10.2.3.5.4 Render - Blender Render Engine - Lighting - lamps - Area

Area

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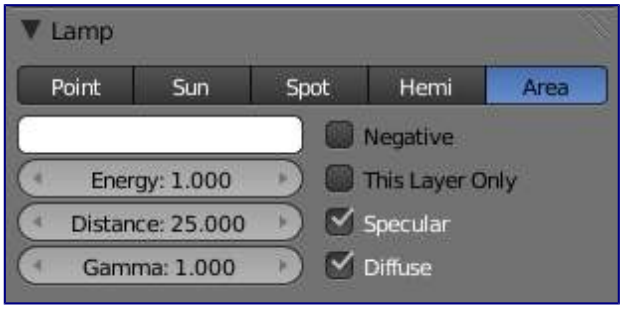
Introduction

The *Area* lamp simulates light originating from a surface (or surface-like) emitter. For example, a TV screen, your supermarket's neon lamps, a window, or a cloudy sky are just a few types of area lamp. The area lamp produces shadows with soft borders by sampling a lamp along a grid the size of which is defined by the user. This is in direct contrast to point-like artificial lights which produce sharp borders.



Commons Options

Lamp options

Distance, Energy and Color

These settings are common to most types of lamps, and are described in *Light Properties*.

Note that the *Distance* setting is much more sensitive and important for *Area* lamps than for others; usually any objects within the range of *Distance* will be blown out and overexposed. For best results, set the *Distance* to just below the distance to the object that you want to illuminate.

Gamma

Amount to gamma correct the brightness of illumination. Higher values give more contrast and shorter falloff.

The *Area* lamp doesn't have light falloff settings. It uses an "inverse quadratic" attenuation law. The only way to control its falloff is to use the *Distance* and/or *Gamma* settings.

This Layer Only, Negative, Specular and Diffuse
These settings control what the lamp affects, as described in *What Light Affects*.

Shadows

Area light ray-traced shadows are described here: *Raytraced Shadows*.

When an *Area* light source is selected, the *Shadow* panel has the following default layout:

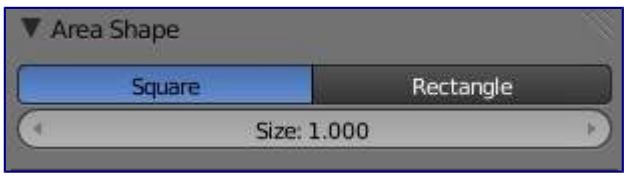
The *Shadow* panel when *Area* light source is selected.

Adaptive QMC settings

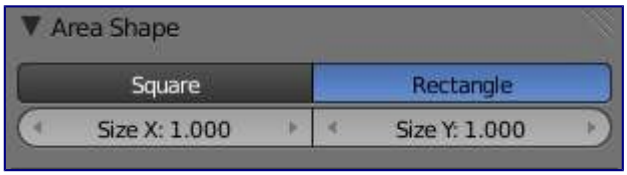
Constant Jittered settings

Area Shape

The shape of the area light can be set to *Square* or *Rectangle*.



Square options



Rectangle options

Square / Rectangular
Emit light from either a square or a rectangular area
Size / Size X / Size Y
Dimensions for the *Square* or *Rectangle*

Note

Shape Tips

Choosing the appropriate shape for your *Area* light will enhance the believability of your scene. For example, you may have an indoor scene and would like to simulate light entering through a window. You could place a *Rectangular* area lamp in a window (vertical) or from neons (horizontal) with proper ratios for *Size X* and *Size Y*. For the simulation of the light emitted by a TV screen a vertical *Square* area lamp would be better in most cases.

Area Raytraced Shadows

Adaptive QMC settings

The *Area* light source can only cast ray-traced shadows. The ray-traced shadows settings of this lamp are mostly shared with other lamps, as described in *Raytraced Properties*. However, there are some specifics with this lamp, which are detailed below:

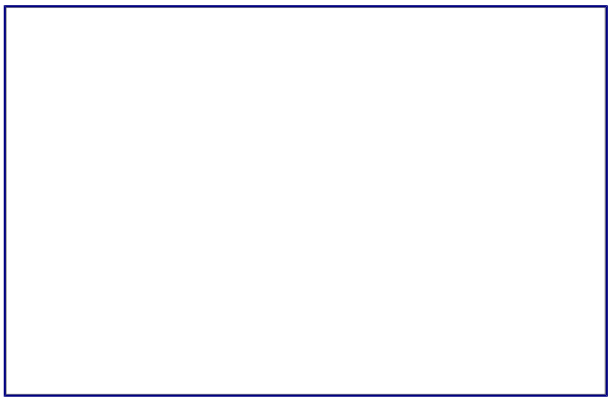
Shadow Samples

Samples
This have the same role as with other lamps, but when using a *Rectangle Area* lamp, you have two samples settings: *Samples X* and *Samples Y*, for the two axes of the area plane. Note also that when using the *Constant Jittered* sample generator method, this is more or less equivalent to the number of virtual lamps in the area. With QMC sample generator methods, it behaves similarly to with *Lamp* or *Spot* lamps.

Sample Generator Types

Adaptive QMC / Constant QMC

These common setting are described in *Shadow Properties*.



Constant Jittered settings

Constant Jittered

The *Area* lamp has a third sample generator method, *Constant Jittered*, which is more like simulating an array of lights. It has the same options as the old one: *Umbra*, *Dither* and *Jitter.*

The following three parameters are only available when using the *Constant Jittered* sample generator method, and are intended to artificially boost the “soft” shadow effect, with possible loss in quality:

Umbra
: Emphasizes the intensity of shadows in the area fully within the shadow rays. The light transition between fully shadowed areas and fully lit areas changes more quickly (i.e. a sharp shadow gradient). You need *Samples* values equal to or greater than 2 to see any influence of this button.

Dither
: Applies a sampling over the borders of the shadows, similar to the way anti-aliasing is applied by the *OSA* button on the borders of an object. It artificially softens the borders of shadows; when *Samples* is set very low, you can expect poor results, so *Dither* is better used with medium *Samples* values. It is not useful at all with high *Samples* values, as the borders will already appear soft.

Jitter
: Adds noise to break up the edges of solid shadow samples, offsetting them from each other in a pseudo-random way. Once again, this option is not very useful when you use high *Samples* values where the drawback is that noise generates quite visible graininess.

Technical Details

Principles behind the Area light

The (*Principles behind the Area light*) picture helps to understand how the soft shadows are simulated.

`(a)` is the *Area* light as defined in Blender. If its shape is *Square*, then the softness of the shadow is defined by the number of light *Samples* in each direction of the shape. For example, `(b)` illustrates the equivalent case of an *Area* light (*Square* shape), with *Samples* set at `3` on the *Shadow and Spot* panel.

The *Area* lamp is then considered as a grid with a resolution of three in each direction, and with a light "dupliverted" at each node for a total of nine lights.

In case `(a)`, the energy (`E`) is `E/1`, and in case `(b)`, the energy of each individual pseudo-light is equal to `E/(Nbr of lights)`. Each pseudo-light produces a faint shadow (proportional to its energy), and the overlay of the shadows produces the soft shadow (it is darker where the individual shadows overlap, and lighter everywhere else).

Hints

You will note that changing the *Size* parameter of your area lamp doesn't affect the lighting intensity of your scene. On the other hand, rescaling the lamp using the `S` in the 3D View could dramatically increase or decrease the lighting intensity of the scene. This behavior has been coded this way so that you can fine tune all your light settings and then decide to scale up (or down) the whole scene without suffering from a drastic change in the lighting intensity. If you only want to change the dimensions of your *Area* lamp, without messing with its lighting intensity, you are strongly encouraged to use the *Size* button(s) instead.

If your computer isn't very fast, when using the *Constant Jittered* sample generator method, you could find it useful to set a low *Samples* value (like `2`) and activate *Umbra*, *Dither*, and/or *Jitter* in order to simulate slightly softer shadows. However, these results will never be better than the same lighting with high *Samples* values.