

## The Automated Determination of Refractive Index of Glass Samples Using the Oil Immersion Method and a Phase Contrast Microscope



### WHAT IS AN AAFS STANDARD FACTSHEET?

The AAFS produces clear, concise, and easy-to-understand factsheets to summarize the contents of technical and professional forensic science standards on the OSAC Registry. They are not intended to provide an interpretation for any portion of a published standard.

### WHAT IS THE PURPOSE OF THIS STANDARD?

The refractive index of a glass can be a distinguishing characteristic both for determining the type of glass and the forensic comparison of glass evidence.

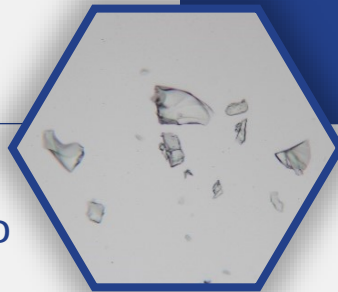
Oil immersion refractometry with a phase contrast microscope and hot stage provides a controlled method for determining refractive index values between 1.48 and 1.55. Many glass samples fall into this range.

This standard test method is used to determine the refractive index of glass samples at a specified wavelength and temperature. Since refractive index will vary with temperature and wavelength, these set conditions provide standard parameters for comparison of refractive index values.

### WHY IS THIS STANDARD IMPORTANT? WHAT ARE ITS BENEFITS?

The technique described by this standard test method provides a reliable approach for highly precise and repeatable measurements of refractive index for glass samples.

Repeatability and reproducibility limits for this technique have been established through interlaboratory study and are presented in this standard.



### HOW IS THIS STANDARD USED, AND WHAT ARE THE KEY ELEMENTS?

This standard provides a test method for the determination and forensic comparison of refractive index values for glass samples. A computer and appropriate software is used with this technique to determine the match point temperature from which the refractive index is calculated.

Guidance on the number of glass fragments to measure in comparison to a potential source is provided.

Details regarding sample preparation and proper instrument setup and calibration are listed in the document. The frequency with which the calibration must be evaluated is provided.

A procedure for conducting forensic glass comparisons is detailed in this document. This procedure includes a calculation to determine if two or more glass samples have indistinguishable refractive indices.

A standard test method for the measurement of the refractive index of glass samples provides the means to build a reference library from which the commonality or rarity of a refractive index value can be evaluated.