3D 材质

Qt设计工作室提供了一套预生成的**Qt快速3D**材料。如果 3D 材质未显示在**"组件"**中，则可以将 **QtQuick3D.材质**模块添加到项目中，如添加和移除模块中所述。但是，由于使用预生成的 3D 材质可能会导致性能问题，因此我们建议您改用**"原则材质"**、**"默认材质"**或**"自定义材质"**。有关更多信息，请参见材质和着色器和创建自定义材质。

> **注意：** **"材料"**模块在 Qt 6 中不可用。要使用预生成的 **Qt 快速** 3D 材质，您需要在创建项目时选择 Qt 5 作为**目标 Qt 版本**。

要将 3D 材质应用于组件，应首先删除默认材质，然后将新材质从**"组件"**> **Qt 快速 3D 材质**"> **Qt 快速 3D 材质**拖放到"导航器"中的模型组件。添加到模型中的材料将在模型组件的"属性"视图中列出。您也可以将相同的材料应用于另一个组件。同样，请先删除默认材料。然后，您应该选择该组件并转到**"属性"**视图。找到"**材质**"属性，+选择图标，然后在下拉菜单中选择新材质。

每种材料都有自己的一组属性，可用于进一步定义材料的外观。对于每个材质，**"环境映射"**属性指定是否将环境映射用于镜面反射。使用**"纹理"**属性为环境贴图选择纹理。"**阴影贴图"**属性确定是否使用阴影贴图生成逼真的阴影。您还可以为阴影映射选择**纹理**。

定制材料

您可以使用 **Qt Quick 3D 效果**>**自定义着色器** Utils 中提供的自定义材质组件作为创建用于着色模型的自定义材质的基础组件。有关更多信息，请参见自定义效果和材质和自定义着色器。

金属材料

下面描述了金属基材料的性能，其中包括**铝**，**阳极氧化铝**，**铝拉丝**，**铝发射**，**铜**和**钢铣削同心**。

颜色

通过指定"**金属颜色"和"基色"**属性来设置材料的表面色调。使用"**发射颜色"**属性可以设置发光材质的发光颜色。可以使用颜色选取器或指定 RBG 值。

反射

使用"**反射**"选项卡下的属性来指定材质的反射质量。有关与反射相关的各种材质属性的详细信息，请参见使用高光和反射。

› 使用**"地图偏移"**和**"地图比例"**属性可以定义反射贴图的偏移和比例。还可以使用**"纹理"**属性为反射贴图定

- 设置**菲涅耳功率**属性以减少迎面反射（直接看表面），同时保持在掠角处看到的反射。

粗糙度

使用"**粗糙度**"属性可以确定光与材料接触时的行为。在粗糙度为零的情况下，光线会从材料上反射出来，使其看起来有光泽。粗糙度增加会导致从材料反射的光散射，从而导致哑光外观。

- "**贴图偏移**""**贴图比例**和**纹理**指定应用于材质的粗糙度质量。
- 使用数值"**粗糙度**"属性可以定义材料的光泽度或哑光显示方式。

排放

使用"**发射**"选项卡下的属性指定材料的自发光质量。有关与发射相关的属性的更多信息，请参见自发光材质。

- "**强度**"属性决定了材料表面发出的光量。
- "**贴图纹理**"属性定义自发光贴图的纹理，而"**蒙版纹理**"定义自发光蒙版的纹理。使用"**蒙版偏移**"设置自发光贴图的遮罩偏移。

撞

在"**凹凸**"（Bump） 选项卡下指定属性，以模拟材料表面上的精细几何位移。使用 **Amount** 属性设置置换量，使用"**纹理**"属性定义凹凸贴图的纹理。有关详细信息，请参阅模拟几何位移。

钢磨同心材料的特性

另一种金属，**钢磨同心**材料具有其他材料不具备的某些特性：

- "**各向异性**"属性拉伸高光，从而模拟微小的划痕。还可以使用"**纹理**"属性来定义各向异性贴图的纹理。
- **折射率**定义了透射光在到达材料表面时弯曲的程度。

在**纹理**选项卡下：

- 用于设置纹理贴图的平铺重复的 **Tiling** 属性。
- 使用"**漫反射**"属性为漫反射贴图设置纹理，使用"**各向异性**"属性为各向异性贴图设置纹理。

Glass Materials

The following describes properties related to glass-based materials, which include **Glass**, **Frosted Glass**, **Frosted Glass Single Pass**, and **Glass Refractive**.

Color

Set the surface tint of the material by specifying the **Glass Color** property. You can also specify the **Band Light Color** for the **Frosted Glass** material.

Use the **Glass Color** and **Band Light Color** properties to set the color properties for glass-based materials.

General

- Set the **Fresnel Power** property to decrease head-on reflections (looking directly at the surface) while maintaining reflections seen at grazing angles.

light reflected off the material to scatter, which results in a matte appearance.

- The **Reflectivity** property specifies how much light is reflected from the material.
- The **Index of Refraction** defines reflectivity by determinining how much a ray of transmitted light is bent when it reaches the surface of the material.
- The **Refract Depth** property sets the refraction depth for the material.
- Use the **Minimum Opacity** property to determine the minimum level of opaqueness for the material.
- The **Blur size** property sets the amount of blurring behind the glass.

Bump

For frosted glass materials, specify the properties under the **Bump** tab to simulate fine geometry displacement across the surface of the material:

- Use the **Scale** and **Bands** properties to define the scale and number of the Bump Bands.
- The **Strength** property sets the glass bump map strength.
- Use the **Internal** property to specify whether the bump map should only be used for internal lighting.
- The **Texture** property to define a texture for the bump map.
- The **Coordinates** property sets the bump coordinates of the refraction.

For more information, see Simulating Geometry Displacement.

Random Gradient Mapping

For frosted glass materials, you can also specify **Random Gradient Maps** by using properties **1D**, **2D**, **3D** and **4D**. Each of the properties defines a texture map used to create the random bumpiness of the material.

Band Light

The outlook of the **Frosted Glass** material can be further defined by specifying the **Band Light** properties:

- The **Fallof** property sets the light intensity falloff rate.
- The **Angle** property sets the angle of the light source to which the band is perpendicular.
- You can also set the **Brightness** of the band light.
- Use the **Position** property to set the coordinates for the band light in the UV space.

Noise

For the **Frosted Glass Single Pass** material you can specify the noise quality by defining the noise **Scale** property and setting the noise **Coordinates**.

Plastic

The following describes properties for the available plastic materials, which include **Plastic Structured** and **Plastic Struct Emissive**.

Color

General

Plastic materials share some of the properties with glass materials. For descriptions of **Roughness** and **Index of Refraction** properties, see general properties for glass materials.

- The **Texture scaling** property determines how fast a material is repeated on a surface.
- The **Bump Factor** property sets the strength of bumpiness for glass materials.

Random Gradient Mapping

See Random Gradient Mapping for Glass Materials.

Emission

The properties of emission for glass materials are similar to those of metal materials. For decription of emission properties, see emission properties for metal materials.

Paper Materials

The following describes properties for the available paper materials, which include **Paper Artistic** and **Paper Office**.

Color

Set the surface tint for the **Paper Office** material by specifying the **Paper Color** property.

Transmission

Specify the **Transmission** settings to define the outlook of light passing through the material. The **Transmission Weight** property specifies how much light scatters through the surface of the material, while the **Reflection Weight** sets the luminance of highlights and reflections.

General

- The **Translucency Falloff** sets the point of decline for translucency of the material.
- The **Opacity** property sets the material's level of opaqueness.
- For the description of **Texture Tiling** properties, see tiling for metal materials.

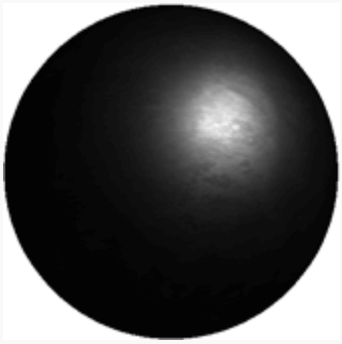
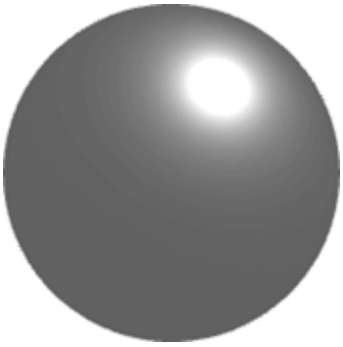
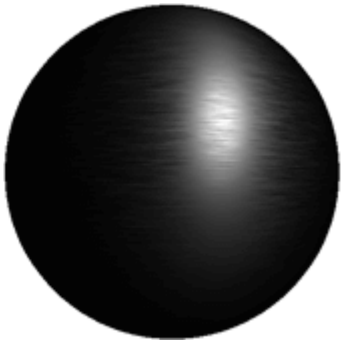
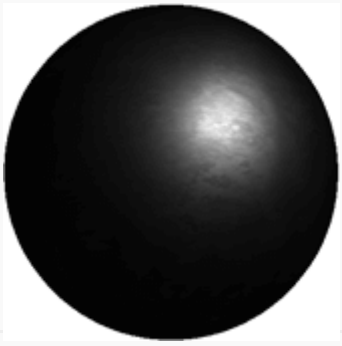
Diffuse Map

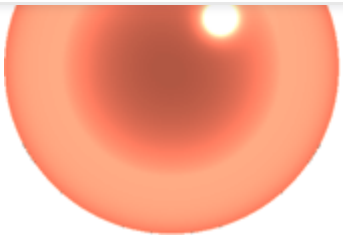
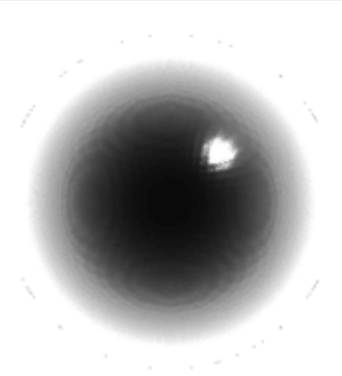
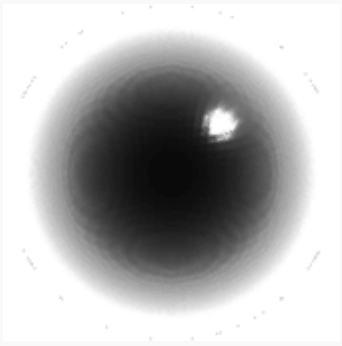
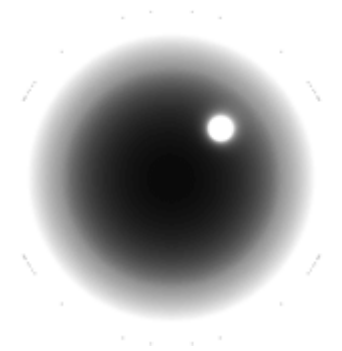
Use the **Light Wrap** property to set the diffuse light bend of the material. The **Texture** property defines a texture for the diffuse map.

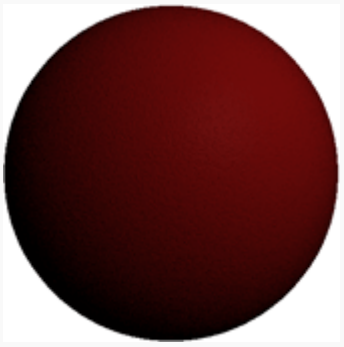
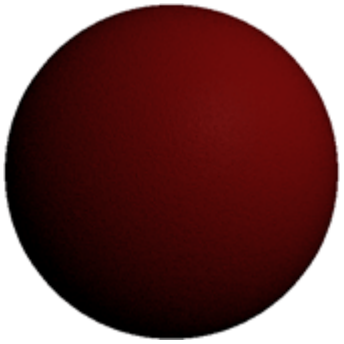
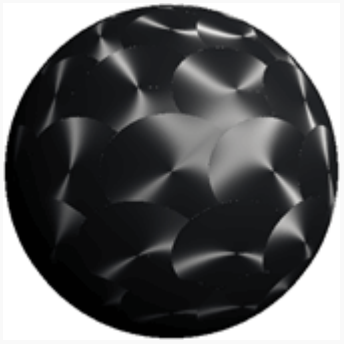
Bump

For the description of **Bump** properties, see properties for metal materials.

Available Materials

Material	Example Image	Description
Aluminum		A material with the appearance of aluminum.
Aluminum Anod Emis		Anodized aluminum with emissive properties.
Aluminum Anodized		Anodized aluminum.
Aluminum Brushed		Brushed aluminum.
Aluminum Emissive		Aluminum with emissive properties.
Material	Example Image	Description
Copper		A material with the appearance of copper.

		
Glass		A material with the appearance of glass.
Frosted glass		Frosted glass.
Frosted Glass Single Pass		A single-pass frosted glass.
Glass Refractive		Refractive glass.
Paper Artistic		A paper material with an artistic finishing.
Material		**Description**

Paper Office		A paper material with an office-style finishing.
Plastic Struct Emissive		A red structured plastic material with emissive properties.
Plastic Structured		A red structured plastic material.
Steel Milled Concentric		A milled concentric steel material.

‹ Textures

3D Effects ›

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