Tip Sheet

ArchiCAD 11
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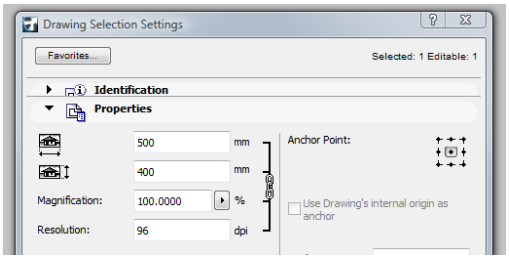
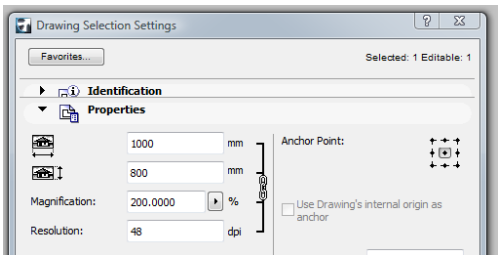
Understanding Digital Image Resolution

What is Resolution?



This is the settings of an image placed on a layout in ArchiCAD. This image is 1890 pixels wide and 1512 pixels high. At the current settings, this will result in a physical size on the layout sheet, of 500mm wide and 400mm high, at a resolution of 96dpi.



If we were now to change the physical width to 1000mm and the height to 800mm, the resolution automatically changes to 48dpi. This is because a digital image has *no absolute size or resolution*. All it has are a certain number of pixels in each dimension(x and y). Therefore the resolution changes as the physical size changes because the same number of pixels in the image is being spread over a larger physical area. ArchiCAD cannot add new information to the image, so resolution decreases as the physical size increases. For example, the image in figure A is 600 pixels wide by 480 pixels high, and has been placed at 300dpi. Figure B is 145 pixels wide by 115 pixels high at 300dpi. Figure C is the same image as Figure B, but placed at 72dpi.

Figure A

Figure B

Figure C

As you can see, even though Figures B and C have the same amount of pixels, Figure C looks significantly worse than B. This effect will be even more pronounced when printing.

Screen resolution vs. print resolution

Now, the big question with regards to image size in ArchiCAD is usually 'What size image do I need?'. This deceptively simple question is the source of much confusion in this area. The problem is that the answer depends entirely on what the image is there for. In ArchiCAD, there are 2 likely reasons that you would insert an image:

1. For display only e.g.; tracing (survey etc), design images etc..
2. For output e.g.; renders placed in layout books

In the first instance (display), you don't need as high a resolution because a typical computer monitor will only display a resolution of around 72-96 dots per inch (dpi).

For output, the resolution will depend on what you are outputting to. The naked eye can usually perceive about as far as 240dpi, so anything above this is probably overkill for standard work. Most modern inkjet printers have a maximum true resolution of 240dpi, so this is generally a good resolution to shoot for. Other common output resolutions include:

- Poster/Billboard printing – check with your printer, but around about 24dpi is common.
- Plain (non-photo grade) paper – 150-180dpi is fine for plain-paper printing
- Very high resolution (eg magazine prints, photos etc.) 360dpi

Once you have sorted out what resolution you need, you need to know what physical size the image needs to be. So for example, a full page A4 (29.7cm x 21.0cm) print at 150dpi (60 pixels/cm) will require an image 1782 (29.7 x 60) pixels high and 1260 (21 x 60) pixels wide.

Output file formats

As of version 11, ArchiCAD produces much more standardized PDF documents. These PDF files are essentially 'container' files for several types of information, the most common of these being bitmaps, vectors, and text. Linework in your ArchiCAD file is stored as vectors, text as text, and images as bitmaps. This means that the resulting PDF file will remain as faithful to the source view/layout as possible to ensure that what you see on screen is what you get back from the print shop. An important new addition to the PDF production in ArchiCAD 11 is that bitmap images in PDFs are stored at their full resolution, where before they would all be 'resampled' to fit the resolution of the output PDF. This means that if you have an image placed on your layout at 100dpi, and another at 200dpi, the resulting PDF file will contain a 100dpi image and a 200dpi one. In version 10 these would both have been converted to whatever resolution the PDF printer was set to.

Because of this, if you want to save on file size, make sure that the images you use are at the output resolution you want. There is no harm in placing images of higher resolution than necessary other than that they will make the PDF file larger, and may make ArchiCAD a little slower to re-draw while navigating around your project.