

## Certification Scheme

PR-004

Revision	Issue Date	Author	Reviewer	Approval
Revision 1	August 19, 2020	<i>Ken Keith</i>		
		Ken Keith, Executive Director	Renee Byrne, ICS Consulting	Matthew Holmes, National President
Revision 2	October 22, 2020	<i>Ken Keith</i>	<i>RByrne</i>	<i>Matthew Holmes</i>
		Ken Keith, Executive Director	Renee Byrne, ICS Consulting	Matthew Holmes, National President

## Revision History

Revision Status	Revised Section (s)	Description of Revision	Reason for Revision
0	All	New Procedure	Original Document – Compliance with ISO 17024:2012
1	Cover Page, header and footer	Added approval table to cover page. Updated company logo in header and removed issue date from footer.	Re-design of company logo and document template.
	4.1	Removed reference to ISO 9000 and ISO 9001	The QMS is developed in accordance with ISO 17024.
	4.2	Corrected references to documents and forms	As a result of updating QMS documents and forms.
	5	Updated all responsibilities	To better reflect current positions and responsibilities.
2	Table of Contents; 2. Scope and section 6.6	Removed section 6.6 and all references to category IV certification.	Remove reference to category IV certification scheme because it is not yet implemented.

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## 1. Purpose

The purpose of this procedure is to identify and describe CMVA / ACVM certification schemes established to provide certification of individuals performing condition monitoring and diagnostics of machines using vibration analysis. These certification schemes are developed in accordance with the requirements of the International Standards ISO 18436-2 and ISO 17024 and in accordance with the CMVA / ACVM quality management system.

## 2. Scope

This procedure applies to all categories of certification provided by CMVA / ACVM. Including:

- Vibration Analyst Category I – Data Collection
- Vibration Analyst Category II – Basic Analysis
- Vibration Analyst Category III – Diagnostics and Program Management

## 3. Definition

**CMVA** – Canadian Machinery Vibration Association

**ACVM** – L'Association Canadienne en Vibrations de Machines

**Performance Objective** – says that a person will be able to carry out a specific task, in given circumstances. It implies action. It does not say what a person has to know or understand. It does not specify how many hours of training are required. It does not demand specific reading assignments or require specific courses of instruction or laboratory exercises or experience. A Performance Objective simply says – “there is a job to be done; can this person do it?”

## 4. References

### 4.1. International Standards

The following referenced international standards are indispensable for the application of this document. The latest edition of the referenced documents (including any amendments) applies.

- ISO 17024 Conformity assessment – General requirements for bodies operating certification of persons.
- ISO 17000 Conformity assessment – Vocabulary and general principles.
- ISO 18436-1 Condition monitoring and diagnostics of machines – Requirements for qualification and assessment of personnel, Part 1: Requirements for assessment bodies and the assessment process.
- ISO 18436-2 Condition monitoring and diagnostics of machines – Requirements for qualification and assessment of personnel, Part 2 – Vibration condition monitoring and diagnostics.
- ISO 18436-3 Condition monitoring and diagnostics of machines – Requirements for qualifications and assessment of personnel, Part 3 – Requirements for training bodies and the training process.
- ISO 13372 Condition monitoring and diagnostics of machines – Vocabulary

### 4.2. CMVA / ACVM Documents

The following referenced CMVA / ACVM documents are indispensable for the effective implementation and operation of this Certification Scheme and its processes.

- CMVA / ACVM Training and Certification for the 21<sup>st</sup> Century, issued November 10, 2011.
- CMVA / ACVM Certification: Exam Development and the Continuous Improvement Process, 2011.
- CMVA / ACVM Certification Program Category I – Data Collection Performance Objectives, English DOC-004-1.
- CMVA / ACVM Certification Program Category I – Data Collection Performance Objectives, French DOC-004-2.
- CMVA / ACVM Certification Program Category II – Basic Analysis Performance Objectives, DOC-004-3.
- CMVA / ACVM Certification Program Category II – Basic Analysis Performance Objectives, DOC-004-4.
- CMVA / ACVM Certification Program Category III – Diagnostics and Program Management Performance Objectives, DOC-004-5.
- CMVA / ACVM Certification Program Category III – Diagnostics and Program Management Performance Objectives, DOC-004-6.
- Certification Categories issued October 2006.
- Application for Examinations and Certification of Vibration Analysts, FM-006-1 English, FM-006-2 French.
- Application Process, PR-006
- Assessment Process, PR-007
- Examination Process, PR-008
- Certification Process, PR-009
- CMVA / ACVM Recertification Form, FM-006-3

## **5. Responsibility**

### **5.1. Executive Director**

The Executive Director or designate is responsible for ensuring this procedure is written to meet the latest requirements for certification schemes as stated in the ISO 17024, ISO 18436-1 and ISO 18436-2.

The Executive Director is responsible for communicating the requirements of this procedure to all staff, Board of Directors, volunteers, and other interested parties as required. This communication should be in a format where all affected personnel understand their roles and responsibilities as it relates to this procedure.

### **5.2. National President**

The CMVA / ACVM National President in office or designate is responsible for reviewing and approving this procedure for adequacy prior to release.

### **5.3. Board of Directors**

The CMVA / ACVM National Board of Directors are responsible for decisions and actions related to the improvement of certification services. This improvement initiative is part of the annual management review, as required by ISO 17024.

## 5.4. Technical Training Committee

The CMVA / ACVM Technical Training and Certification Committee are responsible for:

- The development and review of the certification schemes detailed in this procedure.
- Maintaining documents to demonstrate that the development and review of the certification schemes were done in accordance with the requirements of ISO 17024. See section 8.1 below.
- Ongoing review, validation and continuous improvement of the certification schemes described in this procedure.

## 5.5. Staff / Volunteers/ Document Users

As applicable to their role with the CMVA/ ACVM, all Staff, Volunteers and Document users are responsible for following the processes required by this procedure and for reporting any nonconformity or opportunity to improve this procedure or the processes described within it.

# 6. Certification Schemes

## 6.1. General

CMVA/ ACVM has established and implemented the following certification schemes in accordance with the requirements of ISO 18436-2.

For all certification categories listed below, candidates must adhere to our stringent code of ethics.

## 6.2. Code of Ethics

Individuals certified according to all categories listed below shall recognize the precepts of personal integrity and professional competence according to international principles. Accordingly, certified individuals shall:

- a) Perform their professional duties with proper regard for the physical environment and the safety, health and well-being of the public.
- b) Undertake only those measurements and analysis for which they are competent by virtue of their training and experience and, where warranted, engage, or advise the engagement of such specialists as are required to enable them to properly complete assignments.
- c) Conduct themselves in a responsible manner and utilize fair and equitable business practices in dealing with colleagues, client, and associates.
- d) Shall protect to the fullest extent possible, consistent with the well-being of the public, any information given them in confidence by an employer, client, colleague or member of the public.
- e) Refrain from making unjustified statements or from performing unethical acts which would discredit the certification programme based on Category I of the international standard ISO 18436-2.
- f) Indicate to the employer or client any adverse consequences which may result from an overruling of their technical judgement by a non-technical authority.
- g) Avoid conflicts of interest with any employer or client and, if any such conflicts should arise in the performance of work, shall inform the affected persons promptly of the circumstances, and
- h) Strive to maintain their proficiency by updating their technical knowledge as required to properly perform condition monitoring measurement and analysis techniques.

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## 6.3. Vibration Analyst Category I – Data Collection

### 6.3.1. Scope of Certification

CMVA / ACVM Certification to Category I – Data Collection is a certification scheme that is based on a set of performance objectives developed by the CMVA / ACVM to amplify the ISO 18436-2 International Standard concerning the training and certification of vibration personnel in the field of Vibration Condition Monitoring and Diagnostics. These performance objectives are what an individual certified to Category I should be able to do on the job.

### 6.3.2. Job and Task Description

An individual certified as a Vibration Analyst Category I – Data Collection should be able to master the performance objectives as described in the document CMVA / ACVM Certification to Category I – Data Collection Performance Objectives. The performance objective titles are:

- Principles of Vibration
- Data Acquisition
- Signal Processing
- Condition Monitoring
- Fault Analysis
- Corrective Action
- Equipment Knowledge
- Acceptance Testing

The certified individual shall not be responsible for:

- The choice of sensor, test method or technique or for any analysis or diagnosis to be conducted.
- The assessment of test results, other than identifying conditions against pre-established criteria, such as acceptance, alert, alarm, shutdown, etc...

### 6.3.3. Required Competence

To become CMVA /ACVM Certified as Category I – Data Collection, an individual must achieve a minimum of 70% on a written exam and complete the Data Collection Practicum.

A major, but not exclusive, focus of certification to Category I is Data Collection. Vocabulary is also part of required knowledge.

The certified individual should be able to perform accurate and consistent data collection, which is believed to be absolutely essential to worthwhile route-based condition monitoring programs.

### 6.3.4. Abilities

Individuals certified to category I are able to perform a range of pre-defined, generally simple single-channel, machinery vibration condition monitoring activities in accordance with established procedures. All activities shall be performed under direction.

### 6.3.5. Prerequisites

Prior to CMVA / ACVM Certification to Vibration Analyst Category I – Data Collection the individual shall insure the following activities have been completed:

- Acquire the appropriate hours of training in each performance objective as defined by 18436-2 or equivalent.
- Achieve 70% or greater in the certification exam

- 6 months practical experience in the field of machinery vibration condition monitoring and diagnostics.
- Payment of applicable fees

*Reference: CMVA / ACVM Certification Program Category I – Data Collection Performance Objectives*

## **6.4. Vibration Analyst Category II – Basic Analysis**

### **6.4.1. Scope of Certification**

CMVA / ACVM Certification to Category II – Basic Analysis is a certification scheme that is based on a set of performance objectives developed by the CMVA / ACVM to amplify the ISO 18436-2 International Standard concerning the training and certification of vibration personnel in the field of Vibration Condition Monitoring and Diagnostics. These performance objectives are what an individual certified to Category II should be able to do on the job.

### **6.4.2. Job and Task Description**

An individual certified as a Vibration Analyst Category II – Basic Analysis should be able to master the performance objectives as described in the document CMVA / ACVM Certification Program Category II – Basic Analysis Performance Objectives. The performance objective titles are:

- Principles of Vibration
- Data Acquisition
- Signal Processing
- Condition Monitoring
- Fault Analysis
- Corrective Action
- Equipment Knowledge
- Acceptance Testing
- Equipment Testing and Diagnostics
- Reference Standards
- Reporting and Documentation
- Fault Severity Determination

### **6.4.3. Required Competence**

To become CMVA / ACVM Certified as Category II – Basic Analysis, an individual must achieve a minimum of 70% on a written exam and are also responsible for all the performance objectives listed for Category I.

A major, but not exclusive, focus of certification to Category II is Basic Analysis. Vocabulary is also part of required knowledge.

### **6.4.4. Abilities**

Individuals certified to category II are able to perform industrial machinery vibration measurements and basic vibration analysis using single-channel measurement, with or without phase trigger signals, according to established and recognized procedures. They require all the knowledge, experience and skills expected of category I. Individuals certificated to category II should be able to provide technical guidance to and instruct category I personnel.



### 6.4.5. Prerequisites

Prior to CMVA / ACVM Certification to Vibration Analyst Category II – Basic Analysis the individual shall insure the following activities have been completed:

- Achieve 70% or greater in the certification exam.
- 18 months practical experience in the field of machinery vibration condition monitoring and diagnostics.
- Category I certification or equivalent.
- Acquire the appropriate hours of training in each performance objective as defined by 18436-2 or equivalent.
- Payment of applicable fees.

*Reference: CMVA / ACVM Certification Program Category II – Basic Analysis Performance Objectives*

## 6.5. Vibration Analyst Category III – Diagnostics and Program Management

### 6.5.1. Scope of Certification

CMVA / ACVM Certification to Category III – Diagnostics and Program Management is a certification scheme that is based on a set of performance objectives developed by the CMVA / ACVM to amplify the ISO 18436-2 International Standard concerning the training and certification of vibration personnel in the field of Vibration Condition Monitoring and Diagnostics. These performance objectives are what an individual certified to Category III should be able to do on the job. Category III candidates are also responsible for all the performance objectives in Category I and Category II.

### 6.5.2. Job and Task Description

An individual certified as a Vibration Analyst Category III – Diagnostics and Program Management should be able to master the performance objectives as described in the document CMVA / ACVM Certification Program Category III – Diagnostics and Program Management Performance Objectives. The performance objective titles are:

- Principles of Vibration
- Data Acquisition
- Signal Processing
- Condition Monitoring
- Fault Analysis
- Corrective Action
- Equipment Knowledge
- Acceptance Testing
- Equipment Testing and Diagnostics
- Reference Standards
- Reporting and Documentation
- Fault Severity Determination

### 6.5.3. Required Competence

To become CMVA / ACVM Certified as Category III – Diagnostics and Program Management, an individual must achieve a minimum of 70% on a written exam and are also responsible for all the performance objectives listed for Category I and Category II.

A major, but not exclusive, focus of certification to Category III is Diagnostics and Program Management. Vocabulary is also part of required knowledge.

#### **6.5.4. Abilities**

Individuals certified to category III require all the knowledge, experience and skills expected of personnel certified to categories I and II. The individual certified to category III should be able to provide technical guidance to and instruct category I and II personnel, and, subject to agreement with the employer or client, deem them competent to carry out certain duties which would normally be outside the scope of those competencies.

It is the responsibility of the employer or client to ensure that category III personnel have the necessary competency in the required management skills, e.g. creating budgets, preparing cost justification, and managing personnel development.

#### **6.5.5. Prerequisites**

Prior to CMVA / ACVM Certification to Vibration Analyst Category III – Diagnostics and Program Management the individual shall insure the following activities have been completed:

- Achieve 70% or greater on the Category III examination.
- 36 months practical experience in the field of machinery vibration condition monitoring and diagnostics.
- Use of scientific non-programmable calculators, including trig and log functions, supplied by the candidate.
- Category II certification is required.
- Acquire the appropriate hours of training in each performance objective as defined by 18436-2 or equivalent.
- Payment of applicable fees.

*Reference: CMVA / ACVM Certification Program Category III – Diagnostic and Program Management Performance Objectives*

## **7. Certification Process Criteria**

### **7.1. Criteria for initial certification and recertification**

#### **7.1.1. Initial certification**

For all categories of CMVA / ACVM Certification an individual is required to:

- Have a combination of education, training, and experience sufficient to ensure they understand the principles and procedures consistent with each category they are applying for.
- Complete and submit the Application for Examination and Certification of Vibration Analysts, FM-006-1 English, FM-006-2 French. This application includes an agreement to conform to the CMVA / ACVM Code of Ethics and an affirmation that the individual meets the ISO 18436-2 Requirements for Certification.
- Able to use a basic scientific calculator and be familiar with the operation of person computers
- Achieve a minimum of 70% on the examination.
- Meet the pre-requisites as identified in section 6 above.
- Pay applicable fees.

An individual may apply for Direct Entry to Category II if they have a minimum of 12 months experience and meet any one of the following requirements:

- Hold any 4-year degree from a college or university.
- Hold any 2-year technical degree from a college or university.
- Have 3 or more years of experience in vibration analysis.
- Hold active vibration analyst recognition (certificate) at any category from any reputable training organization.

For categories III and IV, individuals must be familiar with current vibration analysis. It is highly recommended that individuals seeking certification in categories III and IV successful complete two or more years of mechanical technology or mechanical engineering at an accredited college, university or technical school.

*Reference: Application for Examination and Certification of Vibration Analysts, FM-006-1 English, FM 006-2 French.*

*Application Process, PR-006*

### 7.1.2. Recertification

CMVA / ACVM Certification are valid for a maximum of five years from the date of issuance indicated on the Candidate's Certificate. Certification can become invalid when:

- The time period of five years has lapsed.
- The individual becomes physically or mentally incapable of performing the duties
- At the discretion to the Technical Training and Certification Committee, after reviewing evidence of unethical behavior.

To re-certify to all CMVA / ACVM certification categories the candidate must provide verifiable evidence of continued satisfactory work activity without significant interruption by completing the CMVA / ACVM Recertification Form, FM-006-3 and submit with applicable fees.

Applications for renewal after a certificate has expired may be considered after expiry subject to the requirements of the Technical Training and Certification Committee as per the Recertification Process, PR-009. If renewal criteria are not met, the individual must apply as a new candidate.

Pay your certification renewal fee \$350.00. If you are a current member of CMVA / ACVM and have been a **continuing** member of CMVA / ACVM since you were certified, your re-certification is free.

*Reference: PR-009 Certification Process  
CMVA / ACVM Recertification Form, FM-006-3*

## 7.2. Assessment methods for initial certification and recertification

### 7.2.1. Methods for initial certification

The assessment methods applied to all CMVA / ACVM certification categories are:

- Successful achievement of 70% or better on examinations applicable to the certification category.
- Meeting applicable pre-requisites as identified in section 6.0 above.

- Exam results are released to the candidate as Pass or Fail only. Percentages are not released.
- A candidate who fails the exam may re-write for a reduced fee, one time only. There should be 3 months between re-writes

### 7.2.2. Methods for recertification

The CMVA / ACVM Technical Training Committee receive recertification applications from candidates wishing to recertify. The committee assesses the candidate's recertification application; their Re-certification Log, CMVA / ACVM or VI membership status and determines if criteria has been met for the recertification of the candidate.

*Reference: Assessment Process, PR-007  
Examination Process, PR-008  
Certification Process, PR-009  
CMVA / ACVM Recertification Form, FM-012*

### 7.3. Surveillance methods and criteria

Electronic records of certified individuals shall be kept at the national office of CMVA / ACVM, and complete backup copies shall be maintained off-site.

Exams shall be retained for 3 months after the release of results to the candidate, to allow for an appeal process. Thereafter, they shall be destroyed.

A further safeguard is that all those who earn certification will be issued a signed certificate.

### 7.4. Criteria for suspending and withdrawing certification

When there is a failure to resolve issues that have resulted in suspension, CMVA / ACVM may withdraw certification or reduce the scope of certification.

As referenced in section 7.1.2 above, Certification can become invalid when:

- The time period of five years has lapsed.
- The individual becomes physically or mentally incapable of performing the duties
- At the discretion to the Technical Training and Certification Committee, after reviewing evidence of unethical behavior.

*Reference: Certification Process, PR-009*

### 7.5. Criteria for changing the scope or level of certification

The criteria for changing the level of certification would be when a candidate chooses to advance themselves by achieving the next category of certification. Or the candidate could choose not to renew their certification and thereby lose certification.

CMVA / ACVM could change the scope of certification if one or more of the following conditions applied:

- A change in the international standards ISO 18436-1 or ISO 18436-2.

- Change to CMVA / ACVM Certification Schemes.
- As part of the continuous improvement process.

*Reference: Certification Decision & Marks Process, PR-009*

## 8. Certification Scheme Development, Review and Validation

### 8.1. Development

The Certification Schemes described in section 6.0 above are structured and documented in this procedure to meet the latest requirements of ISO 17024. The content of the certification schemes are taken from documents that have been long established by CMVA / ACVM. These documents were established to communicate to interested parties:

- CMVA / ACVM's certification process.
- The value of certification to employees/ candidates; and
- The value of certification to employers.

The content of each certification scheme is derived directly from the latest version of the International Standard ISO 18436-2 Condition monitoring and diagnostics of machines – Requirements for qualification and assessment of personnel – Part 2 Vibration condition monitoring and diagnostics.

The documents listed in section 4.0 above were referenced in the development of the Certification Schemes described in section 6.0 above.

The Technical Training Committee maintains documents to demonstrate that, in the development and review of the certification schemes, the following are included:

- Involvement of appropriate experts.
- An appropriate structure was used that fairly represents the interest of all parties, without any one interest dominating.
- Prerequisites that have been identified and aligned with competence requirements.
- Assessment mechanisms that have been identified and aligned with competence requirements.
- Performance objectives that identify the tasks for successful performance and the required competence for each task.
- Exam development and continuous improvement process to confirm applicable prerequisites, confirm assessment mechanisms and examination content.
- Recertification requirements and intervals.

### 8.2. Review and Validation

This procedure and the Certification Schemes contained within, will be reviewed, and validated on an ongoing basis. As a minimum, during annual Management Reviews, an agenda item is included to consider any changes that may be necessary to the Certification Schemes.

Ongoing feedback is requested from candidates who write examinations in each category. Candidates are encouraged to note on their exam papers where they feel the exam question was "bad". Exam results are review before being released, where appropriate, improvements may be made to examination questions.

*END OF PROCEDURE*