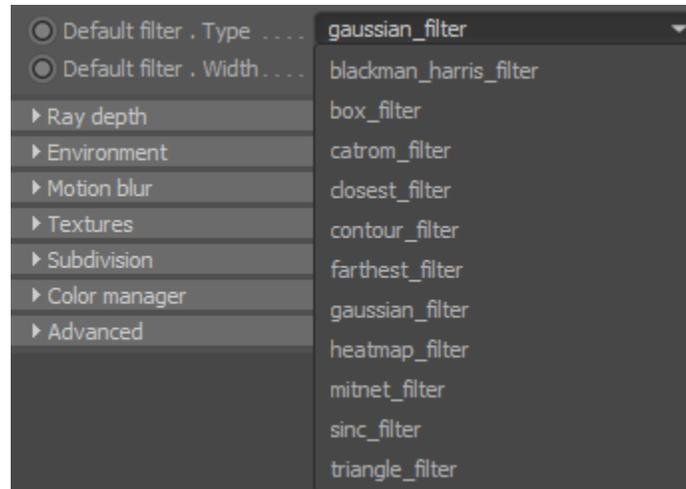# Sample Filtering

Default Filter Type

The filter type used for averaging individual subpixel samples into a final pixel color. Most of these filters are available for legacy purposes only. More details can be found on Wikipedia.

> ✓ We recommend using the Gaussian (width 2.0) or Blackman-Harris filters.

The complete list of filters is:

- Blackman-Harris
- Box
- Catrom
- Closest
- Difference
- Farthest
- Gaussian
- Heatmap
- Mitnet
- Sinc
- Triangle
- Variance
- Contour

Choosing a pixel filter is very much a personal choice. Some people prefer one over the other, but ultimately it's just slightly different amounts of blurring. While more blurring means less aliasing, it is also at the cost of detail loss.

It is best to avoid using a box filter (which is like disabling filtering) as well as using a filter width so small that you end up with practically no filtering.

It is important to note that all renderers don't implement filters in the same way, even if they have the same names. What Arnold calls a gaussian may not be the same as your Photoshop gaussian or 3Delight/PRMan/MentalRay. There can be slight differences in implementation, differences in the cutoff of filters whose support is infinite, etc. So don't assume that your filtering know-how can be transferred from one renderer to another verbatim. However, Arnold tries to replicate the standard filters from RenderMan.

The default gaussian-2.0 is slightly blurrier than others, but you could just reduce its width from 2.0 to 1.8-1.9 to get it sharper.

The catrom filter is one of the few filters that has negative weights and therefore may give you trouble when rendering to unclamped floating-point formats.

The choice of pixel filter should have zero render time impact. What could have a slight effect on render time is the width of the filter; too big a width and you have to consider many subpixel samples when filtering each pixel. For example, the catrom filter has a hardcoded width of 4 pixels compared to the 2 pixels of the gaussian filter which may slightly increase the render time.

If sharper renders are important, you should instead make sure that options.texture_max_sharpen is set to 1.5.

Most of these filters are available for legacy purposes only. The complete list of filters is:
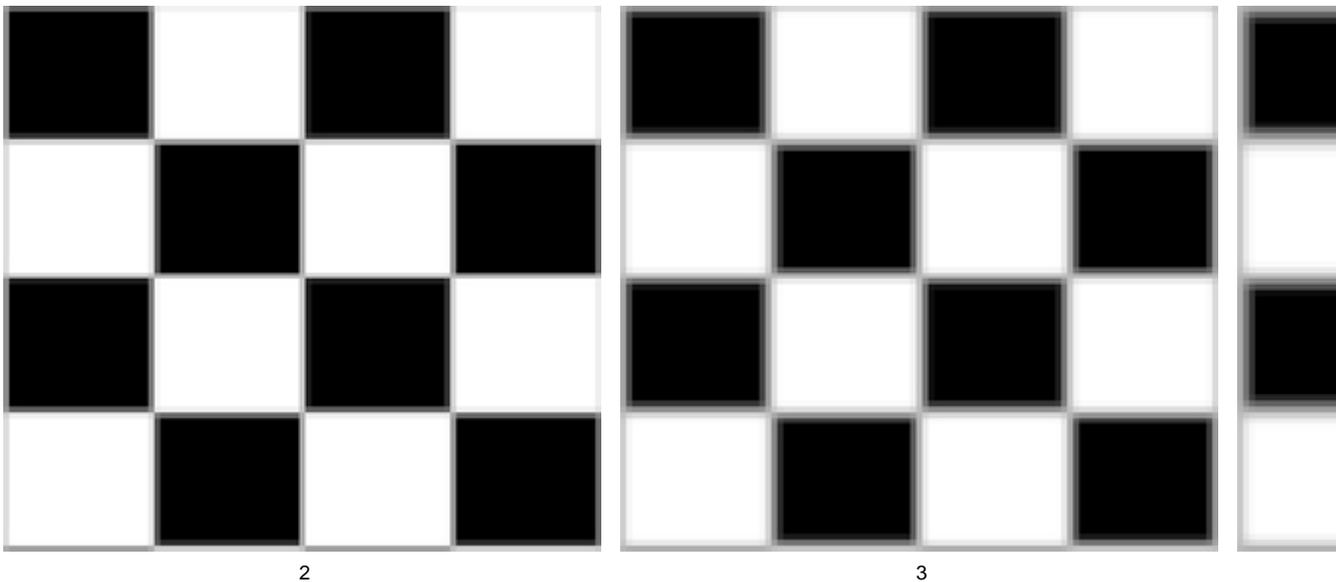
- Blackman-Harris
- Box
- Catmull-Room

- Gaussian (default)
- Mitchnell-Netravali
- Triangle
- Variance
- Contour

✓ We recommend using the default *Gaussian* (width 2.0) or *Blackman-Harris filters.*
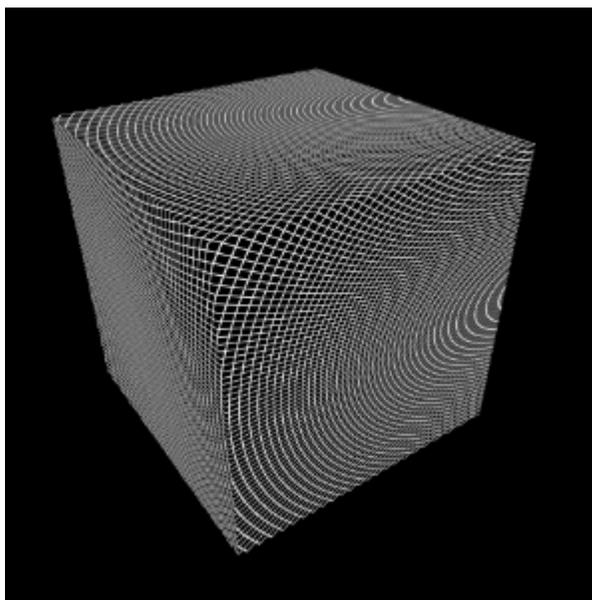
Filter Width

The width of the subpixel sample averaging filter, in pixels. For circularly symmetric filters, this is the diameter of the filter's support.
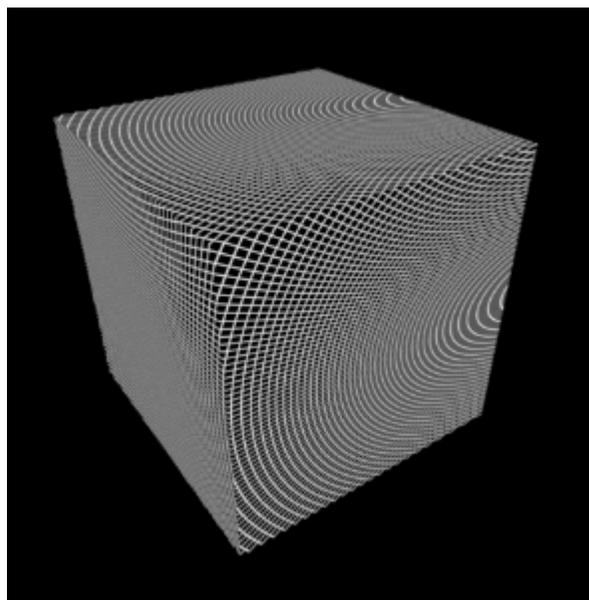

2

3

This example demonstrates the effect filter width can have on moire effects in your images. Increasing the filter width setting helps to reduce the moire effect.
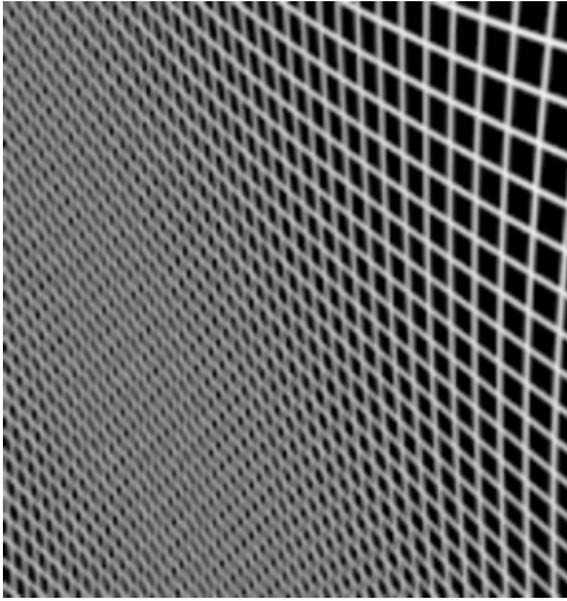
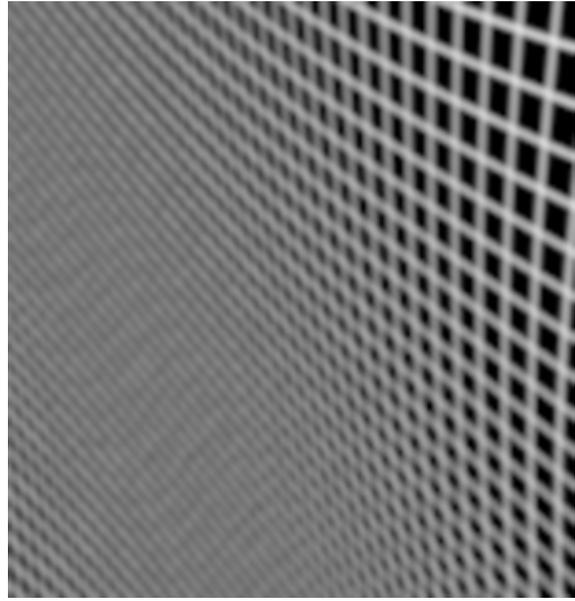This is more noticeable on the left side and top of the cube.

2

4

Close Up of Filter Width 2

Close Up of Filter Width 4