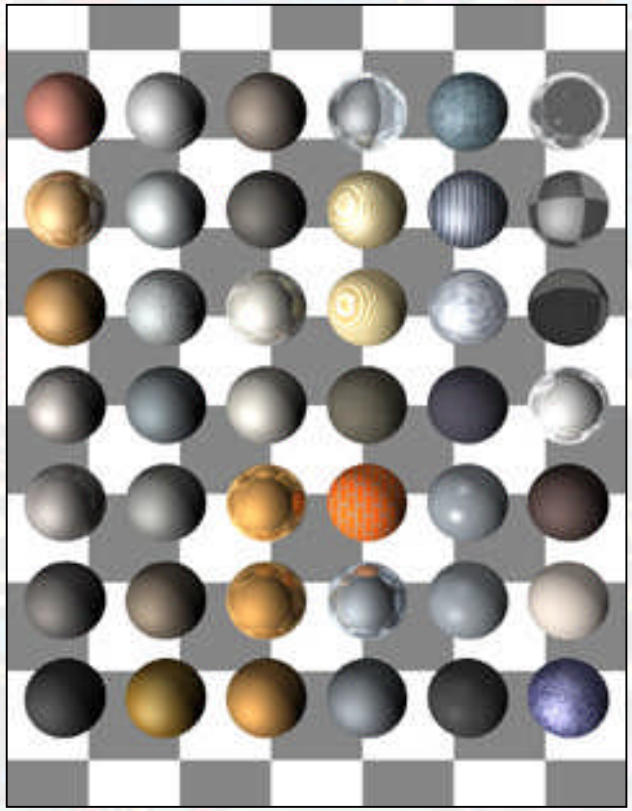
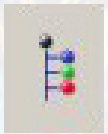
Materials in NX Render

Overview

- Where materials are stored in NX Render
- Internal material definition and the NX interface
- Material types and their characteristics
- Material components
  - Colour
  - Pattern
  - Reflectance
  - Bump
  - Transparency
- Texture spaces

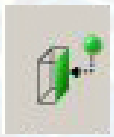


Sources of materials in UG



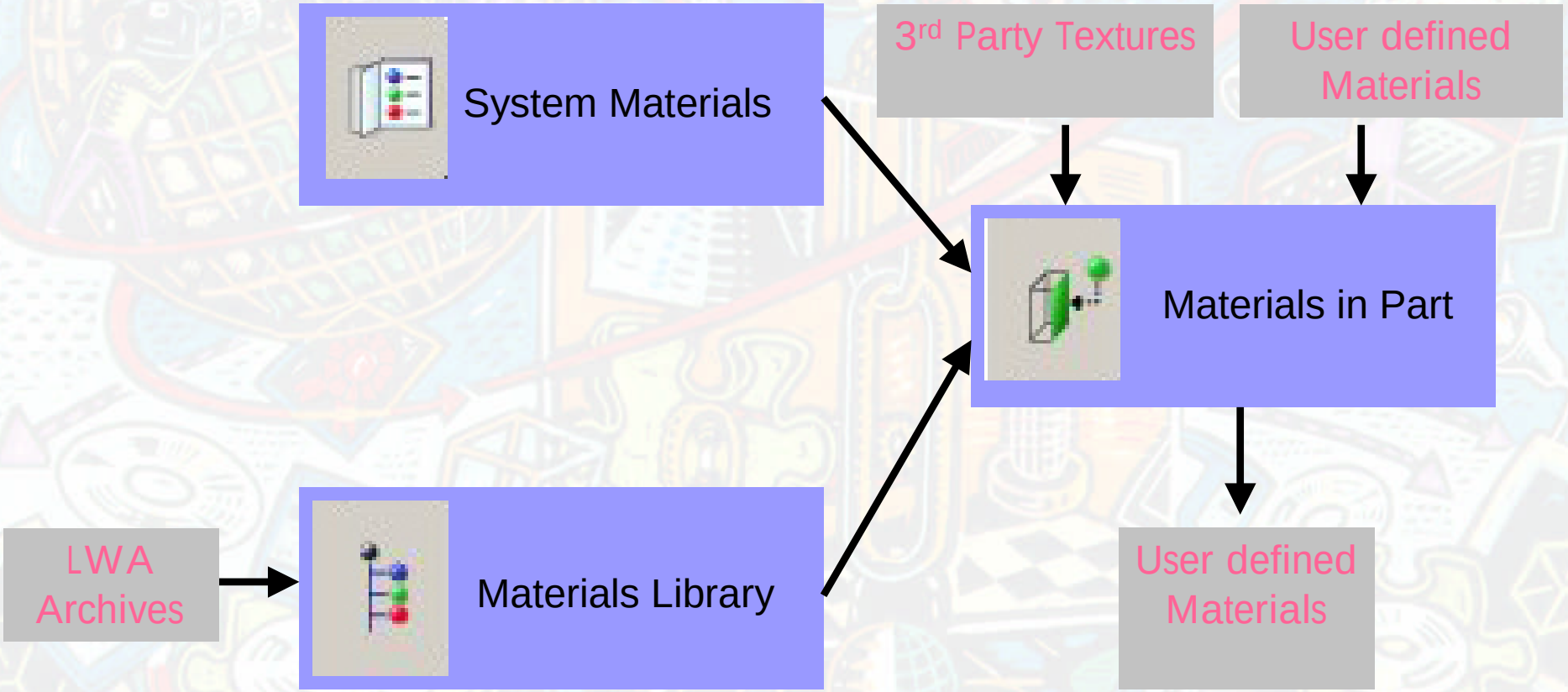
- Materials Library - Default Archive (lwpda.lwa)
- External LWA Archives – www.lightworks-user.com
  - Moldtech & Roehlen
  - UNS Metals
  - RAL

- System Materials (a subset of the materials library)



- User Created materials
  - Use of 3rd Party texture libraries
  - Adapt existing materials
  - User defined Palette files (*.pax)

Workflow of materials in UG

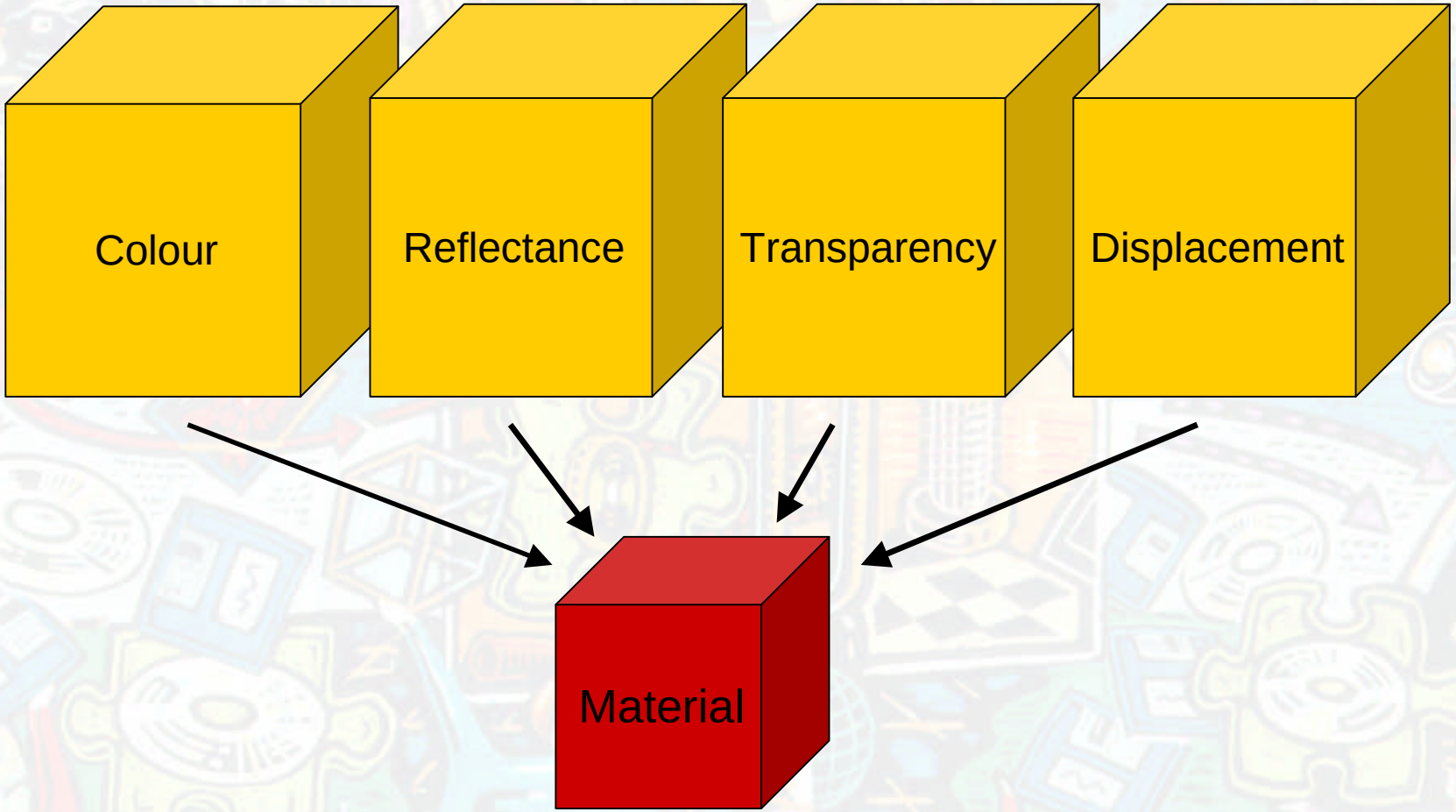


Predefined Materials in NX Render

- Metals - accurate representation
- Plastics – Edit to get specific reflection effects
- Glass – accurate representation
- Finish – Always needs editing
- Pattern - Always needs editing

Materials and Textures

Internal material definition



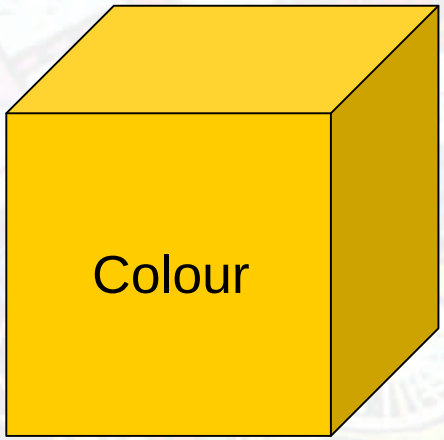
Materials and Textures

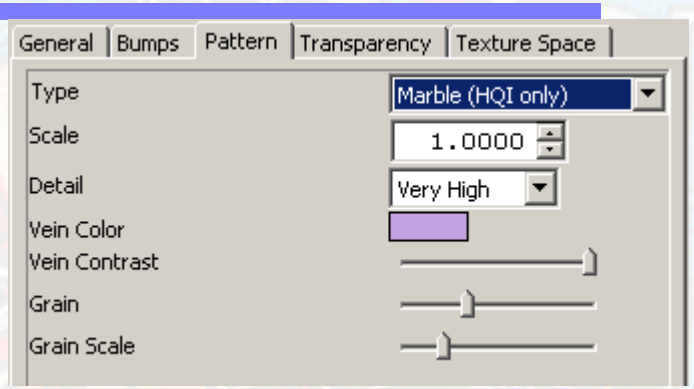
Colour is always required for a material.

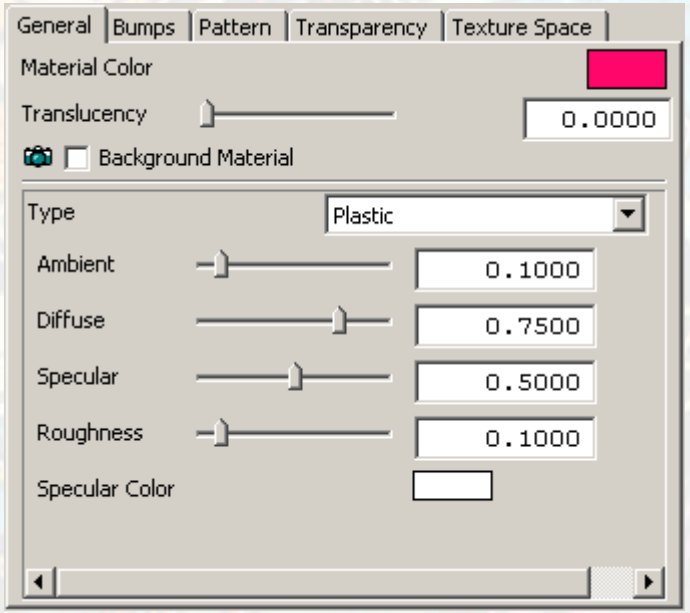
Defined in 2 ways:

- material colour – RGB
- Pattern – Image based or procedural shader

Pattern overrides Material colour







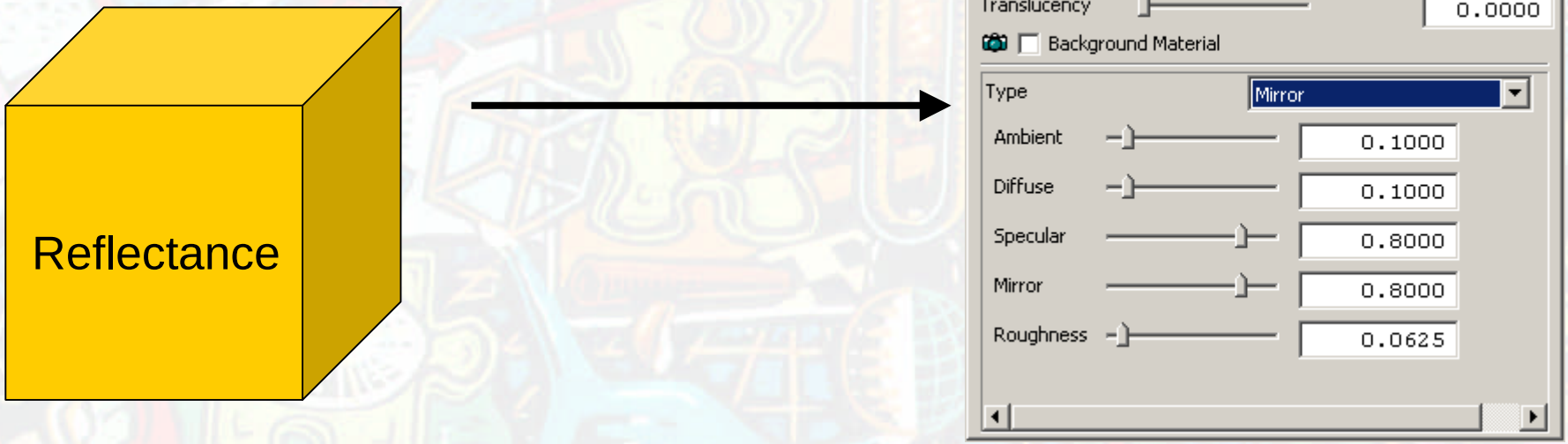
View > Visualization > Material Editor

Materials and Textures

A reflectance is always required

Defines how light is reflected from the material

Range of reflectance models provided



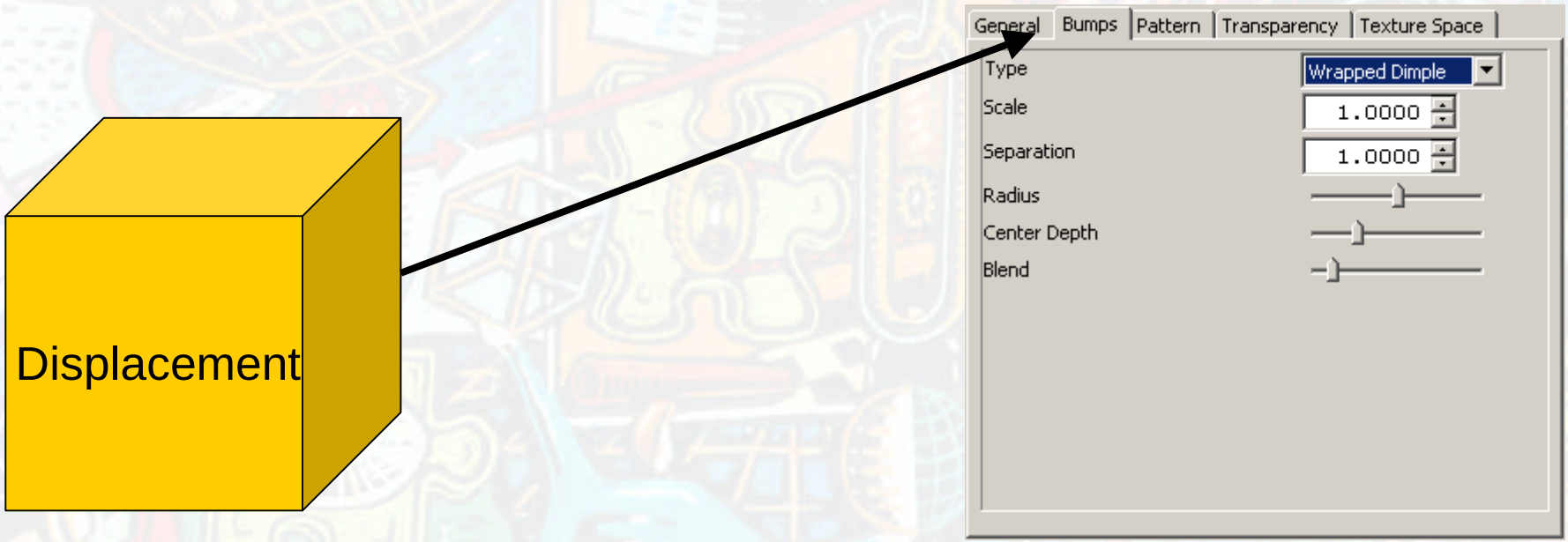
View > Visualization > Material Editor

Materials and Textures

Bumps are optional (can be none)

Appearance is dependant on the lighting

Visibility is affected by reflectance type

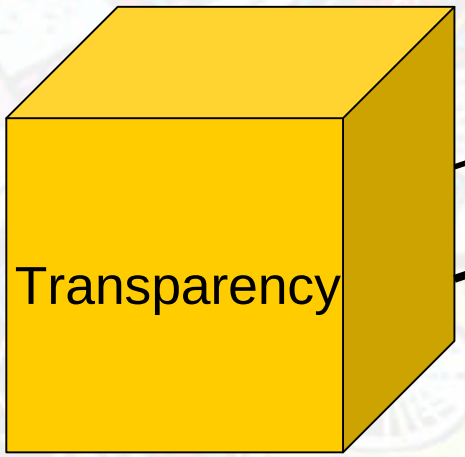


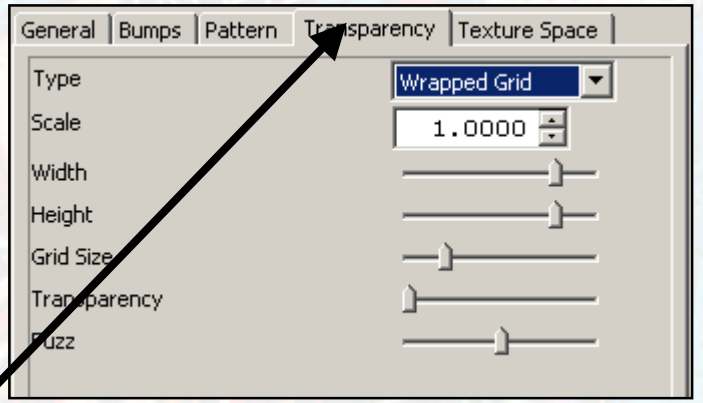
View > Visualization > Materials/Textures

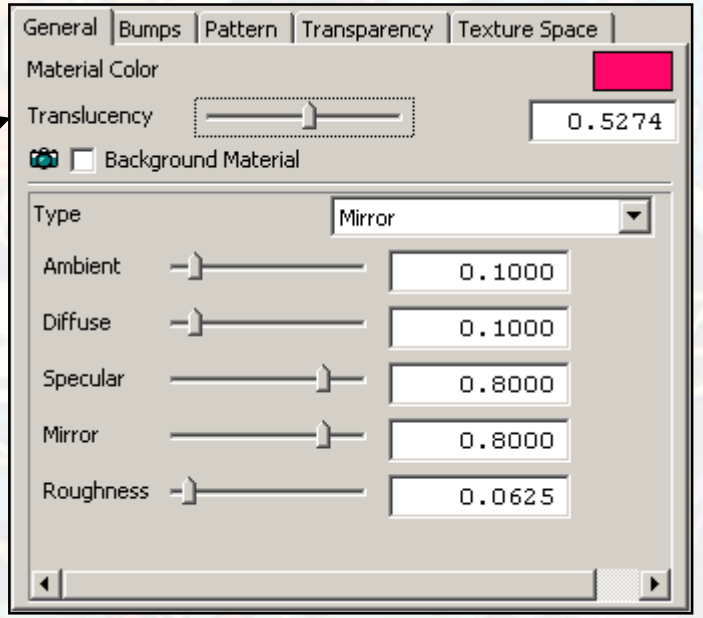
Materials and Textures

Translucency on the general tab
- Simple transparency
- Factors in backlight

Transparency tab
- Transparency overrides translucency
- Image and procedural transparency effects

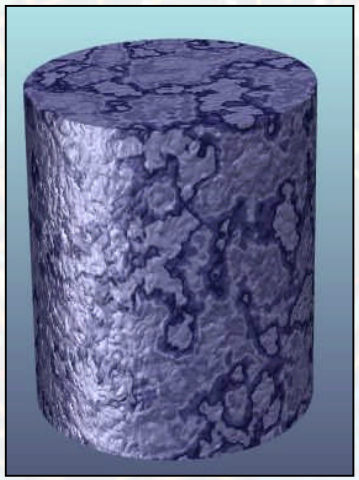


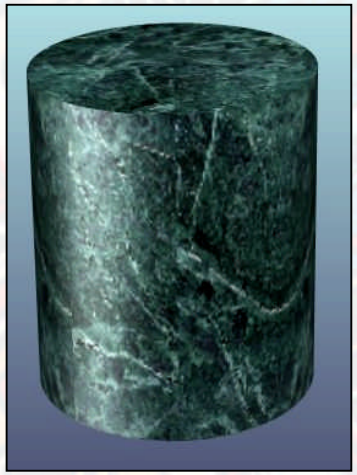




View > Visualization > Materials/Textures

Material Types – Procedural vs Bitmap





Procedural – Based on Algorithm

- No tiling problems
- Very controllable
- Resolution independent

- Effects limited to range of algorithms

Bitmap – Based on Image

- User definable
- Realistic

- Tiling problems for large areas
- Resolution dependant
- Time overhead preparing bitmap

Material types – Solid and Wrapped

Solid

Material components without “wrapped” in the title

Calculated in 3D space

No texture space required

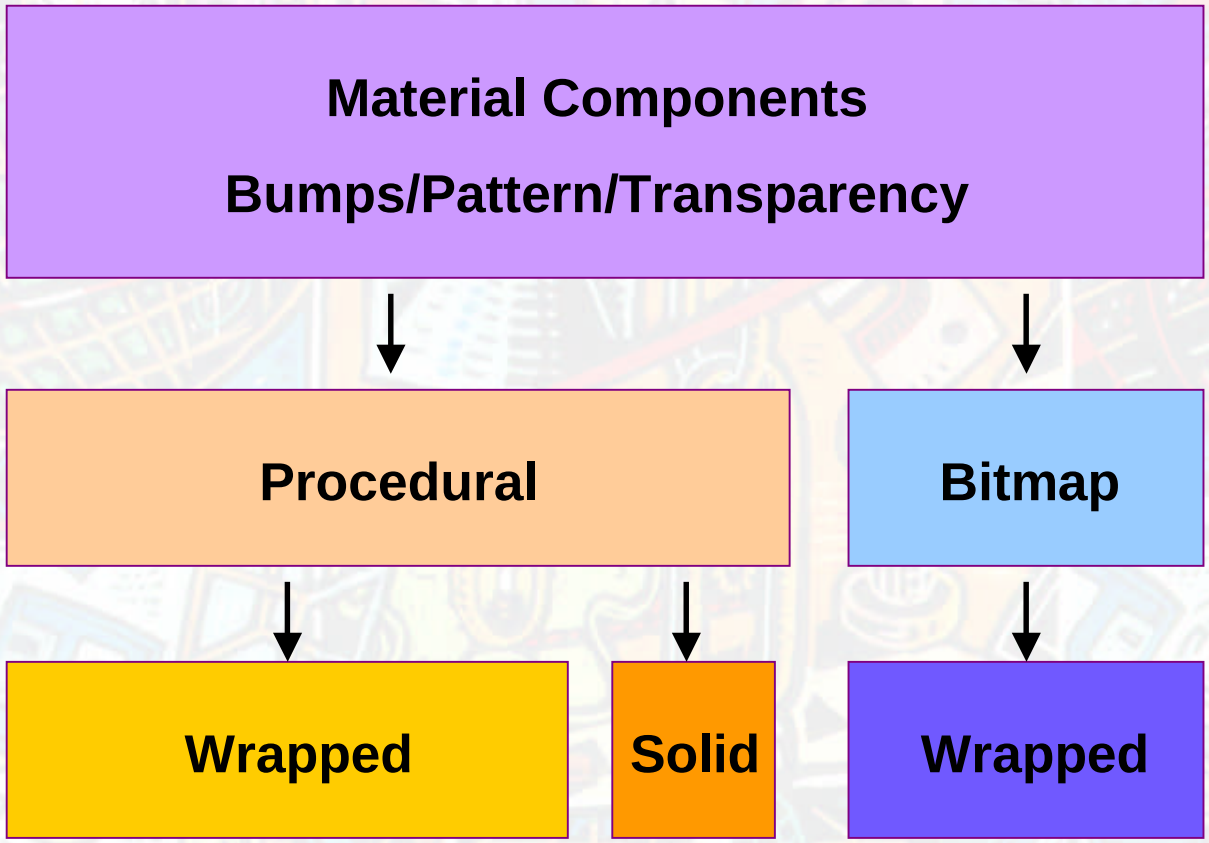
Wrapped

Material components with “wrapped” in the title

Calculated in 2D texture space

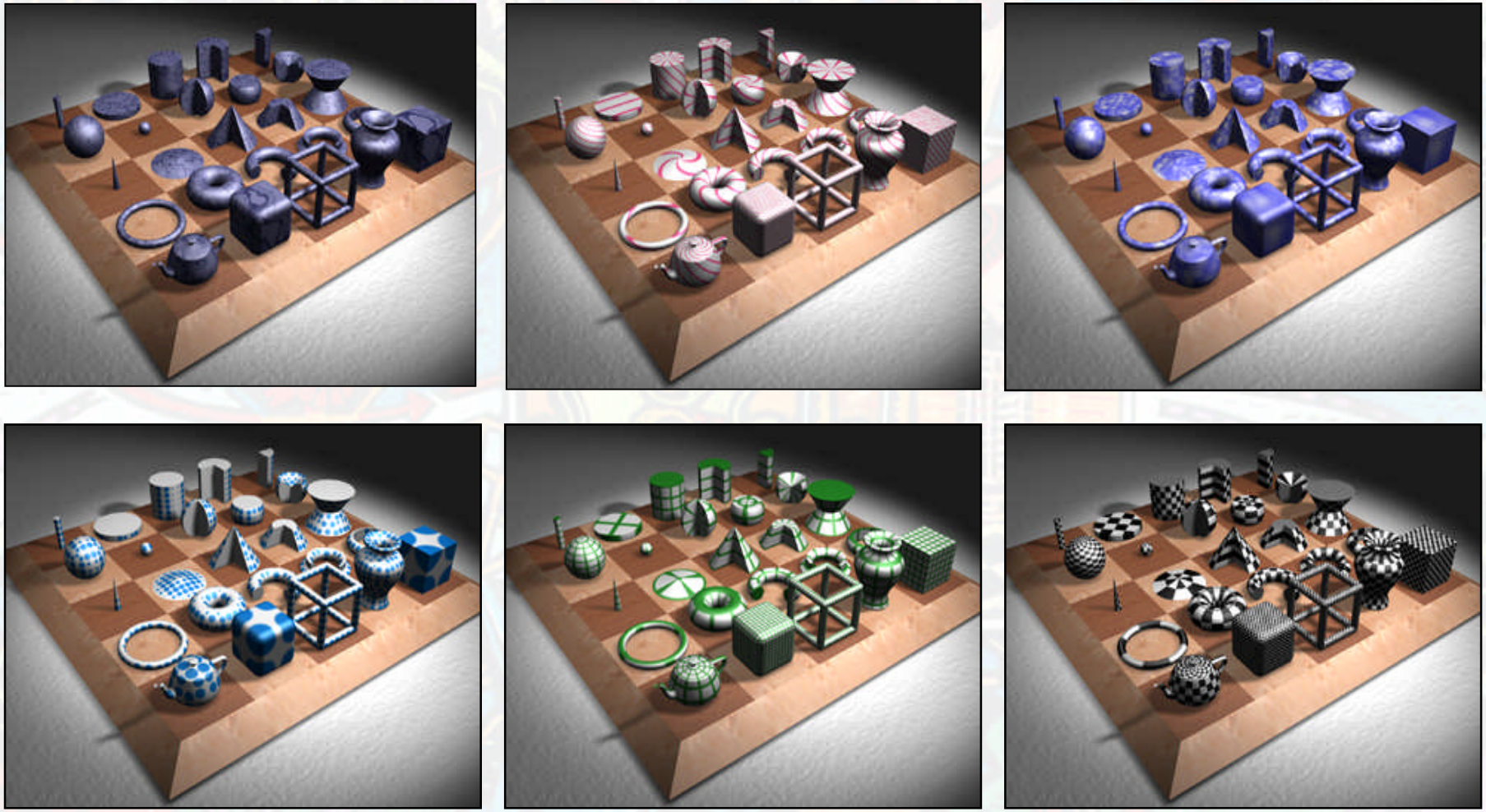
Require a texture space

Material Component - Categorization



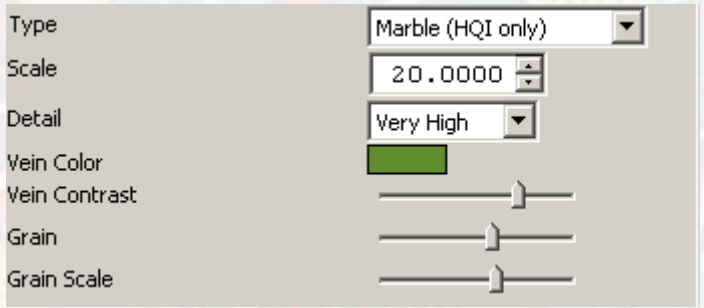
Pattern

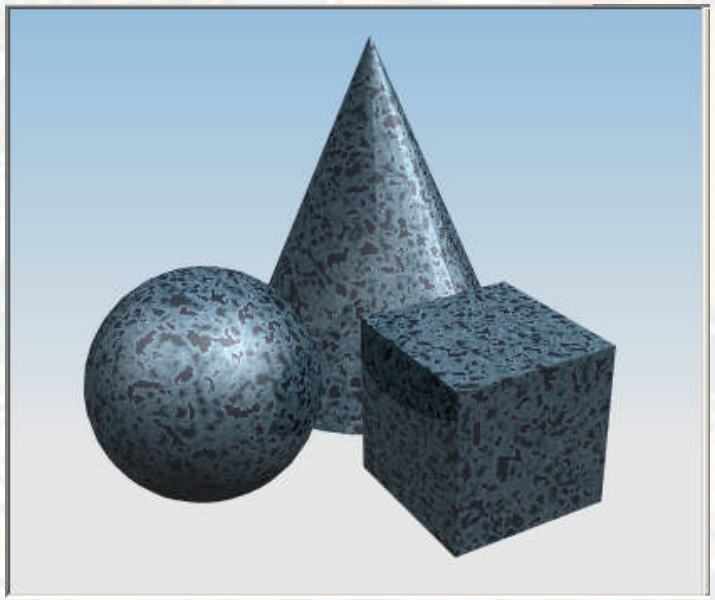
Pattern contains a wide range of procedural material components



Pattern

- Procedural Patterns are parameterised and easy to change
- Some are more realistic than others
- Can be used to create other effects than those indicated by the name





Pattern – Wrapped Image

- Wrapped image can be used for accurate representation of specific materials
- Create image yourself or use 3rd party texture libraries
- Wrapped images can only be positioned and scaled up or down

Image files need to be be tiff format with no compression

Reflectance

Constant

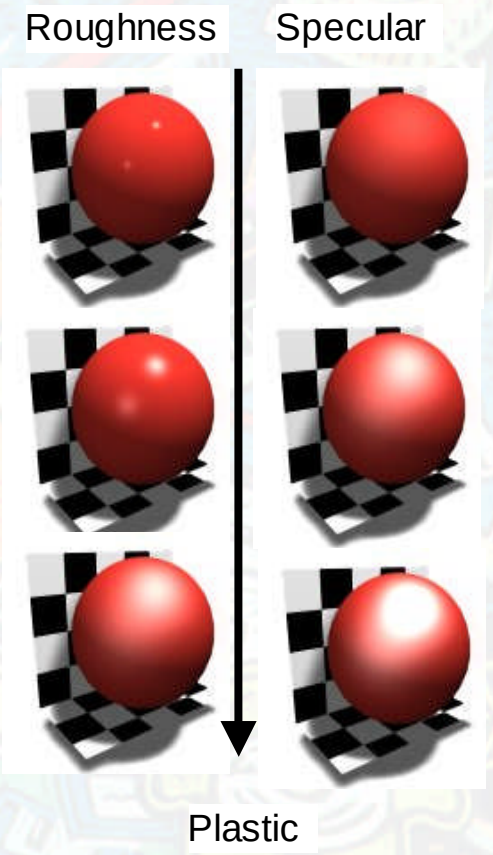
- Independent of lighting
- Like ambient light of 1
- Use for light sources/background images

Matte – materials with no specular reflectance

- Diffuse – controls material brightness when illuminated
- Ambient – controls material brightness in shadow

Plastic – Specular highlight

- Diffuse and ambient as for matte
- Specular – controls highlight intensity
- Roughness – controls highlight size



Reflectance - Raytraced

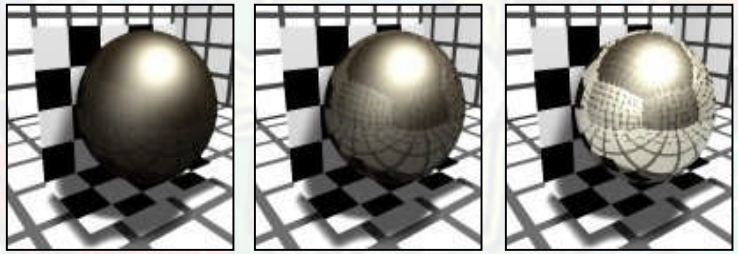
Mirror

- Raytrace reflections
- Appearance dependent on surroundings
- *Mirror* default can be too high for some uses
- *Ambient* and *diffuse* often too low
- Useful for adding specular reflections to any surface

Reflectance - Raytraced

Conductor

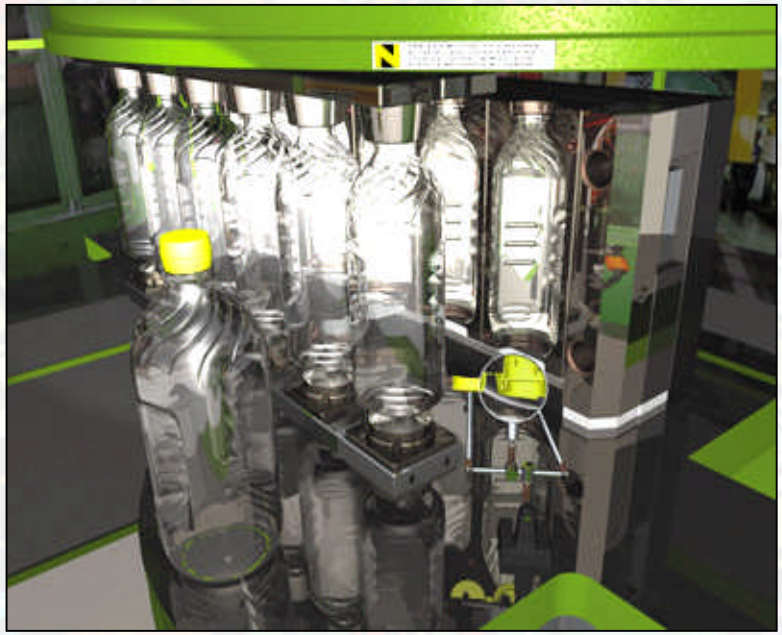
- Accurate representation of metals
- Don’t edit Refraction and absorption parameters
- *Mirror* can be changed to represent level of finish
- Can be used to represent anodized materials and metal finishes e.g.:
  - Use aluminium or steel predefined shader
  - Set *mirror* to 0
  - Set *colour* to black



Reflectance - Raytraced

Dielectric

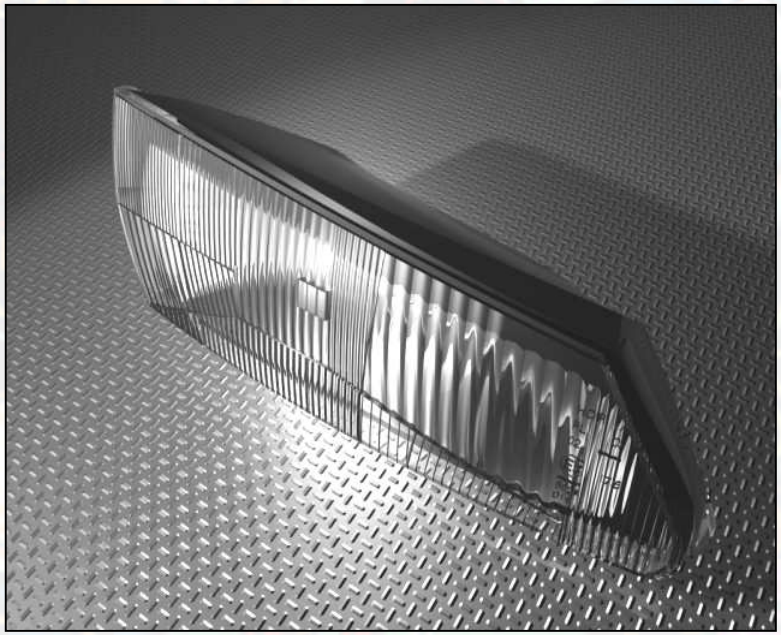
- Accurate representation of transparent materials
- Raytrace reflection and refraction
- *Ambient, diffuse, Specular* and *roughness* work as for plastic
- Don’t use *Translucency* option with Dielectric or Glass



Bumps

Optional – can be *None*

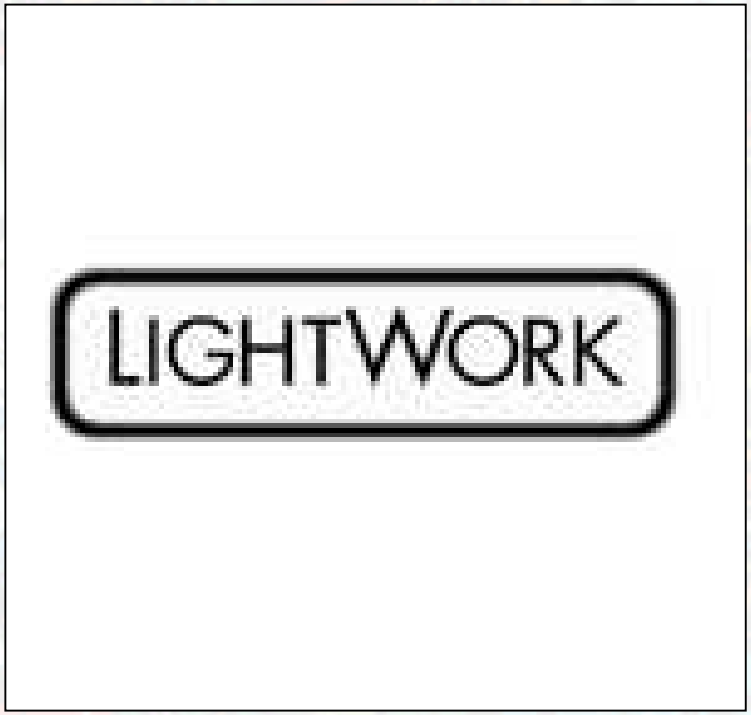
- Dependent on lighting
- Procedural noise-based patterns - Rough, Casting
  - Create specific finishes such as spark erosion
  - Add slight imperfections to surfaces
  - Break up raytrace reflections
- Procedural regular patterns – treadplate, dimple



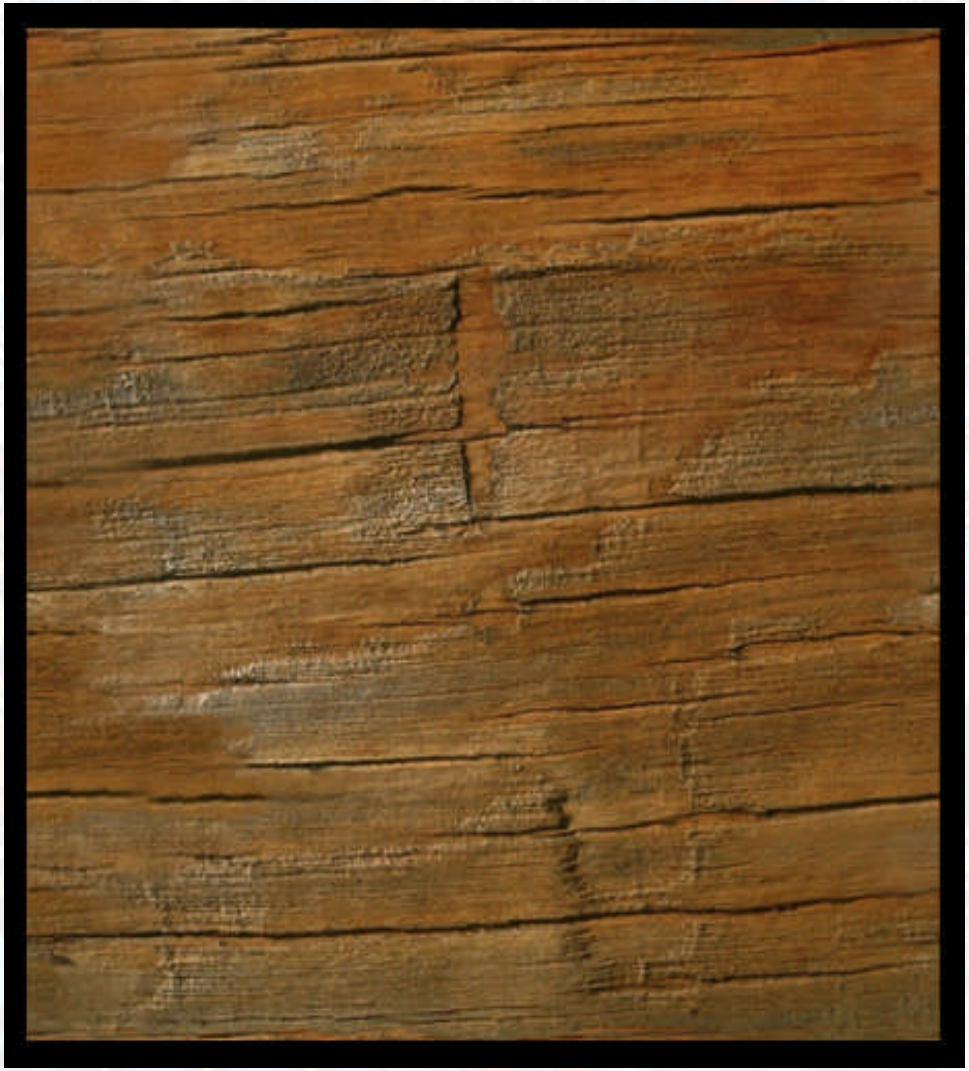
Bumps

Image Bump map

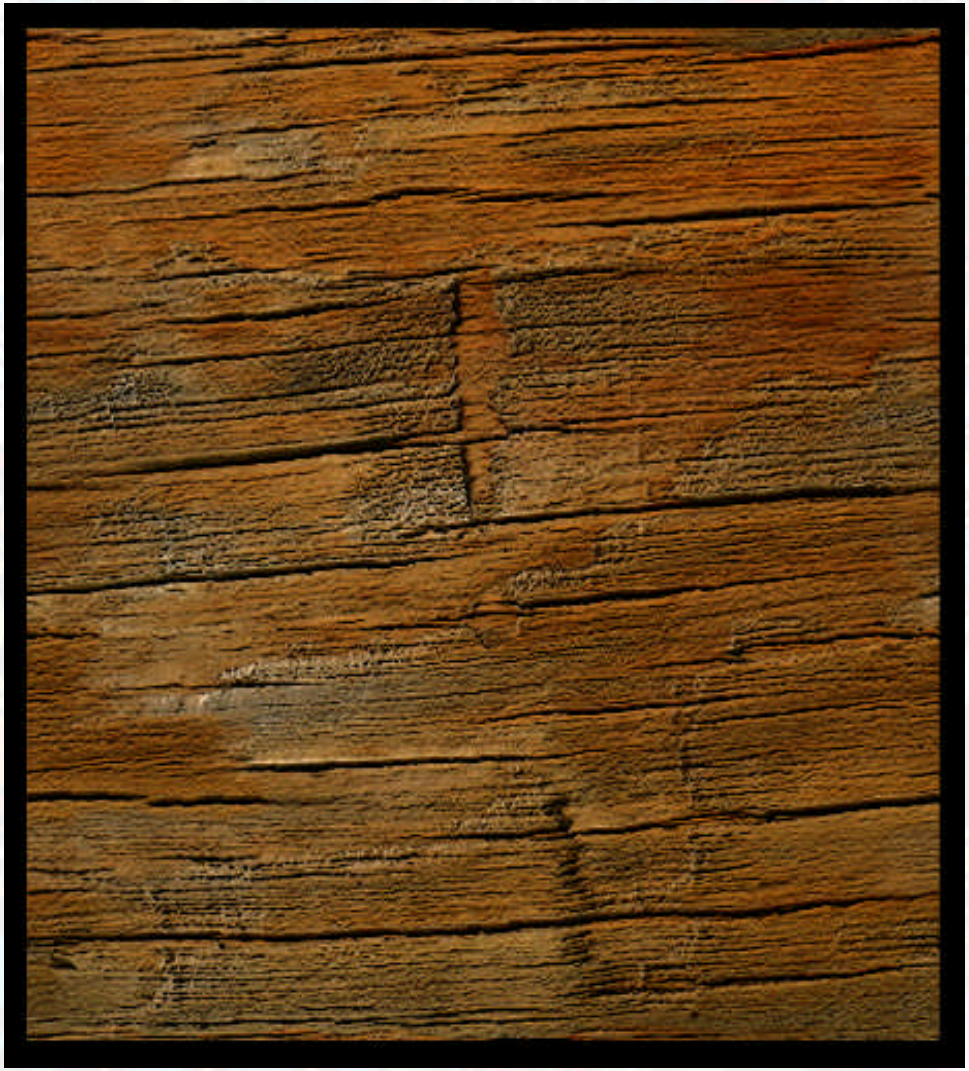
- Use to emboss logos
- Add to colour image maps
- Use tiff files without LZW compression



Bumps



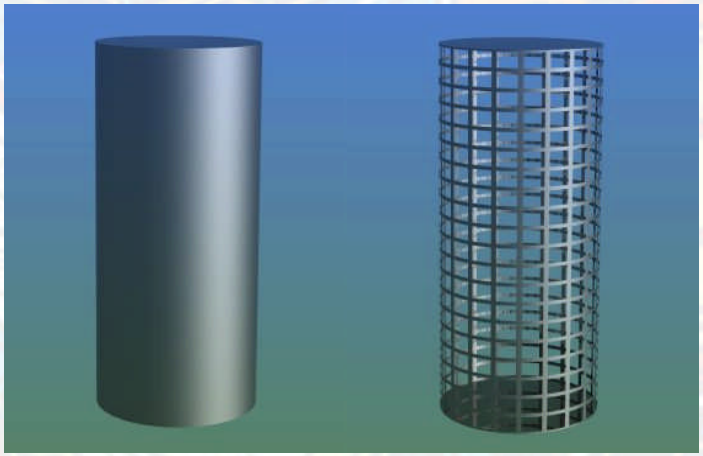
Bumps



Transparency

Transparency textures are optional i.e. can be *none*

- Represent complex geometry using simple geometry
  - Eroded, Wrapped Grid
- Stencil lettering and logos onto surfaces
  - Wrapped stencil uses greyscale to set alpha



Note that *improved* render mode and below do not render transparency

Texture Spaces

Available texture spaces

Auto Axis

- Aligns to axis planes

Spherical

- Longitude is half length of latitude

Cylindrical

- To repeat around axis scale < 1
- Scale along axis is num repeats

Arbitrary Plane

- Use for non axis-aligned planes
- Accurate positioning

UV

- Use for complex surfaces