



reflection maps in electricimage

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introduction

This tutorial will cover reflection maps and the mapping of them in EI.

I won't attempt to cover the other methods of creating reflection (Mirrors and Environment)that will have to be dealt with by others or in a later tutorial.

What you have here are only my observations and what works for me.....this by no means is a scientific or even an educated approach to the properties of reflection or how to achieve them.

When I work at making some object look reflective I only go as far as giving it a "**believable**" look....not necessarily an accurate one. It should sit in the scene and just communicate "**reflective quality**" and that quality should fit the scene. and not be overly obvious.

There is way too much attention put on the fact that a reflection has to be absolutely accurate down to the eyeballs and face looking at the object. I don't believe so....just shoot for the object saying "**hey I'm made from shiny stuff and I can reflect things**". The other methods of creating reflections will assist in the creation of exactness within this subject.

1) modeling for optimum reflective quality

The first step to getting a believable reflection is to ensure your geometry is optimised for this attribute. My motto is "**if you want it to look cool.....make it round**".

In the example image I applied the same material to both objects and ensured they were mapped exactly the same. Why does one look great while the other look like.....well this is a G rated tutorial :-). The rings are booleaned to both objects so the right-hand side model is reflective looking only in the curved geometry.

See figure 1 <reflection geometry>



Figure 1 <reflection geometry>

The simple answer to this is if you want reflective looking objects "using" reflection maps then you need to put some roundness in the edges. This example is purposely over-rounded for the sake of drama. The surest sign of amateurish-looking CG art is in the edges.....someone commented once "**those edges are sharp enough to cut a tomatoe**"....I still remember it to this day.



Figure 2 <reflection image>



Figure 3 <reflection object full>



Figure figure 4 <reflection med>



figure 5 <reflection object med>



figure 6 <reflection least>



figure 7 <reflection object least>

If you have objects that need to be very angular then a different approach has to be used to really pull them off.

With EIM being now out it is a great tool to achieve this look.....extremely useful to give a very attractive high-lite and reflective edge.

2) reflection maps.....what makes one good and the other...

Contrast

The contrast of a reflection map is very important. Here are 3 examples of the same reflection map but at 3 different contrast levels.

Example 1. This is an example of what I use most of the time for a workable reflection map and what it looks like on an object rendered.

See figure 2 <reflection image>

See figure 3 <reflection object full>

Example 2. Same reflection map but the contrast has been turned down in Adobe Photoshop and the result on the same object.

See figure 4 <reflection med>

See figure 5 <reflection object med>

Example 3. Finally, the contrast is almost gone in this version with results on an object.

See figure 6 <reflection least>

See figure 7 <reflection object least>

I personally find material like chrome has a very high-contrast look to it where-as something like aluminum has a much lower contrast in the reflection. Mind you aluminum foil has a much higher level than, lets say, an aluminum pot. There is no substitute for actually looking at the material in real life that you want to duplicate.

Color

Most effective reflection maps for me have a general absence of color...not exactly sure why one version without color will usually look more believable than one with....probably the metals I mimic don't reflect color anywhere near the amount that they reflect the values in their environment. Also the intrinsic color of the metal seems to overpower the color in the environment which is being reflected. For any color shifts I want in the metals I usually rely on the diffuse channel to give me the look.



figure 8 <color map>



figure 9 <color map object>



figure 10 <top projection>

This example is of an overly saturated reflection map and what it looks like on an object.

See figure 8 <color map>

See figure 9 <color map object>

I use this as a general rule but have also seen some very nice reflections with subtle color variations....this is an area where a lot of experimenting is required. If your reflective object is outside and there is a nice blue sky....it probably would look good to have some of the blue in the map. Not too much...just enough to have it sit believably in the scene. This is also a place where you can give more visual clues as to the material's make-up. Chrome would get pretty blue but aluminum would have much less and blurred across the surface.

In summary a good reflection map will have a wide range of contrast and will be somewhat mono-chromatic. It is possible to blur the map in the "**Filter**" window to diminish the effects of a highly contrasted map....for once again...aluminum and similar materials.

3) mapping a reflection map to an object

Most of the time I just go with the default spheric frontal projection but there are times when I've had to rotate the map one degree at a time many times in a row. Sometimes a specific look is achieved only when the reflection map is at an exact angle. An example of this is when I was working on the EI Packaging art.

I had set-up the EI Logo scene from a very specific angle and had worked the reflection map rotation just the way I wanted (the Logo is rectangular in shape so the angle is quite important to get the shine just so). At the last minute I was requested to render it out from below as someone had decided this might be the way to go. Moving the camera wasn't a problem but now the Logo looked very different and as this was a still it had to have a certain look I was after. I sat there for 2 hrs rotating the map around different axis one or two degrees at a time to get to what you see now. So most of the time if it looks good, it looks goodbut there will be times when rotating the map just a little will bring the object to life.

Being very familiar with what I'm after in reflective looks and if I'm not getting it quickly I start assigning the reflection map first to "**left**", then "**right**", "**top**" etc projections.....on rectangular shapes the difference is very noticeable. On spherical somewhat less. Very seldom do I find cylindrical mapping useful and flat even less so...but that's just me. This is the same reflection map with "**top**" projection selected.

See figure 10 <top projection>

4) reflectivity channel settings

Reflection Map window settings:

Slider

If I'm doing metal (chrome..gold) and especially if it is the featured object the slider is turned up to 11 in the reflectivity channel. Floors with mirrors are way less and plastics and paints are usually below 0.5. Very light objects usually blow out past 0.2 or 0.3.

Most of the time I have "**reflectivity bias**" box checked. Floors with mirrors usually look best to me with a color selected and used.

Blur.....under the reflection map "**filter**" tab.

Blurring the reflection map can give a number of different metallic finishes.....the less blur the more highly reflective. Chrome=default blur, Aluminum=whole buch of blur, Steel=less than aluminum but still a bit.....you have to experiment with this and compare it to real objects to get it looking right.

The settings for this example are Blur at 30 and Reflectivity slider set at 0.7.....with these settings the object starts to take on the look of steel. Further manipulation in the other material channels would make it more convincing.

See figure 11 <blur 30 slider 0.7>

Reflectivity Map Window

In this window you have the ability to add grey-scale maps to assist in placing "**amounts**" of reflectivity. Where-ever there is white in the map you get full reflection.....where black, none. The grey range effects the range and pattern of your reflection. This function is very useful for controlling where you want the most reflection.... good for toning down areas which have grime on them or scuff marks on a floor.

This example has the Checkerboard Procedural shader applied to the object as a reflectivity map....where there is white...you see reflection.

See figure 12 <checkerboard reflectivity>

This example has a Ramp shader mapped to the reflectivity channel. Notice the reflection goes from nothing to full.

See figure 13 <ramp reflectivity>



figure 11 <blur 30 slider 0.7>



figure 12 <checkerboard reflectivity>



figure 13 <ramp reflectivity>

s) diffuse channel and reflections

I find the diffuse channel settings very important in the creation of reflective materials. Reflection maps have a self-illuminating quality which can be tricky to control at times. If you map a pure white texture map in the reflection map window and turn the reflectivity slider full up you will get a very white object. You can turn the lights way down and it will have very little effect on how the object looks.

Let's say you have a real chrome ball which is highly polishedit will reflect exactly what is in the room and will have very little of it's own material color etc.....what you mainly see is the reflection. This is how reflection maps behave....only the map is taking the place of the environment. So if you have a very dark scene and want reflective objects in it then you need to create a reflection map which matches the scene (a dark one).



figure 14 <brightness/falloff>

Two settings which I use in the diffuse channel to gain some control back when using high reflection are "**Brightness**" and "**Falloff**". Brightness is turned down to compensate for the self-illumination and fall-off turned right up to give a little of the volume (3Dness) back to the object as the reflection map is not very forgiving to depth...it tends to flatten the object. In real life highly reflective objects loose their dimension.....I like to give a little back.

This example has the Brightness and Fall-off set to defaults.

See figure 14 <brightness/falloff>

Diffuse Maps

Most of the time I have a subtle diffuse map when creating a reflective object.....I like the variation in coloration and the warmth it gives to the object. I have the filter slider turned way down.....just enough map to give a little variation to the surface.

This is the same object but with the diffuse map turned off.....when on it is at .19 amount in the previous examples.



figure 15 <without diffuse map>

See figure 15 <without diffuse map>



figure 16 <over-done bumps>

6) bumps

Some amount of bump in the Bump Channel can go a long way to breaking up your reflection map if it looks too static or predictable. Obviously if you have a very high-tech perfectly surfaced object there will be minimal bump in the surface. Even a slight amount when the object is animated will be enough to give that less than perfect look to your models. I usually use the Fractal Noise shader if I'm using factory shaders....afraktal is wonderful to have as a 3rd party shader for bumps and other reflective effects.....but that is another tutorial in itself.

This example has over-done bumps to show the effect they have on the reflection map.

See figure 16 <over-done bumps>

7) specular

Some like to have the Diffuse check-box selected in the specular channel when creating reflective materials.... myself, I usually don't. Most of the time I keep the specular close to default or even smaller.....you can type in a number larger than 200 to really tighten the hi-lite up.

in closing

Well, this is pretty much it.....can't think of much more of value which I can say. These ideas are workable to get the results I'm after and for the most part useful to me. Hopefully useful to you also.

If you come up with some cool images email me and let me know or if you have your own successful tips I'm always looking for different, more effective approaches.

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