

ANSI/ASB Standard 157, First Edition  
2023

**Required Components for a Proficiency Testing  
Program in Bloodstain Pattern Analysis**



## Required Components for a Proficiency Testing Program in Bloodstain Pattern Analysis

ASB Approved April 2022

ANSI Approved May 2023



410 North 21<sup>st</sup> Street  
Colorado Springs, CO 80904

This document may be downloaded from: [www.aafs.org/academy-standards-board](http://www.aafs.org/academy-standards-board)

*This document is provided by the AAFS Academy Standards Board. Users are permitted to print and download the document and extracts from the document for personal use, however the following actions are prohibited under copyright:*

- *modifying this document or its related graphics in any way;*
- *using any illustrations or any graphics separately from any accompanying text; and,*
- *failing to include an acknowledgment alongside the copied material noting the AAFS Academy Standards Board as the copyright holder and publisher.*

*Users may not reproduce, duplicate, copy, sell, resell, or exploit for any commercial purposes this document or any portion of it. Users may create a hyperlink to [www.aafs.org/academy-standards-board](http://www.aafs.org/academy-standards-board) to allow persons to download their individual free copy of this document. The hyperlink must not portray AAFS, the AAFS Standards Board, this document, our agents, associates and affiliates in an offensive manner, or be misleading or false. ASB trademarks may not be used as part of a link without written permission from ASB.*

*The AAFS Standards Board retains the sole right to submit this document to any other forum for any purpose.*

*Certain commercial entities, equipment or materials may be identified in this document to describe a procedure or concept adequately. Such identification is not intended to imply recommendations or endorsement by the AAFS or the AAFS Standards Board, nor is it intended to imply that the entities, materials, or equipment are necessarily the best available for the purpose.*

*Proper citation of ASB documents includes the designation, title, edition, and year of publication.*

*This document is copyrighted © by the AAFS Standards Board, LLC. 2023 All rights are reserved.  
410 North 21st Street, Colorado Springs, CO 80904, [www.aafs.org/academy-standards-board](http://www.aafs.org/academy-standards-board).*

## Foreword

This document is intended to provide guidance to Forensic Science Agencies providing bloodstain pattern analysis services for the development and adoption of a proficiency testing program.

For accredited laboratories that already have an established quality assurance program and proficiency testing procedures, this document is not intended to supplant the quality standards set forth by accreditation but may assist these agencies in the refinement of their program relative to BPA.

The American Academy of Forensic Sciences established the Academy Standards Board (ASB) in 2015 with a vision of safeguarding Justice, Integrity and Fairness through Consensus Based American National Standards. To that end, the ASB develops consensus based forensic standards within a framework accredited by the American National Standards Institute (ANSI), and provides training to support those standards. ASB values integrity, scientific rigor, openness, due process, collaboration, excellence, diversity and inclusion. ASB is dedicated to developing and making freely accessible the highest quality documentary forensic science consensus Standards, Guidelines, Best Practices, and Technical Reports in a wide range of forensic science disciplines as a service to forensic practitioners and the legal system.

This document was revised, prepared, and finalized as a standard by the Bloodstain Pattern Analysis Consensus Body of the AAFS Standards Board. This document originated as a product of the Scientific Working Group on Bloodstain Pattern Analysis (SWGSTAIN) and it was further developed by the Bloodstain Pattern Analysis Subcommittee of the Organization of Scientific Area Committees (OSAC) for Forensic Science.

Questions, comments, and suggestions for the improvement of this document can be sent to AAFS-ASB Secretariat, [asb@aafs.org](mailto:asb@aafs.org) or 401 N 21st Street, Colorado Springs, CO 80904.

All hyperlinks and web addresses shown in this document are current as of the publication date of this standard.

ASB procedures are publicly available, free of cost, at [www.aafs.org/academy-standards-board](http://www.aafs.org/academy-standards-board).

**Keywords:** *bloodstain pattern analysis, proficiency testing, quality assurance.*

**Table of Contents**

1 Scope.....1

2 Normative References .....1

3 Terms and Definitions .....1

4 Requirements .....1

    4.1 Planning the Proficiency Testing Scheme.....1

    4.2 Test Administration.....2

    4.3 Test Design .....3

    4.4 Test Validation .....3

5 Evaluation .....3

    5.1 Evaluation Procedures .....3

    5.2 Evaluation Results.....4

    5.3 Inconsistencies .....4

    5.4 Levels of Inconsistency .....4

    5.5 Test Feedback .....4

    5.6 Corrective Action.....4

6 Documentation .....5

Annex A (informative) Bibliography .....6

# Required Components for a Proficiency Testing Program in Bloodstain Pattern Analysis

## 1 Scope

This standard establishes required components of a proficiency testing program for forensic science practitioners conducting bloodstain pattern analysis. Components covered in this standard include the testing scheme, general test design, etc. It does not include specific test content.

## 2 Normative References

The following reference is a document that 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.

ISO/IEC 17043:2010, *Conformity assessment—General requirements for proficiency testing*.<sup>a</sup>

## 3 Terms and Definitions

For purposes of this document, the following definitions apply.

### 3.1

#### **bloodstain pattern analyst**

An individual who has completed the prescribed course of study.

### 3.2

#### **external proficiency testing**

An evaluation of practitioner performance against pre-established criteria by means of interlaboratory comparisons. [ISO/IEC 17043:2010]

### 3.3

#### **Forensic Science Service Provider**

#### **FSSP**

A forensic science agency or forensic science practitioner providing forensic science services. .

### 3.4

#### **internal proficiency testing**

An evaluation of practitioner performance against pre-established criteria by means of intralaboratory comparisons.

## 4 Requirements

### 4.1 Planning the Proficiency Testing Scheme

**4.1.1** When establishing a proficiency testing program, a Forensic Science Service Provider (FSSP) shall design a plan which details the components and extent of the program.

---

<sup>a</sup> Available from: <https://www.iso.org/standard/29366.html>

Proficiency tests may be developed internally or acquired from an external proficiency test provider accredited under ISO 17043 [1]. Whenever possible proficiency tests should be acquired from an externally accredited provider.

**4.1.2** The FSSP shall define in the program who is to be tested.

**4.1.3** The program plan shall delineate the scope of the duties the analyst generally performs, unless otherwise documented for non-compliance.

The FSSP should consider accreditation standards and certification requirements.

**4.1.4** The proficiency test shall assess the knowledge, skills, and abilities necessary for bloodstain pattern analysts to fulfill their responsibilities. These areas need not be tested within one test and may include, but are not limited to:

- a) pattern recognition and documentation;
- b) angle of impact determination;
- c) area of convergence and origin determination;
- d) clothing examination;
- e) stain selection and sampling for biological analysis;
- f) photographic techniques;
- g) case analysis and case conclusions;
- h) chemical enhancement; and
- i) presumptive testing.

In addition to these areas, the FSSP should evaluate adherence to their administrative procedures.

**4.1.5** The FSSP shall establish the format(s) for the administration of the proficiency tests. Types of administration formats include the following.

- a) Informed (or non-blinded) – The bloodstain pattern analyst is aware of the test during administration. .
- b) Blind – The bloodstain pattern analyst is unaware of the test during administration.

## **4.2 Test Administration**

**4.2.1** External providers shall be accredited by ISO 17043, for all accredited FSSPs.

**4.2.2** Regardless of whether the FSSP chooses an internal or external test provider, the FSSP shall consider the following:

- a) test designer’s experience and qualifications;

- b) test design and complexity;
- c) relevance to the FSSP and analyst's capabilities; and
- d) whether accredited by ISO 17043, or not.

**4.2.3** The FSSP shall, unless otherwise documented for non-compliance, document that the bloodstain pattern analyst(s) has followed established procedures while performing the test.

**4.2.4** Proficiency testing shall, unless otherwise documented for non-compliance, be conducted on an annual basis for each qualified bloodstain pattern analyst. Consideration should be taken to establish the maximum time intervals between tests in which the analyst's knowledge, skills, and abilities (see 4.1.4) are tested (e.g., extended leave).

### **4.3 Test Design**

**4.3.1** A bloodstain pattern analyst shall be involved in the design and construction of bloodstain pattern analysis proficiency tests.

**4.3.2** The proficiency test should mimic actual casework as closely as possible and include supporting information, when applicable. Patterns should be created using mechanisms similar to those that are encountered in casework. Consistent with typical casework, supporting information should be provided to the participant and may include the following:

- a) general and item-specific scenario information;
- b) stain pattern location and spatial context information;
- c) medical information; and
- d) blood source information (e.g., DNA information).

**4.3.3** The designer shall document the proficiency test design and construction.

### **4.4 Test Validation**

**4.4.1** Proficiency tests offered by an external test provider shall be validated by pre-distribution to other bloodstain pattern analysts, preferably from different agencies.

**4.4.2** While there is no requirement for third party validation of internal or interagency proficiency tests, internal validation should follow the guidelines in this document for external test providers.

## **5 Evaluation**

### **5.1 Evaluation Procedures**

The FSSP shall establish procedures in the program for the evaluation of the proficiency test results.

An FSSP shall consider any issues which affect the objectivity of the evaluator to minimize bias or conflicts of interest. Evaluation of proficiency test results should be carried out so that neither the

evaluator nor test participants know who the other party involved in the evaluation process. The evaluator(s) shall consider the following:

- a) the design and construction of the test;
- b) the expected results as determined by the evaluator;
- c) the consensus results; and
- d) the expected results as supplied by the provider.

## **5.2 Evaluation Results**

- e) The FSSP should identify a bloodstain pattern analyst(s) actively engaged in the field to perform the evaluation. If an evaluator is not available within the FSSP, a FSSP should enter into an agreement with another agency or analyst for evaluation.

## **5.3 Inconsistencies**

If an inconsistency is identified, the FSSP shall determine the cause and level of the inconsistency. The FSSP should have criteria for categorization of inconsistency levels based on its effect on the work product.

## **5.4 Levels of Inconsistency**

FSSP s may have their own levels of inconsistency. The following categories are provided as examples.

- a) Class I – The nature and cause of the inconsistency raised immediate concern regarding the quality of the bloodstain pattern analyst’s work product.
- b) Class II – 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 bloodstain pattern analyst’s work product.
- c) Class III – The inconsistency has only minimal effect or significance, is unlikely to recur, is not systemic, and does not significantly affect the overall reliability of the bloodstain pattern analyst’s work product.

## **5.5 Test Feedback**

The program for the FSSP shall have a procedure that ensures the proficiency test results are conveyed to the bloodstain pattern analyst and any other relevant individuals.

## **5.6 Corrective Action**

The program for the FSSP shall have corrective action procedures in place appropriate to the level and source of the inconsistency.



## **6 Documentation**

The program for the FSSP shall have procedures in place to retain all documentation related to the proficiency test for a prescribed period of time.

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

### **Bibliography**

The following bibliography is not intended to be an all-inclusive list, review, or endorsement of literature on this topic. The goal of the bibliography is to provide examples of publications addressed in the standard.

- 1] Scientific Working Group on Bloodstain Pattern Analysis (SWGSTAIN). *Guidelines for Proficiency Testing in Bloodstain Pattern Analysis*.<sup>b</sup>

---

<sup>b</sup> Available from: [www.nist.gov/system/files/documents/2017/12/14/qaproficiencytestingdocument-final\\_1.pdf](http://www.nist.gov/system/files/documents/2017/12/14/qaproficiencytestingdocument-final_1.pdf)



**ASB**  
**ACADEMY**  
**STANDARDS BOARD**

Academy Standards Board  
410 North 21st Street  
Colorado Springs, CO 80904

[www.aafs.org/academy-standards-board](http://www.aafs.org/academy-standards-board)