



## Questioned Documents Section – 2007

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### J8 The Analysis of 2-Phenoxyethanol for the Dating of Documents

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After attending this presentation, attendees will understand more about the principles of 2-phenoxyethanol (PE) a common volatile organic compound found in many ballpoint writing inks. It is a generally accepted principle that the level of PE diminishes as an ink evaporates and therefore may be used in some circumstances to ascertain if an ink entry(ies) was produced on the purported date(s) of a document.

This presentation will impact the forensic community and/or humanity by providing some fundamental information about PE levels found in fresh ink samples from various types of pens, and how the levels of PE evaporate under controlled conditions. Understanding the dynamics of PE can help forensic examiners form conclusions based on the levels of PE in certain cases.

Reliably determining the age of an ink on paper continues to be a significant challenge for forensic document examiners. There are generally accepted static methods that may be used to help ascertain if written entries were produced on their purported date. Manufacturers may add chemical tags to identify the year the ink was first used, the presence of certain ingredients introduced into a formulation on a known date may be identified, and/or a questioned ink can be compared with a known database of standards to ascertain when a formulation was first commercially available. Reliably measuring a component of ink that is known to change as ink ages such as PE, is more challenging, and requires considerable understanding with regards to external factors that may affect interpretations. Therefore, the objective of this study was to perform a series of experiments on various brands of black ballpoint inks to determine: i) the initial levels of PE in a fresh sample of ink with a range of variation; ii) how the levels of PE changed as the inks aged and; iii) how the inks aged on different substrates.

This research presents the preliminary results from these studies and discusses the practical aspects of utilizing this information to conduct ink dating examinations on a case-by-case basis. There should be certain criteria established when using and interpreting PE levels to form conclusions.

**Ink Dating, Phenoxyethanol, Ink Aging**