

Image Resampling For Print

Notes by Gavin Kirby

It is very important to set your images to the correct resolution and size when creating files for mass print production. Converting your images files from their native state so that they can be successfully reproduced is often done incorrectly. These notes are to help you to understand the relationship between the three key image areas of resolution, physical size, and file (memory) size.

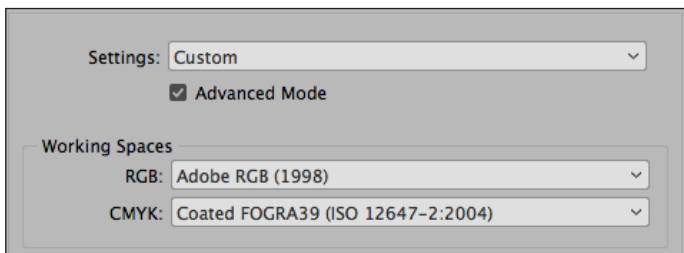
When setting an image for professional print production you should be aiming for these goals:

1. **The image colour mode should be CMYK.** The vast majority of work that you produce for print will be printed on a four colour press. Your files will need to be separated into the for print process colours, CMYK.
2. **The image resolution should be 300dpi.** To ensure a good quality result from the printing process you need to have your images at 300dpi (dots per inch). It is this conversion that causes the most issues. You can not just add extra dots to an image if they were not there to begin with. More on this later.
3. **The physical size (height and width) of the image should be as close to the reproduction size as possible.** This helps to optimise the document so it prints efficiently and does not create unnecessarily large print files that impact on your work flow.

Setting your Colour.

Ideally you should have all your design applications working in the same colour spaces. If you are using the Adobe products you can set your application colour space by going to *Edit - Colour Settings*.

I recommend setting your RGB colour space to *Adobe 1998* and the CMYK colour space to *Coated FOGRA39*.



As mentioned above, for print images you want to set your colour mode to CMYK. This is easy enough to do but there are some considerations you may need to take into account before converting an image from its native state to CMYK.

Ideally the conversion to CMYK should be one of the last steps that you do to the image. This is to limit the amount of colour damage you do to the image. It is not recommended that you continually switch between modes as it will cause the colours to degrade and become muddy.

Whenever possible it is good practice to preserve a copy of the original image in its native format and colour mode. When you convert an image's colour mode do a *Save As* and rename the file. This will not then overwrite the original file.

Types of Image Files.

The type of image file that you are working on may differ from job to job as will the amount of work you will need to do on the file. Some files will just be a simple re size and others may need extensive editing work and multiple layers.

Multi Layer Files: When working on a file that has multiple layers it is best to keep the colour mode as RGB. This is because most of the filters work best in RGB and you are helping to preserve the colours of the image.

Once you have finished working on the file you can then flatten the layers, change the colour mode, and do a *Save As* renaming the file to preserve the layered file so that you can return to it and edit if needed.

Single Layer Files: Usually the file just need to be re sized in some way or cropped. Once you are ready to save a print version of the image you can go through the same process as a multi layered file. Flatten the layers (just incase), change the colour mode, and do a *Save As* renaming the file.

Image Resampling For Print.

Understanding image resampling is becoming more important for designers. This is because of the way in which we create our imagery. Before digital cameras photographic film would have been scanned at a high resolution to be added to a design layout. Of course this is still the case with hand drawn artwork. However, most of the images you will engage with as a designer will already be in a digital format. It will be your job to find images that you can successfully resample to meet your print needs.

Here are some a couple of tips to help you to know what to look for when searching for digital images that you can resample for print:

ppi to dpi: ppi is used when talking about digital image resolution and dpi refers print resolution. They are essentially the same thing when working on your images in Photoshop.

Pixel Dimensions: The height and width of the image in pixels. The more pixels the image has the larger it will be when resampled. Most digital cameras will have a Megapixel rating. The higher the megapixel rating the more pixels are in the image. One Megapixel is about one million pixels.

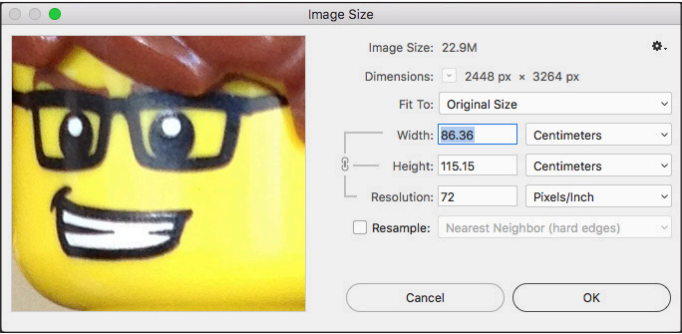
Pixel Resolution: The number of pixels per inch (ppi). Most digital images will have a resolution of 72ppi in their native state. To get the image to a printable resolution you will need to compress the pixels into a denser resolution. This is done by resampling the image.

Example 1 Digital Camera:

Here is an image taken with a digital camera.



Here is the information relating to the image in its native state. (*Image - Image Size*).



Pixel Dimensions = 2440 px wide x 3264 px high

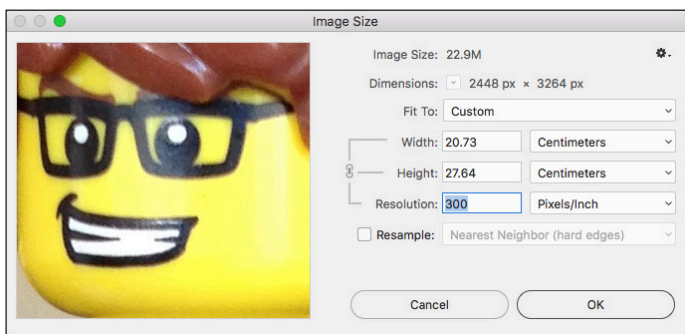
Physical Dimensions = 86.86 cm x 115.15 cm

Pixel Resolution = 72 ppi

Image Memory Size = 22.9 mb

To resample this image so it is at a printable resolution (300dpi) you need to make sure that the *Width*, *Height*, and *Resolution* are linked (as in the previous image). to link these three sections you need to deselect the *Resample* check box.

Now, when I increase the image resolution the physical dimensions of the image will reduce, compressing the pixel dimensions into a smaller space and maintaining the image quality. Here are the new values:



Pixel Dimensions = 2440 px wide x 3264 px high

Physical Dimensions = 20.73 cm x 27.64 cm

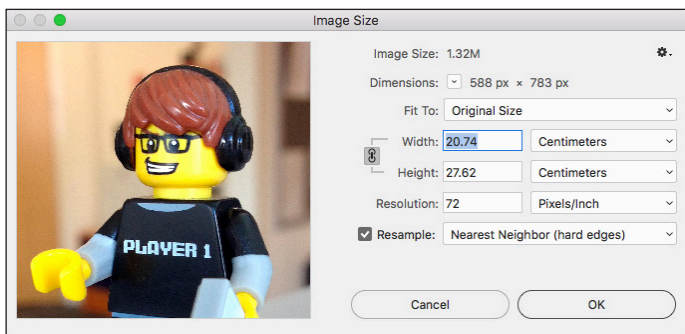
Pixel Resolution = 300 ppi

Image Memory Size = 22.9 mb

The pixel dimensions and image memory size remain the same. However, increasing the pixel resolution to 300 has compressed the physical dimensions to 20.73 cm x 27.64 cm. The image has now been resampled.

Example 2 Web Image:

In this example we are using an image that appears to be the same but has been pulled from a website. Let's have a look at the image values:



Pixel Dimensions = 588 px wide x 783 px high

Physical Dimensions = 20.73 cm x 27.64 cm

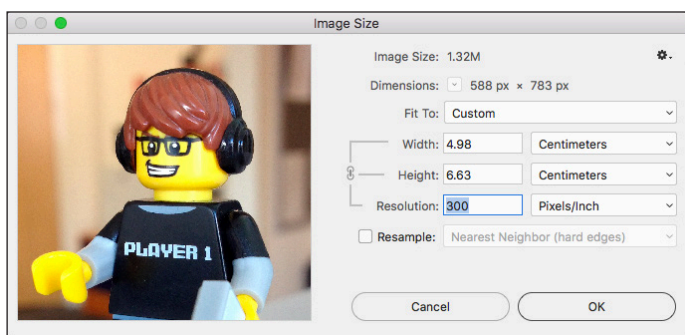
Pixel Resolution = 72 ppi

Image Memory Size = 1.32 mb

Although this image has the same physical size as the resampled print image from example 1, the web image

has a much lower resolution and pixel dimension. When this image is resampled to a print quality it will reduce in size considerably.

Here are the resampled values:



Pixel Dimensions = 588 px wide x 783 px high

Physical Dimensions = 4.98 cm x 6.63 cm

Pixel Resolution = 300 ppi

Image Memory Size = 1.32 mb

Now that the image has been resampled to a printable resolution it has reduced the physical size of the image to 4.98 cm x 6.63 cm. This is because the image had low amount of pixels to begin with.

NOTE: you can not just add extra pixels to an image to increase the quality of the image.

Example 3 Adding is not Resampling:

If the image you are using is at a low resolution and has a low level of pixel dimensions you can not improve the image quality by just increasing the image resolution. The only way to ensure you have good image quality at a printable image resolution is to resample the image.

This is why you can not just add pixels and expect better image quality:

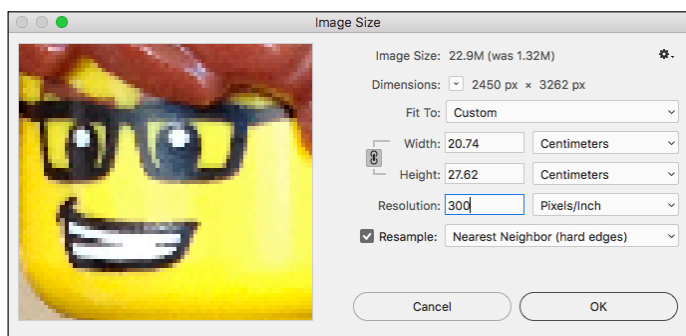
Here we have two images that we can compare against each other. The first image has been correctly resampled to be at 300dpi. The second image is a web version of the same image and is at 72dpi. Both images have been magnified so you can more easily see the differences in image quality.



Resampled 300dpi image.

72dpi web image.

The second image has now had its resolution increased to 300ppi (essentially 300dpi) but the image has not been resampled.



All that has happened is that the existing pixels have been divided into smaller pixels of the same colour. The quality of the image has not improved.



Resampled 300dpi image.

Resolution increased to 300dpi.

File Formats For Print.

It is also very important to be saving your work in the correct file formats to ensure the best output possible for your design files. These notes will look at the main file types in the two main stages of the design process.

Design Stage.

This is the stage where you are importing images and graphic elements into your InDesign document before the final output. Generally there will be two types of files that you are going to be importing into your InDesign files. These are Raster/Bitmap images and Vector graphic files.

Raster/Bitmap Images: These are your photographic images that you will be generating using Photoshop.

PSD: Photoshop Document. This is the native file format for Photoshop and works well when placed into InDesign. It also allows for transparency. However, it is recommended that you don't use layered PSD files as they can cause issues at output.

TIFF: Tagged Image File Format. Similar to a PSD in that it is not a compression format.

JPEG: Joint Photographic Experts Group. A lossy compression format that discards image information to achieve smaller file sizes. Converting a JPEG to a TIFF or PSD will not improve the image quality.

Conclusion: If you can, use flattened PSD files or single layer transparency files for Raster/Bitmap images. It is also important to not resize Raster images too much once they have been placed into InDesign as over stretching can cause pixilation of the image and reducing the image will not improve the quality. Resample your images appropriately.

Vector Images: These are your graphic images that are generated in Illustrator.

AI: Adobe Illustrator. These are the native files from Illustrator that can be placed into InDesign. They remain scalable due to the nature of the file and have a clipped background. It is advisable to convert all text to outlines to reduce any font issues that could occur but be sure to have a version of the file that still has live text.

EPS: Encapsulated Postscript. Also very good at handling vector artwork and can be used in a wide number of other applications. Can be seen as an older file type but it does give a reliable format.

PDF: Portable Document Format. Saving your vector work as a PDF will give you access to lots of different save options (crop marks, compression etc) and also the ability to limit re-edits in Illustrator.

Conclusion: Any of these file types will work for you it just depends on your working preference. However, I would strongly recommend that all fonts are converted to outlines regardless of which file type you plan to use.

Adding Images to your InDesign File.

Currently there is a much greater synergy between the different Adobe applications that enables you to copy and paste or drag items from one application to another. This sounds great in principle but just because you can doesn't mean you should.

The best way to add images to InDesign is to place them via the *File - Place* command. This method of placing images will enable you to better track the quality of the images that you are using and Preflight your files more effectively before saving for final output.

Links Palette.

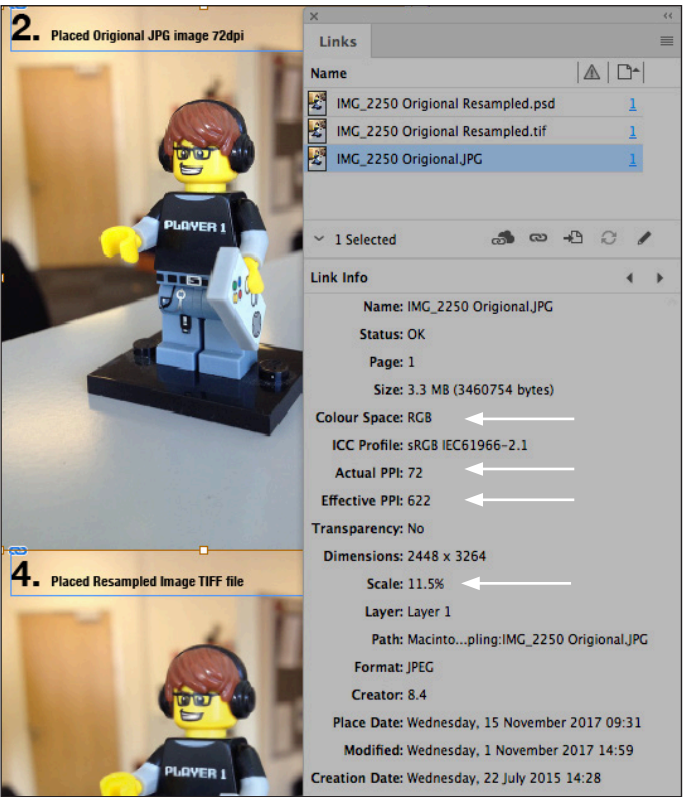
The Links palette (*Window - Links*) is a very useful way to keep track of the images that you are using in your InDesign documents. However, the information it displays can only be seen if the image has been placed correctly, not pasted in.

In the image below four images have been added to an A4 page. Image 1 has been copied and pasted into the document and the other three images have been placed via *File - Place*.



Looking at the Links palette you can see that only three of the images are registering. This is because image 1 has not been placed into the document. This means that it can not be checked correctly to see if it is printable.

By selecting the Original image in the Links Palette you will be able to see all of the values attached to that image. Below you will see that the image is in RGB and the Actual PPI is at 72. However, the Effective PPI is at 622. This tells me that the image is a low resolution image (72ppi) but has been shrunk to fit the design. If you look you will see the Scale is 11.5%.



By looking at the information relating to image 2 it is clear that there are some issues that need to be addressed, such as colour mode, resolution, and dimensional size.

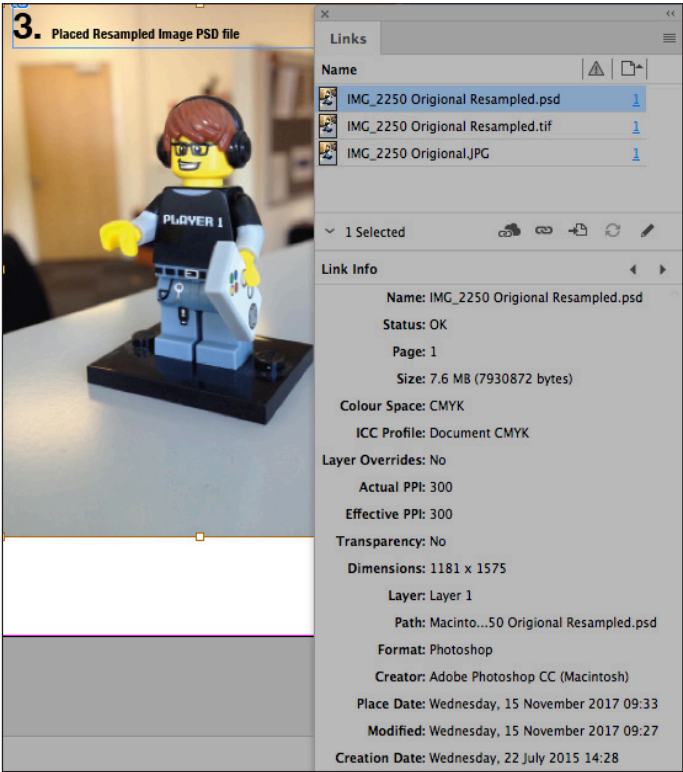
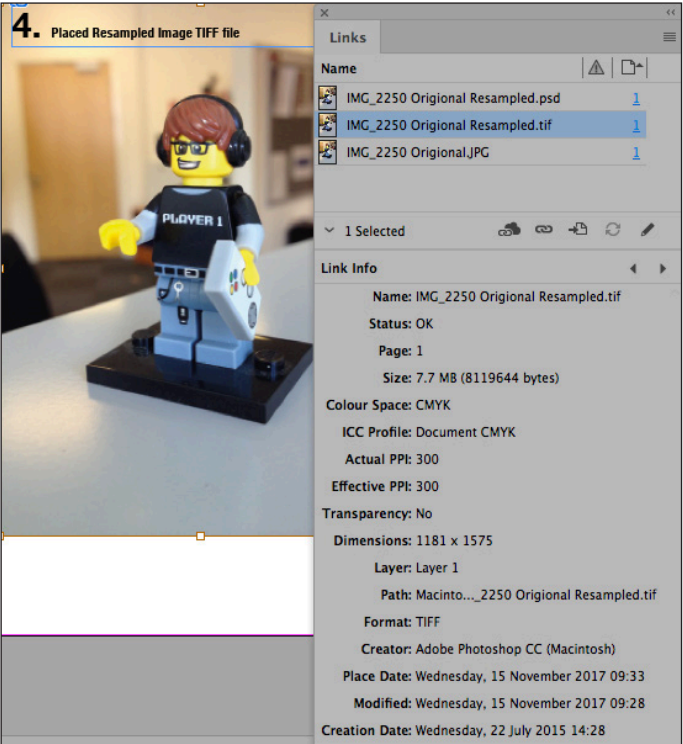


Image 3 is a resampled PSD file. Here you can see a correct colour mode for print (CMYK) and both the Actual and Effective PPI are at 300. This tells you that the image is at actual size and has not been scaled to fit. The lack of Scale information also confirms that the image has not been resized.

Image 4 is a resampled TIFF file and has very similar setting to the PSD file.



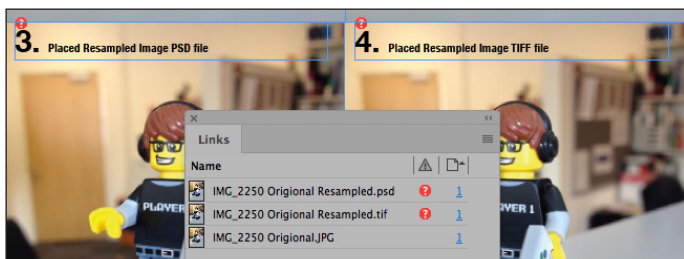
Broken Image Links.

Good file management is very important for your projects. Losing your images that are linked to your InDesign document can be very problematic. It is always a good idea to have all of the images that appear in your document in one folder. However, if image links do become broken this is how to go about fixing them.

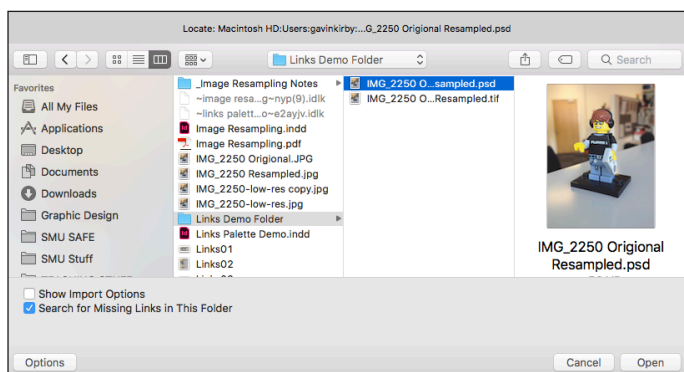
First it helps to understand what can cause the link break in the first place:

1. The image may have been moved to a different folder during a moment of file tidying. This will break the image link.
2. Renaming the file or saving it to a different file format after it has been placed into the InDesign document. This will break the image link.
3. Moving your work from one computer to another and not copying all the files across. This will break the image link.
4. Deleting the original file. This will break the image link. Hopefully you will have a back up of the image otherwise you will need to reacquire the image to fix the problem...or use a different image.

Solutions: Issue number 1 and 2 have basically the same solution, you just need to reestablish the link to the file/s.

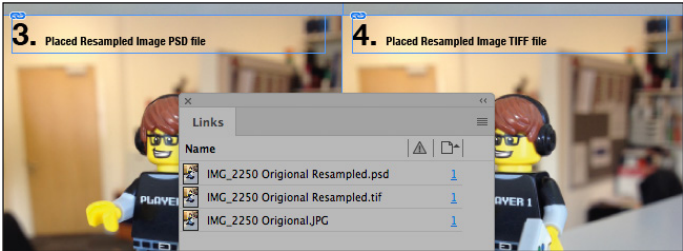
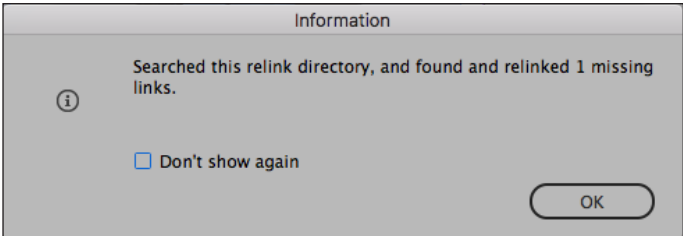


Here you can see that two of the image links are broken. This is because they have been moved to a different folder. To reestablish the link, double click on one of the error indicators...



Navigate to where the files have been moved to and select the file that you are looking for. In the above example I'm looking for the *Resampled.psd* file. Then click *Open*.

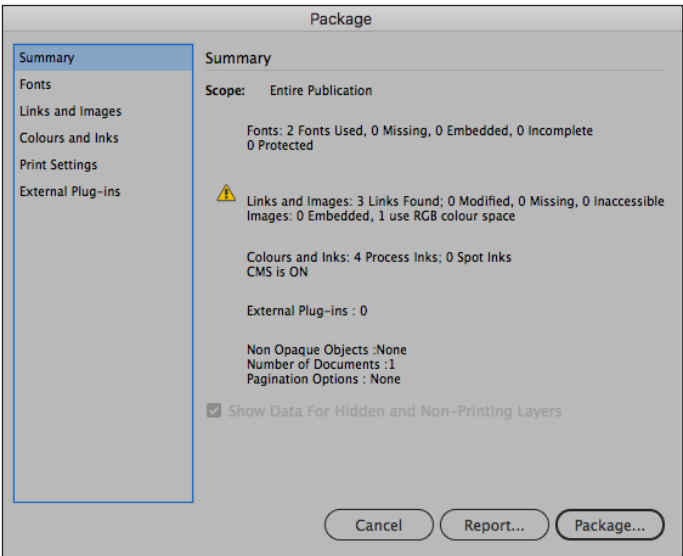
That location/folder will then be searched for other missing images related to the document.



This is the same method for fixing links to renamed files, the only difference is you need to choose the newly named file.

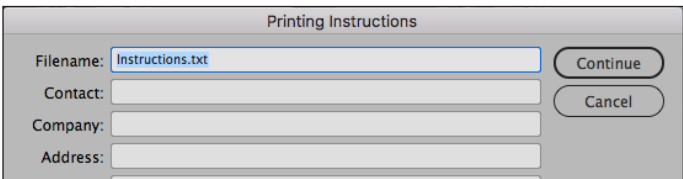
Solutions: Issue number 3 Is quite a common one for students as they are regularly moving files from home computers to UNI computers. This also raises other issues like compatibility issues relating to application versions and font problems. The best solution for this is to package your InDesign files for moving to another computer.

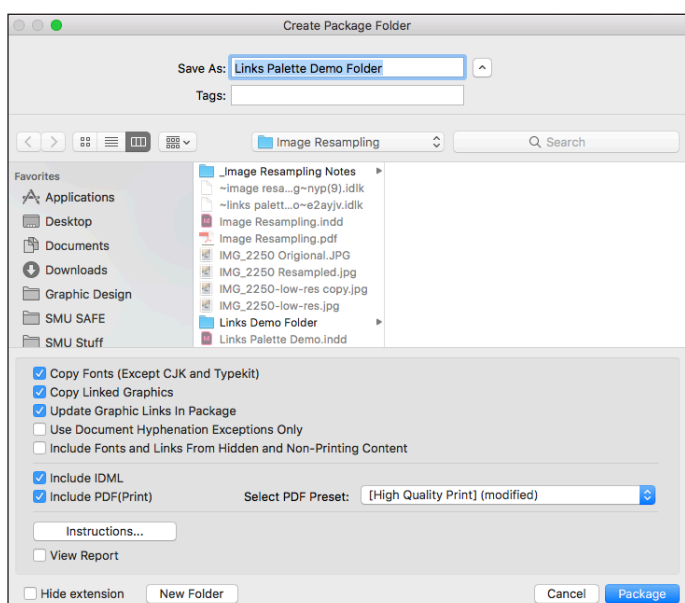
Firstly, your document need to be saved and have all of the image links intact. Then go to *File - Package*.



You will be presented with the Package window that shows you a summary of all the components that make up your InDesign document. Click *Package*.

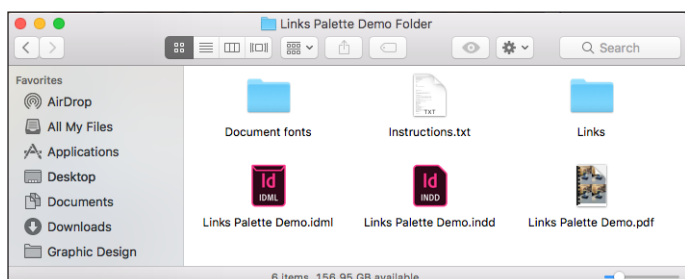
You can add contact info if needed, otherwise click *Continue*.





The Packaging process default settings will create a folder containing a copy of the InDesign file, a legacy version of the file that can be opened in earlier versions of the software, an images folder containing all the linked images, a fonts folder containing all the fonts it is able to copy*, an instructions file with your contact details if you filled that section in, and a PDF of the document.

**Fonts from Adobe Typekit will not be copied to the fonts folder...which is a pain so be aware which fonts you are using.*



The packaged folder can then be copied on to other computers or even sent to printers for output.

Preflight.

Before your final version of the InDesign document is to be sent to print it is a good idea to Preflight your work.

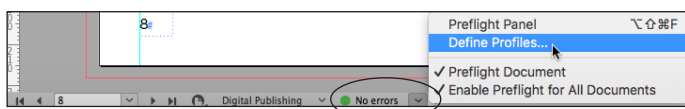
Preflighting is when you check your document for any possible issues that could occur. You can set it so that it will alert things like low resolution images, over set text, missing fonts, colour modes etc.

NOTE: I use Preflight to help assess how you have created your InDesign documents ;)

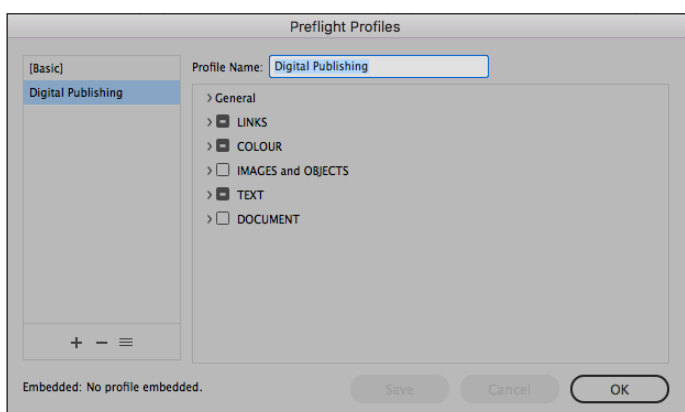
The basic default Preflight is not very good at spotting the things you want it to spot so I would recommend configuring your own Preflight inspection parameters.

These notes will show you how to settings I use to Preflight my print documents, but first you need to access the Preflight window to define a new profile.

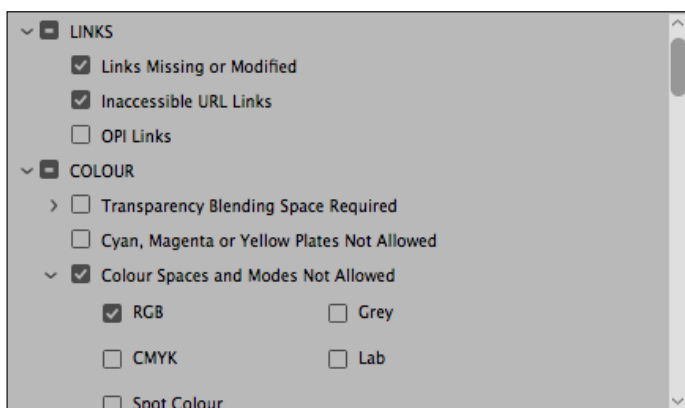
To the bottom left of the InDesign window you will see a page counter and navigation buttons, then you have the name of the Preflight Profile (in this example it is *Digital Publishing*. However, you will probably see *[Basic]* (*working*) as the profile name).



Next to that you will either see a green dot with *No errors* or a red dot with *errors*. From the menu next to this, select *Define Profiles*.

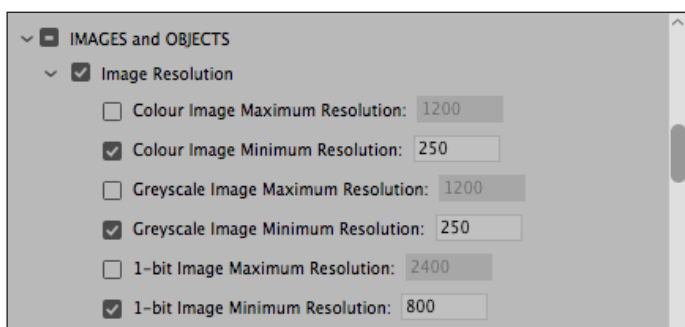


In the Preflight Profiles window click the + symbol to create a new profile and give it an appropriate name.

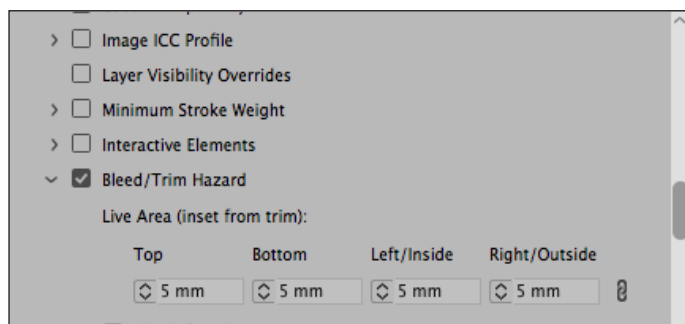


Links: Searches for any missing or modified linked images.

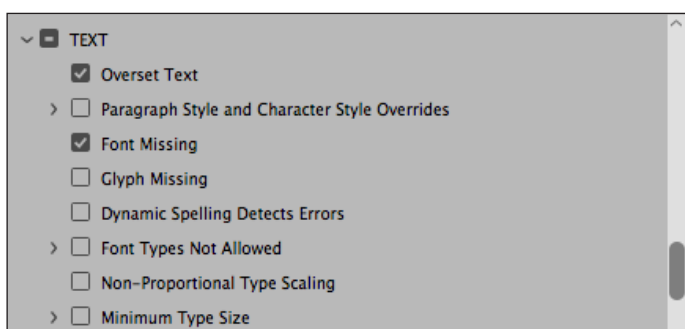
Colour: Allows you to set colour modes not allowed for this document/output method.



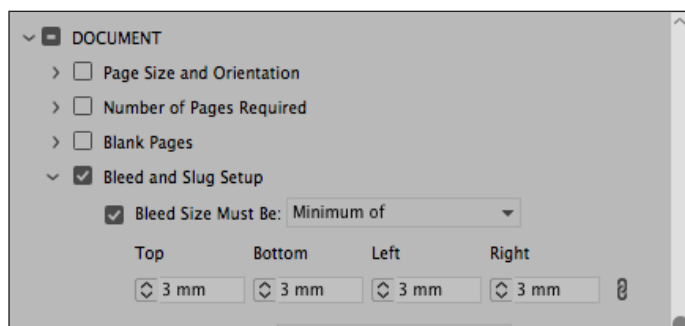
Images and Object: Allows you to set maximum and minimum resolution ranges for your images.



Bleed/Trim Hazard: This sets a safe zone along the edges of your page. In this example, any object like a text box or image that is less than 5mm from the edge of the page will flag as an error. It helps to prevent unwanted trimmed items.



Text: Alerts against missing fonts and other text related handling. I only wish I could search against Auto leading.



Bleed and Slug Setup: Does the document have bleed set up correctly, even if it is not using it.