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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 272, *Forensic sciences*.

The following is a list of all parts in the ISO 21043 series:

ISO 21043-1, *Forensic Sciences – Part 1: Terms and definitions*

ISO 21043- 2, *Forensic Sciences – Part 2: Recognition, recording, collection, transport and storage of items*

ISO 21043- 3, *Forensic Sciences – Part 3: Analysis*

ISO 21043- 4, *Forensic Sciences – Part 4: Interpretation*

ISO 21043- 5, *Forensic Sciences – Part 5: Reporting*

Introduction

This document is part of a series of five that includes the different components of the forensic process from scene to courtroom. This document establishes requirements designed to safeguard the process for the analysis of items. The requirements are designed to ensure the use of suitable methods, proper controls, qualified personnel, and appropriate analytical strategies throughout the forensic analysis of items.

In this document, the following verbal forms are used:

— “shall” indicates a requirement;

— “should” indicates a recommendation;

— “may” indicates a permission;

— “can” indicates a possibility or a capability.

Further details can be found in the ISO/IEC Directives, Part 2.

Annexes A and B are for information only.

The notes given provide clarification of the text, examples and guidance. They do not contain requirements.

Forensic Sciences —

Part 3: Analysis

1 Scope

This document specifies requirements and provides recommendations for the analysis of items of potential forensic value. It includes requirements and recommendations for the selection and application of suitable method(s) for the analysis to meet the needs of the customer and fulfil the request.

It is applicable to activities conducted by a forensic service provider that occur at the scene and within a facility.

The requirements facilitate the comprehensive, accurate, and reliable analysis of items.

This document is applicable to all disciplines of forensic science; however, it is not applicable to the recovery of digital data which is covered by ISO/IEC 27037[1].

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 21043-2, *Forensic sciences — Part 2: Recognition, recording, collecting, transport and storage of items*

Numerous requirements listed in this standard are also described in ISO/IEC 17025:2017, *General requirements for the competence of testing and calibration laboratories*.

However, references to ISO/IEC 17025:2017 are for information purposes only [2].

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21043-1, *Forensic Sciences – Part 1: Terms and definitions* apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

4 General requirements

4.1 General

The procedures, including methods, for the analysis of items shall be documented, suitable for their intended use and, when applicable, include information regarding:

a) measures that mitigate - the risk of loss, degradation, contamination and/or alteration of items;

b) sampling/selection of items;

c) item preparation;

d) selection of methods suitable to address the customer's request;

e) use of reference and control samples;

f) metrological traceability;

g) assessment of measurement uncertainty;

h) activities to demonstrate reliability of the observations;

i) maintenance, operation, and calibration of equipment (hardware and software), including relevant performance parameters that can substantially impact the observations and their interpretation;

j) environmental conditions that can substantially impact the observations and their interpretation;

k) method limitations;

l) use of any external service providers.

The examiner shall record the relevant observations, data, information and methods used during analysis. Information includes reference to uniquely identified equipment and consumables that can substantially impact the reliability of the observations.

Deviations from a procedure shall be recorded and the record retained.

Refer to ISO 21043-2 for further requirements for item handling and control, including collecting, packaging, labelling, transport, storage, and chain of custody.

4.2 Validation and verification of methods

Methods, including software, calculations and measurements, shall be validated prior to implementation. Methods previously validated elsewhere shall be verified at the facility where they are to be used, prior to implementation. Off-the-shelf analysis software used within its intended purpose and scope may be considered sufficiently validated, but shall be verified prior to implementation.

Known source items, comparable to those encountered in casework, shall be used for method validation and verification.

When changes are made to a validated method, the influence of such changes shall be determined and where they are found to affect the original validation, a new method validation shall be performed prior to implementation[2].

Method validation should include the following performance characteristics, when applicable:

a) precision;

b) accuracy;

c) limit of detection;

d) limit of quantitation;

e) specificity/selectivity;

f) calibration;

g) robustness;

h) carry-over/contamination.