



A149 Forensic Analysis of Duct Tapes: Study of Scrim Via Scrim Count and Fiber Analysis

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After attending this presentation, attendees will learn of the forensic methodology adopted by the Forensic Chemistry and Physics Laboratory (FCPL) of Health Sciences Authority (HSA), Singapore, in the characterization of duct tapes and the characteristics of duct tapes commercially available in Singapore.

This presentation will impact the forensic science community by communicating that, other than legitimate uses, adhesive tapes are often used in numerous types of criminal activity such as homicide, kidnapping, and construction of improvised explosive devices. A majority of the cases submitted to FCPL involve using adhesive tapes to wrap drug packages for the purpose of illicit drug trafficking, which carries a serious penalty under Singapore's laws. For such cases, the value of adhesive tape examination is in associating strips of tape used to wrap different packages together or associating strips of tape from a wrapped package to a particular roll of recovered tape. Establishing such linkages could associate different suspects together or even seemingly independent cases to a drug syndicate.

One of the frequently encountered types of tape in casework is duct tape. Duct tapes generally consist of three layers: backing; fabric reinforcement (scrim); and adhesive. In this study, 50 rolls of duct tape that are commercially available in the Singapore market are characterized based on their physical characteristics (width, surface features on backing, and scrim count) and the type of fibers used in the scrim (twist, microscopic and fluorescence properties, melting range, cross section, and chemical composition). This study serves as a foundation to determine the frequency of occurrence of duct tape characteristics in the local market. The type and frequency of occurrence of manufacturing defects in the rolls of duct tapes studied will also be reported.

In the characterization of scrim, FCPL adopted the method derived from "Forensic analysis and discrimination of duct tapes," which described the scrim count per inch of duct tapes method (henceforth referred to as Method A).¹ Method A is useful in most cases except when the case involves small tape fragments or when the tapes are pasted on other types of evidence. Thus, FCPL explored two other methods (henceforth referred to as Methods B and C, respectively). Method B investigated the possible correlation between the surface characteristics on the backing and the warp yarns of the scrim. This method could potentially be useful in cases where the scrim is inaccessible for examination. Method C investigated the average length per warp and fill spacing to characterize fragments of tape.

The Discriminating Power (DP) of Methods A, B, and C as well as the respective combined DP with fiber analysis was determined to assess their usefulness, which could be particularly significant in situations where no physical fits are found. From this study, a general workflow to characterize duct tapes was implemented, based on their state and condition in which they are submitted.

Reference:

¹M J Bradley & A H Mehlretter. Forensic analysis and discrimination of duct tapes. JASTEE, vol. 3(1), pp.2-49 (2012).

Duct Tapes, Scrim Count, Fiber Analysis