

Addendum to EasyMatch QC User's Manual for ICUMSA 420 nm and 560 nm

For use with ColorQuest XE, UltraScan VIS and UltraScan PRO Sensors

Description

CMR-3145 modifies EasyMatch QC to include ICUMSA 420 and 560 Color indices for the color measurement of white and brown sugar solutions.

Calculation of ICUMSA 420 Color is per ICUMSA Method GSI-7 (1994) and also found in ICUMSA Method GS 2/3 -10(1998) and GS 2/3 -9 (2000). ICUMSA 560 is similar to the ICUMSA 420 methods.

The white sugar ICUMSA formula is:

$$\text{ICUMSA 420 Color} = \frac{\text{ABS}_{420} \text{ of 50 Brix sugar solution} \times 1000}{g \times b \times \frac{c}{100}}$$

where:

ABS_{420} is the absorbance at 420 nm of the white sugar solution
 b is the optical pathlength of the transmission cell
 c is the sample concentration [% from 1 – 100]
 g is the specific gravity of the sample solution [0.5 – 2]

The brown sugar ICUMSA formula is:

$$\text{ICUMSA 560 Color} = \frac{\text{ABS}_{560} \text{ of 50 Brix sugar solution} \times 1000}{g \times b \times \frac{c}{100}}$$

where:

ABS_{560} is the absorbance at 560 nm of the 50 Brix brown sugar solution
 b is the optical pathlength of the transmission cell
 c is the sample concentration [% from 1 – 100]
 g is the specific gravity of the sample solution [0.5 – 2]

Display of ICUMSA 420 and 560 Color values will be limited to CQXT, CQXE, USPRO, USVIS spectrophotometers measuring in transmission only (TTRAN - preferred or RTRAN).

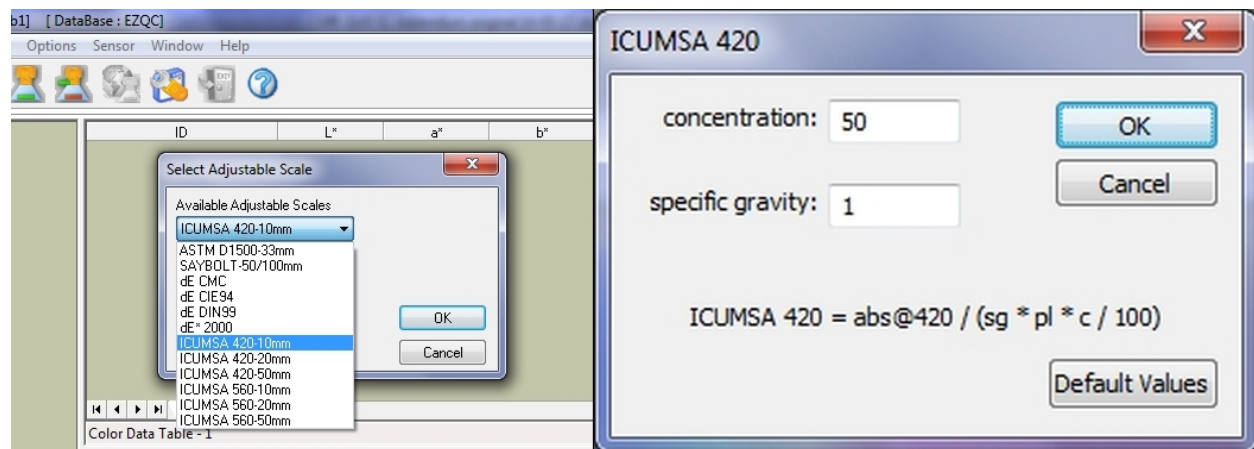
In keeping with past practices, there will be 6 indices available for user selection in the Color Data view - **ICUMSA 420-10mm, ICUMSA 420-20mm, ICUMSA 420-50mm, ICUMSA 560-10mm, ICUMSA 560-20mm and ICUMSA 560-50mm** corresponding to the cell path length used.

The **ICUMSA XXX-XXmm Color** will display in the Color Data View, Trend Plot Data View as well as Data Export and any other features that are normal for a color index.

ICUMSA 420 values will be displayed to single digits for ICUMSA 420 Color values below 100 and to the nearest 10 units above 100.

ICUMSA 560 Color values are always above 100 and typically can be in the thousands. ICUMSA 560 Color values will be displayed to the nearest 10 units.

Under **Options/Adjust Scale Factors**, there would be a choice for "**ICUMSA 420-XXmm**" allowing the user to change the calculation parameters for the white sugar solution and "**ICUMSA 560 XX-mm**" allowing the user to change the parameters for brown sugar solution.



- b is the optical path length of the transmission cell taken from the user-selection of the index.
- c is the concentration of the sample solution [% from 1 – 100] with 50% as default.
- g is the specific gravity of the sample solution [0.5 – 2.0] with 1.0 as default.

The following accessories (purchased separately) are needed for use with this CMR:

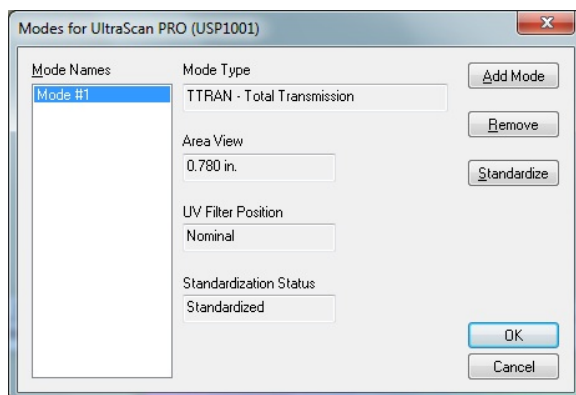
- A 10, 20 or 50-mm **transmission cell**

Part #	Description	Dimensions	Volume
13-8573-40	10-mm Transmission Cell	10-mm path length x 55-mm wide x 57-mm high	20 ml
04-4592-00	20-mm Transmission Cell	20-mm path length x 55-mm wide x 57-mm high	40 ml
B04-1003-801	33-mm Transmission Cell	33-mm path length x 55-mm wide x 57-mm high	70 ml
13-8573-20	50-mm Transmission Cell	50-mm path length x 55-mm wide x 57-mm high	100 ml

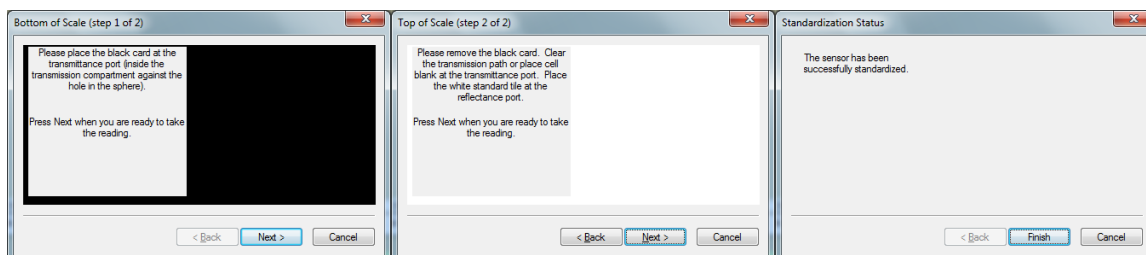
- A **C02-1005-481 Transmission Cell Holder** or D02-1011-568 Transmission Spill Tray and Cell Holder (purchased separately) are needed for use with this CMR.

Installation

1. Install EasyMatch QC software with CMR-3145 as described in your EasyMatch QC Installation Guide.
2. Insert your hardware key into a USB port on the PC. This key allows operation of the software and activates the CMR-3145 features.
3. Install the Transmission Cell Holder in the transmission compartment of the instrument.
4. Fill a transmission cell of a fixed path length (10 mm preferred, 20 mm or 50 mm) with distilled water, and place it on the transmission cell holder.
5. Start the software and load a diffuse sphere sensor such as ColorQuest XE, UltraScan VIS or UltraScan PRO (will be prompted if no sensor is loaded).
6. After the diffuse sphere sensor is installed, you will be prompted to standardize. Create a mode for TTRAN LAV 25 mm UV Filter Nominal mode.



7. Using this mode, standardize the instrument using first the light blocker at the TTRAN port to set 0% transmission, then the cell filled with DI water and the calibrated white tile at the reflectance port, to set 100% transmission. A successful standardization message will be displayed as the 3rd step.



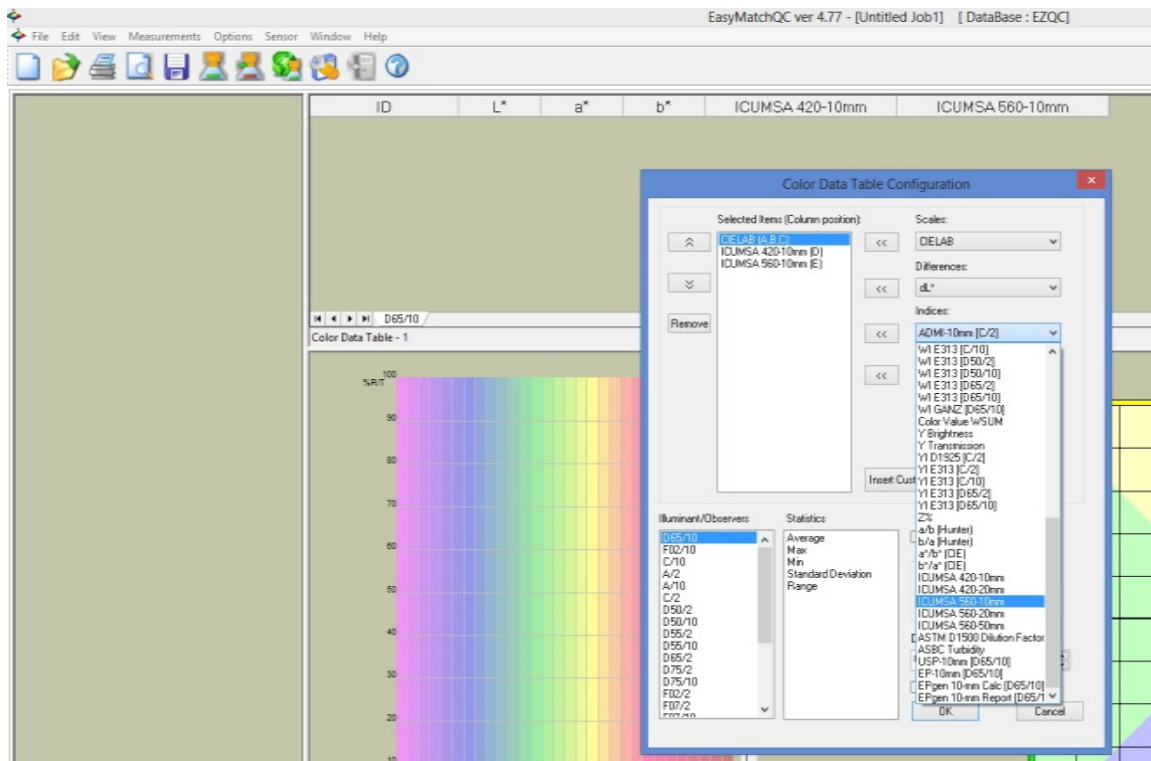
- Go to Help/About and verify that CMR-3145 is displayed indicating that the software modification is installed correctly and ready to configure.



Software Configuration

To set up CMR-3145 for display, take the following steps:

- To display the ICUMSA metrics, place your mouse over an empty area in the Color Data View, Right Click/Configure and select Indices.
- Find “ICUMSA 420-10mm” for white sugar and “ICUMSA 560-10mm” for brown sugar in the list and select either or both metrics for display in the Color Data View.

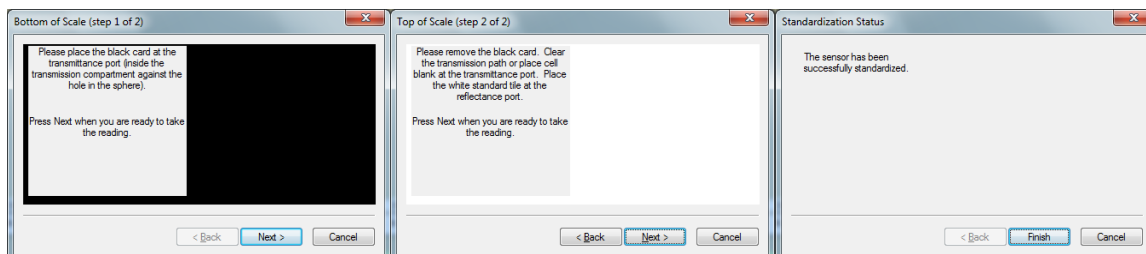


3. Your screen should look similar to the one above.
4. For a simpler display, uncheck “Tolerances” if you do not wish to set and display them. Adjust the font size (12 pt is typical). Set your mouse over the Color Plot/Right Click/Delete to remove this plot if not using.
5. Select File/Save Job Template As to save this display view as the default “01 Basic Color Template” for all subsequent new Jobs.

Daily Operation

Operate CMR-3145 as follows:

1. Fill transmission cell with distilled water and place on the transmission holder against the TTRAN port in the transmission compartment.
2. Standardize the instrument in TTRAN LAV 25 mm UV Filter Nominal mode using the light blocker to set 0% transmission and distilled water or in a transmission cell (10 mm preferred) to blank for top-of-scale at 100%.



3. As a PQ (Performance Qualification) step, it is recommended that the User read back the cell and DI water as a Standard or Sample prior to beginning a series of product measurements. It should always read a ICUMSA 420nm value of 0 and ICUMSA 560nm value of 0 within tight tolerances.
4. After performance qualification, proceed to measure the ICUMSA Color of diluted white and brown sugar samples in the transmission cell.