



## Questioned Documents Section - 2016

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### J11 **Conductive Inks: Implications for Forensic Document Examiners**

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After attending this presentation, attendees will have a greater understanding of conductive inks. This presentation will explore their potential uses, their unique properties, and their implications for the various techniques used in forensic document examination.

This presentation will impact the forensic science community by providing subjective information about conductive inks and the actual and theoretical implications that may be associated with their presence on questioned documents.

Conductive inks have been publicly available for multiple years; however, they have had numerous disadvantages that limited their practical use. Early conductive inks have suffered from the inefficient transporting of electrical currents, hours of drying time required, and the need for a stiff base to which they must be applied. Due to the limited potential for practical implications in casework, forensic document examiners and researchers have not studied conductive inks in depth.

Recently, a company has developed efficient water-based conductive inks that are deposited using a ballpoint pen. These inks were developed as an educational tool for students learning basic circuitry. Through application with an ordinary ballpoint pen and the application of magnetic attachments, it is possible to create a working circuitry encompassing switches, resistors, and lights on a piece of paper. Despite their intended use, there are numerous potentially nefarious uses of this technology that could lead to an examination by a forensic document examiner. Due to these potential uses, earlier research presented at the 2015 American Academy of Forensic Sciences Annual Scientific Meeting has been further researched and expanded upon to provide more in-depth information about this technology.

Conductive inks pose unique theoretical implications for the forensic document examiner. The development of indentations with electrostatic detection devices relies upon detecting different charge densities on a questioned document. Conductive inks, unlike ordinary inks, are designed to attract a charge. It is therefore theoretically possible that the charge density of the questioned document may be affected in a manner that is adverse to the development of indentations. This presentation will attempt to provide a more subjective understanding of what effect, if any, there is on the electrostatic detection of indentations.

The previous research presented on conductive inks was specifically focused on its effects on the electrostatic detection of indentations on a questioned document. This updated presentation also includes a systematic examination of conductive inks including numerous techniques to provide a more comprehensive picture of what a forensic document examiner could expect to see when conducting an examination of conductive ink.

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#### **Conductive, Ink, Documents**