IRTCAT-I ISO Category I

INFRARED THERMOGRAPHY TRAINING
& CERTIFICATION

MOBIUS INSTITUTE

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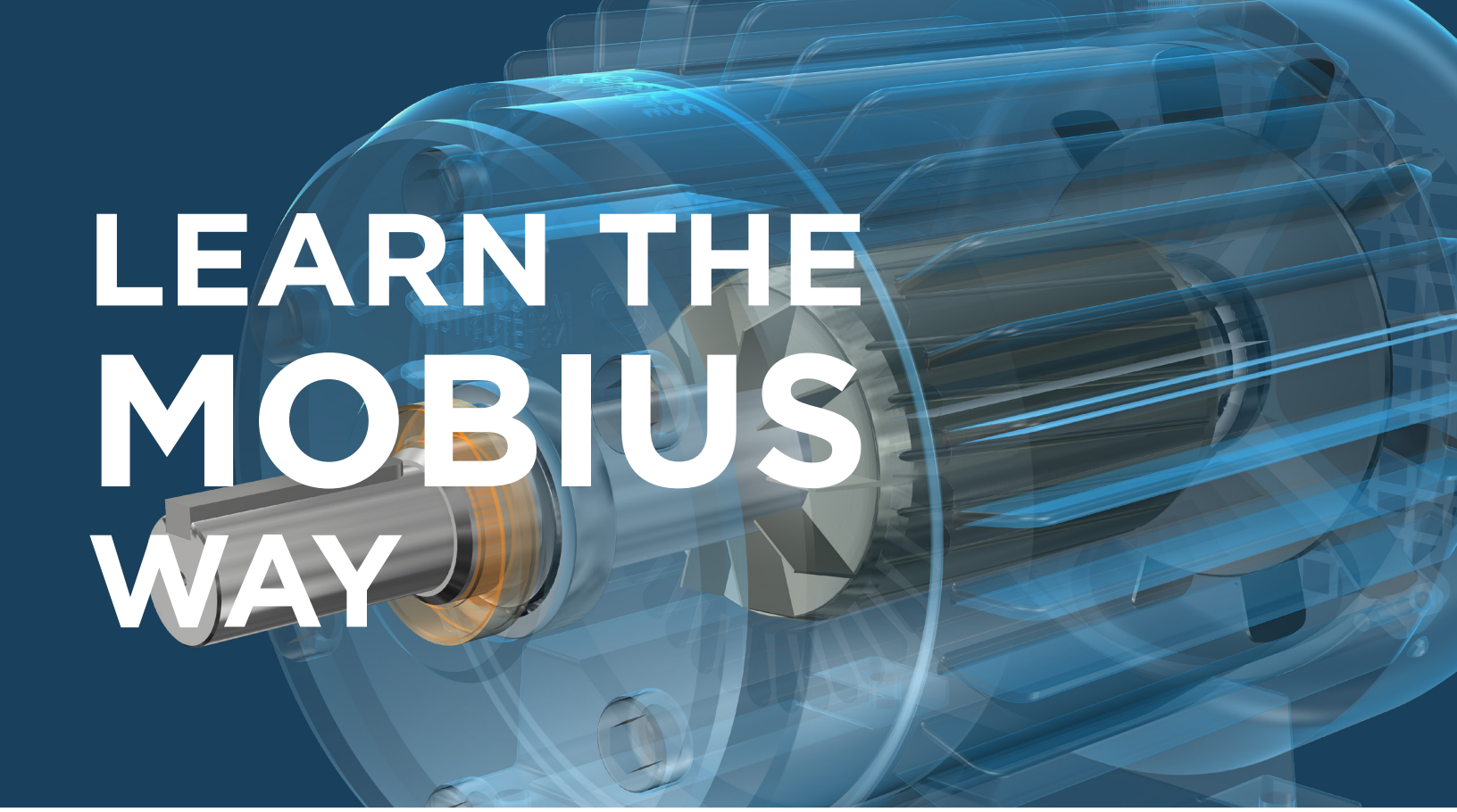

LEARN THE MOBIUS WAY

WHY LEARN WITH MOBIUS INSTITUTE™?

There are three major reasons why over 5,000 students choose Mobius Institute every year, and why you should, therefore, choose Mobius Institute for your Infrared Thermography training and certification.

- We make complex topics simple with amazing 3D animations and simulations that make you say, *"Ah, now I get it!"*
- We give you access to the entire course before the class begins so you are better prepared, and for 4 months after the course, just in case you still have questions.
- We use anonymous, stress-free polling throughout the course, so you know if you truly understand each topic, and the instructor knows not to move on to the next topic - *no student is left behind.*

MOBIUS INSTITUTE BOARD of CERTIFICATION

MOBIUS INSTITUTE

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WITH MOBIUS INSTITUTE™, YOU CAN *LEARN YOUR WAY.*

We offer the ultimate flexibility. See the course details for more information.

CLASSROOM INSTRUCTOR-LED COURSES

We have training partners in 60 countries, offering 23 languages.

VIRTUAL INSTRUCTOR-LED COURSES

Attend a virtual course - just like a live course, but you learn via GoToMeeting.

PRIVATE ON-SITE INSTRUCTOR-LED COURSES

Have the instructor come to your site to save your precious time and money (and health).

ONLINE VIDEO COURSES

Traditional eLearning courses and iLearnReliability Learning Management System (LMS) courses

WHY BECOME CERTIFIED BY THE MOBIUS INSTITUTE BOARD OF CERTIFICATION™?

There are so many benefits to becoming certified:

- You should be recognized for your achievements; not everyone is up to the challenge of understanding Infrared Thermography, let alone successfully collecting data and utilizing it
- Being certified by an accredited certification organization is a major step up from simply passing a test. Our certification is recognized internationally, setting you apart from others in the industry.
- The educational process is extremely valuable, but being certified tells an employer (or a consulting client) that you are capable of doing an important job

Almost 55,000 students around the world, just like you, chose Mobius Institute for a good reason.

You will receive a digitally encrypted certificate, an ID card, and a personalized logo. Update your email signatures, resume, and social media to reflect your certification achievement.

IRTCAT-I INFRARED THERMOGRAPHY

ISO 18436-7 Category I

This course will prepare you for life as an Infrared Thermographer. You will learn the fundamentals of infrared energy and the camera, and you will learn about the most common applications.

With the assistance of the Mobius Institute interactive simulations, 3D animations, and case studies, you will not require a great memory to learn all the facts and concepts. As a result, you will understand the 'science' of infrared thermography. You will understand how the camera functions and learn about plant equipment's mechanical and electrical failure modes so that you can accurately and confidently detect and diagnose a wide range of fault conditions. You will come away from the course with the knowledge and confidence to be successful as an infrared thermographer.

Once you complete the training you will be eligible to take the exam to become certified by the internationally renowned Mobius Institute Board of Certification [MIBoC] to ISO 18436-7 Category I. To be certified, you will need to achieve a minimum score of 75% of the 50 questions and complete the Ishihara color perception test. The MIBoC certification is one of the only international programs accredited to ISO/IEC 17024 – there is no higher standard in condition monitoring certification.

IRTCAT-I CANDIDATE PROFILE

This course is intended for the infrared thermographer who will:

- Set up and operate the thermal imaging equipment for safe thermographic data collection
- Verify the calibration of thermographic measurement systems
- Identify, prevent minimize and control poor data acquisition and error sources
- Apply a specified thermographic measurement technique
- Evaluate and report test results and highlight areas of concern

IRTCAT-I Infrared Thermography

ISO 18436-7 Category I

WHAT WILL YOU GAIN FROM TAKING THIS COURSE?

There are so many benefits to taking this course. You will learn...

- Why we perform condition monitoring
- How to decide between reactive, preventive, condition-based, and proactive maintenance
- Vibration Analysis, Ultrasound Analysis, Oil Analysis, Wear Particle Analysis, and Electric Motor Testing
- All about heat vs. temperature and temperature scales
- The laws of thermodynamics
- How thermal conductivity occurs in different materials
- The difference between thermal conductivity and specific heat capacity
- Real-life examples of conductive heat transfer
- Convective heat transfer
- How wind will affect the results you achieve
- Radiant heat transfer
- How your infrared camera works and the functionality to perform inspections
- How to acquire data and process images
- "Thermal tuning."
- How to determine emissivity
- How to identify and deal with reflections
- How to acquire data and store images
- The basic principles of diagnostics and prognostics
- The relationship between CBM, diagnostics, and prognostics
- The different thermal signatures of heat generation
- The concept of "comparative temperature measurements."
- How to distinguish between active and passive thermography

IRTCAT I FAST FACTS

Duration:

32 hours, typically over four days

Format:

- Live public course
- On-site course
- Virtual online course
- Video distance learning online courses and Life Long Learning (LLL) access

Compliance:

- Training and certification: ISO 18436-7
- Certification: ISO 18436-1, ISO/IEC 17024
- Training: ISO 18436-3

Exam:

- Two hours
- 50 multiple-choice questions
- 75% passing grade
- Can be taken online or in-person at the course

Certification requirements:

- Training course completed
- 12-months of work experience, verified by an independent person
- Pass the Ishihara color perception test
- Valid for 5 years

Pre-study:

- Access to the "Learning Zone" upon registration and payment
- Complete set of videos covering every topic
- An excellent way to be prepared and get the most from the course

Post-study:

- Continue to access the Learning Zone for 4-months after the course
- Continue learning, without charge, on MOBIUS CONNECT® via WWW.MOBIUSCONNECT.COM

Mobius Institute Board of Certification is an accredited certification body per ISO/IEC 17024 and ISO 18436-1 authorized to provide certification in accordance with ISO 18436-1 and 18436-2.

Mobius Institute Board of Certification (MIBoC) is an impartial and independent entity that is directed by scheme and technical committees to ensure that its certification meets or exceeds the requirements defined by the applicable International Organization for Standardization, ISO 18436 standards.

MOBIUS INSTITUTE is a worldwide provider of Reliability Improvement, Condition Monitoring and Precision Maintenance education to industrial plant managers, reliability engineers, and condition monitoring technicians. Our programs allow plants to be successful in implementing Reliability Improvement programs through delivery of more easily understandable and comprehensive training of Reliability and Vibration Analysis via public, in-plant and online education programs.

For more information about additional training courses, software tools, industry terminology and definitions, accredited certification, and specific course details, visit:

www.mobiusinstitute.com

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learn@mobiusinstitute.com

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SOLVING • LEARNING • SHARING

MOBIUS CONNECT is your gateway to reliability and CBM videos, webinars, articles, tips, and a live feed and forum. You will connect with people, just like you, all over the world.

At MOBIUS CONNECT, you can solve problems, continue learning, and share your experience - all for free!

You must never stop learning.

- Maintenance practices
  - Reactive, preventive, condition-based, proactive
  - How to decide between them

- Condition monitoring
  - Why it works
  - Vibration, ultrasound, oil analysis, wear particle analysis, and electric motor testing
  - Detecting faults, root causes, and quality control

- Principles of infrared thermography
  - Understanding the difference between heat energy and temperature
  - The laws of thermodynamics
  - Heat transfer modes – conduction, convection and radiation
  - The thermal capacity of different materials

- Thermal conduction
  - The fundamentals of conduction
  - Conductive heat transfer rate
  - Thermal conductivity of different materials

- Thermal convection
  - The fundamentals of convection
  - Compensating for the “wind cooling effect”

- Thermal radiation
  - The fundamentals of radiation
  - Emitted, reflected and transmitted radiation
  - Radiation wavelengths and the electromagnetic spectrum
  - Emissivity and the Stefan-Boltzmann Law
  - Incident and exitant radiation

- Equipment and data acquisition
  - Understanding the infrared camera
  - Lenses and lens materials
  - Capturing and controlling the image with temperature range, level and span
  - Color palette selection
  - Error source recognition, prevention and control
  - Calibrating the thermal camera
  - Environmental and operational conditions
  - Image storage and management

- Safety rules and guidelines
  - Hazard awareness
  - Standards and guides
  - Personal Protective Equipment (PPE)

- Thermographic applications
  - The basic principles of diagnostics (ISO 13379) and prognostics (ISO 13381)
  - Machinery engineering principles
  - Electrical application – fuses, transformers, switchgear, transmission lines etc
  - Mechanical application – pipes, tanks, refractories, heat exchangers etc
  - Civil applications – windows, air leaks, construction integrity etc
  - Process applications – steam traps

- General image interpretation guidelines
  - Image processing
  - Fault classification

- Report generation
  - Providing actionable information

WHAT IS THE DIFFERENCE BETWEEN MOBIUS INSTITUTE INFRARED THERMOGRAPHY TRAINING/CERTIFICATION AND THE OTHER OPTIONS AVAILABLE?

In short, we have invested heavily in highly informative animations, 3D illustrations, and interactive simulators that make all the complex topics far easier to understand. Plus, our certification not only follows international standards per ISO 18436-7, but the examination process administered by Mobius Institute Board of Certification [MIBoC] is accredited to ISO/IEC 17024. There is no higher standard of certification.

WHY IS ACCREDITED CERTIFICATION IMPORTANT?

Accredited certification is worldwide recognised certification that is respected within the industry. The exams are not necessarily harder, but the process is far more 'robust'. If you want to be able to hold your head high knowing that you meet the highest international standards that every employer instantly recognizes, then you must be certified by the Mobius Institute Board of Certification [MIBoC].

The accreditation process, administered by Government appointed agencies such as ANSI, UKAS, and JASANZ, includes regular audits to ensure the certification process is fair and independent. The audits are given to check that the certification body continues to meet the international standards: ISO 18436-7, ISO 18436-1, ISO 18436-3, and ISO/IEC 17024. They check that we continually follow these processes and that an effective quality control process is in place to ensure that we continue to adhere to the standards governed by ISO.

If you are going to go to the effort and expense to be trained and certified, then why not shoot for the highest standard of certification?

DO I NEED TO BE TRAINED IN THE FIELD OF INFRARED THERMOGRAPHY?

On the face of it, infrared thermography looks 'easy'. Point the camera, look for hot spots, and order the maintenance. But nothing could be further from the truth. It is a classic case that many people don't know what they don't know. The science behind infrared thermography, the failure modes you are attempting to detect, and the cameras themselves are all very complex. If you do not master all three areas your program will not only lose all credibility (missed faults and unnecessary work orders), but you will put your own safety, and the safety of your co-workers and the viability of the plant at risk.

You have three choices. Receive basic training on the camera and face all the risks described. Take 'conventional' training and be forced to attempt to remember all the testing techniques, failure modes, and more, (and suffer the consequences if your memory is not perfect). Or you can take our training, with powerful new 3D animations and simulations that will embed the knowledge in your brain, so that you understand it. You will look at the application with a new set of eyes. It will all make sense. You will avoid all the testing traps and you will get the diagnosis right the first time because you mastered the technique, not just relied on memory.

CAN I SKIP THE TRAINING COURSE AND GO DIRECTLY TO THE EXAM?

No, you must complete training to meet the certification requirements. Training must be from a MIBoC approved IRT training provider.

WILL I RECEIVE PRE-COURSE STUDY MATERIALS?

Every registered student will receive an instructional email to finalize their course registration. They will also receive a link to their personal Learning Zone account. The account provides a digital version of the coursebook and also a series of movies. These movies are actual course videos, recorded in a studio, and contain the same content taught in the Instructor-led course the student is registered in. The Learning Zone account may be used for pre-course study materials, review during the course, reference after the course, or used to re-take the course and re-sit your certification exam. The account is activated at the time the student registers for the course and expires 4 months after the closing date of the course they will be attending.

DO YOU OFFER ON-SITE INSTRUCTOR LED COURSES?

Yes, we offer a range of courses that can be conducted onsite, including our Infrared Thermography course, Ultrasound, Asset Reliability Practitioner® ARP, Vibration Analysis, Balancing, Alignment and others. If you are in North America, please email learn@mobiusinstitute.com for a quotation. Outside North America, contact your local training partner.

MAY I TAKE ONE OF YOUR COURSES IF I AM NOT INTERESTED IN BECOMING CERTIFIED OR IF I HAVE INSUFFICIENT EXPERIENCE FOR CERTIFICATION?

Yes, our courses are open to anyone that wishes to improve their knowledge. If you are involved in Infrared Thermography in any capacity, such as sales, marketing, engineering, design, or reliability, you will come away with a far better understanding of how machines are monitored, how faults develop, and what can be done to determine what faults actually exist in a machine. All attendees receive certificates of training completion.

AFTER I ATTEND YOUR COURSE AND TAKE THE EXAM, WHEN WILL I RECEIVE NOTIFICATION AS TO WHETHER I PASSED, AND WHEN WILL I RECEIVE MY CERTIFICATE?

You will receive notification of your results 5-10 days after the exam has been received at our Australian office. If you have passed the exam and met all certification requirements, you will receive your digital certificate 10-15 days after your exam results notification email.

HOW LONG IS THE CERTIFICATION VALID?

Certification is valid for five (5) years.

HOW DO I RENEW MY CERTIFICATION?

We will endeavor to contact you before your certification expires, therefore it is important that you keep your student profile in our TMS system up to date (TMS is the training management system you will use to register for the course and for certification). We recommend a best practice of utilizing a personal email address for certification communications, in case of a job change.

HOW DO I QUALIFY FOR RENEWAL?

When it is time to renew your certification, you are required to provide evidence of continued work experience in the field of infrared thermography for the previous five years without significant interruption since certification. This evidence is to be added to your student profile under your experience. We will ask you to nominate an independent person/manager or supervisor who can verify your work experience. You will also be required to submit evidence of passing an Ishihara perception color test at the time of renewal. There is a fee to renew your certification.

WHAT ARE THE EXPERIENCE REQUIREMENTS FOR IRTCAT-I?

You must have 12-months of hands on work experience with Thermography and associated condition monitoring tasks. You will be asked to nominate an independent supervisor or manager who can verify that you have the required experience.

WHAT IS THE COLOR PERCEPTION TEST?

MIBoC uses the Ishihara color perception test, also known as the color vision test, to measure a person's ability to tell the difference between colors. Ishihara test checks for red-green color blindness.

In an Ishihara test, a person looks at a series of circles (known as Ishihara plates) with dots of different colors and sizes. A person who has trouble seeing red and green will find the shapes and numbers hard to see, or may not see them at all.