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Condition monitoring and diagnostics of machine systems — Requirements for certification of personnel —

Part 1:

Sector specific requirements for certification bodies and the certification process

Surveillance et diagnostic d'état des machines — Exigences relatives à la qualification et à l'évaluation du personnel —

Partie 1: Exigences relatives aux organismes d'évaluation et au mode opératoire d'évaluation

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ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 18436-1 was prepared by Technical Committee ISO/TC 108, *Mechanical vibration, shock and condition monitoring*, Subcommittee SC 5, *Condition monitoring and diagnostics of machine systems*.

ISO 18436 consists of the following additional parts, under the general title *Condition monitoring and diagnostics of machine systems* — *Requirements for the certification of personnel*:

Part 2: Vibration condition monitoring and diagnostics

Part 3: Requirements for training bodies and the training process

Part 4: Field lubricant analysis

Part 5: Lubricant laboratory technician/analyst

Part 6: Acoustic emission

Part 7: Thermography

Part 8: Ultrasound

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Introduction

Condition monitoring and diagnostics of machine systems is an integral part of an effective asset management and maintenance programme. Non-intrusive technologies used in condition monitoring and fault diagnosis include vibration, infrared thermography, lubricant analysis, acoustic and ultrasonic analysis, and electric signature analysis. In many instances, these technologies act as complimentary condition monitoring tools. The skills and expertise of the practitioners performing the measurements and analysing the data are critical to the effective application of these technologies.

This document defines the requirements for persons and organizations operating sector specific certification schemes in the non-intrusive machine system condition monitoring and diagnostic technologies that use the technology parts of ISO 18436. General requirements for certifying bodies are contained in this part of ISO 18436. Specific requirements for the certification of personnel in specific condition monitoring technologies are contained in the other parts of ISO 18436.

In accordance with ISO/IEC 17000, and for the purposes of this document an certifying body is a sector specific third-party certification body compliant with ISO/IEC 17024 issuing certificates of conformity. This part of ISO 18436 specifies the general provisions for sector specific certification bodies.

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Condition monitoring and diagnostics of machine systems — Requirements for certification of personnel —

Part 1:

Sector specific requirements for certification bodies and the certification process

1 Scope

This part of ISO 18436 specifies sector specific requirements for organizations ("certification body") operating conformity assessment systems for personnel who perform machinery system condition monitoring, identify machine faults, and recommend corrective action. Procedures for the certification of condition monitoring and diagnostic personnel are specified.

NOTE These requirements are in addition to those of ISO/IEC 17000 and ISO/IEC 17024.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 17000:2004, *Conformity assessment — Vocabulary and general principles*

ISO/IEC 17024:2012, *Conformity assessment — General requirements for bodies operating certification of persons*

ISO 18436, *Condition monitoring and diagnostics of machines — Requirements for qualification and assessment of personnel*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 17000, ISO/IEC 17024 apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <http://www.electropedia.org/>

4 Certification body

4.1 Certification Requirements

A certification body shall be in accordance with ISO/IEC 17024:2012. In addition a certification body shall conform to this part of ISO 18436, including Normative Annexes, and to other relevant parts of ISO 18436 for personnel involved in the condition monitoring and diagnostics of machines.

In addition:

- a) Examiners shall be certified to an advanced category or at least one category higher than the one being examined or the highest existing category of the examination they are conducting or meet the requirements of Clause “12” transition period
- b) Invigilators shall not have any access to the technical content of examination.
- c) Certification bodies should provide an overview of the examination results to the examinee upon written request;
- d) Examination centres, which can include technical organizations, vendors, companies and independent training organizations, shall meet the requirements of ISO 17024 and this document.
- e) Technical committees shall have, as a minimum requirement, membership that is certified to the level of the certification the committee represents, or equivalent competence during a start-up period, or qualified to the opinion of the certification body
- f) Where required by a certification body a suitably independent person shall provide validation of the necessary experience needed to establish the eligibility of applicants, but shall not be directly involved in the assessment procedure itself.
- g) The employer shall be fully responsible for the authorization of the applicant to work and to perform machinery condition monitoring and diagnosis, and the quality and validity of the results of such work. An employer may require additional training and qualification of employees on specialized machinery beyond attestation in accordance with this document before authority to work is given. If the applicants are self-employed, they shall assume all responsibilities described for the employer.

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4.1.1 Mature candidate entry

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Mature candidate entry may be allowed at the discretion of the certification body.

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If the certification body permits mature candidate entry, candidates may apply for direct entry to categories higher than category I and not including the highest category in a technology, without the need to have previously held classifications at lower categories, providing they can produce evidence of training and/or experience that satisfies the requirements of the certification body. Mature candidates may not need to have attended a certification body validated course of training.

To be eligible to apply for assessment as a mature candidate entry, the candidates shall be required to provide evidence of training and experience relevant to the requirements of the respective technical part of ISO 18436 which should also comply with the requirements of ISO 18436-3. The minimum duration of recommended training is shown in each technical part of ISO 18436.

Such candidates should apply to the certification body under the mature candidate route. Candidates for mature entry are required to satisfy the experience and training requirements specified in the relevant technical part of ISO 18436 without significant interruption. If a significant interruption exists, the candidate may be required to undertake further training as determined by the certification body.

4.1.2 Conduct of examinations

All examinations shall be conducted at examination sites approved by the certification body and according to the following requirements:

- a) the examination shall be closed book, except for material provided by the certification body (e.g. a summary of common formulae) — however, the examination for the highest category may, at the discretion of the certification body, be open book;
- b) the candidates shall have access to simple drafting instruments and basic, non-programmable scientific calculators;

- j) no examination related materials shall be retained by the candidate;
- k) any candidate who, during the course of the examination, does not abide by the examination rules or who perpetrates, or is an accessory to, fraudulent conduct shall be excluded from further participation in that examination session (see also 8.3);
- l) all examiners or invigilators of condition monitoring examinations shall sign a statement indicating that they understand and have observed the rules of examination conduct.

In cases where the examination is paper based the following shall also apply:

- i) at the start of the examination, the individual sealed envelopes, labelled with the candidates' names and containing the examination questions, shall be distributed to the candidates by the invigilator;
- ii) upon instructions from the invigilator, the candidates shall open their envelopes and answer the questions;
- iii) at the completion of a written examination, the candidates shall place their examination papers into the envelopes provided, seal and sign them, and give them to the invigilator, who shall forward them directly to the certification body;
- iv) candidates shall be prohibited from answering questions in pencil or using correction fluid, except where test papers are to be scored by electronic means, and shall be required to initial any corrections they may make on examination papers;

4.1.3 Re-examination

A candidate who fails to obtain the pass grade required for certification may be re-examined. A candidate who fails three consecutive attempts shall be excluded from reassessment for at least 12 months and shall be required to reapply.

Candidates excluded for reasons of unethical behaviour shall wait at least 48 months before reapplying.

4.1.4 Personnel certification documents

Certification documents shall include

- m) the applicable machinery condition monitoring technology and abbreviations for sector and category;
- n) the signature, on the certification documents, of a designated representative of the certification body;
- o) the seal of the certification body.

4.1.5 Validity of certification

The period of validity shall not exceed 5 years from the date of certification indicated on the certification documents. Certification shall become invalid when:

- a) this time period has elapsed;
- b) an individual becomes physically or mentally incapable of performing the duties;
- c) at the option of the certification body, after reviewing evidence of unethical behaviour.

4.1.6 Recertification process

Certification may be renewed by the certification body for a new 5 year period from the original expiration date so long as the certification holder provides verifiable evidence of continued satisfactory work activity. Applications for renewal after a certificate has expired may be considered subject to the requirements of the certification body.