

ANSI/ASB Standard 095, First Edition  
2020

Errata 1, 2022

**Standard for Minimum Qualifications and Training for a  
Footwear/Tire Forensic Science Service Provider**



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## Standard for Minimum Qualifications and Training for a Footwear/Tire Forensic Science Service Provider

ASB Approved October 2019

ANSI Approved August 2020



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## Foreword

This document describes the minimum qualifications for a footwear/tire forensic science service provider (FSSP). This document is intended to outline what topics shall be covered in a training program but is not intended to be the sole source of training material. This document cannot cover all aspects of training for every topic or for unusual or uncommon examinations.

This document is based on training an individual who has little to no experience or training in the area of footwear/tire impression examinations. If working full time on training, it is anticipated that the training will take a minimum of 4-6 months for one discipline (footwear or tire). Training for both disciplines is expected to take a minimum of 6-9 months. This does not include the period of mentored casework which is at the mentor's discretion but is anticipated to last a minimum of 6 months. A trainee may complete a training program in an accelerated or abridged fashion based on prior experience and training.

This document was revised, prepared, and finalized as a standard by the Footwear and Tire Consensus Body of the AAFS Standards Board. The draft of this standard was developed by the Footwear and Tire Track Subcommittee of the Organization of Scientific Area Committees (OSAC) for Forensic Science. This document is a revision of the SWGTREAD Guide for Minimum Qualifications and Training for a Forensic Footwear and/or Tire Tread Examiner.

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**Keywords:** *footwear, tire, impressions, Forensic Science Service Provider.*

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# Standard Practice for Minimum Qualifications and Training for a Footwear/Tire Forensic Science Service Provider

## 1 Scope

This standard describes the minimum qualifications and is an outline for training for a footwear/tire forensic science service provider (FSSP) with little to no experience or previous training.

This standard outlines what topics should be covered in a training program and is not intended to be the sole source of training material.

## 2 Normative References

The following reference is indispensable for the application of the standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

*IAI Recommended Course of Study for Footwear & Tire Track Examiners*, International Association for Identification: Mendota Heights, MN, 2006.

## 3 Terms and Definitions

For purposes of this document, the following definitions apply.

### 3.1 competency test

A ground-truth test that demonstrates that a forensic science service provider has acquired specialized knowledge, skills and abilities in the standard practices necessary to conduct specific tasks or examinations in a discipline prior to performing independent casework.

### 3.2 footwear/tire intelligence

Investigative information gathered regarding footwear or tire impression(s) beyond, or in lieu of, comparison to a known item.

### 3.3 mentored casework

The period directly after an FSSP has been authorized to perform technical review and verification casework by their organization. During the period of mentorship the FSSP shall work with guidance from an experienced FSSP when necessary. As the level of confidence in the new FSSP's ability to independently perform casework increases, the amount of contact time with the mentor gradually decreases. The number of cases under which mentored casework is performed will be determined by the trainer.

### 3.4 mock casework

Cases in which the ground truth is known and made to recreate the conditions and types of samples submitted during actual casework.

### **3.5**

#### **observed casework**

A period during which the trainee observes actual casework undertaken by an experienced FSSP.

### **3.6**

#### **supervised casework**

The period immediately after competency testing, during which time the FSSP shall work cases alongside another experienced FSSP. After this period the newly trained FSSP is authorized to perform technical review and verification.

## **4 Requirements**

### **4.1 Training Requirements**

A training program that meets the requirements outlined below will provide the trainee with the scientific, technical or other specialized knowledge, skill, and experience required to perform the work of the footwear/tire FSSP.

### **4.2 Required Training Materials and Equipment**

**4.2.1** Access to texts, periodicals, papers, and other professional literature.

**4.2.2** Access to equipment appropriate to each topic.

### **4.3 Requirement for the Trainee**

The trainee shall have a minimum of a Bachelor's degree in a natural science (e.g., biology, chemistry, physics, biochemistry), applied science (e.g., forensic science, medical sciences), or closely related field. The degree shall be from an accredited higher education institution.

### **4.4 Requirements for the Trainer(s)**

**4.4.1** The principal trainer should have minimum education requirements of the trainee as stated in 4.3. The principal trainer shall have successfully completed courses of training in the forensic examination of footwear/tire evidence that includes classroom lecture, practical exercises and mentored case work equivalent to the International Association for Identification (IAI) *Recommended Course of Study for Footwear and Tire Track Examiners*.

**4.4.2** The principal trainer must be able to document that they are an IAI Certified Footwear Examiner or be eligible for IAI Certification.

**4.4.3** The principal trainer should have been trained in the topics of instruction included in 4.5.3.

**4.4.4** Some topics may be covered by an additional trainer designated by the principal trainer.

**4.4.5** The qualifications of any other trainers shall be approved by the principal trainer.

**4.4.6** The principal trainer should have been accepted in court as an expert in footwear/tire evidence.

**4.4.7** The principal trainer must have successfully completed a footwear and/or tire proficiency test within the last 12 months.

#### **4.5 Required Training Program**

**4.5.1** The training program will be the equivalent of a training program as described in the IAI Recommended Course of Study for Footwear and Tire Track Examiners under the supervision of a principal trainer. Note: While attending meetings and listening to presentations is useful, it is not the equivalent of training as meant in this section.

**4.5.2** A training record for each trainee will be maintained and should document the following in each topic area:

- a) a bibliography of relevant literature study;
- b) examination(s) (e.g., written tests, oral tests, practical exercises and assignments);
- c) case work log (e.g., number, type, items, reports);
- d) outside training, technical visits, courses, conferences, or workshops attended;
- e) research conducted.

**4.5.3** The formal written training program will include specific topics of instruction. General forensics topics common to all disciplines, such as evidence handling and chain of custody, are presumed to be covered in an introduction to forensics completed prior to beginning footwear/tire evidence training. The order in which the topics are administered is discretionary. The minimum specific topics are as follows.

**4.5.3.1** Trainee shall demonstrate a thorough understanding of the history of forensic footwear and tire examination, its place within and value to the criminal justice system and the concept/philosophy of source attribution. Introduction to forensic footwear and tire examination will cover the following topics:

- a) history;
- b) value of footwear and tire evidence;
- c) concept/philosophy of source attribution;
- d) class characteristics;
- e) randomly acquired characteristics;
- f) relevant published validation studies.

**4.5.3.2** Trainee shall demonstrate a thorough understanding of the common terminology relating to footwear/tire evidence.

**4.5.3.3** Trainee shall demonstrate a thorough understanding of the different manufacturing techniques used to produce the following:

- a) footwear;
- b) tire.

**4.5.3.4** Trainee shall demonstrate a thorough familiarity with best practice crime scene preservation methods pertaining to footwear/tire evidence and relationships to other forensic disciplines as follows:

- a) relationship of forensic footwear/tire evidence to other forensic evidence and disciplines (e.g., DNA, trace, friction ridge);
- b) marking and documentation.

**4.5.3.5** Trainee shall demonstrate a thorough understanding of instruments and equipment commonly used in forensic footwear/tire examinations as follows:

- a) procedures and protocol;
- b) photographic equipment;
- c) measuring devices;
- d) light sources;
- e) computers, software and peripherals;
- f) other relevant laboratory equipment.

**4.5.3.6** Trainee shall demonstrate a thorough understanding of the formation of an impression, different types of detection methods, the distinction between different types of impressions, and have practical experience of specialized lighting and physical and chemical detection methods. Specific topics of emphasis are as follows:

- a) wet or dry in origin;
- b) positive or negative impressions;
- c) patent impressions;
- d) latent impressions;
- e) specialized lighting;
- f) physical and chemical methods.



**4.5.3.7** Trainee shall demonstrate a thorough understanding of the theory behind and have practical experience of all facets of photography as follows:

- a) theory of photography;
- b) camera operation;
- c) general crime scene photography;
- d) examination quality photography;
- e) two- and three-dimensional impression photography;
- f) lighting techniques;
- g) filters.

**4.5.3.8** Trainee shall demonstrate a thorough understanding of the theory behind and have practical experience of digital imaging systems scanning as follows:

- a) software,
- b) imaging formats,
- c) resolution,
- d) image sizing,
- e) digital comparison.

**4.5.3.9** Trainee shall demonstrate a thorough understanding of the theory behind and have practical experience of the four methods of enhancement as follows:

- a) photographic;
- b) chemical;
- c) physical;
- d) digital.

**4.5.3.10** Trainee shall demonstrate a thorough understanding of the theory behind and have practical experience of lifting to recover footwear/tire impressions under different substrate and environmental conditions as follows:

- a) electrostatic lifting;
- b) gelatin, adhesive, casting, and other lifting materials.

**4.5.3.11** Trainee shall demonstrate a thorough understanding of the theory behind and have practical experience of casting to recover footwear/tire impressions under different substrate and environmental conditions as follows:

- a) casting materials;
- b) fixatives and release agents;
- c) casting in different substrates;
- d) casting in different environmental conditions.

**4.5.3.12** Trainee shall demonstrate a thorough understanding of footwear/tire intelligence gathering, existing databases and their capabilities, importance and proper use of producing footwear/tire intelligence, and examples of how and when this is beneficial to the investigator. Specific topics of emphasis are as follows:

- a) database searches;
- b) intelligence generation and distribution;
- c) tire track width, turning diameter and wheel base measurements;
- d) footwear size and height estimation limitations and constraints;
- e) direction of travel;
- f) producing intelligence from images or video footage.

**4.5.3.13** Trainee shall demonstrate a thorough understanding of the common methods of producing test impressions as follows:

- a) footwear;
- b) tire.

**4.5.3.14** Trainee shall demonstrate a thorough understanding and have practical examples of current examination best practice protocols, case organization, note taking, evidence evaluation, comparison, conclusions, findings and verification of footwear/tire comparisons as follows:

- a) protocols;
- b) case organization;
- c) documentation;
- d) evidence analysis;
- e) comparison;
- f) evaluation;

- g) findings and conclusions;
- h) technical review, verification and quality assurance.

**4.5.3.15** Trainee shall demonstrate an awareness of uncommon aspects of footwear/tire examinations, their limitations and other forensic and complimentary non-forensic (medical) practitioner's skills. In those cases, where these uncommon aspects are present it is essential to communicate findings while keeping within the scope of work for footwear/tire FSSP. These uncommon case types could include the following:

- a) barefoot impressions;
- b) fabric impressions (e.g., socked foot impressions);
- c) related forensic evidence (e.g., DNA, trace, podiatry, gait);
- d) footwear and tire impressions on skin.

NOTE This document does not cover friction ridge barefoot impression comparisons nor does it cover fabric impressions. These types of comparisons require training outside the scope of work of a footwear/tire FSSP. A FSSP should be aware of the value of non-friction ridge barefoot evidence and its significance. A non-friction ridge barefoot comparison should not be undertaken by a footwear FSSP unless they have significant specialized training in the area of morphological barefoot evidence.

**4.5.3.16** Trainee shall be familiar with the theory and application of statistics for forensic science and error rates. Specific topics of emphasis are as follows:

- a) probability and various interpretations of probability;
- b) likelihood ratios and Bayes' factors;
- c) populations, inference, and sampling;
- d) uncertainty and error rates;
- e) reporting results.

**4.5.3.17** Trainee shall be familiar with human factors topics and their practical implications including efforts to minimize human factors influencing forensic decision making, as well as the ability to effectively communicate science both in a written and verbal context to a non-scientific audience. Specific topics of emphasis are as follows:

- a) sources and minimization of bias;
- b) task relevant information;
- c) optimizing workplace environment;
- d) fatigue;
- e) error management;

- f) ethics;
- g) communicating science effectively;

**4.5.3.18** Trainee shall demonstrate competence and ability to write reports across a range of conclusions to effectively communicate their findings and conclusions.

**4.5.3.19** Trainee shall demonstrate a thorough understanding of the forensic footwear/tire FSSP's role within the criminal justice system. Specific topics of emphasis are as follows:

- a) state expert witness qualifications;
- b) admissibility requirements;
- c) effectively communicate findings and conclusions;
- d) preparation of exhibits;
- e) successfully complete a moot court.

**4.5.3.20** Trainee shall observe a number of cases covering a broad spectrum of forensic footwear/tire cases.

**4.5.3.21** Trainee shall successfully complete a number of mock footwear/tire cases including but not limited to areas of recovery, enhancement, photography, preparation of test impressions, documentation and report writing.

**4.5.3.22** Trainee shall successfully complete both written and practical competency tests that encompass a majority of the training topics. These tests may occur after each training module, after which time an FSSP may perform specific tasks on a test item. Upon completion of the training program a final overarching test shall be completed.

**4.5.3.23** Trainee shall complete a number of cases under the supervision of an experienced FSSP.

**4.5.3.24** Trainee shall undergo an extended period of mentorship during which time the FSSP works with guidance from an experienced FSSP(s) to discuss areas including but not limited to best practices, weight of findings, sufficiency, conclusions and report writing.

## **4.6 Continuing Education and Professional Development**

**4.6.1** All footwear/tire track FSSP shall remain current in their field through continuing education and professional developmental activities. A minimum of 48 hours of continuing education and professional development shall be obtained by forensic footwear/tire track FSSP over three years.

**4.6.2** FSSPs shall conduct routine reviews of literature and other publications to keep current with information relevant to the discipline.

**4.6.3** FSSPs are advised to seek certification in their discipline through an accredited body.

## **Annex A** **(informative)**

### **Bibliography**

This is not meant to be an all-inclusive list as the group recognizes other publications on this subject may exist. At the time this standard was drafted, these were the publications used for reference. Additionally, any mention of a particular software tool or vendor as part of this bibliography is purely incidental, and any inclusion does not imply endorsement.

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**SWGTHREAD documents can be downloaded from:**

<http://treadforensics.com/index.php/standards/u-s/standards-swgthread>

SWGTHREAD, *Standard for Terminology Used for Forensic Footwear and Tire Impression Evidence*, 2013.



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