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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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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 the 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 of 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 www.iso.org/iso/foreword.html.

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

This third edition cancels and replaces the second edition (ISO 18436-1:2012), which has been technically revised.

A list of all parts in the ISO 18436 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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 certification bodies are contained in this document. Specific requirements for the certification of personnel in specific condition monitoring technologies are contained in the other parts of ISO 18436.

This document specifies the general provisions for sector specific certification bodies.

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 document 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 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/IEC 17000, *Conformity assessment — Vocabulary and general principles*

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

ISO/IEC/TS 17027, *Conformity assessment — Vocabulary related to competence of persons used for certification of persons*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 17000, ISO/IEC 17024, ISO/IEC/TS 17027 and the following 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 https://www.electropedia.org/

3.1
certification body
sector specific third-party certification body issuing certificates of conformity

Note 1 to entry: A certification body is to be understood as compliant with ISO/IEC 17024.

Note 2 to entry: This is in accordance with ISO/IEC 17000.

3.2
significant interruption
absence or change of activity which prevents the certified individual from practising the duties corresponding to the category in the method and the sector(s) within the certified scope, for either a continuous period in excess of two years or two or more periods for a total time exceeding three years

Note 1 to entry: Legal holidays or periods of sickness or courses of less than 30 days are not taken into account when calculating the interruption.

Note 2 to entry: Derived from ISO 9712:—, 3.34.

4 General

A certification body shall be in accordance with ISO/IEC 17024. In addition, a certification body shall conform to other relevant technology specific parts of ISO 18436 for personnel involved in the condition monitoring and diagnostics of machines.

NOTE Some technical parts have the title "Condition monitoring and diagnostics of machines — Requirements for certification of personnel" due to a change in scope of the 18436 series to third party assessment only.

Moreover:

a) Examiners shall be certified to:

   1) an advanced category or at least one category higher than the one being examined, or

   2) the highest existing category of the examination they are conducting or

   3) meet the requirements of Clause 11.

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 be approved by the certification body.

e) Technical committees shall have as a minimum requirement:

   1) membership that is certified to the level of the certification the committee represents, or

   2) equivalent competence during a start-up period, or

   3) qualified to the opinion of the certification body.

f) Where required by a certification body, a suitably independent person, such as the candidates manager/supervisor, 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.

5 Mature candidate entry

The certification body may allow mature candidate entry at its discretion.

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.

For candidates to be eligible to apply for assessment as a mature candidate entry, the certification body shall require that they provide evidence of training and experience relevant to the requirements of the respective technology specific parts of ISO 18436 which should also comply with the requirements of ISO 18436-3. The minimum duration of recommended training is shown in each technology specific parts 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 certification body may require that the candidate undertake further training as determined by the certification body.

6 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.

c) No examination related materials shall be retained by the candidate.

d) 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 Clause 7).

e) All examiners or invigilators of condition monitoring examinations shall sign a statement indicating that they understand and have observed the rules of examination conduct.

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

   1) 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.

   2) Upon instructions from the invigilator, the candidates shall open their envelopes and answer the questions.

   3) 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.

   4) 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.

7 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.

8 Personnel certification documents

Certification documents shall include:

a) the applicable machinery condition monitoring technology and abbreviations for sector and category;

b) the signature, on the certification documents, of a designated representative of the certification body;

c) the seal of the certification body.

9 Validity of certification

The period of validity shall not exceed 5 years from the date of certification indicated on the certification documents and whilst the candidate behaves ethically in accordance with Annex A. Certification shall become invalid:

a) when this time period has elapsed;

b) when 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.

10 Recertification process

Certification may be renewed by the certification body for a new 5 years 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.

11 Transition period

When a certification body initially applies the certification scheme, it may appoint personnel as examiners, for a period not exceeding 5 years, provided that they meet the following requirements:

a) knowledge of the principles of condition monitoring and diagnostics of machines;

b) industrial experience of the application of condition monitoring and diagnostics of machines;

c) ability to interpret and score the examinations.