a series of subjective choices; the gamma and color settings would then be altered to match a known standard output on the screen, see figure 2.

This system might well be considered better than nothing but it is hardly an accurate or objective method of calibrating a monitor. A quick test will easily show that different users will calibrate a monitor to different values, highlighting the vagaries of this kind of subjective approach and user based system.

It is therefore not surprising that the importance of this part of the colour workflow

has lead to much re-consideration on what is the best way of undertaking this critical calibration.

Figure 2



In an attempt to solve this problem we are now seeing a range of more objective and automated systems becoming available.

These consist of a colorimeter or color photo-spectrometer that is attached to the monitor (see figure 3), which then takes readings of a range of colours that are provided by the associated software. There is a large range of these monitor-calibration systems at an equally large range of costs.

Like many other areas of technology, you get what you pay for and, even though the cheapest are likely to provide better results than the Adobe Gamma system, it will be worth paying for the best if you are trying to provide the highest quality and most reliable colour reproduction.

Figure 3



It is important to remember that the colors a monitor displays will change over time and therefore it is important to regularly calibrate your monitor, certainly at least once a month is recommended.

Generic color information

What is color ?

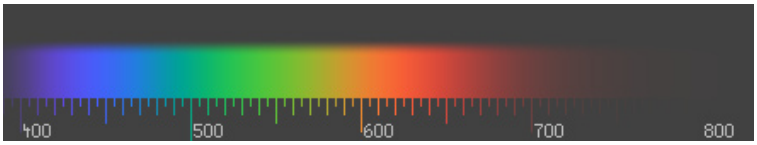
White light

White light is a mixture of all the wavelengths that human vision is capable of detecting. We generally think of daylight as white. However daylight is not always white. Because it is filtered by the Earth's atmosphere it changes color depending on the angle at which the light is entering the atmosphere in relation to our position on the Earth. Particles in the atmosphere also have a bearing. For instance, when there is an abundance of moisture particles in the air we may see a blue tint to a view.

Color

Color is the sensation produced in human vision when electromagnetic radiation, of certain wavelengths within the range 380 nm to 780 nm (figure 1), reflects from objects into our eyes where electro-chemical reactions cause signals to be passed to our brains. These signals are interpreted in the brain as colors. That is, colored light only appears to us when there is a predominance of wavelengths from just a part of the spectrum.

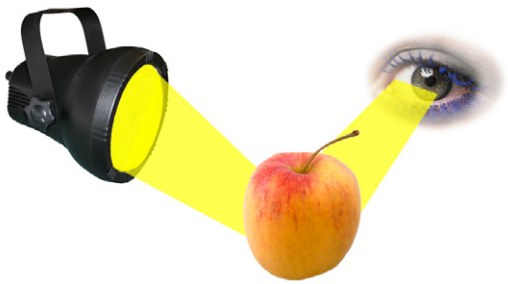
Figure 1



It is when the objects we look at absorb part of the spectrum to which we are sensitive that we perceive the color of an object. For instance, if an object absorbs those wavelengths corresponding to the colors red and green then we perceive blue. If an object absorbs those wavelengths corresponding to the colors green and blue then we perceive red.

The color of an object is not contained within the object, the color is the result of the light which strikes the object and is reflected by it, see figure 2.

Figure 2



Perception of color

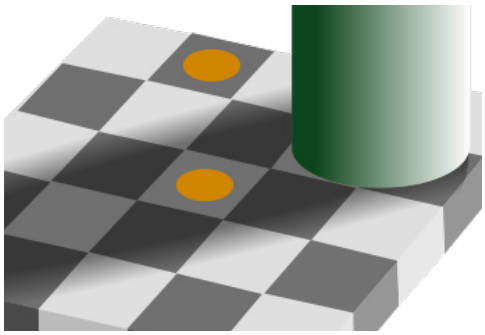
Seeing color is a sensation. Each person does not feel sensations the same way; there is no absolute color that is inherently seen the same way by every individual person. Everyone will agree that ripe tomatoes are red. However, a group of people probably won't agree on which tomato is the reddest, or how a group of tomatoes should be ranked in terms of their redness.
Sometimes we have inbred emotions related to certain colors. Red is an aggressive color in western society. People with red cars tend to drive faster. Police also tend to stop red cars more often since they drive faster and because they are responding to seeing the color red.

Factors affecting the perception of color

There are a number of other circumstantial and environmental factors, which impact on how the eye perceives light and color, see figure 3.

They include:
- Color temperature (light intensity)
- Metamerism
- Surrounding color

Figure 3



The squares containing the orange circles are the same shade of gray.

Color temperature
The intensity of the surrounding light changes the perceived color of any object. Color temperature is a way of measuring the intensity of light radiating from a light source. It is measured by comparison to a specific metal contained in a black box and heated to a specific temperature. The unit used to measure color temperature is Kelvin.
The standard color temperature for viewing color reproductions is 5.000 Kelvin. Viewing booths suitable for evaluating color must be set to this standard to ensure correct lighting conditions.

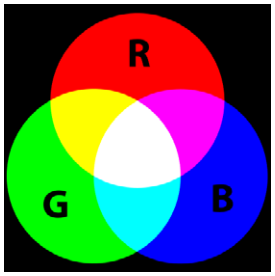
Metamerism
Metamerism occurs when two colors match under one light source, but appear different under another light source. Those two colors are called a metameric match.
A metameric match might cause problems when trying to match proofs to press-sheets under different lighting conditions.

Surrounding color
The color surrounding an object can affect how the actual color of the object is perceived. If a green circle is surrounded by yellow, it will appear lighter than if it is surrounded by dark blue.

Given the difficulties in perceiving true and accurate colors, it is, therefore, extremely important to reduce the possibility for error by evaluating color reproduction only under standardised viewing conditions.

Additive color
White light is the sum of many different colors. When equal parts of each of the three major bands of color are added together, white light is created.

Figure 4



White light is the sum of Red, Green, and Blue light (figure 4). This is known as additive color. As stated earlier, Red, Green, and Blue are the primary components of white light. The presence of all three colors will result in white, and the absence of all three will produce Black.

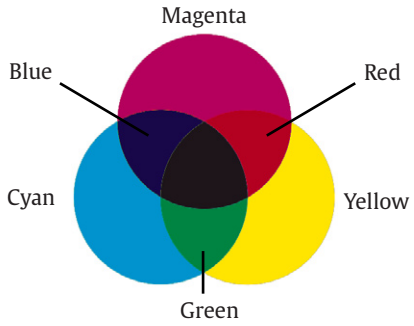
Additive color involves the manipulation of a light source or multiple light sources to control color. A television monitor uses additive zs. The monitor begins with a blank dark screen. Three separate electron beams corresponding to red, green and blue signals are projected onto a fluorescent screen. The screen is made up of tiny triads or groups of three individual cells. A single triad is also known as a screen pixel. Each cell within a triad is sensitive to one of the three beams and will fluoresce or give off a colored light when excited by the beam. The result is a combination of red, green, and blue light for each screen pixel that we see as a single color.

Subtractive color
Printed color begins with white paper illuminated by white light. Take away the light, or print on black paper (with transparent inks) and you will see nothing.

To build a color image, all we can do is selectively subtract some of the light. When we print with a red ink, we see it as red because it absorbs blue and green light and reflects only red. In other words, red ink absorbs or subtracts two thirds of the visible spectrum and reflects one third. The same can be said for blue and green. They each absorb two thirds of the visible spectrum and reflect one third.

In the printing process we use colored inks that each reflect not one third, but two thirds of the visible spectrum. These special inks correspond to the secondary colors of light; namely Cyan, Magenta, and Yellow.

Figure 5



Since each color absorbs one third of the visible spectrum, it takes all three inks to make black. Overprinting any two of these colors will produce red, green, or blue (figure 4). By overprinting selected amounts of cyan, magenta, and yellow, the widest range of colors within the limitations of paper and ink can be achieved.

Color reproduction
In color reproduction, pigmented transparent inks (cyan, magenta, and yellow) are used for printing. These inks are called process colors. A transparent printing ink is made to absorb one component of white light and transmit the other two.

The paper, or substrate, then reflects the transmitted colors back to the eye. Cyan ink absorbs only red light, so appears blue-green. Magenta ink absorbs only green light and appears bluish-red. Yellow ink absorbs blue light.

Color absorption and reflection
In theory, when each of the process colors - cyan, magenta, and yellow - are over-printed, absorbing all the visible light reflected from the paper, the result should be black.
In reality, solid layers of all three printing inks do not absorb all the available light and a brownish grey color is produced. This is because of impurities in process inks. Cyan ink not only absorbs red as it should, but also absorbs some green and blue light. The magenta ink should absorb only green light. But it also absorbs some blue and red. Yellow ink is nearly ideal. To overcome this problem, black ink is also used. When black ink is added to the reproduction, it will add detail and enhance contrast, making the dark areas appear darker and the light areas appear lighter.

Cyan, magenta and yellow can therefore define the printed color space. This representation of the color space is referred to as the CMY color space - a three-dimensional model, resembling the RGB model, yet distorted due to the above-mentioned impurities.

Color separation
In color reproduction, the process of translating a color photograph or transparency into its cyan, magenta, yellow and black components is called color separation.

The principle of color separation is similar in both photographic and electronic scanning processes. Each process utilises the concepts of additive and subtractive color for filtering the individual components of white light.

The photographic process consists of illuminating the original copy with white light and then separating it into three images by placing red, green and then blue filters in between the copy and the film.

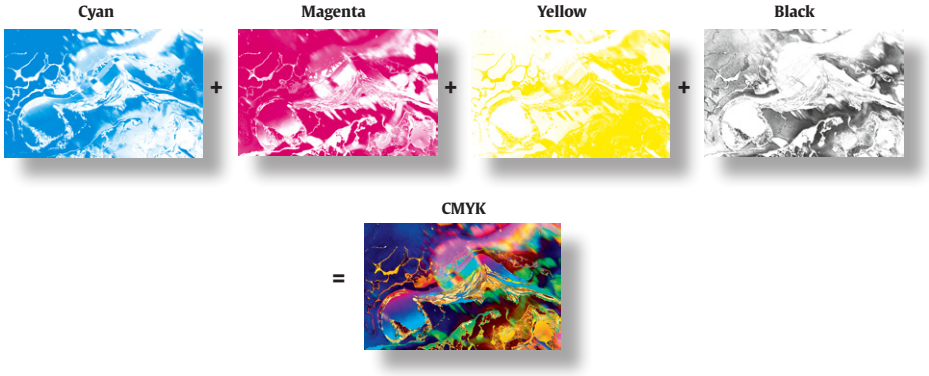
- A red filter is used to generate the cyan separation
- A green filter is used to generate the magenta separation
- A blue filter is used to generate the yellow separation

The black separation is made from a combination of the other three.

CMYK

The printing industry generally refers to the four process color separations (figure 6) as CMYK where: C stands for Cyan, M stands for Magenta, Y stands for Yellow and K stands for Black, to distinguish it from Blue.

Figure 6



Different color languages

The devices comprising an open computer imaging system may all process colors differently. Each type of device can be thought of as using its own 'language' when interpreting and rendering color. This means that there can be no automatic way of guaranteeing color fidelity throughout a system. Also device characteristics, such as age and wear, and operating conditions such as temperature can affect color rendition. This can lead to disappointment with, for instance, printed output when what was seen on the monitor looked fine, or when a screen representation of a scanned artwork looks markedly different from the original.

Color spaces

Unfortunately we are often not going to be able to faithfully reproduce an object as seen by the human vision system. This is a task of which the available devices and systems are just not capable.
Monitors can represent more colors, operating in the RGB color space (red, green and blue phosphors), than desktop printers and the offset lithographic processes.

A scanner records, or samples, an image as a set of RGB values. The accuracy of the color measurements taken from the image depends on the scanner's manufacture, maintenance and settings.

A monitor will display that image to us in a way that depends on viewing conditions, the screen phosphors used in its manufacture, the state of its settings and on its condition. Further, when an image is printed, the colors reproduced and perceived will

depend on the inks as well as the paper used to print on and the conditions under which the print is viewed.

A system is required to compensate for the color handling differences between the devices. This system is required to enable predictable reproduction of an original image with the output being as close as possible to the original. However it has to be acknowledged at this point that the output may be comprised of a smaller set of colors than that in the original scanned artwork. In other words, some colors may be changed or lost.

Support

- FAQ
- Glossary
- Contacts

FAQ

File formats



Why do you not accept JPEG files?
There are a few reasons but mainly because the JPEG file format is 'lossy', that is to say that the figure quality will be reduced each time the file is opened/manipulated. Also JPEG file size can be prohibitive.

Why don't you accept PNG ?
We will constantly review technological developments in the graphics industry including emerging file formats - new recommended formats will be introduced where appropriate.

Why can't I supply in native format (CorelDraw, ChemDraw etc.)?
We prefer your artwork in TIFF or EPS format because these common interchange formats are readable by a wide number of applications. Virtually all image creation/manipulation software can 'Save As...' or 'Export...' to these common formats.

Can I supply an EPS file created in CorelDraw?
We only currently accept TIFF files written by CorelDraw which are exported at the appropriate resolution: 300 dpi for halftones, 500 dpi for combinations (line art and halftone together) and 1000 dpi for line art. This is due to know problems with fills and patterns.

Can I supply artwork in Postscript format?
Unfortunatelly we do not accept artwork in Postscript format.

Why do you accept figures in MS Office format?
We recognise that a large percentage of currently supplied artwork files are in this format, also it is not possible to reliably save from these applications to TIFF/EPS. We have developed conversion techniques that will ensure the source files can be used and will be of sufficient quality if input resolutions of placed images are sufficient

When preparing your MS Office files you must ensure the following point are adhered to:
Make sure that any artwork placed into MS Office applications is at the appropriate, minimum, resolution: 300 dpi for halftones, 500 dpi for combinations (line art and halftone together) and 1000 dpi for line art. Unfortunately it's not possible to check image resolutions in MS Word.

I can't figure out what the resolution of my figures/tables is in my MS Word document, where can I find this?
Unfortunately it's not possible to check image resolutions in MS Word.

The figures and tables were primarily created in MS Excel. When I copied and pasted an image into Paint it indicated that the resolution was too low
Do not copy figures and/or tables primarily created in MS excel into Paint, you may submit these files as Excel files

FAQ

Image, colour & quality issues



My black and white line art is only 300dpi yet your site stipulates a minimum of 1000dpi, can I just increase the resolution in Photoshop?
No - the image must be captured at the given resolution, increasing resolution after capture will never improve the quality of the image.

If the resolution is too low, the image will appear jagged or have a stair-stepped effect. Once the resolution has been determined, either by scanning or by saving in an image-manipulation software package, it cannot be upgraded or increased to improve quality.

What line weights should I use on my artwork?
Any line work should be an absolute minimum of 0.25pt, high-quality reproduction of line work below this width cannot be guaranteed (lower resolution output devices such as office laser printers should not be used as indicators in such cases). For prominent lines (e.g. plot lines on graphs) the weight should be approximately 1pt.

Can I provide screen dumps as electronic artwork?
This is not recommended but in some cases it is unavoidable - an example is when you would like to illustrate a screen/settings from a software application.

I submited high qualty images at 300 and 1000dpi, but in the PDF they are 200dpi JPG, why?
All bitmap images are converted and downsampled regardless of source file to a JPG with a resolution of 200dpi so that the PDF can be send easily via email. For print the hi-resolution file will be used.

What tints of black should I use on my graphs?
It is recommended that you only use 3 or 4 variations of colour or tone on one piece of artwork to avoid problems in distinguishing between lines - a good alternative is to colour all lines solid black and use dashed/dotted lines to show a prominent difference.

What colours can I use on my graphs?
If your artwork is to be printed in colour then use bold, solid colours that will reproduce well. If your artwork is to be printed in black and white you must ensure that a conversion will not result in similar shades of grey - if this is the case then make use of patterns for boxes or dotted/dashed lines.

Why do you ask for colour artwork in RGB format?
RGB is the colour space that has the highest number of available colours - we ask for RGB in order to ensure that your colour artwork can be published online at the highest possible quality.

I've sent "bright and colour full" RGB files, but these colours look different in the printed version, how is this possible?
As normal, the RGB files will be converted to the CMYK (Cyan, Magenta, Yellow, blacK) colour space for the print process. The CMYK colour space has a far smaller 'gamut' than RGB, and hence it is not possible to accurately produce all RGB colours in print (CMYK)

Colour Figures
When an accepted paper is received by production for publication, a letter will be sent to the corresponding author advising of the number of figures to be published in colour and the colour costs for that journal. The corresponding author must indicate if he wishes to pay for colour or if he just wants web colour. If an author doesn't respond within a certain number of days, the paper will be processed for web colour only.

FAQ



Colour Figure Reproduction Charge
For the majority of journals if the author wishes colour illustrations to appear as colour in print then they much cover the cost. In the online version the figures will appear in colour regardless of whether the author pays for printed colour. Some journals also offer additional free offprints if the author agrees to pay for colour.

Should my figures be included in my manuscript file when submitting in EES?
No; please upload your figures separately to your manuscript. When our system converts your paper to PDF for the review process it will include your figures at end of the PDF file.
Note: If you used LaTeX to prepare your manuscript, your separately uploaded EPS files can be embedded in the manuscript itself, using the appropriate commands.

How do I know if my figures are suitable for submission?
Elsevier accepts many different figure file formats, the most common being TIFF, EPS and Microsoft Office files. Please first refer to your journal's Guide for Authors, as this will contain any unique requirements.

I am unable to upload my figures to EES. Why is this?
Please ensure that your figures are in an acceptable file formats; please check our Author Artwork Instructions for the recommended file formats.

The size of your figures will also affect if they can be uploaded. We recommend that figures are not larger that 10 MB and if you have several figures these should not be more than 7 MB each to ensure ease of upload.

If your figures are larger you may need to reduce the resolution or save them in a different format. Often journals have an individual limit on file size, to ensure that you are conforming to the journal requirements please check the journals Guide for Authors for this information.
http://www.elsevier.com/wps/find/authorsview.authors/languageediting/guideforauthors

If you still cannot upload your figures please contact our Customer Support Department for assistance providing information on the size and type of files you are uploading.
>**Click here**

Can I upload figures created in ChemDraw, CorelDraw, Photoshop, Illustrator or Canvas?
We prefer your artwork in TIFF or EPS format because these common interchange formats are readable by a wider number of applications.
Virtually all image creation/manipulation software can 'Save As...' or 'Export...' to these common formats.

What about figure captions?
Submit figure captions with your EES submission.
There are a few ways to submit figure captions with your submission.

1. If the journal provides for a submission item called Figure Caption, submit your caption here in the form of a text file.

2. If there is no submission item provided for Figure Caption, you should list your figure captions at the end of your manuscript text file

Glossary

- **Glossary**

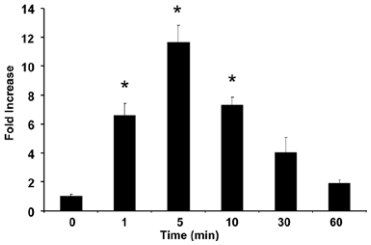
Glossary

Application

Applications (or so-called software programs) are executables designed to perform specific functions. Adobe PhotoShop® is an example of an application designed to perform image editing. Microsoft Word® is an example of an application designed to perform word processing.

Bitmap

A bitmap is an image format that defines an image only in terms of black and white. A bitmapped image is used normally for line art because its elements can only be black and white, unlike a greyscale image.



Color modes

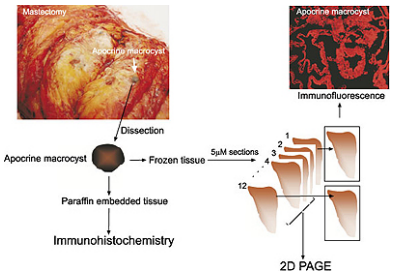
Color work can be produced (sometimes unknown to the author) in several different color modes. The actual colors within these modes are defined in a dimensional co-ordinate system used to describe the colors numerically via values. Some models include Red, Green, Blue (RGB) or Cyan, Magenta, Yellow, Black (CMYK); and Lightness, a, b (Lab).

Color space

A particular variant of a color model with a specific gamut (i.e. range of colors), which is one of its major characteristics. For example, within the color model RGB are a number of color spaces like Apple RGB, Adobe RGB (1998), and sRGB. While each of these define color by the same three axes (R, G, and B), they differ in gamut as well as other specific characteristics.

Combination Art

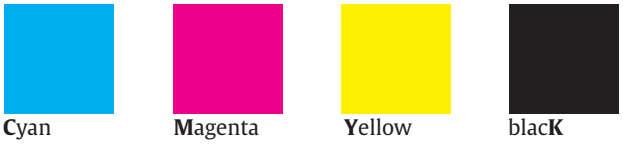
An image that is a combination of both a halftone and line art. The most common occurrences are images where the labelling of the image is outside of the halftone area, or where there is a graph next to the halftone area.



The requirements for this particular type of image are that the text is as clear as possible, with unchanged quality of the halftone. The only way to do this is by combining the properties of the two image types, and this normally results in files that are (significantly) larger.

CMYK

CMYK stands for the four-color printing process (see also process printing) that uses the standard inks Cyan, Magenta, Yellow and Black. It is also known as subtractive color. The color black is achieved by the presence of all inks. Basically, each color can be achieved by using Cyan, Magenta and Yellow, where Black is used to give correct neutral tones and to add detail.



Cropping

Cropping is the term used for the removal of any tspace surrounding your artwork.

DPI

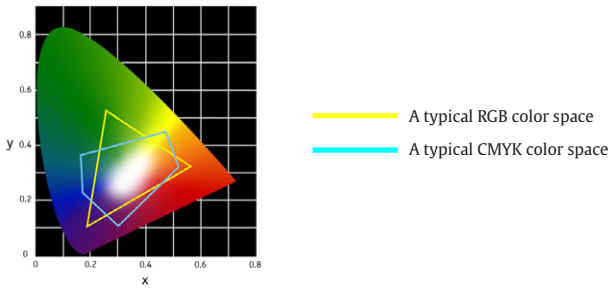
DPI is an acronym of Dots-per-inch (sometimes called Pixels-per-inch), the associated value of which gives he number of pixels that are defined within the boundary of an inch, and is often referred to as the resolution of the image. The more correct term is pixels-per-inch, but dots-per-inch is still used widely in the prepress/printing industry.

EPS

EPS stands for the Encapsulated PostScript format from Adobe. An EPS file is an image that has been created using the language of PostScript, and is generally resolution-independent because it has been created using vectors (unless it contains an 'embedded' bitmap image, like a TIFF file, then the TIFF file's resolution is restricted by its dpi). Because it is the vector that draws the image, the computer can draw the image at any resolution. The computer can thus determine at what resolution it is to draw the image (or portion of the image) on the printing device to which it is connected. An EPS file is normally used for combination artwork or charts and graphs. To be able to scale line art without loss of detail, the EPS format is usually used.

Gamut

When certain colors cannot be displayed within a particular color model, those colors are said to be out of gamut. For example, pure red which is contained in the RGB color model gamut is out of gamut in the CMYK model.



Gif

GIF stands for 'Graphic Interchange Format', the standard was developed by Compuserve and is the predominant image format on the web today, this is an image format that is geared specifically towards computer screen representation. Its resolution is thus normally very low (72 dpi, or that of your computer screen), making it undesirable for printing purposes. In addition, GIF files also contain a maximum of 256 colors thus making the format less desirable for presentation of photographic/halftone images.

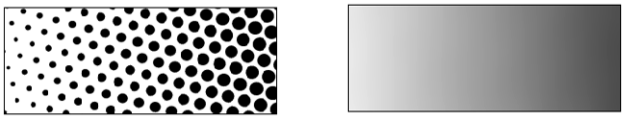
Grayscale

Grayscale images are distinct from black-and-white images, which in the context of computer imaging are images with only two colors, black and white; grayscale images have many shades of gray in between. In most contexts other than digital imaging, however, the term "black and white" is used in place of "grayscale".



Halftone

A halftone is an image like a photograph or micrograph. It is also the method of generating during printing an image that requires varying densities, or shades, to accurately render the image. This is achieved by representing the image as a pattern of dots of varying size. Larger dots represent darker areas, and smaller dots represent lighter areas of an image.



Left: Halftone dots. Right: How the human eye would see this sort of arrangement from a sufficient distance.

Indexed color

A color mode that contains a palette of 256 colors, or less, to define the colors in the image. Indexed color can reduce the data file size while maintaining visual quality. The reduction in file size makes it an ideal format for multimedia or web graphics. It is not used for high-end printing.

Jaggies

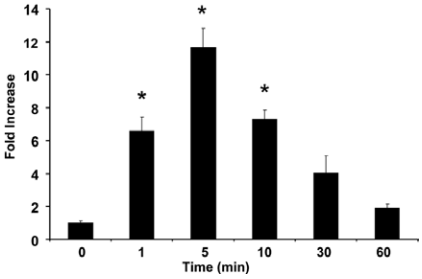
An effect caused by images or lines being rendered at too low a resolution. It can be defined as a 'stair-stepped' effect giving the line or image a rough appearance. By increasing the resolution, we can reduce the stair-stepped effect. It is important to remember that once an image has been saved at a lower resolution it cannot be upgraded to a higher resolution. The physical resolution will increase, but the quality of the image will not.

JPEG

JPEG stands for 'Joint Photographic Experts Group'. JPEG is a standards committee that designed an image compression format. The compression format they designed is known as a lossy compression, in that it deletes information from an image that it considers unnecessary.

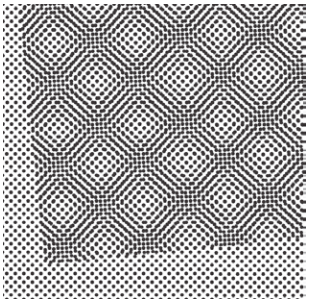
Line art

Line art is any image that consists of distinct straight and curved lines placed against a (usually plain) background, without gradations in shade (darkness) or hue (color) to represent two-dimensional or three-dimensional objects. Line art can use lines of different colors, although line art is usually monochromatic. This could be a TIFF file at 1000 dpi or a vector-based EPS image, to be able to scale line art without loss of detail, the EPS format is usually used.



Moiré

A noticeable, unwanted pattern generated by scanning or re-screening a piece of art that already contains a dot pattern. This effect can also be caused by the misalignment of screen angles in color work.



ELSEVIER

Author Artwork Instructions

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Native images

Native files are the default format generated by software applications (such as FreeHand, Illustrator, CorelDraw, Photoshop and Canvas) which can all be used to generate electronic artwork quickly and reliably. This application file is normally called the working file, and will have an application-specific extension (e.g. .PSD for Adobe Photoshop files).

Elsevier prefers to receive such files saved in either TIFF or EPS format, the option to save in one of these formats can normally be found under either the 'File->Save As...' or 'File->Export...' menu items of all common graphics software.

PDF

Adobe's Portable Document Format is fast becoming a standard format for document exchange. It can be a very useful format for images and may well become a preferred image format in the future.

Pixel

In digital imaging, a pixel (picture element) is the smallest piece of information in an image. Pixels are normally arranged in a regular 2-dimensional grid, and are often represented using dots, squares, or rectangles. Each pixel is a sample of an original image, where more samples typically provide a more accurate representation of the original. The intensity of each pixel is variable; in color systems, each pixel has typically three or four components such as red, green, and blue, or cyan, magenta, yellow, and black.

Process printing

Output based on printing that uses four colors, cyan, magenta, yellow, and black to create the illusion of continuous tone images. For that reason, cyan, magenta, yellow, and black are also known as process colors (CMYK).



PostScript (PS)

A page description language created by Adobe Systems Inc. that is a device-independent industry standard for outputting documents and graphics.

Raster (RIP)

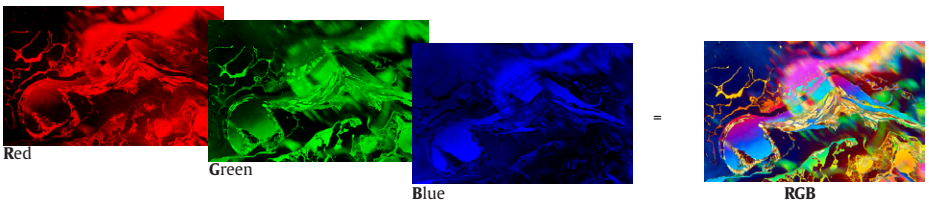
A raster image processor (RIP) is a component used in a printing system which produces a raster image also known as a bitmap. The bitmap is then sent to a printing device for output. Raster image processing is the process and the means of turning vector digital information such as a PostScript file into a high-resolution raster image.

Resolution

The resolution of an electronic file expressed as dots per inch (dpi). We have different resolution requirements based on the type of image supplied. Final (output) resolution for print can be anywhere between 300-3300dpi.

RGB

RGB (Red, Green, Blue) our preferred color 'format' for artwork. RGB is the color process used by computer displays. The presence of all three colors as light waves is perceived by the eye as white; the absence of light is perceived as black. This is also known as additive color. RGB color is very different from CMYK color. The number of colors that can be generated by RGB mode is much larger than those that can be generated by CMYK.





Contact

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For artwork related request and support, please contact us at:
sqsartwork@elsevier.com

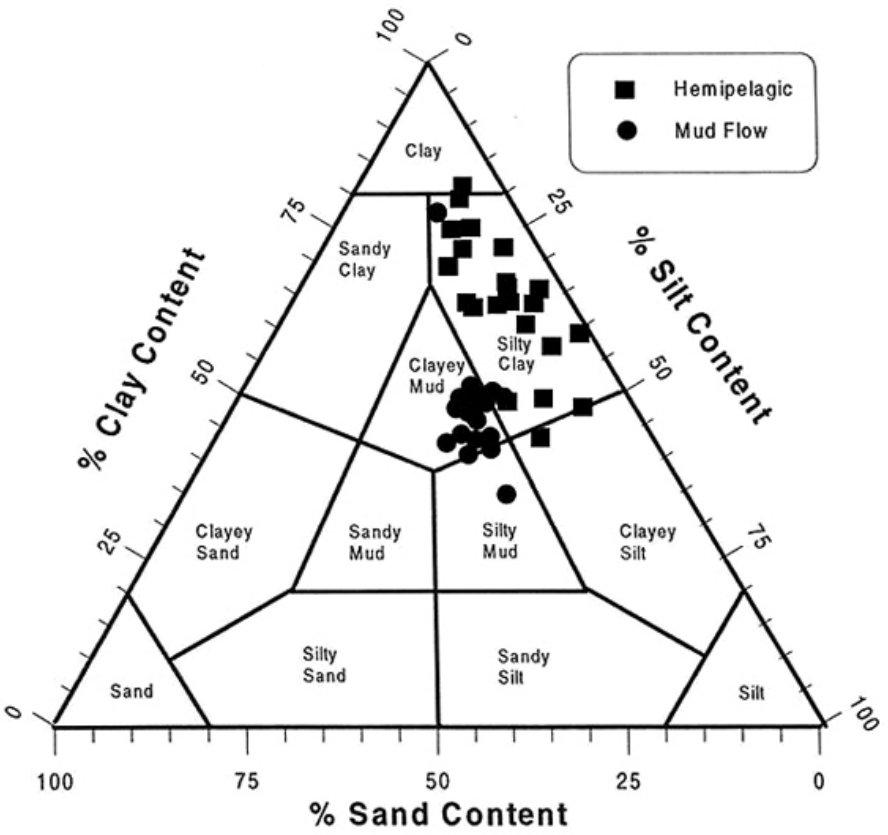
Should you have any additional questions or concerns, please visit our self-help site at: **http://epsupport.elsevier.com/**

Here you will be able to search for solutions on a range of topics, find answers to frequently asked questions and learn more about EES via interactive tutorials. You will also find our 24/7 support contact details should you need further assistance from one of our customer service representatives.

Artwork guidelines

Line art - TIFF (bitmap)

File format: TIFF
Mode: Bitmap
Resolution: 1000 dpi



Sample of a bitmap line image

Requirements

Line art should comply with the following requirements regardless of the software and hardware used during the process:

- Images should be in Bitmap (black and white) mode
- Images should have a minimum resolution of 1000 dpi (or 1200 dpi if the image contains very fine lineweights)
- Images should be tightly cropped
- If applicable please re-label your artwork with a font supported* by Elsevier and ensure it is an appropriate font size
- Save your image in TIFF format with LZW compression applied

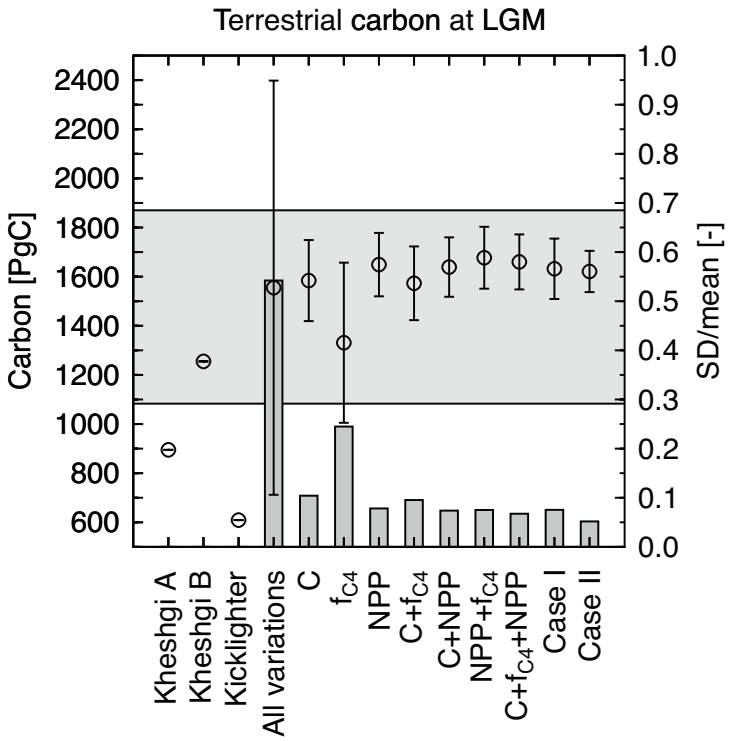
* see generic information / font information
Note: authors are responsible for the quality of their submitted artwork.

<< Back to line art <<

Artwork guidelines

Line art - EPS (vector based)

File format: EPS
Document mode: RGB
Resolution: true vector files are resolution independent.



Sample of a vector based artwork. All text, lines and bars are vector, no resolution involved

Requirements

- When color is involved, it should be encoded as RGB
- Always include a preview/document thumbnail
- Always include/embed fonts and only use the following in your artwork: Arial, Courier, Times, Symbol
- No data should be present outside the actual illustration area
- Line weights range from 0.15 pt to 1.5 pt

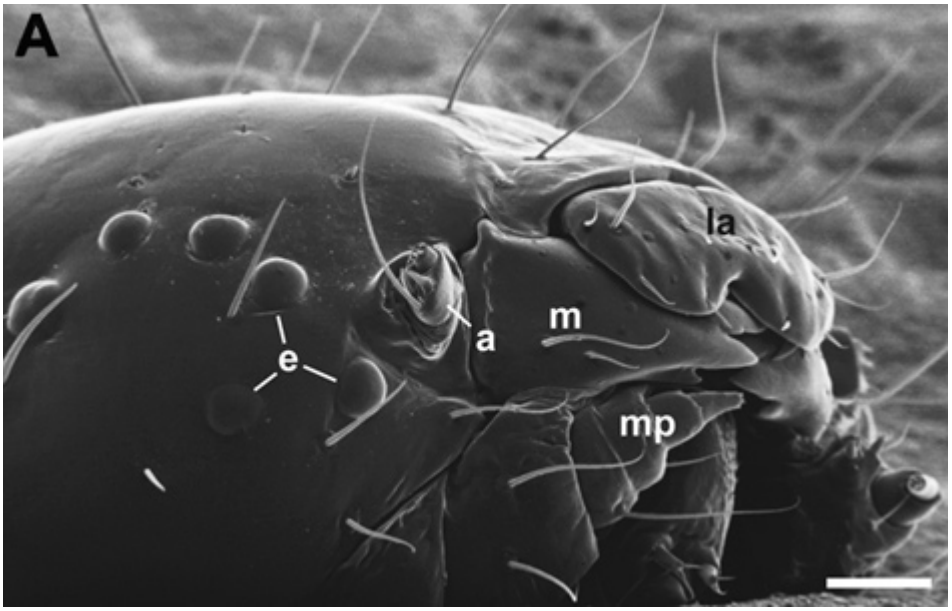
Note: authors are responsible for the quality of their submitted artwork.

<< Back to Line art EPS <<

Artwork guidelines

Grayscale images in TIFF format

File format: TIFF
Mode: Grayscale
Resolution: 300 dpi



Sample of a Greyscale image, resolution 300 dpi

Requirements

Grayscale artwork should comply with the following requirements regardless of the software and hardware used in the process:

- Images should be in grayscale mode
- Images should have a minimum resolution of 300 dpi
- Images should be tightly cropped
- If applicable please re-label your artwork with a font supported* by Elsevier and ensure it is an appropriate font size
- It is recommended to remove Alpha channels before submitting TIFF files.
- It is recommended to flatten layers before submitting TIFF files.
- Save your image in TIFF format with LZW compression applied

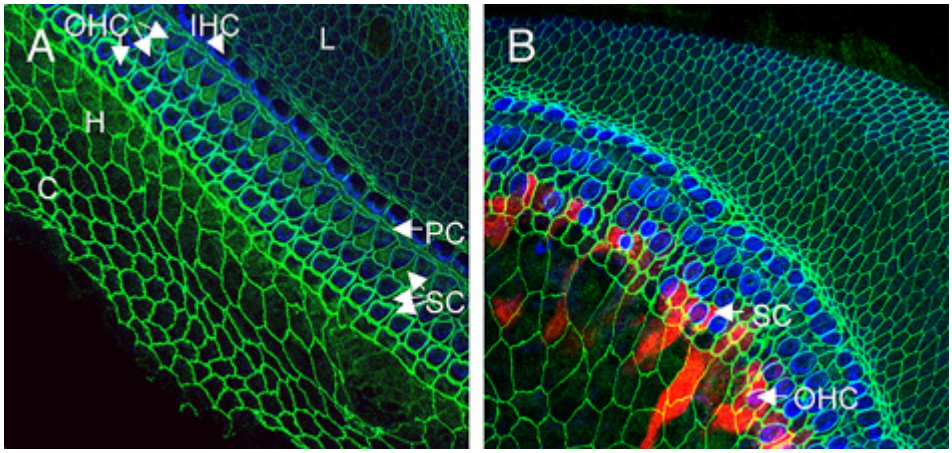
* see generic information / font information
Note: authors are responsible for the quality of their submitted artwork.

<< Back to Grayscale <<

Artwork guidelines

RGB images in TIFF format

File format: TIFF
Mode: RGB
Resolution: 300 dpi



Sample of a RGB image, resolution 300 dpi

Requirements

RGB artwork should comply with the following requirements regardless of the software and hardware used in the process:

- Images should be in RGB mode
- Images should have a minimum resolution of 300dpi
- Images should be tightly cropped
- If applicable please re-label your artwork with a font supported* by Elsevier and ensure it is an appropriate font size
- It is recommended to remove Alpha channels before submitting TIFF files.
- It is recommended to flatten layers before submitting TIFF files.
- Save your image in TIFF format with LZW compression applied

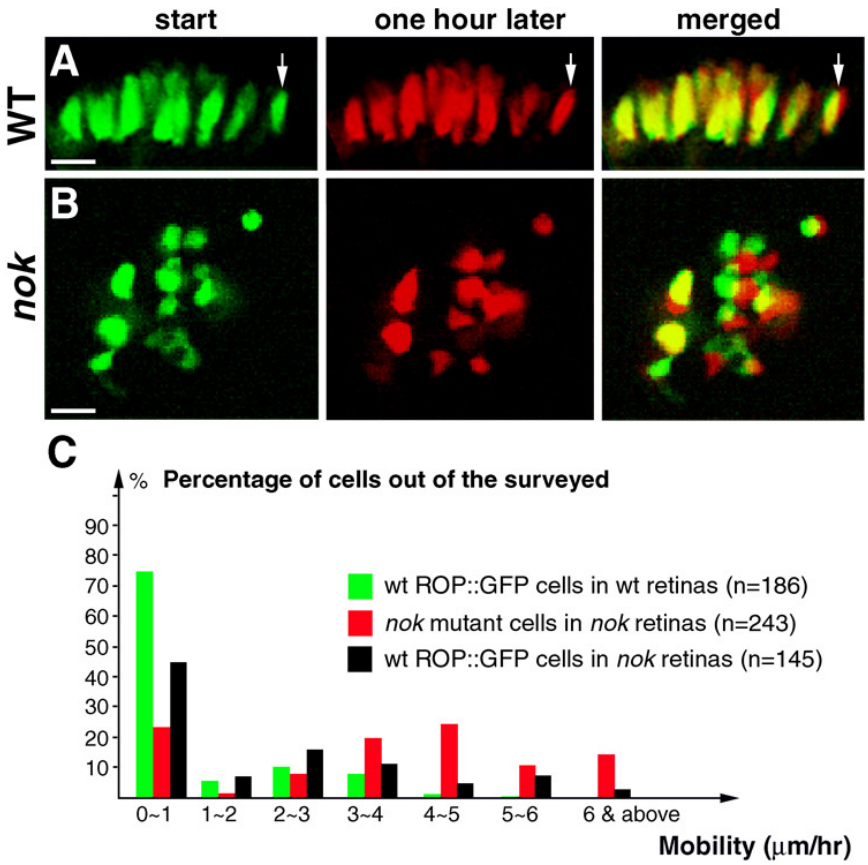
* see generic information / font information
Note: authors are responsible for the quality of their submitted artwork.

<< Back to RGB <<

Artwork guidelines

Combination images - TIFF

File format: TIFF
Mode: Grayscale/RGB
Resolution: 500 dpi



Sample of a combination image in RGB (bitmap), image resolution 500 dpi

Requirements

Combination (line and halftone) artwork should comply with the following requirements regardless of the software and hardware used in the process.

- The tonal areas of the image should be in RGB mode for color, or grayscale for black and white halftone images
- Resolution of 500 dpi
- If applicable please re-label your artwork with a font supported* by Elsevier and ensure it is an appropriate font size
- Save your image in TIFF format with LZW compression applied
- It is recommended to remove Alpha channels before submitting TIFF files.
- It is recommended to flatten layers before submitting TIFF files.

<< Back to Combo TIFF <<

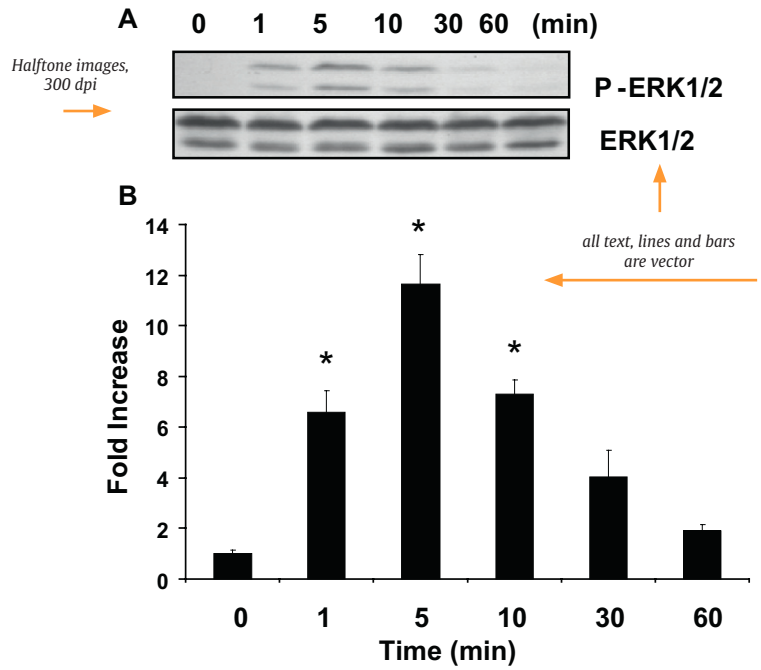
* see generic information / font information
Note: authors are responsible for the quality of their submitted artwork.

Artwork guidelines

Combination images - EPS

File format: EPS
Document mode: RGB
Resolution: dpi/pixels*

* depending on artwork type, see requirements.



Sample of a combination image, vector and halftone, image resolution 300 dpi

Requirements

Combination (line and halftone) artwork should comly with the following requirements regardless of the software and hardware used in the process.

- When color is involved, it should be encoded as RGB
- Always include a preview/document thumbnail
- Always include/embed fonts and only use the following in your artwork: Arial, Courier, Times, Symbol
- No data should be present outside the actual illustration area
- Line weights range from 0.15 pt to 1.5 pt

Artwork in vector-based files must have a good resolution, see requirements.

- resolution for placed Line artwork must be 1000 dpi
- resolution for placed Halftone artwork must be 300 dpi

Once the resolution has been determined, either by scanning or by saving in an image-manipulation software package, it cannot be upgraded or increased to improve quality.

Note: authors are responsible for the quality of their submitted artwork.

<< Back to Combo EPS <<