



Questioned Documents Section - 2015

J10 Conductive Inks and the Electrostatic Detection of Indentations

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After attending this presentation, attendees will understand the unique factors associated with conductive inks. Attendees will also learn what impact conductive inks can have on the development of indentations with electrostatic detection devices.

This presentation will impact the forensic science community by providing information about the theoretical and actual implications associated with specialty writing instruments that utilize conductive inks.

For more than 30 years, forensic document examiners have used electrostatic detection devices to develop latent indentations in questioned documents. These devices allow forensic document examiners to deposit an electrical charge on the questioned document. Indentations that are present on the document have been shown to have a different charge density than the remainder of the document. Through the application of charged toner particles, the forensic document examiner can develop the indentations in a manner that results in a visual transparency of the indentations.

Conductive inks have been available for several years; however, they have not become popular among the general public. Early conductive inks suffered from the inefficient transporting of electrical currents, hours of required drying time, and the need for a stiff base to which they must be applied. Recently, manufacturers have developed efficient water-based conductive inks that are deposited by a ballpoint pen. These inks are intended as educational tools for students to learn how to create basic circuit diagrams on plain paper. Through application with an ordinary pen and the application of magnetic attachments, it is possible to create a working circuit encompassing switches, resistors, and lights on a piece of paper. This advance in technology could lead to the more widespread use of specialty writing instruments that use conductive inks.

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 research is being conducted to develop a deeper understanding of conductive inks. Furthermore, it is the purpose of this research to establish to what degree conductive inks affect the development of indentations with electrostatic detection devices. While it is unlikely that conductive inks will become the subject of a questioned document investigation in the near future, this research will provide a greater understanding of factors that could affect the electrostatic detection of inks.

Conductive Ink, ESDA, Indentations