SKIM AKREDITASI MAKMAL MALAYSIA (SAMM)
LABORATORY ACCREDITATION SCHEME OF MALAYSIA

SC 1.1 - SPECIFIC CRITERIA FOR ACCREDITATION IN THE FIELD OF FORENSIC SCIENCE TESTING

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(Supplementary to MS ISO/IEC 17025)

MS ISO/IEC 17025

JABATAN STANDARD MALAYSIA
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Introduction

This document addresses the specific criteria that are essential for the proper conduct of test in the field of forensic science testing as stated in the scope below. It provides details of additional information to the generally stated requirements of the *Skim Akreditasi Makmal Malaysia* (SAMM) accreditation criteria.

This document shall be read in conjunction with MS ISO/IEC 17025, Skim Akreditasi Makmal Malaysia (SAMM) policies and other relevant requirements published by Department of Standards Malaysia (Standards Malaysia).

The clause numbers in this document correspond to those of MS ISO/ IEC 17025 (except subclauses 3) but since not all clauses require additional requirements, the numbering may not be continuous.

1. Scope

Forensic Science applies scientific methods or expertise to investigate crimes or examine evidence that might be presented in a court of law. Forensic science work involves the examination of a wide range of items and substances. The classes defined in this document do not constitute any restriction on the work that a laboratory can perform but provide a convenient means of expressing the laboratory's recognised capability.

Classes of test appropriate to forensic science testing are listed in Appendix 1. These classes are potential range of activities involved in forensic science testing laboratories on the basis of the types of samples being tested, the scientific disciplines involved, and the test methods employed.

2. Normative References

i. MS ISO/IEC 17025:2017 – General Requirements for The Competence of Testing and Calibration Laboratories.
ii. SAMM Policy 2 (SP 2) – Policy on the Metrological Traceability of Measurement Results.
iii. SAMM Policy 4 (SP4) – Policy for Participation in Proficiency Testing Activities.
iv. SAMM Policy 5 (SP5) – Policy on Measurement Uncertainty Requirements for SAMM Testing Laboratories.
v. SAMM Policy 6 (SP6) – Requirements for SAMM Approved Signatory.

The undated references indicate the latest edition of the referenced documents including any amendments.

3. Terms and Definitions

For the purpose of this Specific Criteria, the relevant terms and definitions given in MS ISO/IEC 17025:2017 apply except for the terms and definitions of which have been added below:

a) Chain of Custody

Procedures and chronological records that account for the possession of an exhibit by tracking its handling and storage while in the custody of a laboratory.

b) Controlled Substance

A drug or chemical whose manufacture, possession and use are regulated by the government. This may include illegal drugs, prescription medications and poisons.

c) Dangerous Drugs

Any drug or substance which is for the time being comprised in the First Schedule of the Dangerous Drugs Act 1952.

d) Examiner/Analyst

An individual who performs casework related duties on exhibits within the laboratory and issues reports containing results, opinions and interpretations based on his/her findings.

e) Exhibit

A test item submitted for the purpose of forensic examination.

f) Questioned Document

Printed, scanned, photocopied, typed or written material for the purpose of identifying the source, determining alterations or other means of gaining information about the item or the circumstances surrounding its production for the purpose of authenticating the document.

i. **Collected Specimen** refers to contemporary specimen document taken from personal or business files or social activities for the purpose of comparison with the questioned document.

ii. **Requested Specimen** refers to document specimen prepared specifically for the purpose of forensic document examination.

g) Reference/Specimen Collection

A collection of suitable specimen, materials, substances, objects or artefacts of known properties or origin that may be used in the determination and comparison of the properties or origins of unknown items.

h) Technical Support Personnel

A person who assists in carrying out casework-related duties on exhibits within the laboratory under the supervision of an Examiner/Analyst.

i) Test Report

A written report of the results, opinions and interpretations of forensic tests/examinations carried out on exhibit/test item submitted to the laboratory.

4. General Requirements

Same as in MS ISO/IEC 17025.

5. Structural Requirement

Same as in MS ISO/IEC 17025.

6. Resource Requirements

6.1 General

Same as in MS ISO/IEC 17025.

6.2 Personnel

In addition to MS ISO/IEC 17025, the following provides clarification to the corresponding clauses of MS ISO/IEC 17025:

6.2.1 All personnel of the laboratory shall include permanent or contract personnel. When personnel are seconded (whether permanent or contract), from another organization (including a forensic laboratory), their competence shall be verified by the laboratory. Where the laboratory utilises temporary personnel, the laboratory shall ensure that temporary personnel are competent and work in accordance with the laboratory's management system.

Personnel shall sign a Code of Conduct (however named) that addresses ethical behaviour, confidentiality, impartiality, any other issues needed to ensure appropriate conduct and safety of all personnel in the laboratory. The Code of Conduct shall be applicable to all personnel, whether permanent, contract or temporary personnel.

6.2.2 The requirements for forensic testing laboratory personnel are defined as follows:

a) Education:

i) For approved signatory and Examiner/Analyst, academic requirements shall include a bachelor's degree in Forensic Science, Science, Biology, Chemistry, Physics, Computer Science, Electrical and Electronic Engineering and/or any relevant discipline that is recognised by Malaysian Qualifications Agency (MQA).

ii) For technical support personnel, academic requirement for education shall possess a minimum of *Sijil Pelajaran Malaysia* (SPM) or equivalent.

b) Training:

For approved signatory, training requirements shall include training in the presentation of evidence in court.

c) Work experience:

For approved signatory, work experience shall be a minimum of one (1) year.

d) Proficiency testing:

All personnel shall undergo yearly proficiency testing and obtain satisfactory results.

6.2.3 The laboratory shall define the qualifications and responsibilities of the administrative reviewer and technical reviewer. The administrative reviewer is not required to be a current or former qualified technical analyst.

6.2.4 The laboratory shall have and follow a documented procedure whereby the testimony of each Examiner/Analyst is monitored on a regular basis. The evaluation shall include appearance, performance and effectiveness of presentation. The monitoring procedure shall also prescribe the

remedial action that is to be taken should the evaluation be less than satisfactory.

6.3 Facilities and Environmental Conditions

Same as in MS ISO/IEC 17025.

6.4 Equipment

In addition to the requirements of MS ISO/IEC 17025, the following shall apply:

6.4.1 Reference/specimen collections of data or items/materials encountered in casework which are maintained for identification, comparison or interpretation purposes (e.g. mass spectra, motor vehicle paints or headlamp lenses, drug samples, typewriter print styles, wood fragments, bullets, cartridges, DNA profiles, frequency databases) shall be fully documented, uniquely identified and properly controlled.

6.4.2 For Digital Forensics:

The laboratory shall retain records that establish traceability of its testing software and firmware equipment to a credible source. The latest or compatible version of the software and firmware shall be used. All software and firmware shall be verified before use.

6.5 Metrological Traceability

The requirements of MS ISO/IEC 17025 and SAMM Policy 2 (SP 2) - Policy on the Metrological Traceability of Measurement Results apply.

6.6 Externally Provided Product and Services

Same as in MS ISO/IEC 17025.

7. Process Requirements

7.1 Review of Requests, Tenders and Contracts

In addition to the requirements of MS ISO/IEC 17025, the following shall apply:

a) All samples submitted shall be accompanied by a formal request form or letter from the customer and upon registration, an official receipt shall be issued by the laboratory.

b) For Questioned Document Examination:

i) Wherever possible, original copy of the questioned and specimen documents shall be submitted for examination

ii) Any questioned document submitted for examination shall be accompanied by collected and/or requested specimen(s) that should be contemporary or as close as possible to the date of the questioned document.

c) For Ignitable Substances:

Where appropriate, a random sample from each batch of the absorbent materials, bags or containers used for collecting fire debris evidence shall be submitted as a control to rule out any incidental contamination.

7.2 Selection, Verification and Validation of Methods

7.2.1 Selection and Verification of Methods

In addition to the requirements of MS ISO/IEC 17025, the following shall apply:

a) All methods shall be fully documented including procedures for quality control, and, where appropriate, the use of reference/specimen collection.

b) When there is a need for any destructive examination to be carried out, consultation with the submitting authority is required prior to destructive testing.

c) When multiple techniques are used, non-destructive techniques shall be performed first.

d) For questioned document examination:

i) Indentation examination shall be conducted prior to any chemical processing on the questioned document(s).

ii) Before a questioned document is subjected to any destructive examination, a duplication including but not limited to photocopy, of the questioned document shall be made for reference.

e) For ignitable substances:

Ignitable substances shall be isolated from the burnt or partially burnt fire debris using appropriate sample preparation technique which shall

be validated and verified before being adopted for use by the laboratory.

7.2.2 Validation of Methods

In addition to the requirements of MS ISO/IEC 17025 the following shall apply:

a) All methods used by a forensic science laboratory shall be fully validated before being used in casework.

b) Where a laboratory introduces a new (validated) method, it shall first demonstrate the reliability of the procedure in-house against any documented performance characteristics of that procedure.

c) Records of validation shall be maintained for future reference.

d) For infrequently performed tests or analysis, the laboratory shall institute a procedure to reverify its capability to perform the test through but not limited to the following:

   i. Regular analysis of control samples and use of control charts even when casework samples are not being analysed; or

   ii. Demonstration of the personnel competence through the use of appropriate reference material before working on the case work sample.

7.3 Sampling

Same as in MS ISO/IEC 17025.

7.4 Handling of Test and Calibration Items

In addition to the requirements of MS ISO/IEC 17025, the following shall apply:

a) The laboratory shall be able to demonstrate that the items examined and reported on were those submitted to the laboratory. A ‘chain of custody’ record shall be maintained from the time of receipt of the test items until its return to the submitting authority.

b) There shall be documented procedures which describe the measures taken to secure exhibits in the process of being examined.

c) At any time, in the process of examination, the exhibits shall not be left unattended.

d) Exhibit integrity shall be a key consideration throughout the forensic science process. The storage conditions shall be such as to prevent loss, deterioration, contamination and to maintain the integrity and identity of the exhibit. This applies both before and after analysis has been performed. The laboratory shall have sufficient storage for keeping exhibits. Where perishable items are stored any degradation of the samples shall be minimised.

e) Access to laboratory and storage shall be restricted to authorised personnel.

f) For Digital Forensics:

Upon receiving, the laboratory shall make a copy of the data in the test item to ensure its integrity under the custody of the laboratory. A copy of the data shall be kept by the laboratory and made available to the submitting authority.

7.5 Technical Records

The laboratory record pertaining to the examination/analysis contains all the relevant information required by MS ISO/ IEC 17025 as well as the following:

a) The laboratory shall have written procedures for taking and maintaining case notes and shall maintain all documentation generated by the Examiner/Analyst related to each case examined to support the conclusions drawn in laboratory reports.

b) The laboratory shall generate sufficient documentation for each technical analysis to support the reported conclusions such that in the absence of the technical analyst who performed the analysis, another qualified individual could evaluate and interpret the resulting data and/or observations.

c) Where appropriate, observations or test results (e.g. electropherograms, physical matches, thin-layer chromatography results, questioned documents etc.) shall be preserved and/or recorded accordingly.

d) When a test result or observation is not being taken into consideration in the interpretation of the final result, the reason(s) shall be recorded.

7.6 Evaluation of Measurement Uncertainty

Same as in MS ISO/IEC 17025 and SAMM Policy 5 (SP5) - Policy on Measurement Uncertainty Requirements for SAMM Testing Laboratories.

7.7 Ensuring the Validity of Results

In addition to the requirements of MS ISO/IEC 17025 and SAMM Policy 4 (SP4) - Policy for Participation in Proficiency Testing Activities, the following shall apply:

a) Analytical performance shall be monitored by operating quality control procedures which are appropriate to the type and frequency of testing undertaken by a laboratory. The range of quality control activities available to laboratories includes the use of:
   i. reference/specimen collections, use of different methods of examination and blank, positive and negative controls;
   ii. control charts;
   iii. spiked samples, standard additions and internal standards;

b) Depending on the particular test being performed, the laboratory may make use of one or several of these examples to ensure the validity of results.

c) The quality control procedures necessary in any particular area of work shall be determined by the laboratory responsible for the work. The procedures shall be documented, and records shall be retained to show that all appropriate quality control measures have been taken, that all quality control results are acceptable or, if not, that remedial action has been taken.

d) The laboratory shall participate in relevant PT programmes offered by PT Providers, where available, accredited to ISO/IEC 17043.

e) Each Examiner/Analyst and Technical Support Personnel shall successfully participate in at least one proficiency test annually in the discipline that the personnel are involved.

f) A signatory shall have successfully undergone a proficiency testing program in the related discipline, provided by an accredited proficiency testing provider. Justification shall be provided where an accredited proficiency testing provider is not used.

g) The laboratory shall review and evaluate the performance of its personnel in the proficiency testing programme. Records of the review and evaluation shall be maintained by the laboratory.

7.8 Reporting the Results

7.8.1 General

In addition to the requirements of MS ISO/IEC 17025:2017, the following shall apply:

a) In the event that the form of a sample had been changed during analysis, a note stating this fact should be included in the test report.

b) All case reports shall be subjected to administrative and technical reviews.

7.8.2 Common Requirements for Reports (Test, Calibration or Sampling)

In addition to the requirements of ISO/IEC 17025:2017, the laboratory report shall where applicable include but not limited to the following information:

a) customer's reference number

b) description of evidence/exhibit received and examined

c) additional marking or labelling introduced during the examination (if any)

d) any exhibit used up

e) results of examination

f) interpretation, conclusion and opinions with the basis stated

g) disposal or return of exhibit after examination

h) name, function and signature of the personnel authorising the report

7.8.3 Specific Requirements for Test Reports

In addition to the requirements of MS ISO/IEC 17025:2017, the following shall apply:

a) The laboratory shall have written procedures for the disclosure of information related to case work and exhibit(s).

b) The laboratory shall have written procedures for handing over of case work report and exhibit(s).

c) The laboratory shall have written procedures for administrative and technical reviews to ensure supporting data and conclusions are reasonable and in the constraints of scientific knowledge.

d) For Ignitable Substances:

Ignitable liquids shall be reported specifically, or as in the relevant ASTM Ignitable Liquid Classification Scheme.

e) For Drugs and Controlled Substances:

Where a drug or substance has been defined or listed in the Act, a note stating the identity of the drug or substance or the schedule under which it is listed in the Act shall be included in the test report.

7.8.7 Reporting Opinions and Interpretations

In addition to the requirements of MS ISO/IEC 17025:2017, the laboratory may, when necessary, include interpretations and opinions in the test reports. Interpretations and opinions are included in the test reports with the intention to assist in the investigation and subsequent presentation of expert evidence in court as stipulated in the Malaysian Evidence Act 1950 [Act 56].

7.9 Complaints

Same as in MS ISO/IEC 17025.

7.10 Non-Conforming Work

Same as in MS ISO/IEC 17025.

7.11 Control of Data and Information Management

Same as in MS ISO/IEC 17025.

8. MANAGEMENT SYSTEM REQUIREMENTS

8.1 Options

8.2 Management System Documentation

Same as in MS ISO/IEC 17025.

8.3 Control of Management System Documents

Same as in MS ISO/IEC 17025.

8.4 Control of Records

In addition to the requirements of MS ISO/IEC 17025:2017, the laboratory shall have documented policies and procedures for the identification, storage, protection, back-up, archive, retrieval, retention time, and disposal of case records, including test reports.

8.5 Actions to Address Risks and Opportunities

Same as in MS ISO/IEC 17025.

8.6 Improvement

Same as in MS ISO/IEC 17025.

8.7 Corrective Actions

Same as in MS ISO/IEC 17025.

8.8 Internal Audits

In addition to the requirements of MS ISO/IEC 17025:2017, an internal audit shall be carried out at least every twelve months. The internal auditor(s) shall be trained, qualified and where resources permit, independent of the activities to be audited.

8.9 Management Reviews

Same as in MS ISO/IEC 17025.

APPENDIX 1

Classes of Testing: Forensic Science Testing

1. DNA and Serology Testing

a. DNA profiling
b. Paternity and kinship testing
c. Body fluid identification
d. Others related to DNA & serology testing

2. Questioned Document Examination

a. Handwriting and signature
b. Inks and printing materials
c. Paper
d. Copiers and copied material
e. Rubber stamps
f. Indentations and alterations
g. Security features markings
h. Typewriters and typewritten material
i. Printers, printing process and printed objects
j. Embossing and embossed materials
k. Charred document
l. Others related to questioned document

3. Dangerous Drugs and Other Controlled Substances

a. Illicit drugs
b. Controlled pharmaceuticals
c. Botanical materials
d. Related chemicals and paraphernalia
e. Others related to dangerous drugs and other controlled substances

4. Toxicology

a. Pharmaceutical products
b. Alcohol
c. Poison
d. Drugs (including therapeutic and dangerous drugs)
e. Pesticide
f. Others related to toxicology

5. Trace Evidence

a. Glass
b. Paint
c. Fibres and hairs
d. Soils
e. Acids and alkali
f. Botanical material
g. Dyes and pigments
h. Identification marks (including number restoration)
i. Oils and greases
j. Adhesives
k. Cosmetics
l. Other examinations related to trace evidence analysis

6. Firearms and Firearms Identification

a. Bullets and cartridges
b. Firearms
c. Firearm discharge residues
d. Trajectory and firing range determination
e. Others related to firearms and firearms identification

7. Fire and Explosion Investigation

a. Hydrocarbon fuels
b. Incendiary devices
c. Fire debris
d. Explosives and explosion residues
e. Explosives and explosion debris
f. Explosives devices
g. Pyrotechnic devices
h. Others related to fire and explosion investigation

8. Vehicles and Vehicle Accident Investigation

a. Component and electrical failures
b. Speed calculations
c. Identification marks (including number restoration)
d. Tyre examination
e. Vehicle involved in accident (and relative position of impact)
f. Others related to vehicles and vehicle accident investigation

9. Marks and Impressions

a. Damage examination
b. Glove marks
c. Shoe marks
d. Tyre marks
e. Fabric impression
f. Tool marks and impressions
g. Others related to marks and impressions

10. Fingerprints

a. Fingerprints (development and comparison)
b. Palmprints (development and comparison)
c. Footprint (development and comparison)
d. Other examinations related to fingerprints

11. Digital Forensics

a. Computer (hardware and software)
b. Mobile device
c. Social media account
d. Closed Circuit Television (CCTV)
e. Plastic/magnetic cards
f. Other examinations related to digital forensics

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