



Measuring Hot Liquids Using HunterLab Instruments

When color measurements of hot liquids are required, it is generally because the samples of interest are solid powders or crystals at room temperature, but the colors of the samples in solid form are not different enough for color measurement to differentiate between them. When the samples are heated to melt them into liquid form, though, the color (and quality) differences are more apparent. Hot liquids may be measured in transmission or reflectance modes using HunterLab instruments.

I. General Measurement Method - Clear Liquids in Transmission

This procedure would be performed using a ColorQuest XE, ColorQuest XT, UltraScan XE, UltraScan PRO, or UltraScan VIS.

1. Install the holder for your container (see choices listed below) into the instrument transmission compartment.
2. Standardize the instrument in the appropriate transmittance mode using distilled water in your measurement container to set the top of scale.
3. Measure a fixed quantity of solid sample into your container.
4. Place the container in a water bath, heating mantle, or forced air oven and heat until a target temperature is reached where the sample is fully liquid.

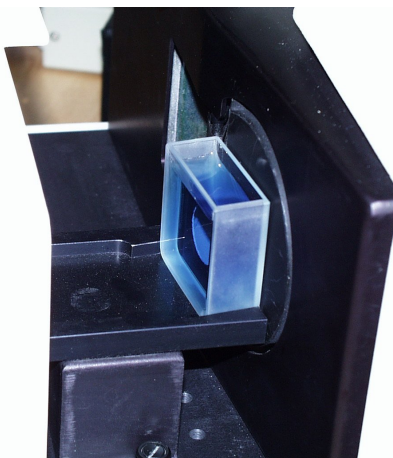
Note: The container that will be used when measuring the sample must be heated along with the liquid (rather than pouring the sample into the container after it is heated) in order to prevent breakage of the container due to the sudden temperature change, and so that condensation on a cool container will not affect the color reading.

5. Using tongs, remove the liquid sample container from the heating device, wipe any moisture from the outside of the container (if required), and transfer it to the sample holder in the instrument transmission compartment.
6. Close the transmission compartment as far as possible.
7. Read the sample.

Standard Transmission Cells as Containers

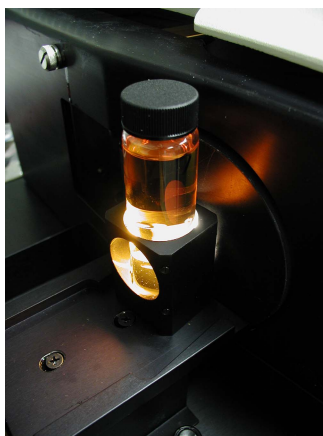
Samples may be heated in HunterLab's standard 10-mm (13-8573-40), 20-mm (04-4592-00), 33-mm (B04-1003-801), and 50-mm (13-8573-20) glass transmission cells and then measured using the transmission cell holder (C02-1005-481). Glass transmission cells with Teflon[®]-lined screw caps (D12-

1011-893 for 10-mm, D12-1011-890 for 20-mm, D12-1011-891 for 33-mm, D12-1011-892 for 50-mm) are also available and may be used the same way. These transmission cells can withstand gradual increases in temperature up to 450°F (232°C), as their joints are flame fused.



Round Vials as Containers

The D02-1011-550 cylindrical cell holder allows TTRAN measurement of hot liquids (up to about 250°C) in a disposable 27-30 mm OD round cell. If a touch screen is included with the system, the CMR 2958 applet allows direct measurement of the APHA and Gardner indices using calculations that are optimized for the round vial rather than a flat transmission cell.



60-mL disposable round cells may be purchased from the following source using the part number GLC-07880:

Qorpak

Bridgeville, Pennsylvania U.S.A.
www.qorpak.com.

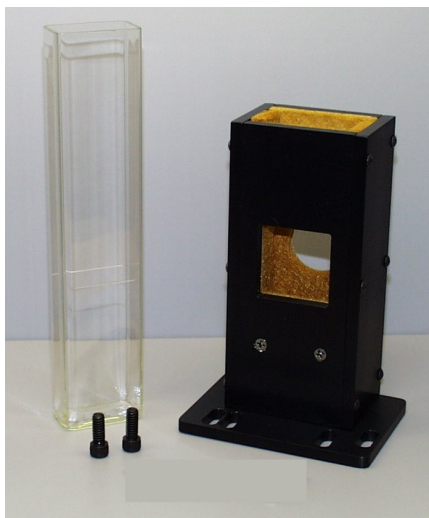
A heating mantle (Design #102B0712200002) and power control unit (Design #104APL120 for 120V, 104APL124 for 240V) with opening suitable for this type of cell may be purchased from:

Glas-Col, Inc.

Terre Haute, IN U.S.A.
www.glascol.com.

Tall Transmission Cells as Containers

CMR 2608 provides an insulated transmission cell holder for measurements of hot liquids (up to 250°C) in the B04-1002-672 tall 20-mm transmission cell. This holder can be used for TTRAN or RTRAN measurements.



II. General Measurement Method A - Translucent or Opaque Liquids in Reflectance

This procedure would be performed using a ColorFlex 45/0, D25A, or LabScan XE.

1. Install the sample cup port plate (04-6622-00 for ColorFlex and D25A, A02-1010-316 for LabScan XE) over the instrument's sample port.
2. Standardize the instrument.
3. Measure a fixed quantity of solid sample into the HunterLab glass sample cup (04-7209-00).
4. Place the sample cup in a water bath, heating mantle, or forced air oven and heat until a target temperature is reached where the sample is fully liquid.

Note: The sample cup must be heated along with the liquid (rather than pouring the sample into the cup after it is heated) in order to prevent breakage of the cup due to the sudden temperature change, and so that condensation on a cool cup will not affect the color reading. The glass sample cup can withstand gradual increases in temperature up to 450°F (232°C).

5. Using tongs, remove the sample cup from the heating device and transfer it to the sample cup holder port plate over the sample port.
6. Cover the sample cup with the opaque cover (04-4000-00).
7. Read the sample.

General Measurement Method B - Translucent or Opaque Liquids in Reflectance

This procedure would be performed using a ColorQuest XE, UltraScan XE, UltraScan PRO, or UltraScan VIS.

1. Install the reflectance sample shelf with light cover (B02-1005-172) over the instrument's reflectance port.

2. Standardize the instrument in a reflectance mode.
3. Measure a fixed quantity of solid sample into a HunterLab glass transmission cell. These cells are described earlier in this note under “Standard Transmission Cells as Containers.”
4. Place the transmission cell in a water bath, heating mantle, or forced air oven and heat until a target temperature is reached where the sample is fully liquid.

Note: The transmission cell must be heated along with the liquid (rather than pouring the sample into the cell after it is heated) in order to prevent breakage of the cell due to the sudden temperature change, and so that condensation on a cool container will not affect the color reading.

5. Using tongs, remove the transmission cell from the heating device and transfer it to the reflectance sample shelf with one of the clear sides facing the reflectance port.
6. Cover the transmission cell with the light cover.
7. Read the sample.

For Additional Information Contact:

Technical Services Department
Hunter Associates Laboratory, Inc.
11491 Sunset Hills Road
Reston, Virginia 20190
Telephone: 703-471-6870
FAX: 703-471-4237
www.hunterlab.com