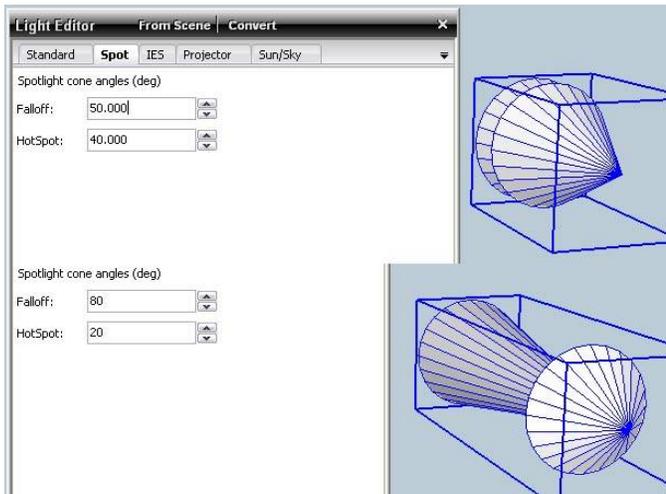


Spot Options Tab



Spot Lights have (2) two main parameters, the Falloff, and HotSpot.

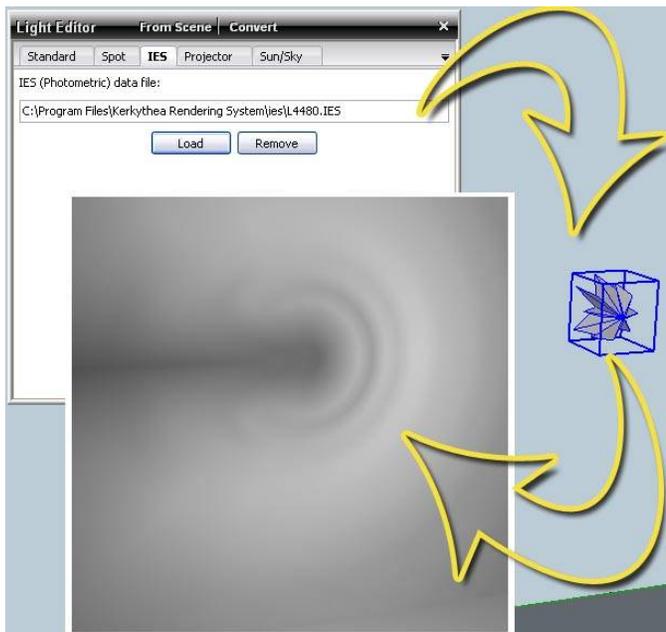
Falloff

Falloff defines the angle which the light will "Fall Off" from full strength to zero. It starts at full strength from the angle defined in the HotSpot. It fades to zero using the angle defined in the "Falloff" parameter. Therefore the Falloff angle must be greater than the HotSpot.

HotSpot

HotSpot defines the angle through which the light will remain at its full power. Outside of this angle, the "Falloff" will begin.

IES (Photometric) Light Options Tab

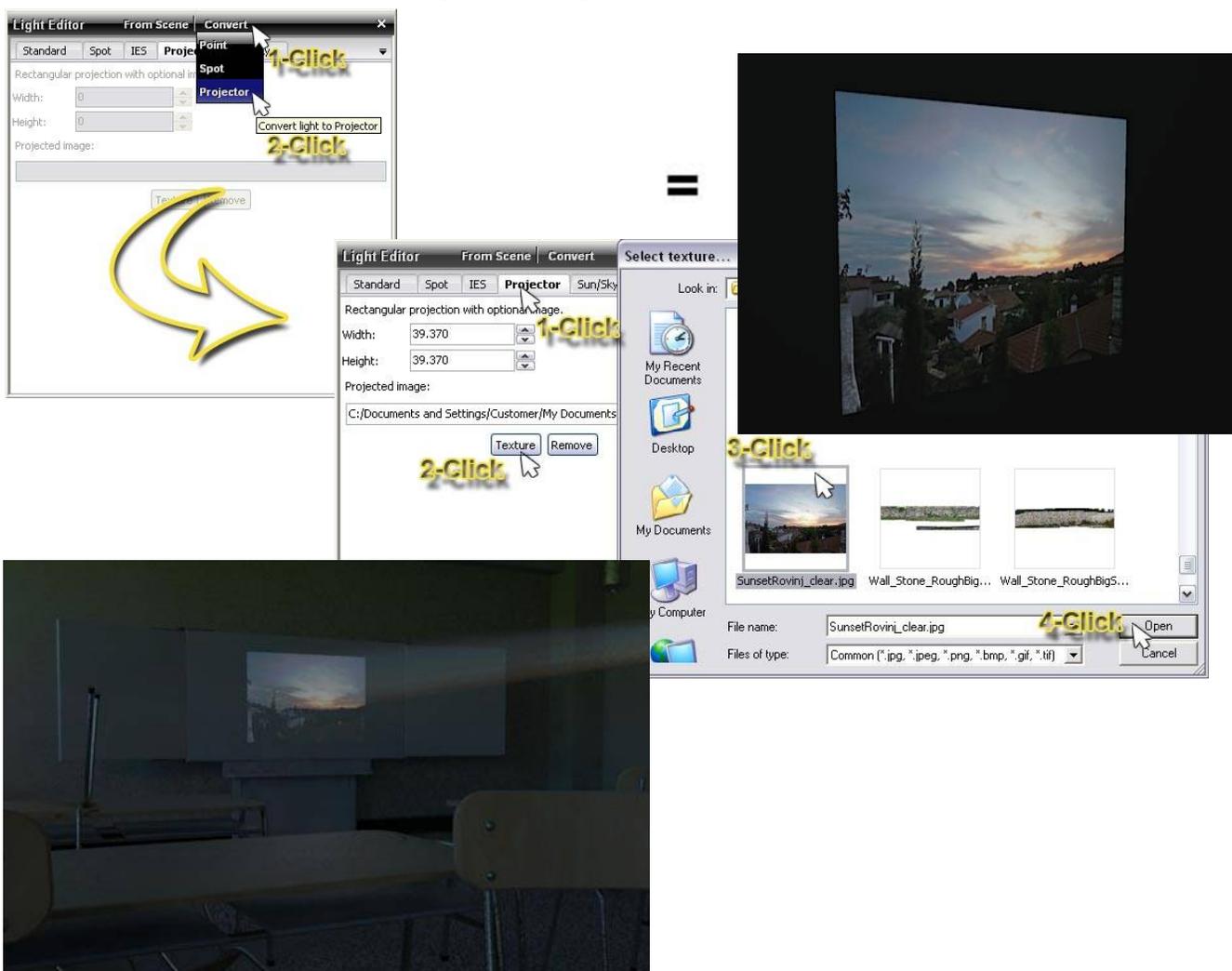


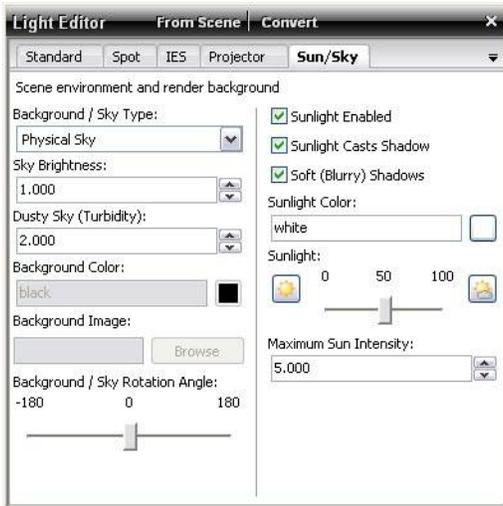
After loading an [IES Data File](#), the spotlight's component will change shape in an attempt to approximate the direction and strength the light will shine. The smaller the 'leg' the less light output from that area of the light. This allows the user full control for easily placing the IES light and orienting it correctly.

Projector Light Options Tab

A Projector Light allows you to load a .jpg image into the light definition so that the light will actually cast the image onto a surface. This is useful not only when rendering an auditorium or classroom space where a projector might be displayed but may also be used for special lighting effects.

1. **Convert a Spot or Omni into a Projector** using the Convert Menu.
2. **Click Texture button** on the Projector Tab and browse to the image.
3. **Light color** will be automatically set to BLACK. (Any other color will tint the image)
4. **Width and Height proportions of Light** will be automatically set to match image dimensions. Projector Light Component Shape will update accordingly.
5. **Name the Projector Light** using the Standard Tab.
6. Increase Power of light to increase "Brightness" of image, and use Exposure on the camera tab.





Sun & Sky Options Tab

The Sun & Sky Options Tab gives full control over the environment. Here it is shown “out of the box” with all the default settings. The default settings should work for most cases. Here is where you can “turn off the sun”. The sun is enabled for your convenience whether or not the shadows are turned on inside of SketchUp. This allows one to work on larger models with the shadows off in SketchUp, but still have them on when hitting the render button.

Background/Sky Type:

Choose the desired sky type from the Background/Sky Type menu:

1 Physical Sky

Default to start, as it changes with the time of day and location set in SketchUp. Physical Sky also contributes good lighting from all directions onto the model.

2 Background Color, Centered Image, Tiled Image, Fit Image (These options will NOT contribute light/reflections)

These options give the least control over placement of image, and do not contribute as lighting from the sky nor to reflections. All of the background types only display a “background” in front of the camera. **The “sky” behind the camera is therefore black. It is best to avoid using them, they are provided for artistic freedom purposes for advanced users.**

3 Sky Color

is best to use when wanting a single color projected onto the scene from all directions. Light Grey works well as a quick “soft box” for product shots. It contributes to both scene lighting and reflections. It also looks great with the clay rendering settings.

4 Hemispherical Sky and Spherical Sky

Insert an image that is meant for use as a spherical sky or hemispherical sky (upper half only of the sphere). It contributes to both scene lighting and reflections. To use, Choose “Spherical Sky” then Click the Texture button to load the Spherical Sky image.

5 Sky Probe

This is for HDR images that are mapped specifically as a spherical “probe”. They look like a circle (see Fig.2). It contributes to both scene lighting and reflections. A “Probe” image will be identified as such on the web page where it is downloaded. If an HDR is loaded as a Sky Probe (or vice-versa) and it is NOT a probe but a Spherical Sky instead, it will result in odd lighting for the scene. Simply change the Sky Type to be the appropriate type and re-render.

Recommended Sun Settings

For faster rendering, and the most realistic shadows, try setting the “Sunlight” slider to “5” or “7” before rendering the scene.

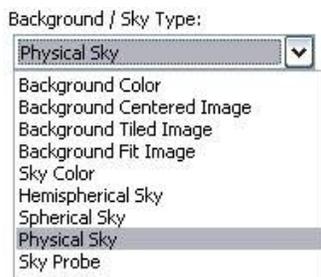
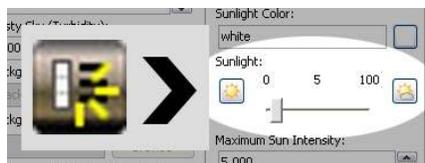


Fig.1 Spherical Sky Example >



< Fig.2 Sky Probe Example

Section 5: The Material Tool



The Material Tool allows you to quickly apply physically accurate material properties to any SketchUp material painted on a face in your scene. Good materials are key to a good rendering. With Twilight's Material Tool it is easy to convert your SketchUp materials into good materials.

With Twilight you are not creating “new” materials, but *modifying* the materials you already have painted in SketchUp. Hi-res textures applied in SketchUp are automatically optimized by SketchUp for quicker display while working, but the hi-res texture linked to the material will be passed through to Twilight and used for rendering. If there is no material applied, it can not be edited with the Material Tool.

It is important to note that the “Default” material in SketchUp will render as flat white. In order to edit the Default Material with Twilight's Material Tool you must paint the surface with a color or texture.

The quickest way to paint all Default Material faces inside of a SketchUp model is to choose a color or texture in the SketchUp material editor, then while holding the **Shift** key paint any Default Material face. All faces with the Default Material in the model will be now painted with the new material. To do this for only the faces connected to the face chosen, hold the **Ctrl** key while painting a face. (Caution, doing the “Shift-paint” option WILL paint all groups and components in the scene as well, and should be avoided when these are present in the scene.

To copy a material from one surface to another, while the Twilight Material Eye Dropper Tool is activated, Hold down the shift key, click-and-hold the mouse button down on the surface of the material you want to copy, drag the mouse to a face painted with the material you want to over-write, then release the mouse button. This is handy for dragging materials one likes from different past models into a new model.

If you are having trouble getting your material to work, refer to the Twilight Material Appearance Priority Order



Material Previews

There are several previews to choose from in Twilight. Clicking the pulldown menu under the preview image will allow you to choose from several spheres in different lighting studios, as well as cubes with different sizes for previewing architectural materials.

Spheres work best with materials without textures, such as glass and metal. While the cubes work best with texture-driven materials like stone, wood, and other patterns with real-world dimensions.

The size of the texture you see rendered in the SketchUp view window should be exactly what you will see in your rendering, so remember that the Preview Scenes are only approximations and actual render results depend on many complex factors.

There are two (2) ways to apply Twilight's Material properties to SketchUp's™ materials, [Material Templates](#) and [Material Libraries](#).

Materials



Material Templates

Material Templates are the quickest and most flexible way to apply Twilight Material Properties to SketchUp Materials. Therefore it is recommended to utilize templates whenever possible (in lieu of using Material Libraries). Some features of Twilight's Material Templates:



1. Template's flexibility allows you to create almost any material extremely quickly and easily
2. Templates share seamlessly among all Twilight users
3. Templates are guaranteed physically accurate unless specifically designed and stated otherwise
4. Templates will not increase a model's file size
5. Templates eliminate the need for project specific libraries, and reduces the chance of missing textures.

How To Apply a Twilight Material Template

Click the Twilight Material Tool, then choose a material in your scene you would like to add special properties to. Then apply a Template by choosing one of the Template names from the Material Tool's dialog Template Pull Down Menu. Materials are demonstrated most easily and quickly in the [Getting Started Video Tutorials #1](#), and in the [Intermediate Video Tutorial #1](#).

When to use a Material Template

Use templates to create a mirror, add reflection and bump mapping to ceramic tiles, add reflections to porcelain, add light emitting properties to any surface in any color, to create a translucent material such as wax, to create water or frosted glass or blurry metal like stainless steel.

Do NOT use templates on any material that does not need special properties, like reflection. Adding special material properties unnecessarily will only add render time with little or no visual gain.

Adding reflections (especially soft or "blurry" [Specular Reflections](#)) will drastically increase realism in a rendering as most materials, even brick, display specular reflections, but be aware that it will add render time and requires higher quality render settings to look correct.

Material Dialog Terminologies After Applying a Material Template

In order to help make modifications to the material, here are some explanations of terms.

Color Channel



There are three main "Channels" for most materials in Twilight. The first and "Main Channel" of the material in most cases is the "Color" of your material. This is also known as the "Diffuse Color". "Color" can technically be a "Color" (an RGB value) or a "Texture" (an image). This is the "Color" or "Texture" of the material *when viewed in purely flat indirect light*. To choose a correct color, imagine what color the material is on a completely overcast day. In fact, to create your own hi-res textures, you want to take hi-resolution pictures of your textures with the most flat lighting possible, such as on a very cloudy day.

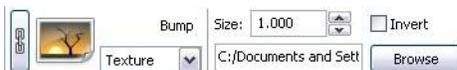
For this reason pure white should not be used as a "color", as it should have "room" to be whiter when light shines on it. In addition, pure black should not be used, as it should have "room" to be darker when shadows fall upon it. There are no materials occurring naturally that are pure white or black. For white, it is recommended to use 90%-95% gray. For black, it is recommended to use 10%-20% gray.

Reflection Channel



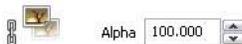
The Reflection Channel is the color you see when bounced off of the surface of the material. It is advisable to leave the reflection color white. To reduce the amount of reflection one should reduce the shininess of the material or reduce the IOR. To create artistic effects adding a strong color here will create some interesting effects. See the Reference Section for an in-depth explanation about, Reflection Maps (using textures in the Reflection channel).

Bump Channel



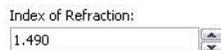
See the Reference Section entry for [Bump Mapping](#) for an overview on the Bump Channel. See also the Material creation examples below.

Alpha Percentage



"Alpha" means the transparency or "see-thru-ness" of the material. This is directly linked to the alpha slider in the SketchUp Material Editor panel. So if you change it in the Twilight Material Editor panel, you will see it changed inside of SketchUp as well. "0" (zero) = completely transparent, "100" means completely opaque. It does not control the reflectivity of the object, only whether you can see thru it or not. **If a Texture contains an Alpha Channel** it will be automatically read/loaded by Twilight. Alpha Channels are automatically recognized by Twilight for the following image types: .tga, .tif, .png, .psd

IOR (Index of Refraction)



IOR may be the most obscure of the most commonly used settings. IOR defines how light is effected when passing through *or reflecting from* a material. For Glass this is a scientifically known number of 1.52. For water it is 1.33 (depending on the temperature).

For most surfaces, this is a scientifically known number, and also is automatically assigned by Twilight whenever you apply a template. So, in most cases, it will not need to be changed manually. If you know the IOR for the material you are trying to create, it must be entered correctly for the material to appear physically accurate. If not known, it's best to choose the template most similar to the type of material you are trying to create. For many materials a good starting template is the "Plastic" Template. There are many Refractive Indexes available on the web. A very nice one is located at: <http://refractiveindex.info/>

Materials



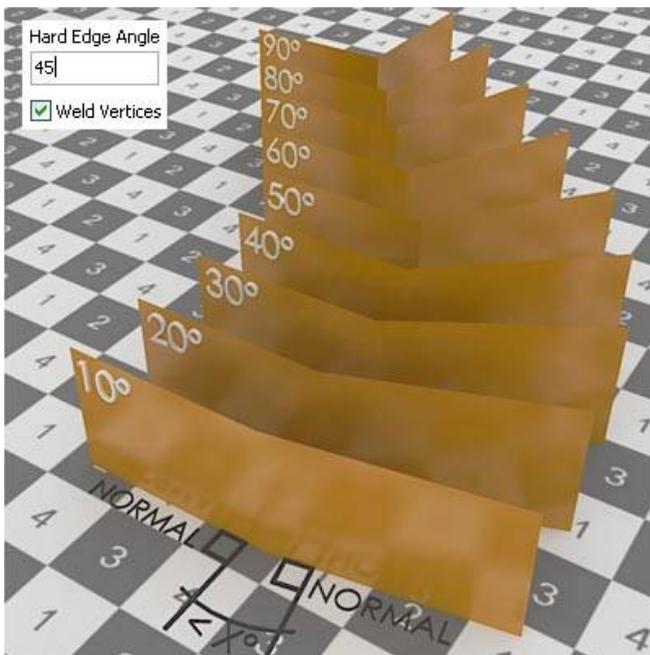
Shiny / Shininess

Shininess:
90.000

Surfaces that are very "smooth, or polished" are considered to be "shiny". (This would be like a Mirror, for instance.) Large numbers here = "smooth" (50000=perfectly smooth). Small numbers here= "rough". (7=lowest recommended value)

So for most objects, like a typical varnished wood floor, start by picking one of the plastics templates to start, (Flat, Satin, or Shiny). Increase or decrease shininess number as desired.

Hard Edge Angle



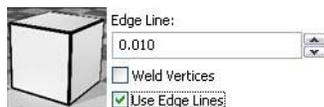
Hard Edge Angle is the angle between the normals of two adjacent faces. Hard Edge Angle is ignored if "Weld Vertices" box is not checked.

Welding vertices means you want to find all pairs of vertices with N distance of each other, and join them into one.

A "normal" is an imaginary line drawn perpendicularly out from the "front" of a face. It is used to decide which edge between two faces should appear smooth, and which should appear as a crease, or sharp. *This only comes into play when "weld vertices" is chosen.*

This is important also with the rendering of Edge Lines correctly on curving surfaces, because the vertices of a model for *materials on curving surfaces will need to be welded*, and this requires that a hard edge angle chosen. "30" is a good angle to choose to start as the smooth angle in most cases with default SketchUp curves.

Combine Hard Edge Angle with Edge Lines when working with Edge lines on curved surfaces... if not, the edge lines will show on each facet of the curved surface.



Edge Line

Checking the Edge Lines box will render lines similar to the edge lines you see in the SketchUp view. Edge Line thickness in Twilight is not linked to edge line sizes in SketchUp. To define edge lines use a simple rule of thumb:

Lonely Edges can not be rendered. That is, an edge that does not define the edge of a face will not be processed by Twilight. To render a "Lonely Edge" simply make it into a face by using a free ruby plugin for SketchUp such as "Extrude Lines 2 Points.rb" which may be found at the [Ruby Library Depot maintained by Didier Bur](#). Using this tool you may extrude the line a small distance with 2 clicks, such as 1/4in (3mm). Then the line will render with Twilight's Material's Edge Lines feature. (try this technique with an imported CAD site plan)

.1= .1 meters = approximately 4" use this for large exteriors such as large buildings or interiors of very large spaces.

.01= .4" use this for fine lines around smaller buildings such as a house and elements like stairways

.001= .04" Use this for fine lines around detailed elements such as furniture objects and cabinetry.

Materials



Material Template Choices Overview

1 **Generic***

Use this template to give a quick touch of reflection to a surface. This template is designed to be quick, but not necessarily the highest quality nor physically accurate. So use it wisely. Use this template also to reset a material. Sometimes it is quicker to just 'start over'. Here you will find the reset button for any material.

*These material templates are by nature not physically "accurate" but are useful for many artistic applications. If you are experiencing strange lighting artifacts in your renderings, be sure to eliminate the use of any of these.

2 **Paint**

As its title suggests, if you have a surface painted the color you want in SketchUp, simply choose your paint finish here. Using a seamless texture for noise in the bump channel with the paint template can add much realism.

3 **Stone**

This template will *not* apply any image of stone, but if you have painted a stone material onto a surface in your scene, choosing this template will make it look great.

4 **Ceramic**

This template will not apply any image of tiles, but if you have painted a ceramic tile material onto a surface in your scene, it will give it the properties of a ceramic tile. Then you need only add a bump map or simply click the chain link icon next to the word "Bump" to link the SketchUp material into the "Bump Channel" Twilight material definition. See also more on [Bump Maps](#). Using a [Reflection Map](#) to eliminate reflections on the grout joints will add much realism.

5 **Plastic**

Many materials we see every day have a lot in common with plastic. A wooden floor, a table top, furniture surfaces, etc. This is a powerful template setting up your material so that you can set the precise reflection type and [Bump Maps](#) and [Reflection Mapping](#) you wish.

6 **Realistic Glass**

If it's Realistic Glass you wish for, you must build the model accurately/realistically/to proper scale. If using the Realistic Glass template, be sure the model you apply it to has a thickness and can 'hold water'. That is, that it is a 6-sided cube, a valid solid, if using a rectangle in a model of a glass table top for example. One should also always be certain that the Normals for all Faces on realistic glass models are facing "out" as the normals are used for calculating much about the light passing through and bouncing from this surface.

7 **Architectural Glass***

The fastest rendering and best looking glass for most architectural renderings will be found in this template. For the quickest architectural renderings with glass, draw a single face to represent the glass surface, paint this face with a glass material from SketchUp, and then apply a choice from this template to that glass material. When using a non-progressive rendering method the template without shadows will render very quickly and allow the most light to enter an interior room. Set IOR to 2.2 and change color of reflection to darker grey for a "tinted" glass look.

*These material templates are by nature not physically "accurate" but are useful for many artistic applications and render nicely in all methods.