



STANDARDS
MALAYSIA

**MALAYSIA INSPECTION BODIES ACCREDITATION SCHEME
(MIBAS)**

**MTR 2 - MIBAS TECHNICAL REQUIREMENTS FOR
ACCREDITATION OF NON-DESTRUCTIVE TESTING**

Issue 3, 10 February 2022

(Supplementary to MS ISO/IEC 17020)



MS ISO/IEC 17020

**JABATAN STANDARD MALAYSIA
Department of Standards Malaysia**

TABLE OF CONTENTS

	Page
1 Introduction and scope	1
2 Normative references	2
3 Terms and definitions	2
4 General requirements	2
4.1 Impartiality and independence	2
4.2 Confidentiality	2
5 Structural requirements	2
5.1 Administrative requirements	2
5.2 Organisation and management	2
6 Resource requirements	3
6.1 Personnel	3
6.2 Facilities and equipment	4
6.3 Subcontracting	5
7 Process requirements	5
7.1 Inspection methods and procedures	5
7.2 Handling inspection samples and items	6
7.3 Inspection records	7
7.4 Inspection reports and inspection certificates	7
7.5 Complaints and appeals	7
7.6 Complaints and appeals process	7
8 Management system requirements	7
Appendix 1 - Calibrations interval for reference standards and measuring instruments in NDT	8
Bibliography	11
Acknowledgements	12

1 Introduction and Scope

1.1 This specific technical requirement document shall provide additional or more specific detail about particular requirements in Non-Destructive Testing (NDT).

1.2 The document shall be read in conjunction with the following documents:

- i) MS ISO/IEC 17020 - Conformity assessment - Requirements for the operation of various types of bodies performing inspection;
- ii) ILAC P15 - Guidance on the application of ISO/IEC 17020;
- iii) MIBAS policy requirements and government regulations.

Note: Where the year of publication is not specified, the latest version of the publication applies

1.3 The clause numbers in this document correspond to those of MS ISO/ IEC 17020 but since not all clauses require additional requirements, the numbering may not be continuous.

1.4 An inspection body accredited for performing NDT under MS ISO/IEC 17020 may perform and report on the following activities:

- a) Testing to appropriate defined standards and procedures, interpretation of test results against the agreed acceptance standards/criteria and determination of conformity.
- b) Determination of significance of defects found based on test results.

1.5 Inspection of NDT may include, but not limited to, the use of the following methods:

- a) Acoustic emission testing (AT)
- b) Eddy current testing (ET)
- c) Infrared thermographic testing (TT)
- d) Leak testing (LT)
- e) Magnetic testing (MT)
- f) Penetrant testing (PT)
- g) Radiographic testing (RT)
- h) Strain gauge testing (ST)
- i) Ultrasonic testing (UT)
- j) Visual testing (VT)

2 Normative references

- i) MS ISO/IEC 17020 Conformity Assessment- Requirements for the Operation of Various Types of Bodies Performing Inspection.
- ii) ILAC-P15 Application of ISO/IEC 17020:2012 for the Accreditation of Inspection Bodies.
- iii) Laws of Malaysia - Act 304 (Atomic Energy Licensing Act 1984).
- iv) Laws of Malaysia - Act 514 (Occupational Safety and Health Act 1994).

3 Terms and definitions

- 3.1** Non-Destructive Testing or NDT: is a form of material/component testing method without involving any form of destruction, damaging or altering the structure of the material. (The Official Portal of Department Skills Development, www.dsd.gov.my)
- 3.2** Radiation Protection Officer (RPO): is a specialist in radiation safety and compliance matters.

4 General requirements

4.1 Impartiality and independence

Same as in MS ISO/IEC 17020 and ILAC P15.

4.2 Confidentiality

Same as in MS ISO/IEC 17020 and ILAC P15.

5 Structural requirements

5.1 Administrative requirements

The inspection body that performs radiographic testing shall possess valid licence(s) as required by the Atomic Energy Licensing Board (AELB).

5.2 Organisation and management

- 5.2.1** Inspection body performing RT and other inspections utilizing ionising radiation shall appoint a RPO and *Orang Bertanggungjawab Terhadap Lesen* (OBTL) as required by the AELB.

5.2.2 Inspection body applying for accreditation shall have knowledge on the relevant management system requirements of the Occupational Safety and Health Management such as MS 1722 or ISO 45001.

6 Resource requirements

6.1 Personnel

6.1.1 In all instances, the inspection body is required to demonstrate that the personnel qualifications specified in the standard or customer specification or applicable regulations are met.

6.1.2 Personnel performing NDT shall be qualified and certified in accordance with one of the followings as appropriate:

- a) Malaysian Skills Certification System for NDT, Department of Skills Development (DSD), Ministry of Human Resources (Malaysia) (Also known as Jabatan Pembangunan Kemahiran (JPK), Kementerian Sumber Manusia Malaysia);
- b) Other independent certifying body meeting a standard that can be demonstrated, as equivalent to ISO 9712;
- c) Certifications issued by an employer under a recognised certification framework (including The American Society for Non-destructive Testing for Personnel Qualification and Certification in Non-destructive Testing (ASNT SNT-TC-1A)) are acceptable, provided that the scheme is directly implemented and administered by the NDT facility and has been subject to on-site assessment and subsequent approval by an independent body within the past five years. The report from the independent body approving the SNT-TC-1A scheme must be authorised by a person, or persons, holding ISO 9712 (or equivalent) Level 3 qualifications in all relevant methods. To be considered independent, the assessing body would need to have no commercial or other interest in the company to be assessed outside of the assessment arrangements.
- d) The inspection body Level 3 personnel shall review and verify the qualifications and certificate issued by the employer. All the records of training, examination and experience shall be properly documented.

6.1.3 In addition to requirement 6.1.2, personnel performing radiography inspection shall be recognised by the AELB responsible for matters related to radiation protection.

6.1.4 In addition to requirements 6.1.2 and 6.1.3, inspection body performing radiography inspection shall employ a RPO that is recognised by the AELB responsible for matters related to radiation protection.

6.1.5 The inspection body is required to demonstrate that NDT personnel engaged for inspection have the knowledge and experience in the type of defects, which may occur during manufacture, and/or use of the plant examined.

6.1.6 The personnel responsible for determination of significance of defects found, based on test results (i.e. inspection bodies accredited to the scope defined in 1.4 of this publication) should, in addition to the appropriate qualifications, experience, training and satisfactory knowledge of the examinations carried out, also have;

- a) Relevant knowledge of the technology used for the manufacturing of the items tested (materials, products etc.) or the way they are used or intended to be used and or the defects or degradations which may occur during use
- b) Knowledge of the general requirements specified in the legislation and standards: and
- c) An understanding of the significance of defects found with regard to the normal use of the items, material, product, etc. concerned.

6.1.7 The documented guidance for the conduct of NDT personnel as required by Clause 6.1 of MS ISO/IEC 17020 should cover aspects such as; impartiality, safety and health of personnel, protective clothing ethic relating to work, human factors, eyesight checks and other such issues.

6.1.8 Approved signatory

The nominees for approved signatory for NDT shall comply with MIBAS Policy 1 and have at least Level 2 certification as described in Clause 6.1.2 above.

Note: Only personnel with RT Level 2 or Level 3 certification by DSD are accepted as an approved signatory for RT.

6.2 Facilities and equipment

6.2.1 Sealed sources and radiation apparatus used for radiography inspection shall meet the requirements of AELB.

6.2.2 Maintenance of radiography devices shall be undertaken by organisation recognised by AELB.

6.2.3 Storage of radioactive material used for radiographic inspection shall be approved by AELB.

6.2.4 Defective radiographic exposure devices that can no longer be repaired shall be disposed in accordance with procedures outlined by AELB.

6.2.5 The calibration and checking intervals for NDT equipment are as specified in Appendix 1.

6.3 Subcontracting

Same as in MS ISO/IEC 17020 and ILAC P15.

7 Process requirements

7.1 Inspection methods and procedures

7.1.1 The inspection body shall use the methods and procedures for inspection which have been jointly agreed between the inspection body and the customer. The inspection body shall advise the customer on any limitations of the methods and techniques to be adopted that may affect the required level of reliability.

Latest standard method is preferable, however it is acceptable based on customer request or contract agreement.

7.1.2 The inspection body shall ensure that the qualification and certification of NDT personnel is appropriate to the inspection to be carried out. This should include checking any limitations in the scope of the certified competence, prior experience and the need for supervision.

7.1.3 The inspection body that performs NDT inspection shall have an established contract review procedure which includes but not limited to the followings:

- a) That the inspection body has the necessary resources, equipment, qualified personnel to undertake the NDT work;
- b) Identification of the test method;
- c) Identification of any acceptance criteria;
- d) Any specific qualification requirements e.g. for non-standard test methods or high integrity;
- e) Any client approval requirements (particularly for non-standard methods);
- f) That the qualification and certification of NDT personnel is appropriate to the inspection to be carried out (This should include checking any

limitations in the scope of competence certified and the resulting need for job specific training and authorisation);

- g) Any specific handling instructions for highly machined components;
- h) Any specific marking instructions e.g. use of halogen free markers;
- i) Any specific reporting requirements including documentation requirements;
- j) Availability of drawings, inspection plans/programmes;
- k) Any specific quality control/monitoring arrangements;
- l) Client acceptance of any necessary sub-contracting.

7.1.4 Where activities on site are involved, the review should also include issues such as:

- a) Responsibility for removal of any cladding, lining or coatings and preparation of the surface for testing;
- b) Access arrangements, working conditions and provision of stable working platforms;
- c) Hazards.

On completion of the review process, the contractual responsibilities of both purchaser and supplier should be clear when contracts are placed.

7.2 Handling inspection samples and items

7.2.1 Samples and items to be inspected shall be clearly identified in a manner that they can be precisely identified against the inspection results. For radiography inspection, these identification numbers and letters shall be clearly visible on the radiographs.

7.2.2 The method of identification shall not damage the samples and items inspected. The use of halogen free markers is recommended for metals affected by halogen materials.

7.2.3 Samples and items that have been tested shall be clearly indicated and marked or mapped on the reference drawing.

7.2.4 For inspection that requires pre-cleaning and post-cleaning to samples and items, the inspection body shall establish and document the cleaning procedures to avoid damage to the inspected samples and items, as well as to ensure that inspection can be performed effectively.

7.3 Inspection records

The retention period for records should be determined and documented to ensure that customer and regulatory requirements are met.

7.4 Inspection reports and inspection certificates

7.4.1 Sampling is often involved as part of the inspection. Reports must indicate the sampling basis and identify when sampling has been carried out by anyone other than the accredited inspection body.

7.4.2 Reports shall identify any factors which have prevented the inspection from being carried out as intended, e.g. restricted access, inadequate surface finish, surface temperature etc.

7.4.3 The decision on the status of the inspected samples and items (e.g. accepted, rejected, repair, etc.) shall be based upon the criteria specified by the owner or agreed by both parties and shall be reported in the final report.

7.5 Complaints and appeals

Same as in MS ISO/IEC 17020 and ILAC P15.

7.6 Complaints and appeals process

Same as in MS ISO/IEC 17020 and ILAC P15.

8 Management system requirements

Same as in MS ISO/IEC 17020 and ILAC P15.

Appendix 1

Calibration and checking intervals for reference standards and measuring instruments in NDT

No.	Item of equipment	Calibration interval	Checking interval	General comments
A. Ultrasonic Testing				
1.	Probe and sensory electronics (setting up the assembly)	Not Applicable	Each time before use	Ultrasonic standard calibration blocks
2.	Standard calibration blocks (material properties)	Not Applicable	Initial	As per specific standard method (e.g. EN ISO 7963, AWS, ASME or equivalent).
3.	Standard calibration blocks (surface conditions)	Not Applicable	Each time before use	Visual examination for deterioration such as corrosion or mechanical damage.
4.	Reference standard calibration blocks (radius and other dimensional checks)	Every 5 years	Not Applicable	By an accredited calibration laboratory or National Metrology Institute (NMI).
5.	Working standard calibration blocks (radius and other dimensional checks)	Not Applicable	Intermediate checks every 2 years	By comparison with reference standard calibration block. If no reference standard calibration block is available, then by an accredited calibration laboratory or National Metrology Institute (NMI).
6.	Ultrasonic test sets <ul style="list-style-type: none"> • linearity of time base • linearity of equipment gains • sensitivity and signal to noise ratio • pulse duration 	Not Applicable	Verified weekly or each time the equipment is used	
7.	Ultrasonic probes and systems <ul style="list-style-type: none"> • probe index • probe beam angle • visual checks for damage 	Not Applicable	The performance characteristics checked at least once per day or before use	
8.	Ultrasonic flaw detectors <ul style="list-style-type: none"> • linearity of time base • linearity of amplifier • accuracy of calibrated attenuator 	Not Applicable	Verified at intervals not exceeding twelve months	

No.	Item of equipment	Calibration interval	Checking interval	General comments
B. Magnetic Testing				
9.	Magnetic particle solution (visible/fluorescence)	Not Applicable	Each batch	Valid manufacturer's certificate with conformance to a standard (e.g. BS, ASTM or EN).
10.	Magnetic inks (for aerosols)	Not Applicable	Each batch	Valid manufacturer's certificate with conformance to a relevant standard. Flux indicators should be used to demonstrate the direction of flux.
11.	Magnetic particle concentration check	Not Applicable	Each shift	As per specific standard method (e.g. ASTM, BS)
12.	Visible light level intensity checks on the test surface	As per specific standard method (e.g. ASTM, BS)		Check the level of illumination using a calibrated light meter each time before use.
13.	Black light level intensity check on the test surface			
14.	UV(A) light meter	Yearly	Not Applicable	By an accredited calibration laboratory or by National Metrology Institute (NMI).
15.	White light meter			
16.	Permanent magnet and magnetic yokes	Not Applicable	6 monthly	Check by measuring the lifting power or pull-off force in accordance with a relevant standard.
17.	Reference Weights (for checking strength of magnet)	Not Applicable	Initial	Once calibrated for life. Calibrate by means of a calibrated balance.
18.	Gauss meter	Yearly	Not Applicable	By an accredited calibration laboratory or National Metrology Institute (NMI).
19.	Ammeter			
C. Radiographic Testing				
20.	Gamma Ray – Source Size X-Ray – Focal Spot Size	Not Applicable	Initial	Manufacturer's certification with official record of dimensions.
21.	Densitometer	Not Applicable	90 days	Calibrate against a reference density strip, which is calibrated by an accredited calibration laboratory or National Metrology Institute (NMI).
22.	Film density strip	As manufacturer's recommendation, whichever is	Not Applicable	By an accredited calibration laboratory or National Metrology Institute (NMI) where available.

		earlier.		Note: Date of first usage of strip to be recorded.
23.	Survey meters	Yearly	Not Applicable	As required by the Atomic Energy Licensing Board (AELB).
24.	Gamma projector	Yearly	Not Applicable	As required by the Atomic Energy Licensing Board (AELB).
25.	X-ray machine	Yearly	Not Applicable	As required by the Atomic Energy Licensing Board (AELB).
26.	Digital Radiographic. * Optical Density Step Wedges * Optical Line Pair Test Pattern	Once every 5 years	Not Applicable	By an accredited calibration laboratory or National Metrology Institute (NMI).
D. Penetrant Testing				
27.	Non-fluorescent (aerosol) penetrant dyes	Not Applicable	Each batch	Valid manufacturer's certificate with conformance to a relevant standard. Where possible verification against Penetrant Comparator Block.
28.	Fluorescent dyes	Not Applicable	Each batch / per work day	Manufacturer's certificate with conformance to a relevant standard. Where possible verification against Penetrant Comparator Block.
29.	UV(A) light meter	Yearly	Not Applicable	By an accredited calibration laboratory or 'National Metrology Institute (NMI)', where available.
30.	White light meter			
E. Eddy Current Testing				
33.	Reference Specimen	Initial	Not Applicable	Manufacturer's certification, customer's requirements or measurement certificate.
34.	Equipment	Not Applicable	Before usage and subsequently after 8 hours of usage	Verified against a reference specimen

Bibliography

1. EA-4/15 G 2015 - Accreditation for Non-Destructive Testing (EA Document).
2. ISO 2919 - Radiological Protection - Sealed Radioactive Sources - General Requirements and Classification.
3. ISO 3999 - Radiation Protection - Apparatus for Industrial Gamma Radiography-Specifications for Performance, Design and Tests.
4. ISO 9712 - Non-Destructive Testing - Qualification and Certification of NDT Personnel.
5. MS ISO/IEC 17025 - General Requirements for the Competence of Testing and Calibration Laboratories.
6. MS ISO 9001 - Quality Management Systems - Requirements.
7. Supplementary Criteria for Accreditation - Mechanical Testing Laboratories (Non-Destructive Testing) (IANZ Document).
8. SAMM Policy 2 (SP2) - Policy on the Metrological Traceability of Measurement Results.

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