

A SHORT COURSE ON THE ANSI OP 3.001-2001

Allen Krisiloff, Triptar Lens Co., Inc.

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Background and Assumptions about the Course

I. Teaching Objectives

- A. Historical context of the Standard
- B. Science behind the Standard
- C. Terminology used in the Standard
- D. Testing instruments referenced in the Standard

II. Structure of the Course

- A. Lecture with Projected Slides
- B. Two 1 hour and 20 minute sessions separated by a 20 minute break

III. Student Profiles

- A. Opticians
- B. Metrology technicians
- C. Lens designers

IV. Prerequisites

- A. High school algebra.
- B. High school optics.

V. Course materials provided

- A. One copy of OP 3.001-2001

Outline of the Course

I. Introduction

- A. Objectives
 1. Historical context of the Standard
 2. Explain some of the science behind the Standard
 3. Explain the terminology used in the Standard
 4. Explain the testing instruments referenced in the Standard
- B. Review of Glass
 1. Glass is a frozen, amorphous, non-crystalline liquid
 2. Chemical composition of Glass
 3. Manufacture of Glass
 4. The Glass Map

II. Recent History of Glass Standards

- A. American Standards
 1. Military
 2. Commercial
- B. International

III. Cursory Review of the OP3.001-2001 Standard

- A. Scope
 1. General
 2. Reference to this Standard
 3. Application Caution and Precedence
- B. Definitions
 1. Abbé Value
 2. Homogeneity of Refractive Index
 3. Melt Data
 4. Spectral Transmittance
 5. Spectral Internal Transmittance
 6. Stress Birefringence
 7. Striae
- C. Requirements
 1. Glass Type
 2. Abbé Value
 3. Refractive Index
 4. Homogeneity of Refractive Index Grade
 5. Spectral Internal Transmittance
 6. Stress Birefringence
 7. Striae
 8. Radioactivity
 9. Inclusions
- D. Appendix A (Equations for Calculating Internal Transmittance)
 1. Equations for Calculating Internal Transmittance
 2. Spectral Transmittance
 3. Spectral Internal Transmittance

- 4. Reflection Factor
- 5. Calculation of Internal Transmittance at a Desired Thickness
- E. Appendix B (Bibliography)

IV. Detailed Examination of the Standard

- A. Scope (Section 1 of the Standard)
 - 1. General Scope
 - a) Stating and Interpreting the general scope
 - b) Specifications
 - c) Tolerances
 - d) Functional Requirements
 - 2. Issues concerning Safety
 - a) Not covered by the Standard
 - b) Older glass contains heavy elements
- B. Definitions (Section 2 of the Standard)
 - 1. Basic Terms
 - a) Refractive index
 - (1) Refractive Index and Wavelength
 - (a) Color Dispersion (Primary and Secondary)
 - (b) Abbe Value
 - (2) Refractive Index and Polarization
 - (a) Polarization
 - (b) Birefringence
 - b) Spectral Transmittance
 - 2. Variability of Refractive Index
 - a) Homogeneity
 - b) Striae
 - c) Inclusions
 - 3. Transmittance
 - a) Total Spectral Transmittance
 - b) Internal Spectral Transmittance
- C. Requirements (Section 3 of the Standard)
 - 1. Notations for Requirements
 - a) Glass Type
 - b) Refractive Index
 - c) Abbé Value
 - d) Homogeneity of Refractive Index
 - e) Striae
 - f) Inclusions
 - 2. Methods of Measurement
 - a) Spectral Internal Transmittance
 - b) Stress Birefringence
 - c) Striae
 - d) Inclusions