



International
Standard

ISO 18436-3

**Condition monitoring and
diagnostics of machines —
Requirements for training and
certification of personnel —**

Part 3:

**Requirements for training bodies
and the training process**

*Surveillance et diagnostic d'état des machines — Exigences
relatives à la formation et à la certification du personnel —*

*Partie 3: Exigences relatives aux organismes de formation et au
processus de formation*

**Third edition
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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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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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 machines*.

This third edition cancels and replaces the second edition (ISO 18436-3:2012), of which it constitutes a minor revision.

The main changes are as follows:

- updated terminology to harmonize the document with current industry practice (such as, removing the use of term 'qualification' and 'assessment' where practicable);
- the part title was aligned with the other parts of the ISO 18436 series.

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.

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

Introduction

Condition monitoring and diagnostics of machines are integral parts of an effective maintenance programme. Non-intrusive technologies used in condition monitoring and fault diagnosis include vibration, infrared thermography, oil and wear debris analysis, acoustic and ultrasonic analysis, and electrical signature analysis. In many instances these technologies act as complementary 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 bodies operating training programmes in the non-intrusive machine condition monitoring, diagnostic, and correction technologies. General requirements for training body personnel are contained in this document. Specific requirements for personnel in condition monitoring and diagnostics are covered in other parts of the ISO 18436 series.

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Condition monitoring and diagnostics of machines — Requirements for training and certification of personnel —

Part 3: Requirements for training bodies and the training process

1 Scope

This document specifies the requirements for bodies operating training programmes for personnel who perform machinery condition monitoring, identify machine faults, and recommend corrective action.

This document specifies procedures for training of condition monitoring and diagnostics personnel.

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 9000, *Quality management systems — Fundamentals and vocabulary*

ISO 13372, *Condition monitoring and diagnostics of machines — Vocabulary*

ISO 18436 (all parts), *Condition monitoring and diagnostics of machines — Requirements for certification of personnel*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9000 and the following apply.

ISO and IEC maintain terminology databases for use in standardization 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
administrative committee
advisory committee
committee advising a training body

3.2
certificate of completion
written testimony of completion of training issued under the rules of a training programme

3.3
invigilator
person authorized by the training body to supervise examinations

3.4
technical training committee
committee organized by a training body to direct the technical aspects of a training programme

3.5

trainer

person with relevant technical and personal qualifications entrusted with training candidates for certification

3.6

training body

organization competent to administer a programme to train personnel in machinery condition monitoring and diagnostics technology

3.7

training centre

centre authorized and monitored by a training body where theoretical and practical instruction are administered

3.8

training process

documented procedures by which a training body provides instruction to candidates for certification

3.9

training programme

programme system having its own written rules of procedure and management for training through the use of verbal, visual and practical instruction

4 Training body

4.1 Purpose

The training body shall be responsible for the development and implementation of procedures to prepare individuals to carry out tasks in machinery condition monitoring and diagnostics.

4.2 Requirements

A training body shall

- a) have the relevant technical, educational and financial resources to ensure effective training is delivered in accordance with the relevant part(s) of the ISO 18436 series,
- b) have the administrative resources needed to organize and implement training programmes,
- c) manage training that can lead to certification in accordance with the relevant part(s) of the ISO 18436 series and shall not promote specific commercial products or services,
- d) use non-discriminatory policies and procedures in the administration of the training programme, and
- e) have a quality system that reflects the intent of ISO 9001^[1].

4.3 Responsibilities

A training body shall

- a) develop, maintain and implement a technically based, practical training programme that prepares an individual to carry out tasks in machinery condition monitoring and diagnosis which may lead to classification as evidence of their certifications,
- b) administer the procedures and operations for training with modern educational procedures and facilities,
- c) take the ultimate responsibility for the training procedures and content, including technical and administrative requirements,

- d) ensure the adherence to training curricula as specified in the relevant part(s) of the ISO 18436 series, recognize the curricula is to enable the trainee to perform the tasks outlined in [Clause 4](#) of the relevant part of the ISO 18436 series and use the terminology given in ISO 13372,
- e) approve properly staffed and equipped training centres which it shall monitor on a periodic basis,
- f) approve the candidate's eligibility for training on the basis of prerequisite fulfilment,
- g) authorize the time, location of the training, training centre, and instructor for each course or programme,
- h) prepare and distribute training materials consistent with the technical requirements in the relevant part(s) of the ISO 18436 series,
- i) select, evaluate and instruct trainers based on education and experience,
- j) prepare and implement training examinations at the training sessions and provide assessment of progress to participants,
- k) issue certificates of training completion,
- l) keep appropriate records of training operations,
- m) maintain records of training examinations,
- n) maintain records of training evaluation forms, and
- o) monitor all delegated functions.

4.4 Training body organizational structure

4.4.1 General

A training body shall have an organizational structure whose details shall be accessible to public examination, and which invites and permits participation by all interested parties.

4.4.2 Responsibilities

A training body shall

- a) identify the persons, groups, and/or committees responsible for
 - 1) procedures, curriculum and surveillance as defined in this document and the applicable competency standards and normative documents,
 - 2) the formulation of policy matters relating to its operation,
 - 3) decisions on the training programme,
 - 4) supervision of the implementation of its policies, and
 - 5) supervision of its finances,
- b) delegate authority to administrative committees, advisory committees or individuals, as required, to undertake defined activities on its behalf.

4.5 Training body management

The management of each training body shall define and document its policy for quality. The management shall ensure that this policy is understood and implemented at all levels of the organization.

The training body shall operate a documented management system, which covers all the requirements of this document and ensures the effective application of these requirements.

4.6 Training centres

4.6.1 General

Training centres, which can include technical organizations, vendors, companies, academic institutions and independent training organizations, are bodies that meet the requirements specified in [4.6.2](#) and have the responsibilities specified in [4.6.3](#).

4.6.2 Requirements

Training centres shall be delegated by a training body and shall, as a minimum

- a) work under the direction of the training body,
- b) have adequate qualified staff to organize and conduct training programmes as prescribed by the training body and in compliance with curricula specified in the relevant part(s) of the ISO 18436 series,
- c) have adequate physical and financial resources to implement training programmes,
- d) provide evaluation forms and training examination records to the training body, and
- e) follow the instructions in this document.

4.6.3 Responsibilities

The training centres shall

- a) conduct training programmes following the prescribed procedures of the training body using qualified trainers (see [Annex A](#)),
- b) use only current materials provided by the training body,
- c) return all original examinations to the training body, and
- d) ensure that the integrity of proprietary materials is not compromised in any way.

4.7 Technical training committees

4.7.1 General

Technical training committees are organized by a training body that meets the requirements specified in [4.7.2](#) and has the responsibilities specified in [4.7.3](#).

4.7.2 Requirements

Separate technical training committees may be formed by a training body to monitor and direct the technical efforts associated with training. The committees shall have, as a minimum requirement, membership that is certified to the level of the training that the committee represents.

4.7.3 Responsibilities

The technical training committees shall

- a) develop or rework training procedures and/or methodology to reflect best practices,
- b) develop training examinations to evaluate candidates' progress, and
- c) adhere to the technical areas of proficiency, as defined by other parts of the ISO 18436 series, for each category of training.

4.8 Records

The training body shall maintain a permanent record system to comply with existing regulations. The records shall demonstrate that the training procedures have been effectively fulfilled, particularly with respect to application forms, evaluation reports, surveillance activities and any other documents relating to this process. The records shall be identified, managed and disposed of in such a way as to ensure the integrity of the process and the confidentiality of the information. The records shall be kept for a period of time so that continued confidence may be demonstrated for at least one full classification cycle (initial period of validity plus first renewal period) or 10 years. The training body shall have a policy and procedure concerning access to these records consistent with [4.9](#).

4.9 Confidentiality

The training body shall have arrangements to safeguard confidentiality of the information obtained in the course of its training activities at all levels of its organization.

Except as required in this document or by law, information gained in the course of training activities about a particular person shall not be disclosed to a third party without the written consent of that person. Where the law requires information to be disclosed to a third party, that person shall be informed of the information provided as permitted by the law.

5 Requirements for training body personnel

5.1 General provisions

In order to ensure that the training process is carried out effectively and uniformly, the competence requirements for training body personnel shall be defined as stated in [Annex A](#) and validated by the training body through its responsible committee.

The training body shall require its personnel (internal or external) to follow the rules defined by the training body, including those relating to confidentiality.

Clearly documented instructions shall be available to personnel describing their duties and responsibilities. These instructions shall be maintained up to date. All personnel involved in any aspect of training activities shall possess appropriate educational qualification experience and technical expertise which satisfy defined competency criteria for the tasks identified. They shall be trained for their specific responsibilities within the training body and be made aware of the significance of the training offered.

The training body shall establish and continuously maintain up-to-date documentation regarding the qualification, training and experience relevant to the training activity of each individual. The information shall be accessible to the individual(s) concerned and shall include:

- a) name and address;
- b) organization affiliation and position held;
- c) educational qualifications and professional status;
- d) experience and training in each field of the training body's competence;
- e) their specific responsibilities and obligations within the training body;
- f) performance appraisals; and
- g) date of most recent record update.

5.2 Additional criteria for trainers

Trainers shall meet the requirements of the training body based upon applicable standards and normative documents as well as the requirements of [Annex A](#) and [Annex B](#).

When selecting trainers for the whole or a part of a specific training programme, the training body shall ensure that the competence brought to each assignment is sufficient. Trainers shall

- a) be familiar with the relevant training system and the appropriate training requirements of the ISO 18436 series,
- b) have a thorough knowledge of the relevant training methods,
- c) have appropriate in-depth technical knowledge and experience in the topics of the training,
- d) be able to communicate effectively both in writing and orally (through an interpreter if necessary) in the language of training, and
- e) be able to make impartial and non-discriminatory technical presentations.

5.3 Certification of trainers

Individuals selected to train in accordance with the ISO 18436 series shall be certified in one of several categories depending on their qualifications (see [Annex A](#)). They shall have demonstrated competence in the concepts of machinery condition monitoring and diagnostics for their classification category as indicated in other parts of the ISO 18436 series which relate directly to the specific technologies.

6 Training procedures

The duration of training shall be guided by the technical requirements and recommendations of the relevant part of the ISO 18436 series. Prerequisites for training programmes shall be established based on the certification categories of the relevant parts of the ISO 18436 series. Training shall be conducted in the form of lectures, demonstrations, and practical exercises with visual, audio, and written communication. All training shall be scientifically based and empirically tempered by proven experience. Training content shall reflect best industrial practice. The training topics shall be selected from the technical areas presented in the relevant part(s) of the ISO 18436 series. Training shall include examinations to ensure that the subject matter has been understood.

7 Eligibility for training

7.1 General

Candidates should have a combination of background education, training, and experience to ensure that they can understand the principles and procedures applicable to machinery condition monitoring and diagnosis technology in which they have chosen to train.

7.2 Education

Each part of the ISO 18436 series dealing with individual technologies specifies the required or recommended formal education for each training and certification category. For example, secondary school, technical school, and/or university.

7.3 Training

The minimum duration of the recommended or required background training has been established for each technology covered by the relevant part of the ISO 18436 series. Training topics and requirements are shown in an annex for each technology covered by the relevant part of the ISO 18436 series. An overview shows hours of training for each certification category and major subject area. The major subject areas shall be broken down in a detailed list of topics where hours of instruction are given for each certification category. The prerequisites for training shall be based on the categories detailed in the certification clauses in the relevant part of the ISO 18436 series and shall be specified.

Evidence of completion of training prerequisites can include

- a) a certificate of completion from a qualified training body, and
- b) a record of time devoted to the study of each topic as specified in the annex on subject areas.

Subject areas chosen for self-study, as required for each technology, shall be documented in detail or training examinations shall be taken from approved trainers.

7.4 Experience

Prior to application for training in a given category, it is recommended that candidates be required to provide written evidence of experience in the field of machinery condition monitoring and diagnosis. The minimum experience recommendations are defined for each technology covered by the ISO 18436 series.

8 Training examinations

8.1 Examination type and content

For each training category, the candidates shall be required to answer a number of questions in a specified time duration. The examination shall be closed book; however, formula sheets or a standard text reference, or other resources, may be permitted for use at the discretion of the training body. The examination may be partially oral or demonstrative depending on the requirements of each part of the ISO 18436 series.

The training questions, covering the technical subjects shown in each part of the ISO 18436 series, shall be selected from a database of questions constructed and administered by the technical training committee of the training body. Questions shall be of a practical nature, yet test the candidate on concepts and principles required to conduct machinery condition evaluations. The questions may involve the interpretation of charts and plots. Simple mathematical calculations may be required. A summary of common formulas may be provided along with the examination by the appropriate technical training committee of a training body assigned to the given technology.

8.2 Conduct of training examinations

All training examinations shall be conducted after the completion of the training. Candidates shall have no questions answered by the course trainer. Examinations may be administered by an invigilator or any competent person designated by the training body.

8.3 Grading

All training examinations shall be scored by the trainer or an invigilator on site. A written summary of the results along with a score shall be given to the candidate.

9 Training recognition

9.1 Administration

After the candidate satisfies all requirements for training in a given category, the training body shall issue a certificate indicating successfully meeting the training requirements.

9.2 Certificates of completion

Certificates of completion shall include at least

- a) the full name of the individual,
- b) the date of completion,

- c) if applicable, the number of educational units completed,
- d) the training category,
- e) the applicable machinery condition monitoring technology, i.e. condition monitoring and diagnostics of machines,
- f) name of the training body,
- g) a unique personal identification number,
- h) the signature, on the certificate, of a designated representative of the training body, and
- i) the seal or logo of the training body.

NOTE By issuing the certificate, the training body attests to the completion of the training by the individual, but does not give any authority to perform machinery measurement or analysis.

10 Files

The training body shall maintain

- a) an updated list of all individuals trained in each category, and
- b) an individual file for each trained individual, containing:
 - 1) application forms;
 - 2) training examination documents, including questionnaires and grade sheets; and
 - 3) data contained on the certificates of completion.

Individual files shall be kept under suitable conditions of safety and discretion for a period of not less than 10 years.