

How to Use the Strainoptics® CALGAGE-S to Verify Polarimeter Measurements

The Strainoptics CALGAGE-S is a variable-field retarder manufactured from a birefringent material that exhibits a linear range of retardation. It is used for photoelastic color observation, verifying instrument measurement accuracy, training operators, and calibrating polarimeters per ASTM C1426, Procedure B.

To Verify Polarimeter Measurements:

1. Make sure that the instrument is configured for PLANE polarization and set up properly for measurement using the Senarmont Analyzer Rotation Method as follows (Figure 1):

For SA-100 Analyzers: Make sure polarimeter top plate is in the “PLANE” position. If necessary, loosen the Analyzer Scale Lock (L) and use the Rotation Tab (T) to rotate the Analyzer Scale (S) to ensure that the Reference Mark (R) is adjacent to the “+45” degree mark on the Degree Scale (D). Tighten the Analyzer Scale Lock. Move the P-C Handle (PC) under the Rotation Tab. Using an Analyzer Knob (K), rotate the Analyzer (A) so that the Index Marks (I) are aligned with the numbers “1” and “0” on the Analyzer Scale.

For A-100 Analyzers: Using an Analyzer Knob (K), rotate the Analyzer (A) so that the Index Marks (I) are aligned with the number “1” and “0” on the Analyzer Scale (S).

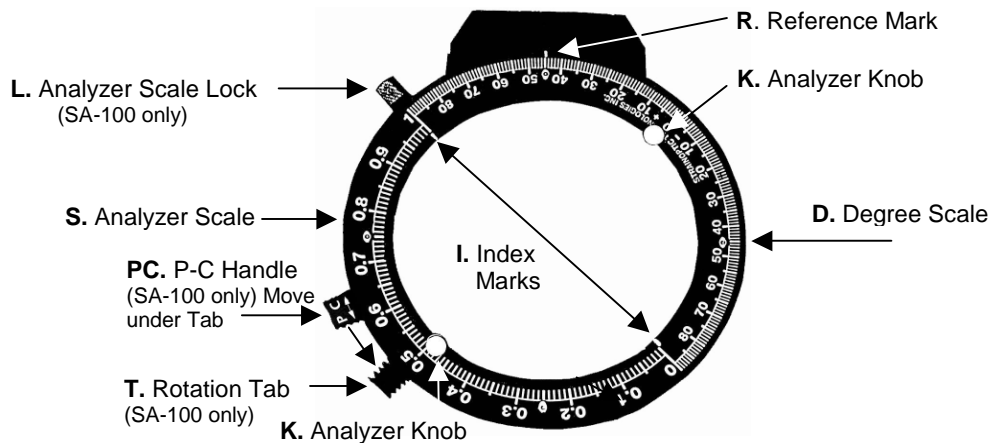


Figure 1. Analyzer Setup for Retardation Measurement Using Senarmont Analyzer Rotation Method

2. Place the CALGAGE-S in the field of view with its long axis parallel to the reference mark on the analyzer (Figure 2a). Using an Analyzer Knob, rotate analyzer clockwise and observe the black fringe at the “0” mark on the gage scale move upscale and change color to a brown-blue (Figure 2b). When the mid-line of the brown-blue fringe is over a calibrated scale mark (Figure 2c and 2d), take a reading from the Analyzer dial, ex. .175. Multiply this value by 570 nm to arrive at the measured retardation (99.75 nm). If the result is within ± 5 nm of the CALGAGE, it can be considered a correct measurement.



Figure 2a. Black fringe at 0

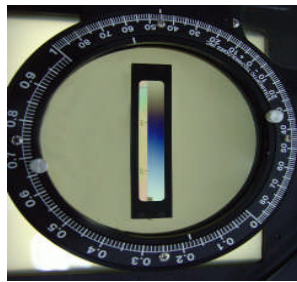


Figure 2b. Rotate Analyzer CW

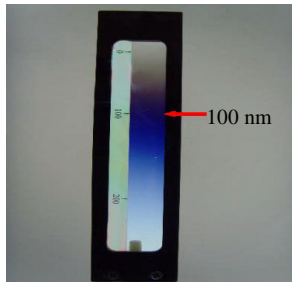


Figure 2c. Reading at 100 nm

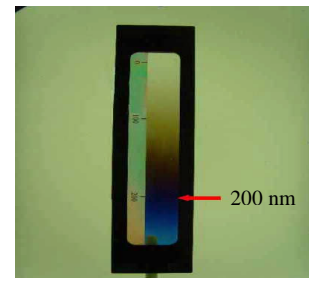


Figure 2d. Reading at 200 nm