The Adaptive Wide Angle filter

How the Adaptive Wide Angle filter works

When you first open an image in the Adaptive Wide Angle filter it will search the lens profiles database to see if there is lens profile data that matches the image's lens EXIF metadata. If a lens profile is present the Correction section of the filter dialog will show 'Auto'. If not, you may want to try following the instructions in the sidebar at the bottom of this page. What the Adaptive Wide Angle filter does is it reads in the EXIF lens metadata, locates an appropriate lens profile and, based on this, assesses which is the best projection method to use. When the Preview box is checked, the initial preview shows an initial distortion correction that you can then refine further using the constraint controls. This initial preview will show what is known as a 'shape conformal' projection, as opposed to a perspective-accurate projection. With this type of projection the emphasis is on preserving shapes proportional to the distance from the viewer. As you add constraint lines you are essentially overriding this projection and telling it to add more perspective. Essentially, the filter lets you selectively apply a perspective projection to the image.

As you apply constraints to the preview some parts of the image will be more squashed together and other parts will become stretched apart. The Scale slider can therefore be used to adjust the scale of the image relative to the dimensions of the original document.

Applying constraints

It helps to understand here that because the Adaptive Wide Angle filter is able to use the Lens profile information for the lens the photo was taken with (based on your file's EXIF metadata) it therefore knows how to calculate all edges as being straight. As I explained earlier, instead of applying a distortion correcting perspective projection, the Adaptive Wide Angle filter applies a 'shape conformal' projection which helps avoid the effects of wide angle, perspective projection distortion. As you apply constraint lines to the image you are selectively overriding the shape conformal projection and telling the filter that you want to apply here more of a perspective-type projection.

In use, you drag with the constraint tool (C) along an edge to define it as a straight line. Now, what seems to be quite magical at this stage is the way the constraint line appears to know exactly how much to bend. Well, it's not so magic really, as the filter
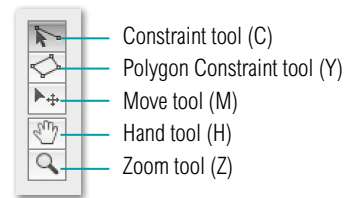

Constraint tool (C)
Polygon Constraint tool (Y)
Move tool (M)
Hand tool (H)
Zoom tool (Z)

Figure 1 This shows the Adaptive Wide Angle filter tools and their associated shortcuts.

Tilt-shift lens images

With photos that have been shot using a tilt-shift lens the user will have the opportunity to adjust the center of optical axis and apply a certain amount of perspective correction at the time of capture. Such photos may still benefit from being processed using the Wide Angle Correction filter. However, it is absolutely paramount that an accurate lens profile be available and the Auto mode selected in the Correction options.

Missing lens profiles

If there is no lens profile available when you try to use the Adaptive Wide Angle filter you may want to see if one is available online. Go first to the Lens Correction filter and apply it to the same image. Click on the Search Online button. This will show a list of other user-created lens profiles that may possibly match. You can then select one of these and go to the Lens Profiles fly-out menu and choose 'Save Online Profile Locally'. This will then save the profile to the lens profile database on your computer and automatically be available the next time you open the Adaptive Wide Angle filter.

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2

already knows how much to bend based on the Lens Profile data. In the case of the Lens Correction filter the Lens Profile data is used to precisely remove the geometric distortion. With the Adaptive Wide Angle filter it doesn't straighten the lines unless you ask it to do so and it knows how much to bend the constraint based on the lens profile data. So, as you add constraints you'll see the lines in your image straighten. If you hold down the ⟨Shift⟩ key as you do so, you can both straighten an edge and make it a vertical or horizontal line. Where possible, the trick here is to use a minimum of two vertical constraints to apply vertical corrections left and right, plus a single horizontal constraint to match the horizon line. It is best to first align these constraints to known edges in the image preview and once you have done this it is easy enough to edit the constraint lines by clicking on the end points and dragging them to the edge of the frame. This is often crucial, because by doing this you are able to apply an even smoother correction across the entire width and height of the image area. Note that you can also temporarily hold down the ⟨X⟩ key to switch to a 100% zoom factor view, which can make precise placement easier. Once you have got these first three constraint lines to extend edge to edge, you should end up with a fairly satisfactory distortion where you'll only need to add further constraint lines where these are absolutely necessary. As you edit the constraints you'll probably notice how they may follow an odd kink here and there (this can be because the underlying mesh has so far been unevenly warped and the lens profile information guides the constraint line accordingly).

If you select the polygon constraint tool (⟨Y⟩) you can make a succession of clicks to define an area that you wish to see corrected. For example, if you were to click in all four corners of the preview area, the effect would be similar to applying a lens correction to the entire image. The polygon constraint tool is therefore useful for correcting areas of an image where there are no straight lines available to reference, or where you need to correct say, a building facade or a large expanse of tiled flooring.

Rotating a constraint

If you click to select a constraint, you'll see two handles appear on the constraint line. If you click on one of these and drag you will see an overlaying circle and you can drag to apply an arbitrary rotation to the constraint. A green line appears as you do this and the edited constraint will afterwards be colored green (see Figure 2).

Converging verticals

As with the Lens Correction filter, it is possible to make converging vertical lines, such as those on tall buildings go perfectly vertical. In some instances, where such buildings loom large in the frame, it may be best not to make them perfectly vertical, but allow them to converge just slightly. When applying vertical constraints, you can adjust the orientation angle for each (see Figure 1).
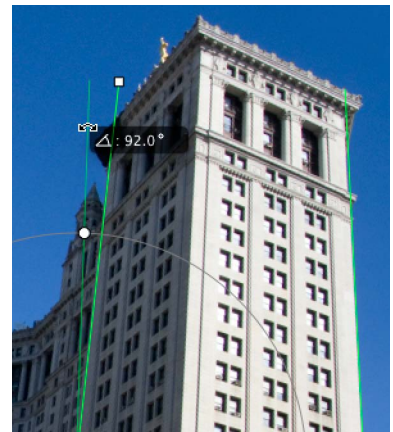

Figure 2 This shows a close-up section of a building where I had applied two vertical constraints to straighten the converging verticals. To keep the perspective looking natural, I edited the orientation of the constraints, setting the one on the left to 92° and the one on the right to 88°.

Constraint colors

The constraint colors are colored as follows. Unfixed constraints are colored cyan, horizontals colored yellow, verticals magenta, fixed orientation constraints green and invalid constraints are colored red, indicating that the constraint you are trying to apply can't be calculated.

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3

1 In this screen shot you can see a photograph that was shot with a 15 mm fisheye lens, opened in the Adaptive Wide Angle filter prior to making any corrections.

2 To start with, I selected the constraint tool and with the *Shift* key held down dragged across the horizon to correct the horizontal distortion at this point in the photograph.

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4

3 I again held down the *Shift* key and this time added a succession of vertical constraints to selectively correct for the vertical distortion (plus I also added a further horizontal constraint near to the bottom of the image. When I was done I clicked OK.

4 Here you can see the final, corrected version. If you refer back to Step 1 you can compare this with the original version.

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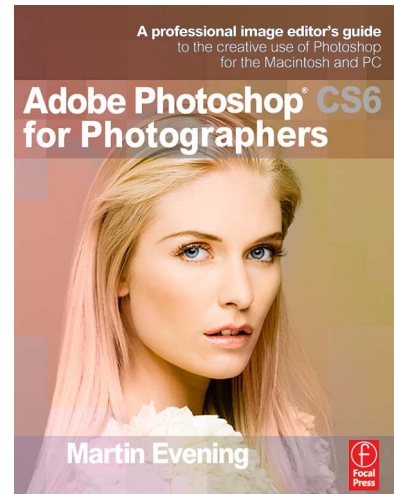
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Focal Press

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Adobe Photoshop CS6 for Photographers is published by Focal Press.
ISBN: 9780240526041
The title is stocked in most major bookstores throughout the world and is also available to purchase from: www.focalpress.com as well as through the on-line bookstores: www.amazon.com and www.amazon.co.uk.

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6