



Designation: **C1426—09 C1426 – 14**

Standard Practices for Verification and Calibration of Polarimeters¹

This standard is issued under the fixed designation C1426; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 Polarimeters and polariscopes used for measuring stress in glass are described in Test Methods **F218**, **C148**, and **C978**. These instruments include a light source and several optical elements (polarizers, optical retarders, filters, and so forth) that require occasional cleaning, realigning, and calibration. The objective of these practices is to describe the calibration and verification procedures required to maintain these instruments in calibration and ensure that the optical setup is within specification for satisfactory measurements.

1.2 It is mandatory throughout these practices that both verification and calibration are carried out by qualified personnel who fully understand the concepts used in measurements of stress retardation and are experienced in the practices of measuring procedures described in Test Methods **F218**, **C148**, and **C978**.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 *ASTM Standards:*²

C148 Test Methods for Polariscopic Examination of Glass Containers

C162 Terminology of Glass and Glass Products

C770 Test Method for Measurement of Glass Stress—Optical Coefficient

C978 Test Method for Photoelastic Determination of Residual Stress in a Transparent Glass Matrix Using a Polarizing Microscope and Optical Retardation Compensation Procedures

F218 Test Method for Measuring Optical Retardation and Analyzing Stress in Glass

3. Terminology

3.1 For definitions of terms used in these practices, see Terminology **C162**.

4. Principles of Verification and Calibration Procedures

4.1 Verification and calibration of polarimeters are accomplished using the following procedures:

4.1.1 *Procedure A: (Verification)*—Measure individual components and their orientation to ensure that the requirements of Test Methods **F218**, **C148**, and **C978** are satisfied.

4.1.2 *Procedure B: (Calibration)*—Determine the accuracy of the polarimeter using a calibrated gage or retarder.

5. Auxiliary Component Requirements

5.1 The following are required to verify and calibrate a polarimeter:

5.1.1 *Verification of Components (Procedure A):*

5.1.1.1 *Verification of Polarization Efficiency*, a light-intensity meter, linear over the range of measured values.

5.1.1.2 *Verification of Quarter-Wave Plate*, a Babinet compensator equipped polarimeter, with a monochromatic light source of traceable wavelength.

5.1.1.3 *Reference Polarizer with Known Axis*.

5.1.2 *Calibration of Polarimeter (Procedure B):*

¹ These practices are under the jurisdiction of ASTM Committee **C14** on Glass and Glass Products and are the direct responsibility of Subcommittee **C14.04** on Physical and Mechanical Properties.

Current edition approved Nov. 1, 2009; May 1, 2014. Published January 2010; May 2014. Originally approved in 1999. Last previous addition approved in 2004 as **C1426-99(2004)**; 2009 as **C1426-09**. DOI: 10.1520/C1426-14.

DOI: 10.1520/C1426-09.

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.