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Specular Reflectance Standards

Operating Instructions

Ocean Optics offers three specular reflectance standards for use as references when measuring the reflection of surfaces with high or low specular reflectivity:

- STAN-SSH: Used to measure high-reflectance surfaces of optical substrates and coatings, machined metals and semiconductor materials. Values are calculated for any angle from 0 to 45º.
- STAN-SSH-NIST: This is a calibrated version of the STAN-SSH. Values are calibrated at a 6º angle traceable to NIST and are included with the standard in a calibration file on CD. A periodic recalibration is recommended. Check with Ocean Optics for recalibration services and costs.
- STAN-SSL: This is a low-reflectance specular reflectance standard.

Operation

Reflection is the return of radiation by a surface, without change in wavelength. Reflection is expressed as a percentage relative to the reflection from a standard substance, such as the STAN-SSH.

If you are using the STAN-SSH-NIST, load the CD that came with your reflectance standard and store the calibration files to a location that you will browse to later.
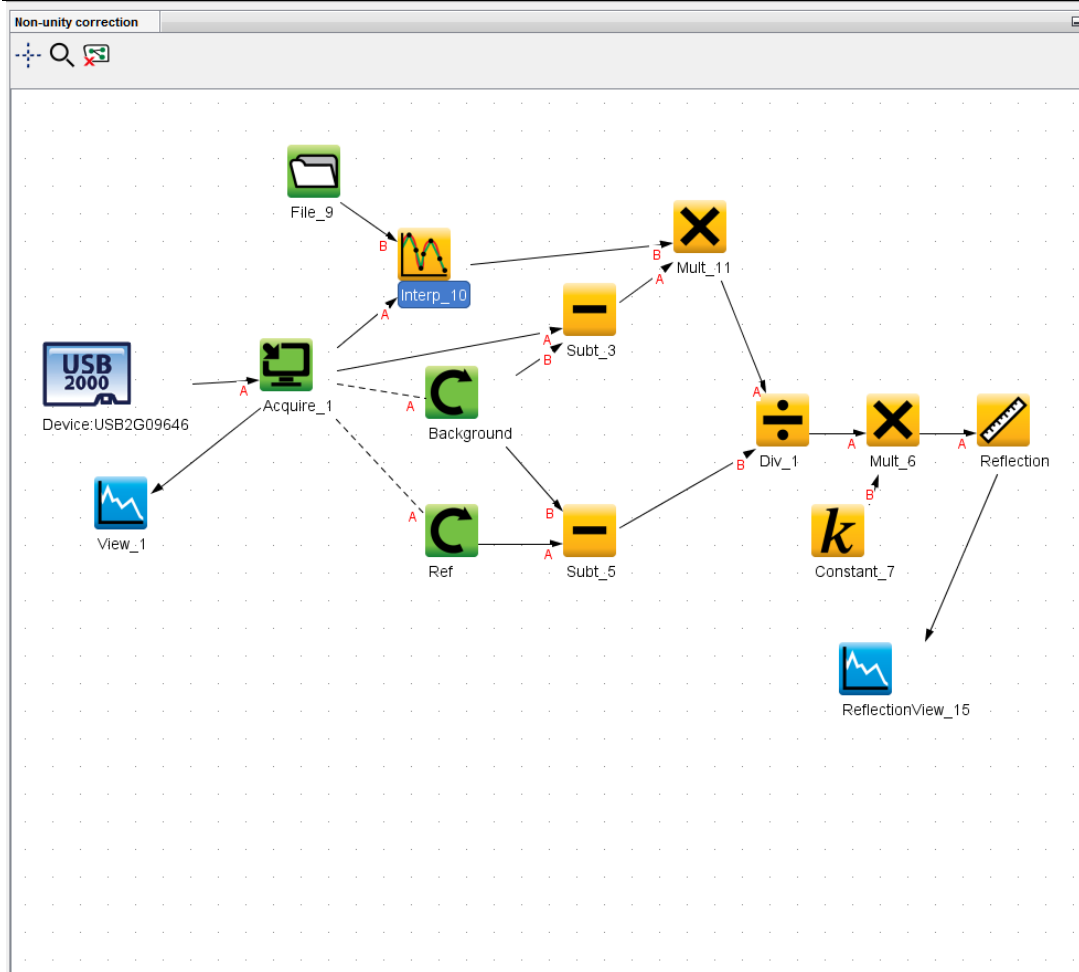
Operating Using OceanView Software

► *Procedure*

1. Use the Reflection Measurement wizard to take a reference spectrum (with the reference standard) and a dark spectrum. You must take a reference and a dark spectrum before measuring reflection.
2. Put the sample in place and ensure that the light path is clear. Then, take a reflection measurement.

3. If you received calibration file with your reference standard, right-click an empty space on the Schematic and go to Sources | File to place a File node on the Schematic (File_9 in the Schematic example below).

4. Double-click the File node to open it. Click File Load in the dialog box that opens and navigate to the reflection standard reference file to load it.

5. Right-click an empty space on the Schematic and go to Advanced Math | Array Math | Interpolation to add an Interpolation node to the Schematic (Interp_10 on the Schematic example below).

6. Connect the Acquire node to the Interpolation node. Note the Acquire node must be connected to the Interpolation node first to configure the Interpolation node to interpolate the wavelengths from the standard file to the wavelengths for the spectrometer.

7. Connect the File node to the Interpolation node.

8. Right-click an empty space on the Schematic and go to Basic Math | Multiply to add a Multiply node to the Schematic (Mult_11 on the Schematic example below).

9. Connect the Sample – Background node (Subt_3 in the Schematic example below) to the Multiply node (Mult_11 in the Schematic example below).

10. Connect the Interpolation node (Interp_10 in the Schematic example below) to the Multiply node (Mult_11 in the Schematic example below)

11. Right click the connection between the Sample – Background node (Subt_3 in the Schematic Example below) and the Divide node (Div_1 node in the Schematic Example below) and delete it.

12. Right click the connection between the Reference – Background node (Subt_5 in the Schematic Example below) the Divide node (Div_1 node in the Schematic Example below) and delete it.

13. Connect the Multiply node (Mult_11 in the Schematic example below) to the Divide node (Div_1 node in the Schematic example below). Note the Multiple node must be connected to the Divide node first so it is the numerator.

14. Connect the Reference – Background node (Subt_5 in the Schematic Example below) to the Divide node (Div_1 node in the Schematic example below).

Non-unity correction has now been applied to your Reflection measurement. You can save this project and reload it for future use. Reference and Background spectra are easily updated using the yellow and gray light bulb buttons in the Graph View.

Operating Using SpectraSuite Software

► *Procedure*

1. Place SpectraSuite in Scope mode by clicking the Scope ( ) icon in the Experiment mode toolbar or selecting **Processing | Processing Mode | Scope** from the menu.

2. Ensure that the entire signal is on scale. The intensity of the reference signal's peak differs depending on the device being used. If necessary, adjust the integration time until the intensity is appropriate for your device. Ensure that the entire signal is on scale.

3. Select **File | New | Reflection Measurement**. Use the Reflection Measurement wizard to take a reference spectrum (with the reference standard) and a dark spectrum. You must take a reference and a dark spectrum before measuring reflection.

4. Put the sample in place and ensure that the light path is clear. Then, take a reflection measurement.

5. If you received calibration file with your reference standard, click the Non-unity Correction icon ( ) on the toolbar. The **Select Reference File** screen appears.

6. Browse to the location where you stored your reflectivity standard files. Then click the **Apply** button.

   The reference information appears on the **Select Reference File** screen.

Operating Using OOIBase32 Software

► *Procedure*

1. Make sure you are in Scope mode, by either clicking the Scope Mode icon on the toolbar, or selecting **View | Scope Mode**. Take a reference spectrum by first making sure nothing is blocking the light path going to your reference. Place the reflection probe over the reflection standard. Keep the reflection probe at an angle between 0 and 45°.

2. Click the **Store Reference** spectrum icon on the toolbar or select **Spectrum | Store Reference** from the menu bar to store the reference. This command merely stores a reference spectrum in memory. You must select **File | Save | Reference** from the menu bar to permanently save the spectrum to disk.

3. Block the light path to the spectrometer. Then, take a dark spectrum by clicking the **Store Dark Spectrum** icon on the toolbar or by selecting **Spectrum | Store Dark** from the menu bar. This command merely stores a dark spectrum in memory. You must select **File | Save | Dark** from the menu to permanently save the spectrum to disk.

   You must take a dark spectrum before measuring transmission.

4. Put the sample is in place and ensure that the light path is clear. Then, take a reflection measurement by clicking on the **Transmission Mode** icon on the toolbar or selecting **Spectrum | Transmission Mode** from the menu bar (since the mathematical calculations used to calculate transmission and reflection are identical). To save the spectrum to disk, click the **Save** icon on the toolbar or select **File | Save | Processed** from the menu bar.

Specifications

Reflectance	Front surface-protected	Front surface-protected	Schott ND9 glass