

Alaska Scientific Crime Detection Laboratory

Footwear Discipline - Additional Guidelines and Procedures

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Introduction

This document supplements the Alaska State Crime Laboratory Quality Assurance Manual. The guidelines and procedures in this manual are additional, Footwear Discipline specific information.

The numbering scheme in this document follows that of the Alaska State Crime Laboratory Quality Assurance Manual. Supplemental requirements are found in Sections 4 and 5 of this document. Additional requirements in Sections 4 and 5 are listed by the Quality Assurance Manual criteria point they address. In Sections 4 and 5, the phrase "*Nothing Additional*" means there is Nothing Additional to the requirements listed in the Laboratory Quality Assurance Manual.

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Abbreviations

List abbreviations examples from FATM below

+	Positive Control
=	Negative Control
#	Number
AB	Amido Black
ACC	Association of Class Characteristics
ACE-V	Analysis, Comparison, Evaluation - Verification
ALS	Alternative Light Source
ARC	Alaska Reference Collection database
AY7	Acid Yellow7
B&W	Black and White
BLK	Black
BP	Black Powder
CA	Cyanoacrylate Ester (Superglue)
CAD-CAM	Computer Assisted Design – Computer Assisted Manufacture
DAB	Diaminobenzidine
DEV	Developed
DFO	1,8 Diazafuoren-9-one
DIFF	Different
DOB	Date of Birth
DPS	Department of Public Safety
ESDA	Electrostatic Detection Apparatus
ESLA	Electrostatic Lifting Appartus
EXC	Exclusion
FW	Footwear
GL	Gel Lift
HDA	High Degree of Association
ID	Identification
IMP	Impression
INA	Indications of Non-Association
IND	1,2 Indanedione
I/S	Inside
JTRAX	Justice Trax
Ⓛ	Left
L#	Lot Number
LAT	Latent
LCV	Leuco Crystal Violet

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LSD	Lacks Sufficient Detail
LACC	Limited Association of Class Characteristics
MP	Magnetic Powder
NEG or Ø	Negative
NIN	Ninhydrin
O/S	Outside
PH	Photography or Photograph
POSS?	Possible or Possibly
PS	Adobe Photoshop
Q	Quality
Ⓡ	Right
RAC	Random Acquired Characteristic
T/C	Tape Closed
RLS	Request for Laboratory Services form
T/S	Tape Sealed
UV	Ultraviolet
VICT	Victim
VIS	Visible
W/	With
}	On copy of test impression denotes area of corresponding wear (on questioned and known impression)
→	On copy of test impression denotes corresponding random acquired characteristic (on questioned and known impression)

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4 Management requirements

4.1 Organization

Nothing Additional

4.2 Management System

Nothing Additional

4.3 Document Control

Nothing Additional

4.4 Review of requests, tenders and contracts

Nothing Additional

4.5 Subcontracting of tests and calibrations

Nothing Additional

4.6 Purchasing services and supplies

4.6.1 *Nothing Additional*

4.6.2 Initial control testing of chemicals mixed at the laboratory is noted in the CHEM INV Excel Spreadsheet for each batch.

4.6.3 *Nothing Additional*

4.6.4 The Footwear Discipline does not have any critical consumables.

4.7 Service to the Customer

Nothing Additional

4.8 Complaints

Nothing Additional

4.9 Control of nonconforming testing and/or calibration work

Nothing Additional

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4.10 Improvement

Nothing Additional

4.11 Corrective Action

Nothing Additional

4.12 Preventive Action

Nothing Additional

4.13 Control of Records

4.13.1.1 Footwear notes are printed to the JTRAX printer and then imported into JTRAX as a tif file.

4.13.1.2 Digital photos and/or scans for Footwear casework are stored online in the Digital Workplace repository.

4.13.1.3 Access to the Digital Workplace repository is limited to the Physical Section Supervisor, Latent Discipline Analysts and Footwear Discipline Analysts

4.13.1.4 *Nothing Additional*

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4.13.2.1

FOOTWEAR NOTES:

Bench notes should mention examinations conducted, procedures utilized, relevant observations, and evidence photographed should be documented in the examiner's notes. The examination notes must include a complete record of observations to support conclusions reached.

A footwear worksheet may take on many forms but should minimally contain the following information:

Footwear Impression Worksheet	Known Footwear Worksheet	Footwear Comparison Worksheet
Laboratory Number	Laboratory Number	Laboratory Number
Item Number	Item Number	Item Numbers
Analyst Name/Initials	Analyst Name/Initials	Analyst Name/Initials
Date of Recovery	Date of Seizure	Comparison of Outsole Design Notes
Location of Recovery	Seized From	Comparison of Size/Alignment Notes
Origin of Impression	Date Item Opened	Comparison of Wear Characteristics
Substrate	Make/Manufacturer	Comparison of Random Acquired Characteristics
Recovery Method	Model (if known)	Photo of Impression and Test Impression from Footwear
Treatment/Enhancement	Condition	Page Number
Scales Checked	Description of Outsole Design	
Description of Impression	Test Impression Method(s)	
Photo of Impression	Photos of Sole, Uppers, Label and Scan of Test Impression	
Page Number	Page Number	

FOOTWEAR REPORTS

A laboratory report contains the results of footwear examinations and any conclusions drawn. The examiner should include any photos and details that support their conclusions. It may be appropriate to mention any factors that have affected the conclusions (eg. clarity, distortion, movement, or contamination). The conclusion scale should be included as part of the report when used.

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METHODOLOGY

Analysis, Comparison, Evaluation, Verification

The following methodology is a structured and systematic guide for footwear impression evidence. There are four parts to the methodology that includes: Analysis, Comparison, Evaluation, and Verification. This process, which is sometimes referred to as ACE-V, is common to all comparative disciplines. The procedures presented are intended to assist the examiner in the comparison of footwear impressions. They are to be used in conjunction with all applicable laboratory policies and proper scientific methodology.

Analysis

The suitability of a footwear impression for comparison is determined by analyzing the quality of the impression, discussing its limitations.

The analyst then considers the number of impressions and designation (right or left) of each impression, sub itemizing each individual impression. The analyst then writes a brief description of each apparent sole design visible in the impression. The analyst visualizes the impression under different light sources and may enhance the impression using photography and/or alternative lifting methods.

The analyst then examines each of the submitted footwear items taking photographs, test impressions and writing a description of the condition of the footwear for each.

Once the analyst is satisfied there is sufficient detail in the impression for comparison, the analyst considers if there are any noticeable differences in the sole designs between the impression(s) and submitted footwear. If there are not the analyst moves on to comparison.

Comparison

The first step in the comparison process is to ascertain if the appropriate known prints are available for comparison. If, for example, a print is obviously a palm because of its size and/or anatomical features, and an individual has fingerprints on file but no palm impressions on file, no comparison is necessary. The analyst will request appropriate known prints from the submitting agency for the individual. This is also the case if the only known prints on file for an individual are of very low quality. No comparison is necessary, and the analyst will request better quality known prints for the individual.

If appropriate known prints are available, the analyst will conduct a comparison of the latent print to a known exemplar to determine if the ridge formations are in agreement. (Note: Comparisons can also be made between two latent prints or two known exemplars to determine if the prints came from the same source, i.e. individual. In these cases, one of the known exemplars or latent prints is chosen for the initial analysis and the process is identical to a latent print to known exemplar comparison).

If the friction ridge characteristics are not in agreement, the exemplar print is excluded as a source of the latent print and the comparison process proceeds to other known exemplars for the case.

Evaluation

Examiners are encouraged to use the following standardized terminology to express their conclusions in laboratory reports. The conclusions listed are followed by report wording example in bold print. The standardized terminology should not be regarded as the only ways to express opinions in reports, there will be occasions where forcing an examiner to use the standard terminology to express their findings may not accurately represent the evidence and it may even be misleading to do so. The guidelines are not standards and should not be used as such. In following any guideline, the examiner should always consider that sometimes the examination will lead into paths that cannot be anticipated and that no guidelines can cover exactly.

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Identification (definite conclusion of identity)—this is the highest degree of association expressed in footwear examinations. The questioned impression and the known footwear share agreement of class and randomly acquired characteristics of sufficient quality and quantity to conclude that the known footwear is identified as having made the questioned impression.

In the opinion of the examiner, the particular known footwear was the source of, and made, the questioned impression. Another item of footwear being the source of the impression is considered a practical impossibility

High degree of association—The questioned impression and the known footwear must correspond in the class characteristics of design, physical size and general wear. For this degree of association there must also exist: (1) wear that, by virtue of its specific location, degree and orientation make it unusual and/or (2) one or more randomly acquired characteristics.

In the opinion of the examiner, the characteristics observed strong associations between the questioned impression and the known footwear; however the quality and/or quantity were insufficient for an identification. Other footwear with the same class characteristics observed in the impression are included in the population of possible sources only if they display the same wear and/or randomly acquired characteristics observed in the questioned impression.

Association of class characteristics—The class characteristics of both design and physical size must correspond between the questioned impression and the known footwear. Correspondence of general wear may also be present.

In the opinion of the examiner, the known footwear is a possible source of the questioned impression and therefore could have produced the impression. Other footwear with the same class characteristics observed in the impression are included in the population of possible sources.

Limited association of class characteristics—Some similar class characteristics were present; however, there are significant limiting factors in the questioned impression that do not permit a stronger association between the questioned impression and the known footwear. These factors may include but are not limited to insufficient detail, lack of scale, improper position of scale, improper photographic techniques, distortion caused by mark deposition and significant lengths of time between the date of the occurrence and when the footwear were recovered that could account for a different degree of general wear. No confirmable differences were observed that could exclude the footwear.

In the opinion of the examiner, factors (such as those listed above) have limited the conclusion to a general association of some class characteristics. Other footwear with the same class characteristics observed in the impression are included in the population of possible sources.

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Indications of non-association —The questioned impression exhibits dissimilarities when compared to the known footwear; however the details or features were not sufficiently clear to permit an exclusion.

In the opinion of the examiner, dissimilarities between the questioned impression and the known footwear indicated non-association; however the details or features were not sufficient to permit an exclusion.

Exclusion—This is the highest degree of non-association expressed in footwear impression examinations. Sufficient differences were noted in the comparison of class and/or randomly acquired characteristics between the questioned impression and the known footwear.

In the opinion of the examiner, the particular known footwear was not the source of, and did not make, the impression.

Lacks sufficient detail – There are two possibilities for this conclusion.

- 1) No comparison was conducted: the examiner determined there were no discernable questioned footwear impressions or features present. This opinion applies when there is insufficient detail to conduct any comparison.

In the opinion of the examiner, an impression was either not present or the impression lacked sufficient detail for any comparison.

- 2) A comparison was conducted: the examiner determined that there was insufficient detail in the questioned impression for a meaningful comparison. This opinion only applies to the known footwear that was examined and does not necessarily preclude further examinations with other known footwear.

In the opinion of the examiner, the impression lacked sufficient detail for a meaningful comparison regarding the particular known footwear outsole.

Verification

For all footwear impression cases, the assigned verifying analyst performs Analysis, Comparison, and Evaluation. The verifying analyst will have access to the bench notes, test impressions, scaled photographs of impressions and the original items upon request.

If the verifying analyst does not agree with conclusions of the original analyst, then the Latent Print Supervisor is notified for resolution. The Latent Print Supervisor may designate another analyst to review the case in question.

Additional reviews are performed until such a time as the conclusion is agreed upon.

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FOOTWEAR INTELLIGENCE

When a footwear impression is submitted to the laboratory for an intelligence search the following procedure should be used:

The image along with some basic case information (agency case #, offense date, offense type and location) should be emailed to footwear.intelligence@alaska.gov with the subject line reading footwear intelligence search request (or similar). A trained examiner marks the email as actioned and will then conduct a search for the outsole design and manufacturer using the Alaskan Reference Collection (ARC) and any other resources at their disposal. The method of search is outlined in the footwear impression work instructions manual. The examiner who completes the search should upload the image of the impression to the digital workplace under the agency/item # and should input the footwear code (identified on the ARC database) to a searchable field in a standardized format (eg Nike 1234).

If the physical item bearing a footwear impression cannot be photographed and is sent to the laboratory then a request for laboratory services form (RLS) must be completed and evidence will give the exhibit a case number and input it into Justice Trax as per any other case.

If the examiner finds identifies the impression as belonging to a certain class of footwear the return a copy of the footwear outsole and any other information such as manufacturer and model to the submitting officer. This service is intended for intelligence only and as such does not require a full evidential lab submission (RLS etc), nor does it require verification or report.

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4.13.2.2 *Nothing Additional*

4.13.2.2.1 **Start Dates – End Dates – Casework Activities**

The start date for casework is listed at the top of the first page of the case notes.

The end date for casework is the date listed under “Conclusions” in the case notes. Dates for each process are noted next to the process. Processes occurring on the same date are noted in sequence from top to bottom or from left to right in an analyst’s notes.

4.13.2.3 *Nothing Additional*

4.13.2.3.1 *Nothing Additional*

4.13.2.3.2 *Nothing Additional*

4.13.2.4 *Nothing Additional*

4.13.2.5 *Nothing Additional*

4.13.2.5.1 Does not apply to the Footwear discipline

4.13.2.5.2 There are no instrumental analyses in the Footwear Discipline.

4.13.2.6 *Nothing Additional*

4.13.2.7 *Nothing Additional*

4.13.2.8 *Nothing Additional*

4.13.2.9 *Nothing Additional*

4.13.2.10 *Nothing Additional*

4.13.2.11 *Nothing Additional*

4.13.2.12 A verification in the Footwear discipline indicates that a second qualified examiner agrees with the analyst’s opinion reported by the first examiner. Verifications are performed when an examiner puts forth a conclusion. Verifications may or may not include a re-examination of the evidence.

When a verification is to be performed, the case examiner will electronically request a verification examination in the Laboratory Information Management System (LIMS). The verifying examiner will then perform the verification and enter the results into the LIMS system, indicating the date performed.

If the verifying analyst does not agree with the conclusions of the original analyst, then the Latent Print Supervisor is notified for resolution. The Latent Print Supervisor may designate another analyst to review the impressions in question.

Additional reviews are not performed until such a time as the conclusions are confirmed or refuted.

If the conclusions is refuted, appropriate corrective actions are initiated by the Latent Discipline Supervisor.

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4.13.2.13 Discipline abbreviations are listed in the Abbreviations Section of this manual.

4.14 Internal Audits

Nothing Additional

4.15 Management Reviews

Nothing Additional

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5 Technical requirements

5.1 General

5.1.1 *Nothing Additional*

5.1.2 There are no measurements of uncertainty in the Footwear discipline

5.1.3 Controls (positive/negative) are utilized to test the efficacy of Footwear development chemicals.

In general, a development chemical is applied to established (literature, et al.) reactionary substance(s) with an expected result. The reactionary substance may not necessarily be footwear residue (ex: blood, albumin, various fluids of similar constituents as footwear residue, etc.).

An analyst performing a control test should limit chemically misleading variables (ex: lack of humidity, insufficient residue, etc.). Fluorescent reactions should be run under appropriate excitation (ALS/Laser wavelength) conditions (utilization of filters, goggles, etc.). In the case of a negative result, a second controls test should be run under similar conditions with the same lot. If a second negative result occurs, a new lot of the chemical should be prepared, logged, and control tested accordingly.

The Cyanoacrylate/Dyestain process is control tested each time it is used. A fingerprint is placed on a clear piece of glass or plastic and processed with evidence items. All chemical enhancement processes are control tested each time they are used. An impression with appropriate residue is placed on a clean, white sheet of paper and processed with evidence items. Any Positive or Negative control results for casework are recorded in the Analyst's case notes.

Specific information for controls such as reactionary substance or expected results are found in the Footwear Work Instructions Manual.

A control sample "Color change" listed in the Footwear Work Instructions Manual is a transformation from the initial substrate hue. Example – from white paper (initial) to purple color for ninhydrin (positive result).

5.1.3.1 Initial control testing of development chemicals mixed at the laboratory is noted in the CHEM INV Excel Spreadsheet for each batch.

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5.2 Personnel

- 5.2.1 All training documented in the Footwear Impressions Training Manual is supervised by competent, experienced Forensic Scientist III or Forensic Scientist IV analysts.
- 5.2.1.1 All training documented in the Footwear Impressions Training Manual is signed off by competent, experienced Forensic Scientist III or Forensic Scientist IV analysts.
- 5.1.2.2 The Footwear Impressions Training Manual includes a section on court testimony. A mock court is required before an analyst is released for independent casework.
- 5.2.1.3 The Footwear Impressions Training Manual includes sections on other forensic disciplines, court procedures and ethics.

5.3 Accommodation and environmental conditions

- 5.3.1 *Nothing Additional*
- 5.3.2 *Nothing Additional*
- 5.3.3 *Nothing Additional*
- 5.3.4.1 Each analyst has an evidence locker in their work area. Any unassigned work areas' evidence locker can be used as needed. Keys for all evidence locker are stored in a key box in the Firearm discipline gun storage room. The key box can only be opened by the discipline supervisor or designee. Keys are checked out by the discipline supervisor or designee. The duplicate key from each locker is kept locked in the key box.

If an evidence locker key is lost, the discipline supervisor must be notified immediately.
- 5.3.5 *Nothing Additional*
- 5.3.6 *Nothing Additional*

5.4 Test and calibration methods and method validation

- 5.4.1 Processing used for a case evidence is left to analyst discretion. Processing guidelines are listed in the Footwear Work Instructions Manual.
- 5.4.2 *Nothing Additional*
- 5.4.3 *Nothing Additional*
- 5.4.4 *Nothing Additional*

5.4.5 Validation of Methods

- 5.4.5.1 *Nothing Additional*
- 5.4.5.2 Validation records are stored in the Validations folder in the Discipline Share folder.
- 5.4.5.3 *Nothing Additional*
- 5.4.5.4 Performance Check records are stored in the Performance Checks folder in the Discipline Share folder.

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5.4.6 Estimation of uncertainty of measurement

5.4.6.1 *Nothing Additional*

5.4.6.2 Measurement of uncertainty does not apply to the Footwear Impression discipline

5.4.6.3 See section 5.1.2 of this manual

5.4.7 Control of data

5.4.7.1 *Nothing Additional*

5.4.7.2 *Nothing Additional*

5.4.7.2.1 Access to the Digital Workplace repository is limited. The Latent Discipline Supervisor, Latent Discipline Analysts and Latent Processing Technicians have Digital Workplace access.

5.5 Equipment

5.5.1 Equipment used in the Footwear Discipline consists of

- Stereo Microscopes
- Rulers
- Fume Hoods
- Digital Cameras
- Scanners
- Electrostatic Lifting Apparatus
- Electrostatic Detection Apparatus
- Cyanoacrylate Chamber
- Light Source
- Alternative Light Sources (ALS)

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5.5.2 CALIBRATION STANDARDS and INSTRUMENTATION MAINTENANCE

STEREO MICROSCOPE

Each stereomicroscope will be checked prior to use to insure that it is functioning properly. This check will be performed by observing an item under the microscope and utilizing past experience in determining if the instrument appears to be giving a true and accurate representation of the evidence.

RULERS

NIST-traceable rulers will be utilized. The Certificates of Calibration for the NIST-traceable rulers will be maintained in the LIMS and on the laboratory's computer network. The rulers will be calibrated annually.

FUME HOOD

The fume hood will be serviced and certified annually by a reputable outside agency. These preventative maintenance actions will be documented and that documentation kept with the laboratory Quality Assurance records.

DIGITAL CAMERAS

Service as necessary.

SCANNERS

Service as necessary.

ELECTROSTATIC LIFTING APPARATUS

If film adheres to surfaces and/or crackling sound can be heard the unit is functioning.

ELECTROSTATIC DETECTION APPARATUS

Electrostatic Detection Apparatus is control tested when evidence items are processed to ensure proper function. Service as necessary.

CYANOACRYLATE CHAMBER

Cyanoacrylate Chamber is control tested when evidence items are processed to ensure proper function.

LIGHT SOURCES

Function check prior to use.

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ALTERNATIVE LIGHT SOURCES

An alternate light sources used are control tested when evidence items are processed to ensure proper function. Corresponding eye protection and filters must also be checked thusly.

5.5.3 Equipment manuals are stored in the Discipline Share folder.

5.5.4 *Nothing Additional*

5.5.5 Equipment records are stored in Discipline Share folder.

5.5.6 Performance checks - See Section 5.5.2 of this manual.

5.5.7 *Nothing Additional*

5.5.8 Equipment Calibration documentation - See Section 5.5.2 of this manual.

5.5.9 *Nothing Additional*

5.5.10 *Nothing Additional*

5.5.11 *Nothing Additional*

5.5.12 *Nothing Additional*

5.6 Measurement traceability

5.6.1 General

5.6.1.1 Calibration Checks - See Section 5.5.2 of this manual.

5.6.2 Specific Requirements

5.6.2.2.1 NIST traceability- See Section 5.5.2 of this manual.

5.6.2.2.2 SI units - See Section 5.5.2 of this manual.

5.6.3 Reference Standards and Reference Materials

5.6.3.1 *Nothing Additional*

5.6.3.2 *Nothing Additional*

FOOTWEAR REFERENCE COLLECTION

5.6.3.2.1 The laboratory has an alphabetized (by manufacturer) reference collection of outsole design. It consists of test impressions of footwear submitted for casework and anonymized prior to storage. Impressions are identified by manufacturer, model/style, size, country of manufacture and numerical code. The footwear reference collection is stored in footwear laboratory.

5.6.3.3 *Nothing Additional*

5.6.3.3 *Nothing Additional*

5.6.3.4 *Nothing Additional*

5.7 Sampling

Nothing Additional

5.8 Handling of test and calibration items

Nothing Additional

5.9 Assuring the quality of test and calibration results

5.9.1 *Nothing Additional*

5.9.1.1 Control testing is covered under criteria point 5.1.3 in this manual and in the Footwear Work Instruction Manual.

5.9.2 A control test negative result is covered under 5.1.3 in this manual

5.9.3 *Nothing Additional*

5.9.3.1 *Nothing Additional*

5.9.3.2 *Nothing Additional*

5.9.3.3 Each Footwear analyst takes a CTS proficiency test yearly.

5.9.3.3.1 *Nothing Additional*

5.9.3.3.2 *Nothing Additional*

5.9.3.4 Each Footwear analyst takes a CTS proficiency test yearly.

5.9.3.5 *Nothing Additional*

5.9.3.6 *Nothing Additional*

5.9.4 *Nothing Additional*

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5.9.4.1 See 4.13.2.1 in this manual

5.9.4.2 *Nothing Additional*

5.9.4.3 *Nothing Additional*

5.9.5 *Nothing Additional*

5.9.5.1 *Nothing Additional*

5.9.6 *Nothing Additional*

5.9.7 *Nothing Additional*

5.10 Reporting the results

5.10.1 *Nothing Additional*

5.10.2 *Nothing Additional*

5.10.3 Test Results

5.10.3.1 *Nothing Additional*

5.10.3.2 *Nothing Additional*

5.10.3.3 *Nothing Additional*

5.10.3.4 *Nothing Additional*

5.10.3.5 Results and report wordings are covered under criteria point 4.13.2.1 in this manual.

5.10.3.6 Exclusions and report wordings are covered under criteria point 4.13.2.1 in this manual.

5.10.3.7 Inconclusive results and report wordings are covered under criteria point 4.13.2.1 in this manual.

5.10.4 *Nothing Additional*

5.10.5 *Nothing Additional*

5.10.6 *Nothing Additional*

5.10.7 *Nothing Additional*

5.10.8 *Nothing Additional*

5.10.9 *Nothing Additional*

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