HEXAGON

VGSTUDIO MAX

Tutorial
First Steps

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Printed in Germany, June 2026.

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Getting started

What you will learn

This tutorial will guide you through the very first steps of getting to know VGSTUDIO MAX. You will see how to open a CT data set, familiarize yourself with the workspace, and learn how you can visualize the volume object in the 3D window and the 2D windows.

Tools you will need

Before you get started, you'll want to make sure you have the following items:

Feature	Description
Product name	VGSTUDIO MAX
Release	2026.2
Example data	*ExampleData_vgstudiomax_GeneralTopics.zip*, which is located on your **download account**[a]. Unzip the content of the *.zip* file to a path of your choice. In this tutorial, we will use the following files: – *GolfBall.vgl*
Document ID	Tutorial-1061-v027-001-en

[a] https://download.volumegraphics.com/website/login.html

Opening a *.vgl* project

There are various ways to load different types of data into VGSTUDIO MAX. A common use case is opening an existing *.vgl* project that contains one ore more volume objects. In this example, the volume object is a scanned golf ball.

1. Start VGSTUDIO MAX 2026.2 by using the new entry created by the installer in the Windows **Start** menu.
2. Select **File >** **Open** and open the *GolfBall.vgl* example data set.

Alternatively, you can simply drag and drop the *GolfBall.vgl* example data set from your file browser into VGSTUDIO MAX.

Exploring the workspace

Once the volume object has been loaded in the scene (i.e., the virtual space in which the object is located), it will be shown in the various windows of the workspace. The following figure shows a typical workspace layout of VGSTUDIO MAX:

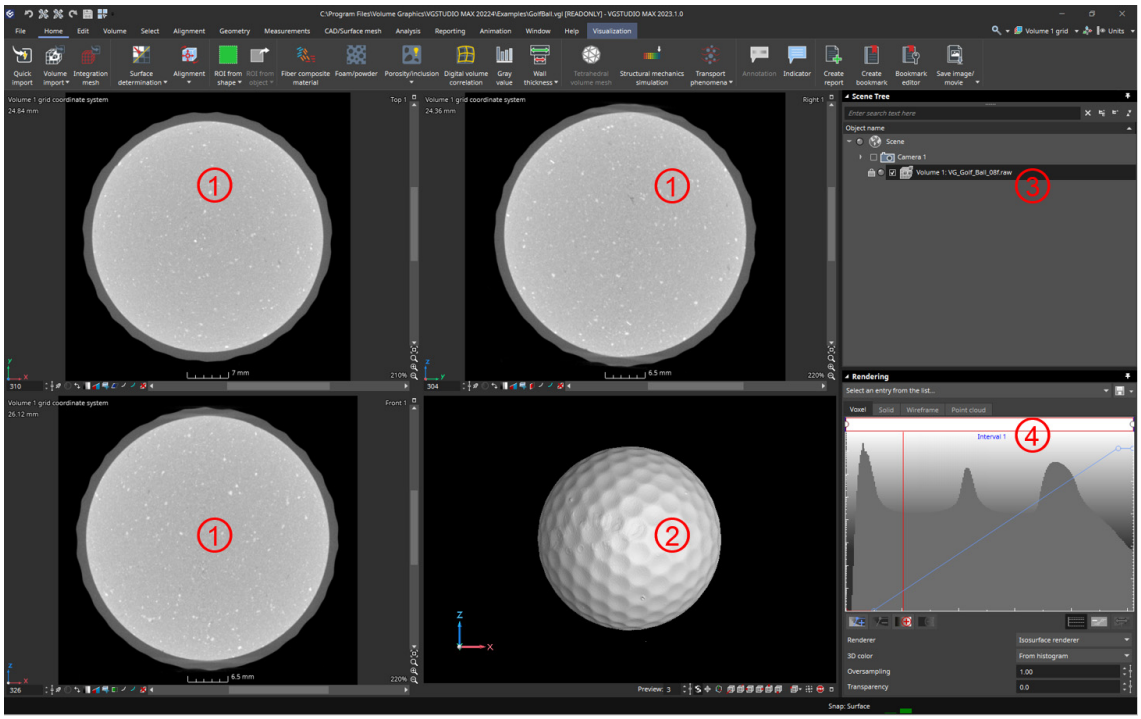

Figure 3-1: Typical workspace

In the default layout of VGSTUDIO MAX you see

– the 2D windows (1);
– the 3D window (2);
– the **Scene Tree** tool (3);
– other tools, e.g., the **Rendering** tool (4).

In case the listed elements are not visible, toggle the visibility of the tools by activating them in the **Tools** drop-down list on the **Window** tab. You can also realign the windows by selecting **Window >** **Quad**.

Scene Tree

In the Scene Tree, the currently loaded objects and their associated analyses, geometry elements, GD&T features, and regions of interest (ROIs) are listed in hierarchical order. Each entry in the Scene Tree has a checkbox, which allows you to toggle its visibility in the 3D and 2D windows.

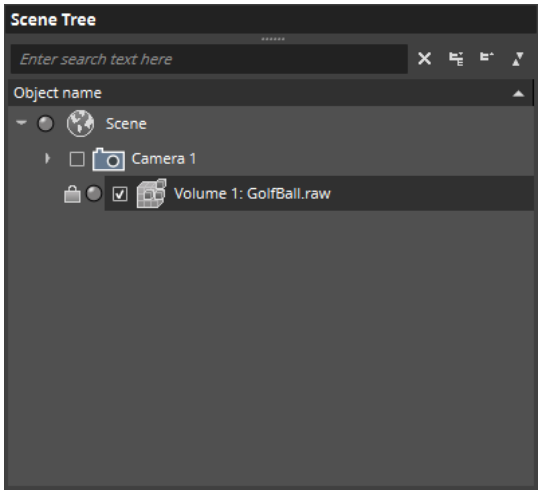

Figure 3-2: Scene Tree with **Volume 1**

1. By default, the checkbox in front of **Volume 1** is checked:
   ➔ The 3D window will show a 3D image of **Volume 1**.
   ➔ The 2D windows will show slices of **Volume 1** from the right, front, and top view.
2. Uncheck the checkbox in front of **Volume 1**.
   ➔ **Volume 1** will no longer be visible in the 2D windows and the 3D window.
3. Check the checkbox in front of **Volume 1** to make it visible again.

Tool dock

The tool dock provides access to various tools in VGSTUDIO MAX. You can open and close a tool by activating and deactivating its entry in the **Tools** drop-down list.

1. Go to the **Window** tab and in the **Tools** drop-down list, deactivate, for example, the **Rendering** tool.

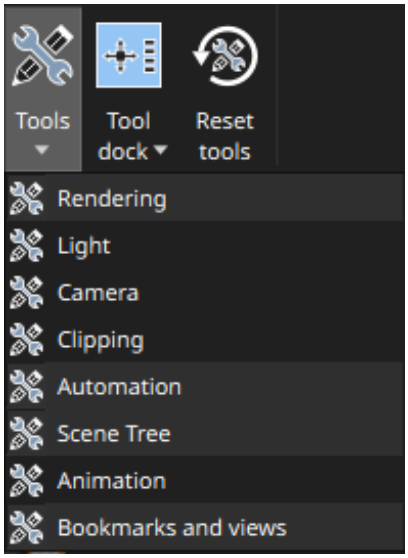

Figure 3-3: **Tools** drop-down list

➔ The **Rendering** tool will disappear from the tool dock.

2. In the **Tools** drop-down list, activate the **Rendering** tool.

➔ The **Rendering** tool will reappear in the tool dock.

3. In order to move the **Rendering** tool to another position on the screen, click and drag the title bar to a position outside the tool dock.

4. In order to enlarge the tool, click and drag any of the borders.

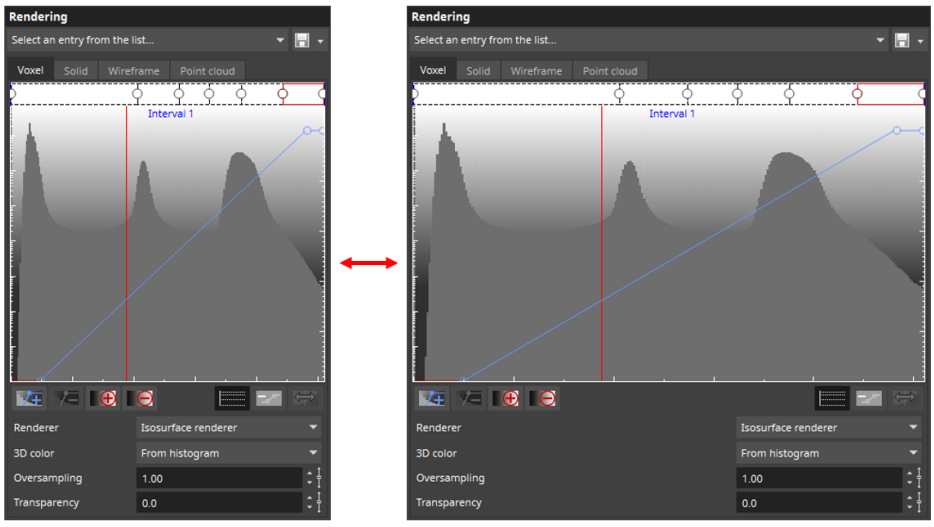

Figure 3-4: Enlarged **Rendering** tool

5. Drag the **Rendering** tool to reposition it back in the tool dock.

3D window

The 3D window shows the rendered 3D image of the object currently selected in the Scene Tree. There are two basic transformation modes for the 3D window: **Rotate** and **Move** mode.

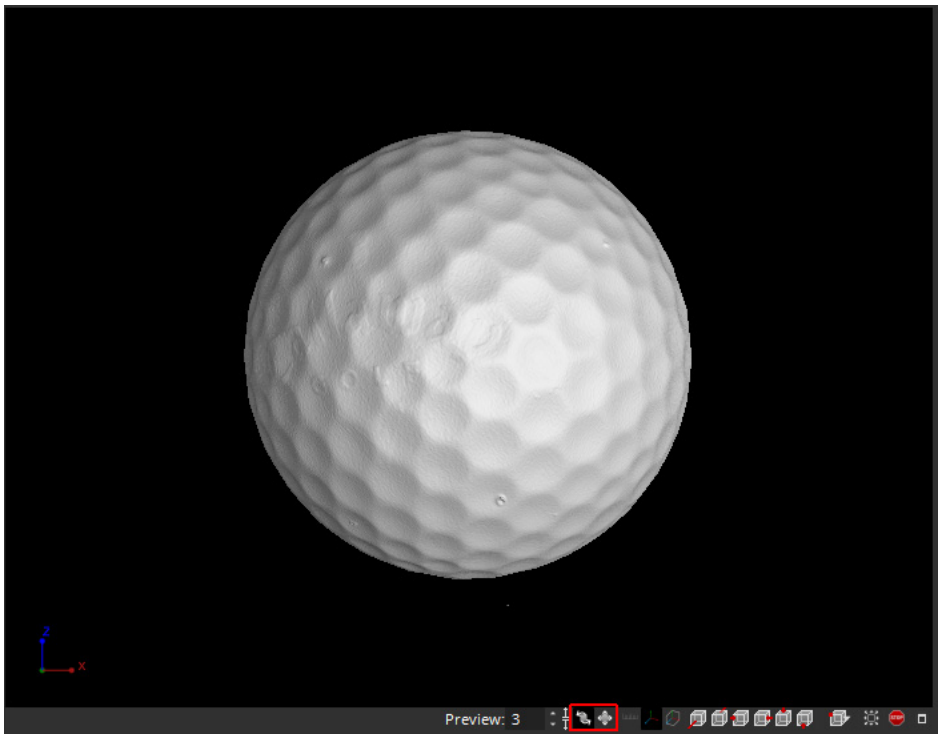

Figure 3-5: 3D window, **Rotate** and **Move** icons

1. To rotate the object, click the **Rotate** icon and click and drag the object in the 3D window.
2. To move the object along the vertical and the horizontal axis, click the **Move** icon and click and drag the object in the 3D window.
3. To move the object along the third axis (orthogonal to the screen, in your viewing direction), click the **Move** icon and use the middle mouse button to click and drag the object.

You can also access the **Move** and **Rotate** functions via the **Edit** tab.

2D windows

By default, the 2D windows show slice views of the currently visible objects as seen from the top (along the z-axis), right (along the x-axis), and front (along the y-axis) of the current coordinate system.

1. Click the **Top 1** window (the xy-plane) and use the mouse wheel to scroll through the object in the z-direction.
   ➔ A blue navigation plane that indicates the current slice position will appear in the other 2D windows and in the 3D window. The navigation plane will disappear after a few seconds of inactivity and reappear each time you change the slice position.

➔ The slice position spin box at the bottom left of the **Top 1** window will indicate the current slice.

You can also use the double-headed arrow at the bottom left of the 2D window or click and drag a navigation plane to scroll faster through the slices.

2. Now do the same for the **Right 1** window (the yz-plane) and for the **Front 1** window (the xz-plane).
   ➔ The navigation plane for the yz-plane will be shown in red, and the navigation plane for the xz-plane will be shown in green.

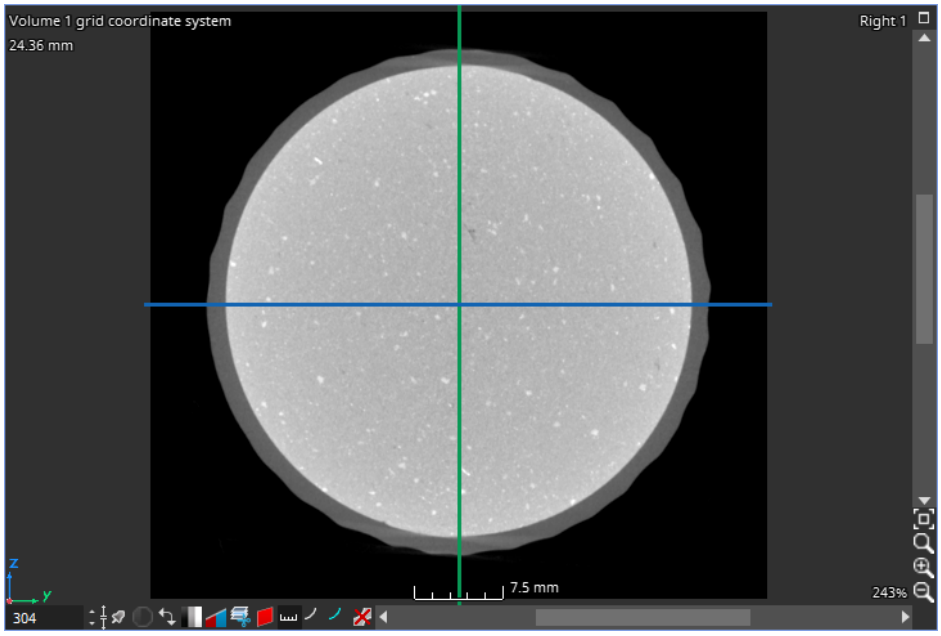

Figure 3-6: 2D window with navigation planes

3. To display the navigation planes permanently, click the **Navigation plane** icon (, , or) at the bottom in any of the 2D windows.
   ➔ The navigation planes will be permanently displayed in all three 2D windows and in the 3D window.
4. Click the **Navigation plane** icon (, , or) again to permanently switch the navigation planes off ; click it a third time to resume the temporary display (, , or).

Zooming in/out

1. In order to zoom the object in or out in a 2D window, hover the mouse pointer over a 2D window, hold down the **Ctrl** key, and scroll the mouse wheel. The zooming will use the mouse pointer as the center, so you will want to place your mouse pointer on an area of interest.
2. To reset the zoom and center the slice view of the object in the 2D window, click the **Focus selected object** icon.

Double-clicking the **Focus selected object** icon will reset the zoom, center the slice view, and take you to the slice in the middle of the data set.

3. In order to zoom the object in or out in the 3D window, hover the mouse pointer over the 3D window and scroll the mouse wheel. Like in the 2D windows, the zooming will use the mouse pointer as the center, so you will want to place your mouse pointer on an area of interest.
4. To reset the zoom and center the object in the 3D window, click the **Center and focus camera** icon.

Hiding and revealing material in 2D

In the 2D windows, you can see that the golf ball consists of two different materials: a uniform outer shell and a speckled inner core. In order to hide or reveal one material, you can adjust the opacity curve in the **Rendering** tool. The opacity curve represents the linear mapping of gray values to opacities and is shown as a diagonal blue line in the histogram. The lower the line, the more transparent the corresponding gray value is rendered.

1. Make sure **Volume 1** is selected in the Scene Tree.
2. In the **Rendering** tool, go to the **Voxel** tab.
   - ➔ The **Voxel** tab shows a histogram of the gray values of the selected volume object.
   - ➔ The opacity curve is shown as blue line that extends from the lower left to the upper right corner.

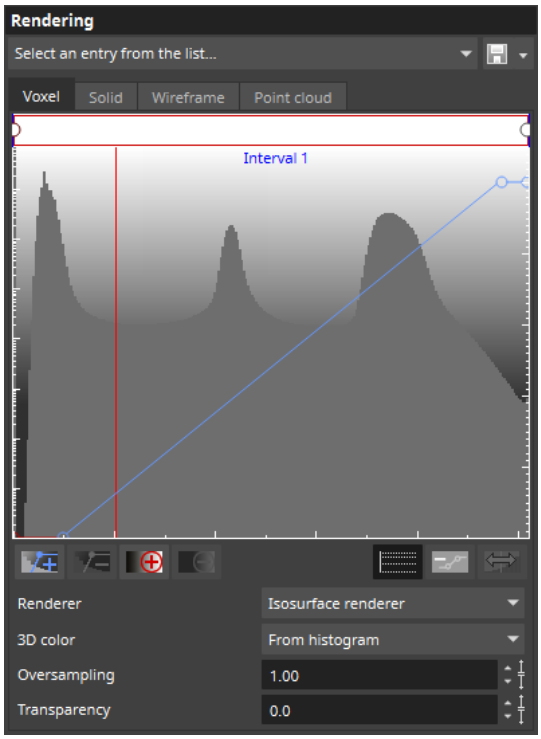

Figure 4-1: **Rendering** tool with opacity curve

3. In order to hide the outer shell and focus on the inner structures of the golf ball, click the second handle from the right and drag it to a position in the middle of the first material peak at the bottom of the histogram area, as shown in the image below.

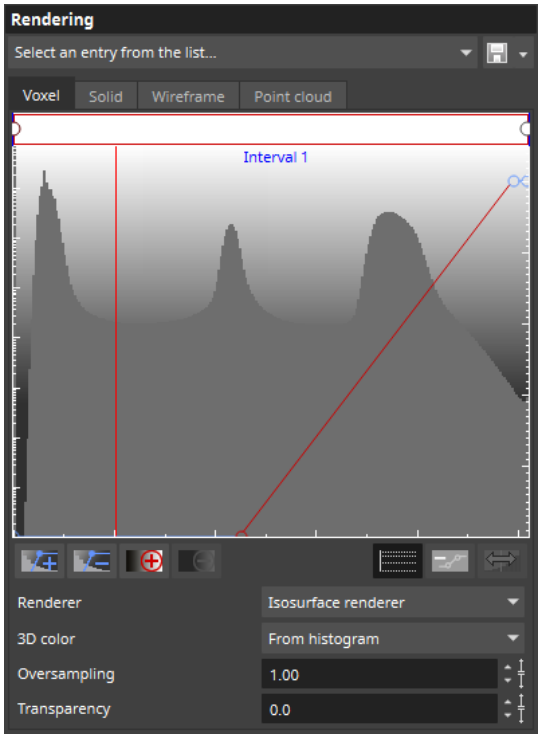

Figure 4-2: **Rendering** tool with adjusted opacity curve

➔ The color of the line segment changes from blue (unselected) to red (selected).

➔ The 2D windows show only the core of the golf ball.

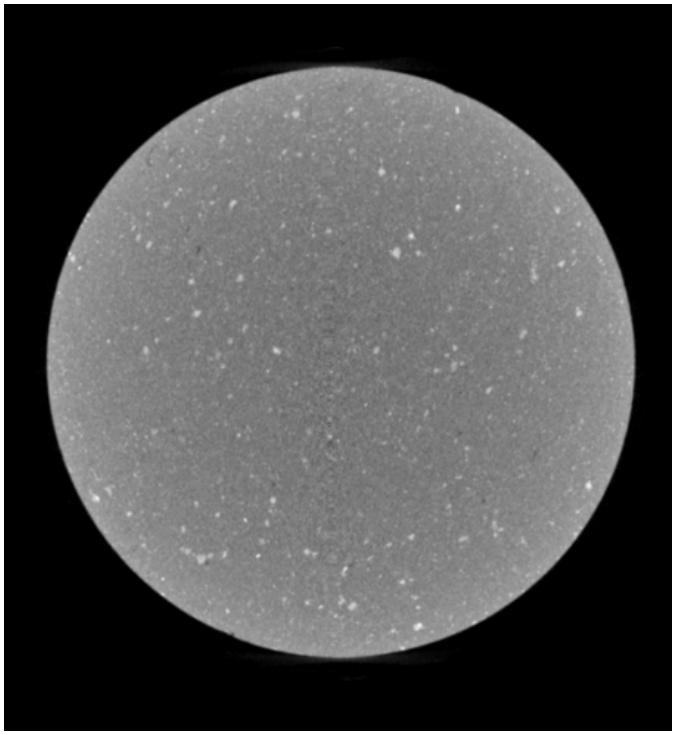

Figure 4-3: 2D view of the inner core of the golf ball

4. In order to restore the original opacity curve, right-click anywhere in the histogram area and select **Reset opacity curve > Default** from the context menu.

Visualizing the surface in 3D

The **Voxel** tab of the **Rendering** tool shows a gray value histogram with an air peak on the left and—in the case of the golf ball—two material peaks on the right. To visualize the different materials of the volume in the 3D window, you can shift the red isosurface line in the histogram to a valley between the peaks. This line defines the gray value of the surface. All materials with gray values to the right of the line (i.e., higher gray values) will be displayed in 3D.

Once a surface determination has been performed, this surface will by default be rendered, and the isosurface line will be fixed. To be able to move it, you will have to disable the rendering of the determined surface. Note that this will not remove the surface determination.

1. Make sure **Volume 1** is selected in the Scene Tree.
2. Check whether **Volume 1** has a surface determination: The icon in front of the volume object indicates whether the surface has been determined (/) or not ( ).
3. If the surface has been determined, go to the **Voxel** tab of the **Rendering** tool and click **Disable surface determination render settings**.

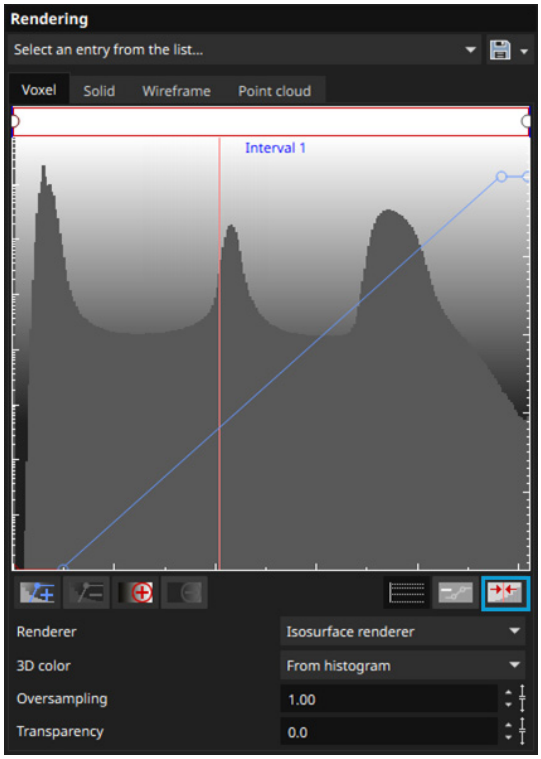

Figure 5-1: Disabling the surface determination render settings

➔ The isosurface line becomes enabled and you can use it to override the rendering of the surface determination.

4. Click and slowly drag the isosurface line to the valley between the two material peaks.

➔ In the 3D window, the surface of the inner material of the golf ball will become visible.

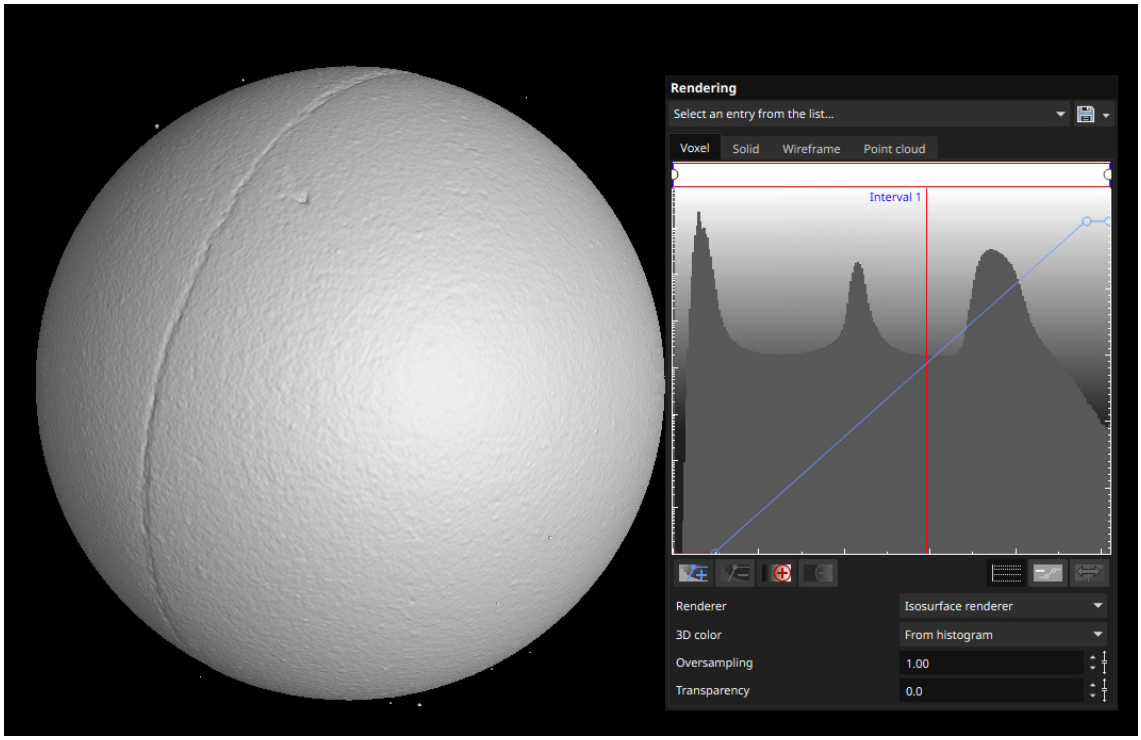

Figure 5-2: 3D view of the inner core of the golf ball

Coloring different materials

In chapter 5 *Visualizing the surface in 3D*, you visualized the surface of the inner core of the golf ball by eliminating the material of the outer shell. In the following chapter, we will assign colors to specific gray value ranges to visually distinguish between the inner and outer materials of the golf ball.

1. In the **Rendering** tool, go to the **Voxel** tab.
2. Right-click the color area at the top of the **Voxel** tab and select **Add color handle** from the context menu or click the **Add color handle** icon at the bottom of the histogram.
   ➔ A color handle will appear in the color area.
3. Repeat this procedure several times as shown in the image below:

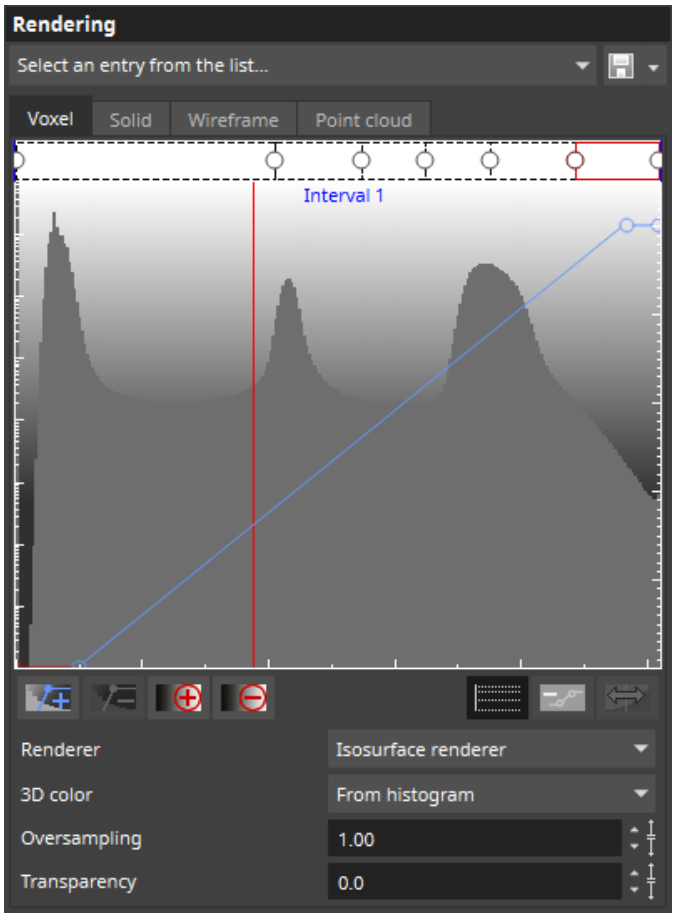

Figure 6-1: Histogram with color handles

4. In the color area, double-click a color segment (i.e., the space between two color handles).
   ➔ The **Select Color** dialog will open.

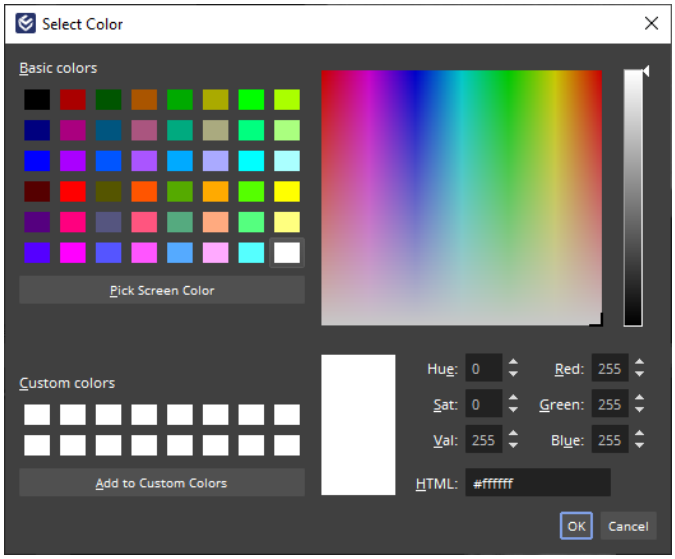

Figure 6-2: **Select Color** dialog

5. Choose a color and click **OK** to apply it to the gray value range defined by the first color segment.
6. Repeat step 4 and step 5 to apply a color to each color segment.
   ➔ Depending on the colors you picked, the histogram will show a color gradient similar to the image below:

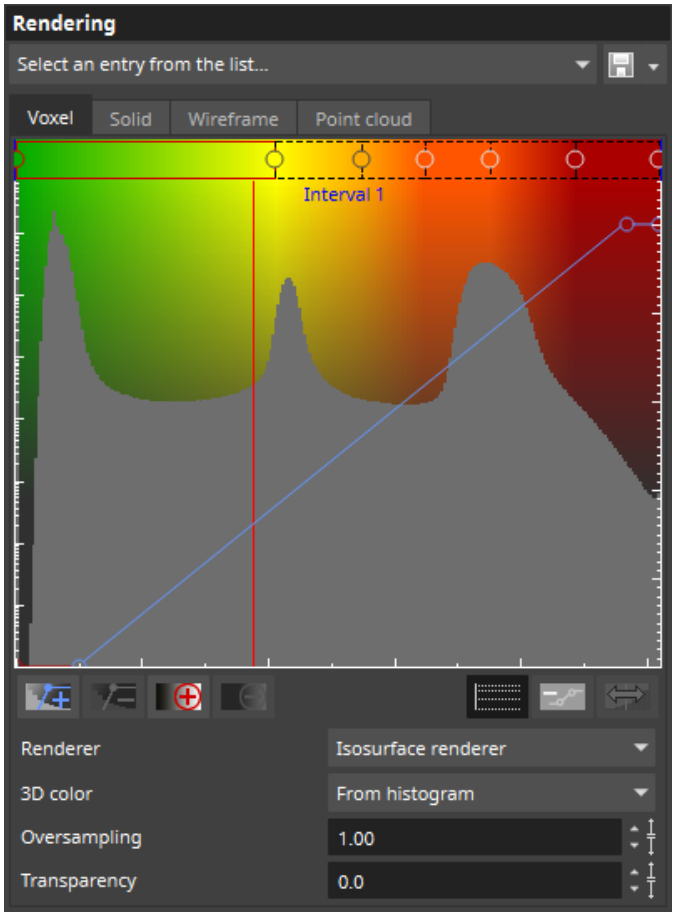

Figure 6-3: Histogram with colored gray value ranges

➔ In the 2D windows, the inner and outer materials of the golf ball are shown in the colors of the corresponding gray value range.

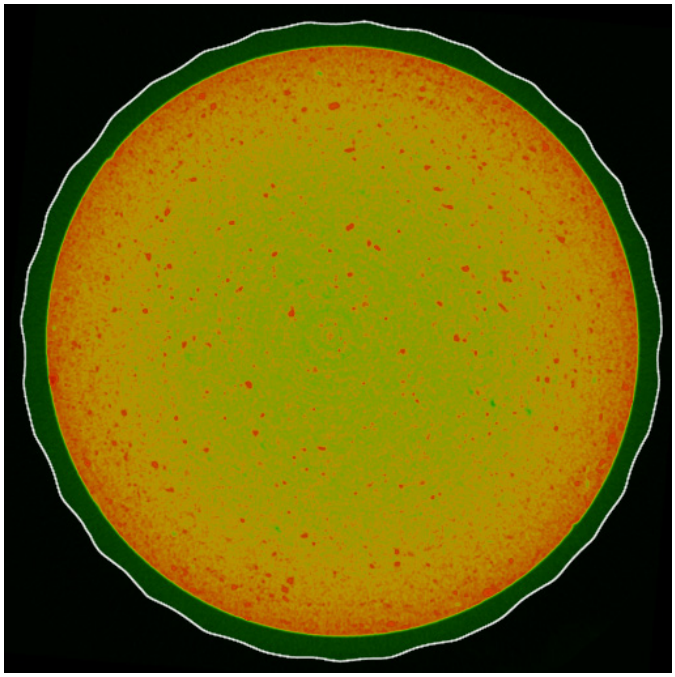

Figure 6-4: Colored gray value ranges in the 2D window

7. If you are not satisfied with the results, you can modify the coloring by clicking a color handle and dragging it to a new position.

You can also use intervals to define gray value ranges. These options are available in the context menu of the histogram area. For more detailed information, see the Reference Manual.

8. In order to toggle between showing the slice images in their original brightness, contrast, and color and showing them in the settings specified in the **Rendering** tool, click the **Original display mode** icon at the bottom of the 2D window.

Coloring different materials using color handles is a quick way to visualize the materials, but it has its limitations. VGSTUDIO MAX offers other possibilities to separate different materials more accurately, such as segmentation, by creating regions of interest or performing a porosity/inclusion analysis. For more detailed information on these methods, see the tutorials available under **Help > Show tutorials** or refer to the Reference Manual under **Help > Show manual**.

You’ve mastered this tutorial... now what?

Congratulations! You have successfully mastered your first steps in VGSTUDIO MAX.

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