



E6 An Initial Investigation Into the Effects of Lacquered Ammunition on Toolmark Transfer

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Learning Overview: After attending this presentation, attendees will be aware that lacquer is commonly used as a waterproofing agent and rust protection agent for ammunition. When a firearm is shot, the lacquer on the ammunition may flake and bubble, thus interfering and even hiding the toolmarks used for comparison. A universal protocol for examining lacquered ammunition should be considered when handling this type of evidence.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by informing attendees that the lacquer used to seal cartridges may interfere in the toolmark transfer process.

When a firearm is discharged, the bullet and cartridge case acquire unique microscopic markings called toolmarks. Firearm forensics involves comparing two objects with similar toolmarks. These comparisons typically involve the bullets or cartridge cases found at a crime scene to ammunition that was test-fired with the suspected weapon. Historically, the primer faces of fired cartridge cases have been examined using a comparison light microscope and entered into a database. In recent years, agencies and laboratories have been transitioning to 2D and 3D imaging to aid in faster comparisons with the help of automated search software programs. The database assigns a match score for the cases, and the examiner makes a final comparison of the evidence and test-fired ammunition to determine if there is a true identification.

One troublesome feature firearms examiners may encounter is the lacquer that is commonly used to seal the primer of cartridges. The purpose of the sealant is to prevent moisture from making contact with the gunpowder inside the cartridge, which would render it useless. So far, little research has been done to test the effects of lacquer on the transfer toolmark process on fired ammunition. Whether an examiner prefers using the comparison light microscope or virtual imaging, the lacquer may need to be removed at some point during the examination as it tends to chip and flake off in patches, thus completely changing the topography of the surfaces compared. There has been concern, however, that the cleaning process may destroy some of the individual characteristics that are also necessary for comparison. In this study, researchers examine several different firearms to determine if lacquer affects the toolmark transfer process.

Lacquered Cartridges, Toolmarks, Cadre