

TRADE SECRETS

Realistic materials

André Kutscherauer demonstrates the techniques used to simulate glass, plastic and metal in our cover image

Although inorganic materials such as metal and glass are easier to simulate in 3D than skin or hair, it takes skill to make them look completely photorealistic. This skill extends not only to the materials themselves, but to the way in which you light them. Many new 3D users make the mistake of tweaking settings such as shadow opacity to correct lighting problems. This often results in images that look subtly, but unmistakably, unrealistic. If your render looks bad, don't tweak it: instead, think about the way you have set up your materials and lighting in the first place.

In this article, I am going to set out some of the techniques I used to get the metal, glass and plastic in this issue's cover render looking photorealistic. The character itself comes from my earlier image, *Selfillumination* [featured in the Exhibition section of *3D World* issue 77], and originally took me three days to model: a process that forms the subject of my first tip.

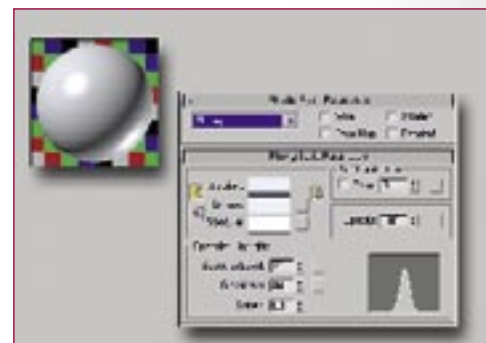
After the modelling, I concentrated on the shading. When doing this, always try to keep the shader tree as short and simple as possible. For example, the plastic in the render is a simple Phong shader with a small amount of reflection, while the glass and metal are simple *mental ray* shaders. Remember that the appearance of shiny materials such as these are defined by reflections and refractions, which means you should spend time thinking about the 'off-scene' scene. In this case, most of the reflections come from a simple lightbox.

Finally, I will briefly explain how area lights were used to make the plastic objects in the scene look realistic, and ways to compensate for the bleaching effect these have on the render in *Photoshop*. Although all of the 3D work set out here was done *3ds Max*, the tips themselves can be applied to almost any 3D application.

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01 Remember that fillets are extremely important for realistic-looking objects. Even if you think your shader is perfectly set up, it won't look real if there are unrealistic hard edges on your models, since a lot of 'materiality' comes out on the edges of objects. On most of the edges in this picture, I created a fillet of at least 3mm so that it would be visible when I was rendering.



02 When defining materials, make them as simple as possible. The more options you've got to deal with within your shader, the more difficult it will be to set it up correctly. Think carefully about whether you really need things like Falloff maps. In special cases (car paint, for instance), the Falloff map in the Reflectivity slot is useful, yet most materials, such as plastic, work fine without it.



03 If you have a lot of reflective materials like metal or glass in your scene, bear in mind that they need something 'off set' to reflect. A lightbox is a good place to start. The one I've used consists of five simple planes, set a short distance apart. The right and left planes are a self-illuminated white material, while the others are a diffuse white material.



04 For the glass, I've used a Dielectric shader in *mental ray*, and adjusted the colour to green. If you have lots of glass in your scene, you'll have to check the render options for reflection/refraction counts. In my case, the optimal Trace Depth settings were Max. Depth of 15 and Max. Reflections and Max. Refractions of 10. This raises the render time, yet increases the realism of the glass and metal.



05 While shiny materials define themselves through reflections, diffuse materials such as plastic need soft, direct light. Area Lights with soft shadows do this perfectly. This scene contains two 1x1m *mental ray* Area Lights, each with Inverse Square Falloff, placed facing one another to the left and right of the scene. Their positions can be seen from the reflections in the top of the bulb.



06 With area lighting, the render will quickly lose its contrast. To fix this, select Layer > New Adjustment Layer > Levels in *Photoshop*, picking Luminosity as the blending mode, so that you can correct its contrast without increasing its saturation. In the Levels layer, press and hold [Alt] and drag the left and right sliders. This will enable you to quickly find the black and white points.