



Purpose: To measure the UV concentration of lane dressings.

Materials:

- Milton-Roy 20D Spectrophotometer
- Digital laboratory balance
- Reagent grade Xylene
- Brinkman 10mL bottle-top dispenser
- 1.0mL gastight syringe
- Disposable polyethylene transfer pipettes
- Disposable sample containers capable of containing > 50mL sample
- Test tubes capable of containing 10mL and rubber stoppers
- Spectrophotometer test tubes
- Kimwipes
- 0ppm, light mineral oil (used as Blank)
- 367ppm USBC Uvitex OB standard (used as LCS, "Laboratory Control Spike")
- Laboratory notebook to record results
- NeoPro powder-free Chloroprene gloves

Procedure:

1. Setup

- a. Power up spectrophotometer and digital balance; allow the instrument to warm up for at least thirty minutes before use.
- b. "Laboratory clean" (SOP-LAB-0) and dry all glassware and sample containers.
- c. Rinse all glassware and sample containers with Xylene.
- d. Record all known sample information in laboratory notebook, initialed and dated.
- e. Label all sample containers and test tubes appropriately: Blank, LCS, Sample XX, Sample duplicate.

2. Sample preparation

- a. Place disposable sample container on digital balance, remove the lid and tare to zero.
- b. Transfer 5g of sample to the container with a disposable transfer pipette and record the weight.
- c. Add five separate aliquots of Xylene, at 10mL/aliquot totaling 50mL using the bottle-top dispenser, to the sample container and replace the container lid.
- d. Gently shake container to allow for thorough mixing.
- e. Using gastight syringe, transfer exactly 1.0mL of the sample to the correctly labeled test tube.
- f. Add one 10mL aliquot of Xylene to the test tube.
- g. Stopper and invert the test tube numerous times to ensure proper mixing.
- h. Repeat steps 1-7 for Blank, LCS, and any other samples to be tested. Be sure to include a sample duplicate.

3. Data collection

- a. Using the wavelength selector knob, set spectrophotometer wavelength to 375 nm.
- b. Using the mode selector located on the panel, select "Transmittance." Verify that the sample compartment is empty, close the lid and adjust the control knob so that the display reads zero.



- c. Laboratory rinse each spectrophotometer test tube with Xylene and discard into waste jar.
- d. Transfer a small amount of the Blank to a spectrophotometer test tube, swirl to mix and then discard.
- e. Fill the sample tube approximately 2/3 full with the Blank and wipe surface clean with a Kimwipe.
- f. Place sample tube into the sample compartment on the Spectronic 20D and close the compartment lid.
- g. Using the mode selector located on the panel, select “Absorbance” and adjust the absorbance reading to zero on the display.
- h. Using the mode select located on the panel, select “Factor” and adjust the factor reading to one on the display.
- i. Transfer a small amount of the LCS to a spectrophotometer test tube, swirl to mix and then discard.
- j. Fill the sample tube approximately 2/3 full with the LCS and wipe surface clean with a Kimwipe.
- k. Using the mode selector located on the panel, select “Concentration.”
- l. Place sample tube into the sample compartment on the Spectronic 20D, close the compartment lid and adjust the concentration to 0.367 on the display. (Spectronic 20D reads in ppt, or parts per 1000 of optic brightener)
- m. Transfer a small amount of the batch sample to be analyzed to a spectrophotometer test tube, swirl to mix and then discard.
- n. Fill the sample tube approximately 2/3 full with the sample and wipe the surface clean with a Kimwipe.
- o. Place sample tube into the sample compartment on the Spectronic 20D, close the compartment lid and record the reading on the display.
- p. Repeat steps “m-n” twice more and calculate an average value for all three readings.
- q. Repeat steps “m-o” for any additional batch samples as well as a sample duplicate.
- r. If the sample duplicate is not within +/- 0.005ppm repeat the entire procedure.

4. Final Concentration

- a. Calculate the final concentration as follows:

$$C_{ppm} = \frac{C_{ppt}}{1} \times \left[\frac{5g}{x} \right] \times \frac{1000_{ppm}}{1_{ppt}}$$

C_{ppm} = Concentration of Uvitex OB in parts per million

C_{ppt} = Concentration obtained from Spectronic 20D in parts per thousand

x = sample weight