

*Approved by Director: Dr. Guy Vallaro***A. Purpose:**

To define a method by which fiber-type evidence will be collected, identified and / or compared

B. Responsibility: Trace Examiner who has successfully completed fiber training in accordance with the Trace Section Training Manual

C. Safety:

The appropriate measures for the proper handling of biohazard materials, sharps instruments and chemicals will be used according to the Connecticut State Forensic Science Laboratory Safety Manual.

D. Procedure: Set up

1. The examiner will use his / her discretion to assess the probative value of the evidence; as well as, determine the types and extent of the examinations conducted. The examiner will use their knowledge, training and experience to determine which tests will be performed and the order in which they will be performed.
2. The examiner may deem it necessary to vary from the set fiber protocol based on the evidence submitted. If a variation in the fiber procedure is necessary, the submitting agency will be notified.
3. If at any time during the comparison of a known and an unknown fiber the examiner determines a significant difference, no further examinations will be conducted and the fibers will be deemed "dissimilar".
4. The procedure outlined in this document may be utilized when the fiber samples are the subsequent components of a thread, yarn, fabric or cordage. Fiber comparison may be an additional examination in the determination of a thread, yarn, and fabric or cordage comparison.
5. A lab coat and gloves will be worn when examining fiber evidence.

E. Procedure: Collection, Documentation and Storage of Fiber-type Evidence

1. Trace material may be transferred from other section of the Laboratory to the Trace Section for further examination. Examinations may include fiber identification or fiber comparisons.
2. Fibers may be collected from an item of evidence during examination within the Trace Section using a forceps, tape lift, scraping or other suitable collection technique based on the type of evidence submitted to the laboratory. The examiner will document the method collection in the case file. (See also SOP-TR-05) Examination of Evidence.

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3. Fiber – type evidence may be stored in paper folds, between glass microscope slides, on a gel lifter or other suitable method. A combination of the above listed methods may be used.
4. The examiner shall use the “Fiber Comparison Examination Worksheet” (QR-TRACE - 06) for the documentation of fiber comparisons.
5. The identification of fiber-type evidence, which does not require a comparison to a known sample, may be written in narrative form on the appropriate Quality Record Worksheet which will remain in the case jacket.
6. Fibers and fiber-type evidence will be prepared for examination based on the condition in which it is received. The examiner will use their training, knowledge and experience related to fiber-type evidence to prepare samples for examination (macroscopic and microscopic) and instrumental analysis. The examiner may choose to flatten the fiber sample to obtain optimum instrumental results.. This may be done by manually rolling the sample flat with a micro-roller or using a similar method such as flattening the sample with a diamond compression cell. The examiner is not limited to the using only the previously listed two methods. The examiner will decide which method is best to prepare the sample based on their knowledge, training and experience.

F. Procedure: Fiber Identifications and Comparisons

1. Fiber identifications may be accomplished by using some or all of the following methods:
 - a. Stereoscopic examination
 - b. Compound microscopic examination,
 - c. Comparison to a reference sample via microscopy
 - d. Polarized light microscopy
 - e. FT-IR.
2. Reference data or reference spectra, when available, shall be included in the case jacket.
3. Fiber samples that are to be used as a “known” for comparison purposes, should represent the entire area of that submission (Example: a garment) when allowable. The examiner will determine the proper location(s) to remove a sample to be used as a “known” sample.
4. Mounting preparations will be similar for “known” and “questioned” fiber samples.
5. When comparing a known and a “questioned” fiber sample the following scheme will generally be followed for **natural fibers**– some or all of the following may be used:
 - b. Stereoscopic comparison
 - c. Compound microscopic comparison
 - d. Microspectrophotometry

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6. When comparing an unknown and a known fiber sample the following scheme will generally be followed for **manufactured fibers**.– some or all of the following may be used:
 - a. Stereoscopic comparison
 - b. Compound microscopic comparison
 - c. Polarized light microscopy (comparison polarized light microscope)
 - d. FT-IR
 - e. Microspectrophotometry
7. If sufficient unknown / known fiber sample is available, the examiner may perform a physical cross-section preparation of the fiber to determine the cross section
8. On occasion supplemental examinations may be used to recover, collect, identify or compare fibers. Supplement examinations may include but are not limited to:
 - a. Alternate light source (ex. Crime Light or UV Lights)
 - b. Florescence microscopy
 - c. Solubility – See work instructions for fiber solubility scheme
 - d. SEM / EDAX. - If a fiber-type sample will be examined via SEM / EDAX, an examiner from the Chemistry Section of the Forensic Science Laboratory may perform the analysis needed and provide the data/ results/ images to the Trace Evidence Examiner. The data / results / images provided will be properly documented and included in the case jacket.

G. Procedure: Report Writing

1. The examiner will assess the macroscopic / microscopic optical results and comparisons and analytical data (instrumental analysis), as well as, use their training and experience to determine if a “known” and “questioned” fiber exhibit “similar” or “dissimilar” microscopic and instrumental characteristics. A report will be generated.
2. The examiner may include the name (generic or trade) of a fiber in the report.
3. The examiner will assess the macroscopic / microscopic optical results and analytical data (instrumental analysis), as well as, use their training and experience to determine the identification of an unknown fiber. The examiner may include the name of the fiber in the report.
4. Upon the completion of fiber identification or a fiber comparison, the examiner may use wording similar to the examples listed below when writing a report.

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Typical statements used when writing a report may include:

1. The red synthetic fibers located in submission / item #1 exhibited microscopic and instrumental characteristics similar to the red fibers located in submission / item #2.
2. The red polyester fibers located in submission / item #1 exhibited microscopic and instrumental characteristics similar to the red polyester fibers located in submission / item #2.
3. Red cotton fibers were located in submission #1.

***Variations of the above listed wording may be included in a report.

The examiner will consult with the co-signer to draft a report, which best reflects the results obtained.

9. References:

Rhode Island State Crime Laboratory – Trace Evidence Procedures Manual

Boston Police Department Crime Laboratory: Trace Evidence Section Procedures

Hall, David M. Practical Fiber Identification. Auburn University Printing Service, Auburn, Alabama (1982).