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**Standard for Footwear/Tire Examination Proficiency
Testing Program**



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Standard for Footwear/Tire Examination Proficiency Testing Program

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Foreword

Proficiency testing is the use of comparisons for the determination of laboratory testing or measurement performance.^[8]

Proficiency testing is one mechanism through which the performance of an organization can be checked to confirm its ability to adhere to the organization's procedures.^[11]

Proficiency testing is used not only as a measure of an agency's overall performance and quality system but also as a tool for monitoring an individual footwear and tire examiner's continued ability to perform work in a specific discipline or tasks.^[11]

A proficiency test program is intended to evaluate the following:

- an individual footwear and tire examiner's ongoing application of a methodology and the agency's procedures, and
- that an individual footwear and tire examiner arrives at appropriate conclusions given the evidence provided.

The purpose of this document is to provide a standard for creating proficiency tests appropriate for examination by a footwear and tire examiner as well as recommendations for testing frequency. This document provides guidance to test developers, laboratory management, and participants, but is primarily concerned with the discipline-level content and the footwear and tire examiner's ability to perform work and not organizational compliance.

Only individual footwear and tire examiners who are performing independent casework are to be proficiency tested.

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.

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Keywords: *footwear, footwear and tire examiner, tire tread, proficiency testing, range of conclusions, test preparation recommendations*

Table of Contents

1	Scope.....	1
2	Normative References.....	1
3	Terms and Definitions.....	1
4	Program Plan and Testing Recommendations.....	2
4.1	General.....	2
4.2	Frequency of Training.....	2
4.3	Knowledge, Skills, and Abilities to Be Tested.....	2
4.4	Test Design.....	3
4.5	Test Materials.....	3
4.6	Test Format.....	4
4.7	Test Source.....	4
4.8	Test Administration.....	4
4.9	Test Validation.....	5
4.10	Test Evaluation.....	5
4.11	Corrective Actions.....	5
4.12	Criteria for Successful Proficiency.....	6
4.13	Feedback of the Test Results to the Footwear and Tire Examiner.....	6
4.14	Documentation.....	6
	Annex A (informative) Bibliography.....	7

Standard for Footwear/Tire Examination Proficiency Testing Program

1 Scope

This standard outlines the requirements for proficiency test providers and footwear and tire examiners for creating proficiency tests appropriate for use by a footwear and tire examiner. The standard also provides recommendations for testing frequency.

The guidance provided is primarily concerned with the discipline-level content and the footwear and tire examiner's ability to perform work and not organizational compliance.

2 Normative References

There are no normative reference documents. Annex A, Bibliography, contains informative references.

3 Terms and Definitions

3.1

blind testing

Footwear and tire examiners and/or the footwear and tire examiner's agency are not aware they are being tested.

3.2

class I inconsistency

The nature and cause of the inconsistency raises immediate concerns regarding the quality of the footwear and tire examiner's/agency's work product.

3.3

class II inconsistency

The inconsistency is due to a problem which may affect the quality of the work but is not serious enough to cause immediate concern for the overall quality of the footwear and tire examiner's/agency's work product.

3.4

class III inconsistency

The inconsistency is determined to have only minimal effect or significance, be unlikely to recur, is not systemic, and does not significantly affect the fundamental reliability of the footwear and tire examiner's /agency's work.

3.5

competency testing

The demonstration that a footwear and tire examiner has acquired and demonstrated specialized knowledge, skills, and abilities upon the completion of a training program or a training program module in the standard practices necessary to conduct examinations in a discipline and/or category of testing prior to performing independent casework.

3.6 consultation

A significant interaction, prior to the initiation of the technical review or verification process, between the reporting footwear and tire examiner and another footwear and tire examiner that results in a jointly - developed opinion or conclusion that would not have been reached by the reporting footwear and tire examiner alone.

3.7 internal source

A non-ISO/IEC 17043 accredited producer of a proficiency test. For example, this source may be the footwear and tire examiner's own agency or another non-commercial source.

3.8 open testing

Footwear and tire examiners are aware they are being tested.

3.9 technical review

Review of all examination records and test reports to ensure the validity of scientific results and conclusions¹.

3.10 verification

Verification consists of confirmation, through the provision of objective evidence, that specified requirements have been fulfilled. For example, confirmation through another expert, trained to competency, conducting an independent analysis, comparison and evaluation of the unknown and known, which may include test impressions, as well as the physical footwear or tire.

4 Program Plan and Testing Recommendations

4.1 General

A footwear and tire examiner agency shall write a plan to encompass the testing program. At minimum, a proficiency testing program plan shall include the following.

4.2 Frequency of Testing

A footwear and tire examiner is recommended to complete at least one footwear/tire proficiency test (internal or external) each year.

4.3 Knowledge, Skills and Abilities to Be Tested

The proficiency test shall reflect the knowledge, skills, and abilities necessary to fulfill the requirements of the footwear and tire examiner's job in relation to footwear/tire evidence. These areas may include but are not limited to the following:

— recovery,

¹ See ASCLD/LAB – *International Supplemental Requirements (Testing)*, 2011 Edition, Page 27.

- chemical enhancement,
- imaging,
- analysis of questioned impression,
- make/model searches,
- digital processing,
- the making of test impressions,
- analysis of known test impressions and known item(s),
- note taking/documentation,
- comparison methodology,
- evaluation of findings,
- conclusions and levels of association/non-association, and
- report writing.

In addition to these areas, the footwear and tire examiner's agency should evaluate the footwear and tire examiner's adherence to procedures relating to evidence handling, technical review and related administrative actions.

4.4 Test Design

4.4.1 Tests should be designed to sample some of the conditions listed in 4.4.1.1 through 4.4.1.3.

4.4.1.1 Tests should include multiple recovery/processing techniques.

4.4.1.2 Tests should be inclusive of all the levels of association/non-association.

4.4.1.3 Tests should include questioned impressions from different sources that bear resemblances to the known items.

4.4.2 The ground truth of the test should be known to the test preparer and not known to the footwear and tire examiner until the test is completed.

4.4.3 Test reporting format shall include the range of conclusions that are supported by the footwear and tire examiner agency's conclusion document.

4.5 Test Materials

4.5.1 Test materials shall be representative of casework, and should include basic and advanced comparisons, but not highly complex comparisons where consultation would be recommended, and the following should be included.

4.5.1.1 Multiple questioned impressions (representing the types and quality of impressions seen in casework) and known samples (physical items - footwear or tires are preferable to photographs and test impressions). Supporting task-relevant information may be provided to or requested by the participant that may include, but is not limited to:

- scene information,
- substrate information,
- recovery information,
- matrix information,
- date of recovery, and
- date of seizure of known item(s).

4.6 Test Format

4.6.1 Tests may be administered in an open or blind format. The test format will be at the discretion of the footwear and tire examiner's agency, noting that a test that is administered blind to both the footwear and tire examiner and the footwear and tire examiner's agency is the most robust in testing the entire system.

4.7 Test Source

Tests may be developed internally or obtained from an external source, which is a commercial producer of a proficiency test that is accredited to ISO/IEC 17043.

4.8 Test Administration

4.8.1 The footwear and tire examiner's agency and/or proficiency test provider should make every effort to avoid redundancy of the subject matter being tested in consecutive tests so that a known pattern cannot be assumed from the test design.

4.8.2 The footwear and tire examiner's agency should ensure the footwear and tire examiner follows the agency's established procedures while performing the analysis, and that independent conclusions are produced as appropriate to a test's purposes. If the purpose of the test includes testing the footwear and tire examiner agency's procedures, then technical review would be appropriate.

4.8.3 Undue time constraints should not be imposed in open testing. Complexity and the number of comparisons in the test should be considered in establishing a timeframe for completion.

4.8.4 In open proficiency tests all conclusions shall be those of the footwear and tire examiner without consultation; any conversation regarding a test shall not be permitted until the participating footwear and tire examiner(s) have completed their test.

4.8.5 Verification and/or technical review are permitted and shall be documented.

4.8.6 Test location and conditions should be conducted in a normal working environment.

4.9 Test Validation

4.9.1 The testing program shall only use tests that have been validated as described below.

4.9.1.1 External proficiency tests – validation shall occur by pre-distribution to three or more certified and/or experienced footwear and tire examiners. The range of acceptable conclusions shall be determined by review of the pre-distribution results. The test shall be validated to ISO/IEC 17043 standards.

4.9.1.2 Internal proficiency tests – tests should only be prepared by an experienced footwear and tire examiner using the guidelines provided in section 4.5-. The preparing footwear and tire examiner(s) shall define the range of acceptable conclusions. In addition, documentation from the preparer should demonstrate that the test can be completed as intended using control samples. For example, if the preparer uses a synthetic blood reagent and the test covers enhancement techniques, then the preparer must provide evidence that the synthetic blood reagent reacts with appropriate chemicals (e.g., amido black, leuco-crystal violet, etc.), including documentation of control numbers, expiration dates, etc.

4.10 Test Evaluation

4.10.1 The footwear and tire examiner's agency should identify a footwear and tire examiner, who has successfully completed training including all competency tests, to evaluate the proficiency test results. If an evaluator is not available within the footwear and tire examiner's agency, it is recommended an agreement is entered into with another agency with a footwear and tire examiner for evaluation.

4.10.2 The evaluator should take into consideration the following:

- the design and construction of the test,
- the expected results,
- the range of acceptable conclusions,
- the limitations of the comparison, and
- the ground truth of the test.

4.10.3 The significance of incorrect conclusions shall be predetermined and stated prior to administering a proficiency test.

4.10.4 If an inconsistency is identified, then the evaluator shall determine the level of the inconsistency. The agency shall have criteria in place for the categorization of the levels of inconsistency based on the inconsistency's impact on the quality of the work product. An example of the levels of inconsistencies may be categorized as Class I, Class II or Class III.

4.11 Corrective Actions

4.11.1 The footwear and tire examiner's agency shall have corrective action procedures in place that are appropriate for the levels of inconsistencies categorized above.

4.11.1.1 A Class I inconsistency may involve the removal of the footwear and tire examiner from casework, review of the footwear and tire examiner's case files, remedial training and the successful completion of a competency test.

4.11.1.2 A Class II inconsistency may involve remedial training.

4.11.1.3 A Class III inconsistency may involve reiteration of the agency's administrative procedures with the footwear and tire examiner.

4.11.2 If a proficiency test results in the same error by more than one footwear and tire examiner, then a root cause analysis shall be performed to establish the cause, and then appropriate corrective action(s) shall be implemented.

4.12 Criteria for Successful Proficiency

Criteria for successful proficiency shall include the following, but not limited to.

- Conclusions that fall within the acceptable range defined by the preparing footwear and tire examiner(s) and/or proficiency test provider(s).
- The footwear and tire examiner's documented findings/notes shall support the derived conclusion.

4.13 Feedback of the Test Results to the Footwear and Tire Examiner

The footwear and tire examiner's agency shall have a procedure which ensures the outcome of the proficiency test is communicated to the participant and any other relevant individuals.

4.14 Documentation

The footwear and tire examiner's agency shall have a procedure to retain all proficiency test documentation.

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.

- 1] Abbott, J.R., *Footwear Evidence: The Examination, Identification, and Comparison of Footwear Impressions*, Charles C. Thomas: Springfield, IL, 1964.
- 2] ASTM E2489-16, *Standard Practice for Statistical Analysis of One-Sample and Two-Sample Interlaboratory Proficiency Testing Programs*.
- 3] Bodziak, W.J., *Forensic Footwear Evidence*, 3rd ed.; CRC Press: Boca Raton, FL, 2017.
- 4] Cassidy, M.J., *Footwear Identification*; Public Relations Branch of the Royal Canadian Mounted Police: 1980. (Reprinted by Lightning Powder Company, Inc. 1995.).
- 5] Hilderbrand, D.S., *Footwear, The Missed Evidence*, 3rd ed., Staggs Publishing, Wildomar, CA, 2013.
- 6] IAI Footwear Certification Requirements, International Association for Identification web site².
- 7] IAI *Recommended Course of Study for Footwear & Tire Track Examiners*, International Assoc. for Identification¹. Mendota Hgts., MN, 2006.
- 8] ISO/IEC 17043:2010 *Conformity Assessment - General Requirements for Proficiency Testing*.
- 9] McDonald, P., *Tire Imprint Evidence*, CRC Press, Boca Raton, FL, 1992.
- 10] Nause, L., and G. Carroll. *Forensic Tire Impression Identification*, Canadian Police Research Centre: Ottawa, ON, Canada, 2001.
- 11] *Proficiency Testing in Forensic Sciences, National Commission on Forensic Science*, National Institute of Standards and Technology, March 2016.

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.

² <https://www.theiai.org/>

SWGTREAD, *Range of Conclusions Standard for Footwear and Tire Impression Examinations*, 2013.

SWGTREAD, *Scope of Work Relating to Forensic Footwear and/or Tire Tread Examiners*, 2005

SWGTREAD, *Guide for Minimum Qualifications and Training for a Forensic Footwear and/or Tire Tread Examiner*, 2006.



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