



## Standard Guide for Forensic Examination of Fabrics and Cordage<sup>1</sup>

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### 1. Scope

1.1 The intent of this guide is to assist individuals and laboratories conducting examinations of fabrics and cordage. It is not designed as a detailed methods description or protocol for the analysis and comparison of fabric and cordage evidence, but as a guide to an acceptable procedure to strengthen the usefulness of the analytical method.

### 2. Referenced Documents

#### 2.1 ASTM Standards:

E 1459 Guide for Physical Evidence Labeling and Related Documentation<sup>2</sup>

E 1492 Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Laboratory<sup>2</sup>

E XXXX Guide for the Handling of Trace Evidence<sup>2</sup>

E 2228 Guide for the Microscopic Examination of Textile Fibers<sup>2</sup>

### 3. Terminology

3.1 *cordage*—twine, ropes, and cords, collectively.

3.2 *core*—fibers or other textile materials running lengthwise through the center of a cordage.

3.3 *course*—the row of loops or stitches running across a knit fabric, corresponding to the filling in woven fabrics.

3.4 *crown*—the raised portion of a strand in a twisted cordage.

3.5 *fabric*—a planar textile structure produced by interlacing yarns, fibers, or filaments.

3.6 *knit fabric*—a structure produced by interlocking one or more loops of yarn or comparable material.

3.7 *pitch*—the number of crowns per inch of the same strand.

3.8 *ply*—the number of single yarns twisted together to form a plied cord; an individual yarn in a plied yarn or cord.

3.9 *selvage*—the narrow edge of woven fabric that runs parallel to the warp. It is made with stronger yarns in a tighter construction than the body of the fabric to prevent raveling.

3.10 *staple fiber*—natural fibers or cut lengths from filaments.

3.11 *strand*—filaments or yarns twisted together or laid parallel to form a unit for further twisting or plaiting into cordage.

3.12 *tracer*—a marker (such as color-coded yarns or labels) integrated into the manufacture of a cord that assists in identifying the manufacturer.

3.13 *twist direction (lay)*—the direction of twist in yarns is indicated by the capital letters S and Z. Yarn with an S-twist is seen when a yarn is held vertically and the plies spiral around its central axis slope in the same direction as the middle portion of the letter S, and Z-twist is seen when the plies slope in the same direction as the middle portion of the letter Z.

3.14 *wale*—a column of loops lying lengthwise in a knit fabric.

3.15 *warp*—the set of yarn in all woven fabrics that runs lengthwise and parallel to the selvage and is interwoven with the filling.

3.16 *weft (filling)*—in a woven fabric, the yarn running from selvage to selvage at right angles to the warp.

3.17 *woven fabric*—generally used to refer to fabric composed of two sets of yarns, warp and weft (filling), that is formed by weaving, which is the interlacing of these sets of yarns.

3.18 *yarn*—filaments (fibers) with or without a twist used to form a strand.

### 4. Summary of Guide

4.1 Due to the general availability of fabric and cordage, they are often encountered by the forensic scientist. This guide assists the forensic scientist in determining and documenting the structural details of fabric and cordage such as design, construction and composition. These structural details can often provide information of significant forensic value.

### 5. Significance and Use

5.1 The construction, composition and color of textiles as evidence in crimes are useful comparison characteristics for forensic examinations. Textiles appear in a variety of weaves, knits, and nonwoven constructions; a combination of fabric types can occur in any one textile. There is a vast range of colors in which textiles are offered in the marketplace. Therefore, the construction, composition, and color of a textile can aid the Examiner in including or excluding a textile for consideration in a forensic examination.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol