



STANDARDS
MALAYSIA

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

**MTR 3 – MIBAS TECHNICAL REQUIREMENTS FOR
ACCREDITATION OF WELDING INSPECTION**

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**MS ISO/IEC 17020
MIBAS**

**JABATAN STANDARD MALAYSIA
Department of Standards Malaysia**

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1 PURPOSE

1.1 This document describes the additional requirements for an applicant to be accredited as an inspection body that carries out welding inspection for joining or welding qualification, fabrication, repair and alteration of coded articles made from ferrous, non-ferrous and polymer composite materials.

1.2 Accreditation is granted to the inspection body for a specific scope of work covering the item inspected type and range of inspection, assessment methods or standards and procedures and approved operating locations and signatories. Inspection body may apply for accreditation for one or more scopes of work.

NOTE 1 The term 'item' is used in this document includes product, process, service or installation as appropriate.

NOTE 2 Type and range of inspection include type examination, in-process inspection (material identification, pre-welding preparation, welder qualification and welding procedure verification, process and weld inspection), in-service inspection or surveillance (external to pressure weld inspection), repair, alteration, qualifications (Destructive and Non-Destructive Report review, welding procedure specification review and welder and welding procedure qualification test witness) and others specified by standards or codes.

NOTE 3 Assessment methods or standards includes, but not limited to, ASME Section IX: Welding and Brazing Qualification, AWS D1.1: Structural Welding Code-Steel, and API Standard 1104: Welding of Pipelines and Related Activities and Client Specifications.

NOTE 4 Procedure means a fixed, step-by-step sequence of activities or course of action (with definite start and end points) that describe who, what (how) where, when and why that shall be followed by the inspection body in the same order to correctly perform the welding inspection.

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

- (a) MS ISO/IEC 17020 - Conformity Assessment- Requirements for the Operation of Various Types of Bodies Performing Inspection;
- (b) ILAC P15 - Application of ISO/IEC 17020:2012 for the Accreditation of Inspection Bodies;
- (c) Factories and Machinery (Steam Boiler and Unfired Pressure Vessel) Regulation, 1970 (if applicable); and
- (d) Any other statutory requirements (if applicable).

2 REFERENCES

- 2.1 ASME Section IX: Welding, Brazing and Fusing Qualifications
- 2.2 ASME Section VIII: Boiler and Pressure Vessel
- 2.3 AWS D1.1 Structural Welding – Steel
- 2.4 API 1104: Welding of Pipeline and Related Facilities
- 2.5 ILAC P-15: Application of ISO/ IEC 17020-2012 for the Accreditation of Inspection Bodies
- 2.6 ISO 15614-1: Specification and Qualification of Welding Procedures for Metallic Materials- Welding Procedure Test- Part 1: Arc and Gas Welding of Steels and Arc Welding of Nickel and Nickel Alloys.
- 2.7 ISO/IEC 17000: Conformity Assessment- Vocabulary and General Principles.
- 2.8 MS ISO/IEC 17020: Conformity Assessment- Requirements for the Operation of Various Types of Bodies Performing Inspection.
- 2.9 MS ISO/IEC 17025: General Requirements for the Competence of Testing and Calibration Laboratories.
- 2.10 MS 1722: Occupational Safety and Health Management Systems: Requirements.
- 2.11 OHSAS 18001: Occupational Health and Safety Management Systems – Requirements.

3 TERM AND DEFINITIONS

API - American Petroleum Institute

ASME - American Society of Mechanical Engineers

AWS - American Welding Society

SMAW - Shield Metal Arc Welding

GTAW - Gas Tungsten Arc Welding

GMAW - Gas Metal Arc Welding

SAW - Submerged Arc Welding

FCAW - Flux Cored Arc Welding

4 GENERAL REQUIREMENTS

As in MS ISO/IEC 17020 and ILAC P15.

5 STRUCTURAL REQUIREMENTS

5.1 Administrative requirements

As in MS ISO/IEC 17020 and ILAC P15.

5.2 Organisation and Management

5.2.1 Inspection body applying for accreditation shall:

- (a) Perform inspection in accordance to MS ISO/IEC 17020;
- (b) Demonstrate to an assessment team that the organisation has at least one permanent or contract staff with the appropriate training, skills and qualifications to meet the requirements listed under Clause 6.1.1 – Welding Inspector;
- (c) Establish, implement and maintain an Occupational Safety and Health Management System in the organisation accordance with the requirements of the relevant Malaysian Standards MS 1722 or with any other equivalent Occupational Safety and Health Management System;
- (d) Demonstrate to the assessment team that it has the necessary facilities and equipment.

6 RESOURCE REQUIREMENTS

6.1 Personnel

6.1.1 Welding Inspector

6.1.1.1 Welding Inspector shall have the following qualification and working experience:

- (a) Sijil Pelajaran Malaysia (SPM) or equivalent with at least five (5) years in welding experience; or
- (b) Diploma holders in technological or engineering field, with at least three (3) years working experience in welding; or
- (c) Degree holders in technological or engineering field with at least one year relevant working experience in welding.

6.1.1.2 In addition to 6.1.1.1 above, the following applies:

- (a) The Welding Inspectors shall be certified by independent personnel certification body meeting Welding Inspection (Level II) – *Sijil Kemahiran Malaysia* (SKM);
Personnel certified to Welding Inspection (Level II) - SKM shall have the ability to perform: Pre-welding Inspection Document Verification; Material, Consumable, Tools & Equipment Inspection; Welding Activities Inspection; Post Welding Inspection; and Welding Inspection Activities Documentation.
- (b) The Senior Welding Inspector shall be certified by independent personnel certification body meeting Welding Inspection (Level III) - *Sijil Kemahiran Malaysia* (SKM);
Personnel certified to Welding Inspection (Level III) - SKM shall have the ability to perform: Pre-welding Document Verification; Welding Inspection Coordination; Welding Document Evaluation; and Staff Training Activities.
- (c) Or any Welding Inspector certification standards equivalent (preferably an accredited personnel certification body).

6.1.1.3 Welding Inspector is responsible to identify significance of defects, based on test results in relation to the appropriate qualifications, experience, training and satisfactory knowledge of the examinations performed. In addition he must also have:

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

6.1.2 Responsibility of Inspection Body

6.1.2.1 Inspection body shall ensure that the colour vision and other sensory deficiencies of Welding Inspectors shall be in satisfactory physical conditions and in accordance to the specified standards. The Welding

Inspectors shall be able to communicate effectively with personnel during site of inspection.

6.1.2.2 The welding inspection body shall take appropriate actions to protect against any impropriety of the Welding Inspectors or any attempt to exert improper influence on them by their clients. The system may include a combination of the following elements:

- (a) Providing proper relevant training to Welding Inspectors;
- (b) Issuing a code of ethics to Welding Inspectors;
- (c) Job rotation for Welding Inspectors;
- (d) Unannounced on-site visits by welding inspection supervisors to check the welding inspection results;
- (e) Taking disciplinary actions and legal sanction against welding inspectors practicing impropriety;
- (f) Comparing the welding inspection against samples kept by the welding inspection body;
- (g) Comparing the pass fail rate of a Welding Inspectors with other Welding Inspectors;
- (h) Requesting Welding Inspectors to record their welding inspection actions in detail;
- (i) Requesting the client to sign and acknowledge the welding inspection body's policy on improper influence before conducting the welding inspection;
- (j) Providing immediate feedback channel for Welding Inspectors to report attempts of clients to exert improper influence; and
- (k) Informing the bodies or clients of parties attempting to exert improper influence.

6.1.2.3 The inspection body should keep a competent log listing of Welding Inspectors that are capable to perform any type of welding inspections and welding inspection activities. Supervisors may assign welding tasks to competent Welding Inspectors according to this log.

6.1.3 Approved Signatory

- 6.1.3.1 The nominees for approved signatory for welding inspections shall comply with MIBAS Policy 1 and Clauses 6.1.1.1 and 6.1.1.2 above.
- 6.1.3.2 They shall also be competent Welding Inspectors authorised by the inspection body.
- 6.1.3.3 Acquired at least a minimum of three (3) years relevant experience.

6.1.4 Training

- 6.1.4.1 Welding inspector's training, emphasis shall be given to:
 - (a) Requirements of the quality systems;
 - (b) Expected latest standards of conduct and ethics;
 - (c) Rationale and practice of keeping information confidential;
 - (d) The quality assurance plan employed by the welding inspection body to assure the quality of results;
 - (e) The importance of adhering to documented quality procedures;
 - (f) The latest standards or code of practices; and
 - (g) The latest advancement in welding technology.

6.2 Facilities and Equipment

- 6.2.1 For equipment which has significant effect on the welding inspection results, the equipment shall be calibrated, checked and verified by an established programme.
- 6.2.2 Where this is impracticable, client's equipment may be used after the Welding Inspectors have verified the suitability for the purpose, including but not limited to:
 - (a) Measurement range;
 - (b) Accuracy;
 - (c) Calibration (Traceability to SI unit).
- 6.2.3 Standard Operation Procedure (SOP) of the verification procedures shall be established and provided to the Welding Inspectors. Where necessary,

the Welding Inspectors shall be provided with reference standards or equipment to conduct the verification checks. This also applies to the Welding Inspectors who handle their own equipment to ensure the calibration is not affected.

6.2.4 Records of verification shall be kept by the inspection body.

6.3 Subcontracting

As in MS ISO/IEC 17020 and ILAC P15.

7 PROCESS REQUIREMENTS

7.1 Inspection Methods and Procedures

7.1.1 Worksheets or log books for recording results and other details of welding inspection shall be provided to Welding Inspectors. The document must be adequate and up to date.

7.1.2 A procedure shall be documented for instance the client's failure to specify any welding specification or incomplete specification.

7.1.3 The inspection body that performs welding inspection shall provide to the Welding Inspectors the following information:

- (a) Types of welding inspection, identification of types of welds, the quantity of welds, the location where the welding inspection is to be performed and the contact person, the welding inspection time and date and any other relevant general information;
- (b) The sampling method (if not specified by welding specification or clients, including the sampling plan and the sampling size);
- (c) The welding inspection method, including characteristics of the welds or the welding process to be examined such as but not limited to SMAW, GTAW, GMAW, SAW, FCAW;
- (d) Instructions for recording welding inspection findings;
- (e) Details and quantity of any welding to be sent back to the inspection body for further examinations or testing, if applicable;
- (f) Any specific handling instructions for highly machined components;
- (g) The method for assigning identification marks of welding inspection samples where necessary;

- (h) Any specific reporting requirements including documentation requirements;
- (i) Availability of approved drawings and inspection plans or programmes;
- (j) Any specific quality control / monitoring arrangements;
- (k) Any special requirement and instruction relevant to the welding inspection, e.g. instruction for welding inspection and sampling welded test pieces, environmental condition requirements and preservation of the collected samples.

7.1.4 Where the environmental conditions affect the welding inspection or sampling results, the inspection body shall ensure that they are within the specified limits and are recorded in the welding inspection records. It may be necessary for the Welding Inspector to bring the necessary monitoring equipment.

7.1.5 All non-destructive and destructive tests associated with any welding inspections shall be carried out by accredited laboratories or mutual recognition arrangement partners of Standards Malaysia and the results produced in endorsed test report.

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.

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

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

7.3 Inspection Records

- 7.3.1 The retention period for records should be determined as in MIBAS Policy 1 (MP 1).

7.4 Inspection Reports and Inspection Certificates

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

- 7.4.2 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.

- 7.4.3 The following optional elements can be included in inspection reports and certificates:

- (a) Description of the inspection work ordered;
- (b) Information on what has been omitted from the original scope of work;
- (c) Brief description of the inspection method(s);
- (d) Identification of equipment used for measuring/testing;
- (e) Where applicable and if not specified in the inspection method or procedure, reference to or description of the sampling method and information on where, when, how and by whom the samples were taken;
- (f) Information on the location of the inspection was carried out;
- (g) Information on environmental conditions during the inspection, if applicable;
- (h) A statement that the inspection results relate exclusively to the work ordered or the item(s) or the lot inspected;
- (i) A statement that the inspection report should not be reproduced, except in full;
- (j) The Welding Inspector's mark or seal;

- (k) Names and/or their signatures (or unique identification) of the personnel members who have performed the inspection and in cases when secured electronic authentication is not accepted.

7.4.4 Where it is necessary to issue interim results on-site, the welding inspection results shall be checked, preferably by a staff member of the welding inspection body other than the one performing the inspection. The checker shall sign the welding inspection record and the interim report to indicate that he/she has carried out the checks. The interim report shall clearly state that the results are not final and may be amended after reviewing by the welding inspection body. The welding inspection body shall ensure that issuing of such an interim document is allowed by the client and it is given only to the designated person. The format of the interim report shall be designed to present the results clearly and unambiguously. The welding inspection body shall also ensure that only Welding Inspectors appraised to be competent to issue interim reports are allowed to do so. They shall also be properly authorized for issuing such reports. Such interim reports shall not bear any Standards Malaysia endorsement.

7.5 Complaints and Appeals

As in MS ISO/IEC 17020 and ILAC P15.

7.6 Complaints and Appeals Process

As in MS ISO/IEC 17020 and ILAC P15.

8 Management System Requirements

As in MS ISO/IEC 17020 and ILAC P15.

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