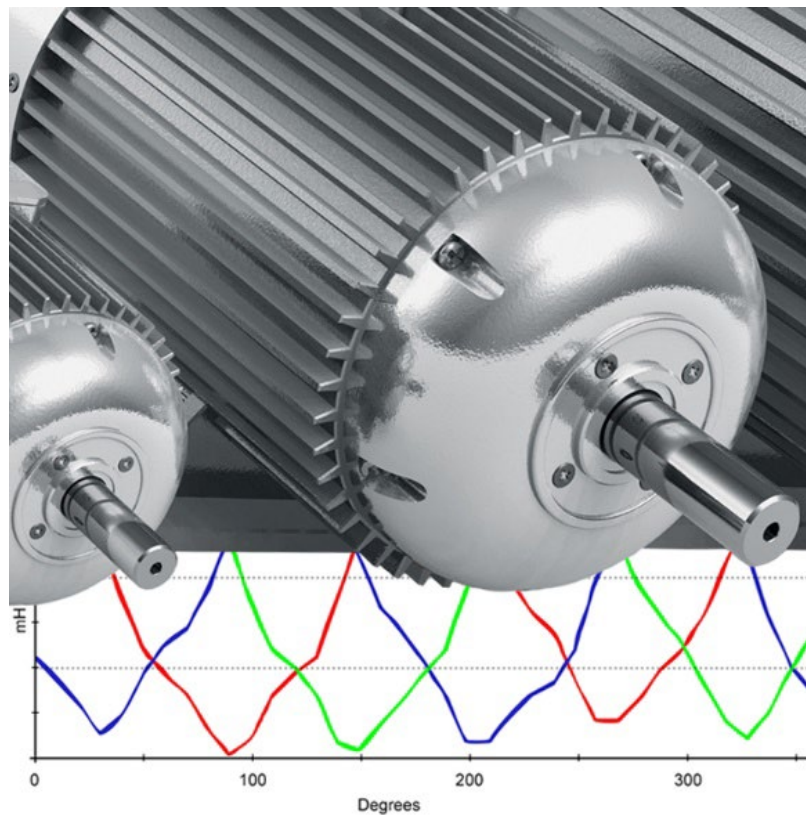




Electric Motor Testing

Certification TSG-EMTC-08.2024



August 07, 2024



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Appendix 1 – Practical Factors and Knowledge Requirements:

1. Practical Factors and Knowledge Requirements

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1. EMTTS Module Applicability Charts – Listing of all Snell Group Motor and Motor Related Training Topics

(Note: EMTTS refers to individual Snell Power Point training topics, i.e., Electric Motor Testing Training Series.)

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Background:

Electric Motor Testing, EMT, has become a preeminent technology for routine monitoring, testing, and troubleshooting of electric motors, motor circuits, and driven equipment. Motor test instruments fall into two categories that make up the technology and its varying capabilities.

1. De-energized Testing
2. Energized Testing

Within those two categories, there are multiple instruments and methods with varying capabilities for assessing motors, motor circuits, and equipment. As with most reliability maintenance technologies, Certification is deemed a necessity for Electric Motor Testing.

The varying capabilities and test methods offered by the motor test instrument manufacturers also present many obstacles to the standard model of most Certifications. It is for that reason the Snell Group has developed a new method of Certification that overcomes those obstacles.

De-energized testing is offered by several manufacturers or OEMs. They all employ differing methods of achieving similar results. Several share some of the same testing methods, but some also offer additional capabilities.

Energized testing is also offered by many OEMs. That testing may include Power Quality, Electrical Signature, and Current Signature data acquisition or only include some of the listed capabilities. Many manufacturers offer just Power Quality testing with a fixed remote monitoring capability or portable instrumentation. Other companies offer installed monitoring devices with remote monitoring capability for other testing. Then there are portable instruments.

With most present Certification paths, a leveled system is utilized. They can range from 2 to 4 levels as a norm. They also present similar expectations from each level of development for the technician. For example, Level 1 is a data collector, Level 2 an analyst, and Level 3 an advanced analyst or program manager. This system works fine given the technologies for which they are utilized with. They do not work for EMT. EMT encompasses multiple technologies with various instruments of differing testing methods and capabilities. A one size fits all Certification path will not work effectively.

The Snell Group has been involved with training and Certification for many decades. Snell was instrumental in contributing and developing many of the standards, procedures, and methods for Infrared. We are also developing standards, methods, and procedures for managing,



ELECTRIC MOTOR TESTING CERTIFICATIONS

testing, and maintaining electric motors. Additionally, we developed training for Electric Motor Testing and Power Quality Analysis.

There are several names for the various motor testing techniques. To standardize terms without utilizing registered trademarks, all references to testing of electric motors will be referred to as **Electric Motor Testing, or EMT**.

Abbreviation	Full Presentation	Testing Method
MCA	Motor Circuit Analysis	De-Energized
MCE	Motor Circuit Evaluation	De-Energized
EMT	Electric Motor Testing	Energized / De-Energized
EMD	Electric Motor Diagnostics	Energized / De-Energized
CSA	Current Signature Analysis	Energized
MCSA	Motor Current Signature Analysis	Energized
ESA	Electrical Signature Analysis	Energized
PQ	Power Quality	Energized

Each motor tester manufacturer provides training for their respective equipment. This training includes operator and analyst training. Because of the varying test and data acquisition capabilities of both energized and de-energized equipment, any Certification Program should rely on “Manufacturer” training as part of the Level 1 or data collector Certification process. Because of differing tests, methods, and software, generic training would prove inadequate, and vendor-specific Certification training is not practical for a vendor-neutral Certifying Authority.

Purpose:

To promulgate a vendor-neutral Certification Program for EMT, that provides a Certification path regardless of utilized instrumentation or equipment. The Snell Group has developed a **non-Levelized** path for Certification for EMT. Depending upon the testing and monitoring capabilities your respective companies / you possess, there are five diverse certifications.

1. **Electric Motor Testing Technician (EMTT)**
2. **Electrical Motor Testing Data Analyst (EMTA)**
3. **Electric Motor Testing Data Advanced Analyst (EMTAA)**
4. **Motor Power Quality Analyst (MPQA)**
5. **Electric Motor Reliability Manager (EMRM)**

Students that have completed previous Snell EMT courses will be provided Certifications. However, they will have to maintain their Certification in accordance with Re-certification requirements delineated in Appendix 3.



Certifications:

Electric Motor Testing Technician (EMTT) - Certification for a person that's basic function is to collect motor data safely and properly.

Electrical Motor Testing Data Analyst (EMTA) - Certification for a person to analyze energized and de-energized motor and motor circuit data. They will also be able to analyze electrical signature and current signature data, to determine motor failure mechanisms and driven equipment faults.

Electric Motor Testing Data Advanced Analyst EMTAA)- will have the training, knowledge, and abilities of an **Electrical Motor Testing Analyst** but will also be trained in the operation and testing of more specific equipment, DC, Synchronous, and Wound Rotor Motors, Permanent Magnet and Servo motors. They will also be familiar with the operation and testing of Variable Frequency Drives. The Advanced Analyst Certification entails the completion of all the advanced topics. These topics will be available individually and as such will have a supplemental listing on the EMTA Certificate. If you only take the DC motor portion of this Certification, you will receive an amended EMTA Certificate; "EMTA, DC Motors." This provides flexibility and provides specific training for the areas necessary to meet your facility's needs.

Motor Power Quality Analyst (MPQA) – Certification for those who monitor facility Power Quality with fixed monitoring devices or portable equipment to identify anomalies that affect facility power and motor efficiency and longevity.

Electric Motor Testing Data Advanced Analyst EMTAA)- will have the training, knowledge, and abilities of an **Electrical Motor Testing Analyst** but will also be trained in the operation and testing of more specific equipment, DC, Synchronous, and Wound Rotor Motors, Permanent Magnet and Servo motors. They will also be familiar with the operation and testing of Variable Frequency Drives. The Advanced Analyst Certification entails the completion of all the advanced topics. These topics will be available individually and as such will have a supplemental listing on the EMTA Certificate. If you only take the DC motor portion of this Certification, you will receive an amended EMTA Certificate; "EMTA, DC Motors." This provides flexibility and provides specific training for the areas necessary to meet your facility's needs.

Electric Motor Reliability Manager (EMRM) - oversees the development and implementation of training, testing, and Certification of Motor Test Technicians and Engineers. They manage the program and monitoring of all critical motor-driven assets and facility power quality. They provide motor management and develop, implement, and maintain motor refurbishment, rewind, acceptance, and maintenance procedures.

These Certifications and associated curriculums are designed to allow anyone to achieve any Certification without a prerequisite, other than OEM training on their respective equipment.



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If a technician is designated to collect data, they can complete the **EMTT** curriculum and Practical Factors. If a technician is assigned to be a data analyst, they may or may not be required to collect data. The EMTA curriculum contains the necessary training to support data collection and analysis.

Maintaining Certification

Certification has become a requirement in many endeavors, from plumbers to welders, automobile mechanics to electricians, and CPAs to doctors. With innovation and technology moving at such a quick pace, it is necessary for all of us in the electric motor testing field to keep up on our EMT proficiency. As part of our Certification process a recertification is deemed important and strongly recommended in most situations. The EMT technician's company shall decide whether to require recertification.

Exercising your craft weekly or monthly is an excellent way to maintain proficiency, but it may be difficult to keep up with changes in the technology. The next best method of keeping up to date with the technology, is with continuing education activities. Attending training courses, trade shows and conferences are a means of staying familiar with changes, new innovations, and offerings. Tracking these activities could be based on a point accumulation system as seen in Appendix 3. Maintaining the proper number of points would sustain the certification. The administration of this record keeping can be done by the company the EMT technician works at or performed by an outside agency such as The Snell Group.

Appendix 3 provides the recommended guidelines for maintaining Certification.



Curriculum Requirements:

Electric Motor Testing Technician (EMTT)

1. Motor Tester Vendor OEM Training
2. Snell EMTT Introduction to Electric Motor Testing Course

Theory Review

1. DC Theory Review
2. AC Theory Review

Electric Motor Testing Fundamentals

1. Motor Nameplate
2. Start Circuit Configurations*
3. Test Equipment Preparation and Verification*
4. Panel Interface and Interlocks*
5. Understanding Secondary Circuits, CT's and PT's
6. Motor External Circuitry and Testing Influence
7. Testing Methods and Overview

*See Disclaimer on Page 9

Electrical Motor Testing Data Analyst (EMTA)

1. Motor Tester Vendor OEM Training
2. Snell Group EMT Combined Course

Theory Review

- 1 DC Theory Review
- 2 AC Theory Review
- 3 Transformer Theory Review

Electric Motor Fundamentals

1. Distribution and Grounding
2. Motor Construction
3. Motor Rewind
4. Motor Nameplate



De-Energized Electric Motor Testing

1. Theory to Support De-Energized Electric Motor Testing

Power Quality and Electric Motor Testing

1. Power Quality Analysis

Energized Electric Motor Testing

1. Electrical Signature and Motor Current Signature Analysis

Safety Considerations for Electric Motor Testing

1. Electric Motor Testing Safety Recommendations*
*See Disclaimer on Page 9

Electric Motor Testing Data Advanced Analyst (EMTAA)

1. Motor Tester Vendor OEM Training
2. Snell Advanced Motor Analyst Course

Advanced Motor Operation and Testing

1. Medium and High Voltage Motor Construction
2. DC Motor Construction
3. DC Motor Operation and Testing
4. Synchronous Motor Construction
5. Synchronous Motor Operation and Testing
6. Permanent Magnet Motor Operation and Testing
7. Servo Motor Operation and Testing
8. Medium and High Voltage Circuit, PTs and CTs, Operation and Testing
9. Generator Operation and Testing

Motor Power Quality Analyst (MPQA)

1. Power Quality Analyzer Vendor OEM Training
2. Snell Power Quality Course

Theory Review

1. DC Theory Review
2. AC Theory Review
3. Transformer Theory Review
4. Distribution and Grounding



Analyzing Power Quality

1. Introduction to Power Quality
2. Power Quality Analysis
3. Case Studies

Electric Motor Reliability Manager (EMRM)

Electric Motor Fundamentals

1. Motor Construction
2. Motor Rewind
3. Motor Nameplate
4. Motor Operation and Theory

Motor Management

1. Determining Motor Criticality
2. Determining Routes and Monitoring Frequency
3. Motor Management Software Solutions
4. Motor Storage – Local, Vendor Facility
5. Motor Acceptance Testing
6. Motor Rewind Procedures
7. Motor Testing Procedures
8. Power Quality Overview
9. Training and Certification Requirements

Disclaimer: This document is provided as a guideline in establishing an effective Motor Testing and Power Quality Certification Program. It is inclusive of the recommended training, knowledge, practical factors, and experience deemed necessary for these Certifications.

It does not give specific guidelines for safety matters!

This document by no means represents all facets of safety or the ability to interface with electrical enclosures and interface equipment. The number and varied designs of these devices make it near impossible to include all the variances in a single document. It is incumbent upon the companies or individuals using this Certification document to learn the specifics for safety and the operation and interfacing of all of their equipment's and test instruments. All plant-specific, local, state, and federal safety rules and regulations should be examined, understood and adhered to during any testing done.



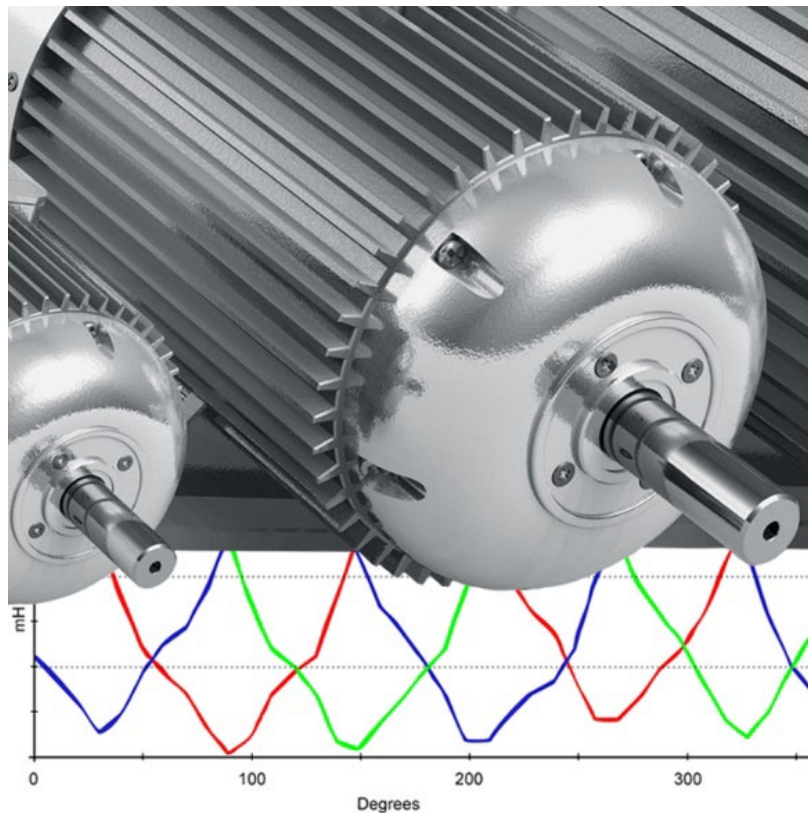
ELECTRIC MOTOR TESTING CERTIFICATIONS

The Snell Group bears no liability or responsibility for or with respect to any safety or physical aspects of the operation of any equipment's, interfacing or connections to any electrical circuits or damage or injury that may occur in the process of any procedure, operation, or maintenance action related to this Certification for any Power Quality or Motor testing related incidents. For the reasons stated above, there is no way to judge the individual's safety practices that they follow, and it is the sole responsibility of the individuals and companies using these guidelines to assure accepted safety practices are always followed when doing motor testing. The Snell Group assumes no liability or responsibility, express or implied, when the individual conducts any testing.



Electric Motor Testing

Practical Factors and Knowledge Requirements



Appendix 1



ELECTRIC MOTOR TESTING CERTIFICATIONS

Practical Factors and Knowledge Requirements:

The table below lists the minimum recommended knowledge requirements and practical abilities necessary to achieve an effective Certification for the individual categories. An “X” in a column indicates that line item is required. A “1*,” indicates that the item is required if data collection is being performed by the analyst.

Practical Factors and Knowledge Requirements	EMTT	EMTA	EMTAA	MPQA	EMRM
Tester OEM Software	X	X	X	X	
Database Construction	X	1*	1*	1*	
Tester Operation	X	1*	1*	1*	
OSHA 1910 and NFPA 70E Trained*	X	1*	1*	1*	
Electrical Safety for Interfacing Motor Circuits – Connections*	X	1*	1*	1*	
Starting Circuit Configurations*	X	X	X		
Wye Delta Start Configuration for De-Energized Testing*	X	1*	1*		
Familiarity With Starter Interlocks*	X	1*	1*	1*	
Familiarity and Ability to Read Motor Circuit Schematics*	X	1*	1*	1*	
Medium and High Voltage Connection Interface*	X	1*	1*	1*	
Potential Transformer Configuration and Determining Ratios	X	1*	1*	1*	
Current Transformer Configurations and Determining Ratios	X	X	X	1*	
Installed Equipment Operation and Effects	X	X	X	1*	
Determining Good Data and Data Confirmation	X	X	X	1*	
DC Theory - Series Circuits	X	X	X	X	
DC Theory - Parallel Circuits	X	X	X	X	
AC Theory - Series Circuits	X	X	X	X	
AC Theory - Parallel Circuits	X	X	X	X	
Correlate Motor Circuit to Series or Parallel	X	X	X	X	
AC Theory - RLC Circuits		X	X	X	
Transformer Theory		X	X	X	
Transformer Configurations		X	X	X	
Transformer Turns Ratios		X	X	X	
Transformer Losses		X	X	X	
Operation and Use of Amp Probes / Current Transformers		X	X	X	
Methods of Determining PT and CT Ratios		X	X	X	
Understand Distribution Systems		X	X	X	
Understand Grounding Systems and How They Can Affect Data		X	X	X	
Understand Induction Motor Construction		X	X	X	X
Thorough Understanding of the Motor Rewind Process		X	X		X
Thorough Understanding of EASA Testing Process		X	X	X	X
Familiar with NEMA MG-1		X	X	X	X
Understand all Motor Nameplate Data		X	X		X
Familiar with Required Non-Nameplate Data		X	X		X
Understand Basic AC Generator Theory		X	X		

*See Disclaimer on Page 9



ELECTRIC MOTOR TESTING CERTIFICATIONS

Practical Factors and Knowledge Requirements	EMTT	EMTA	EMTAA	MPQA	EMRM
Left-Hand Rule for Generators		X	X	X	
Understand Operation of a Simple AC Generator		X	X	X	
Understand Frequency and Period and how to Calculate		X	X	X	
Understand the Operation of a Rotating Armature Alternator		X	X	X	
Understand the Operation of a Field Armature Alternator		X	X	X	
Familiarity with the different types of Generator Rotors		X	X	X	
Familiarity with 3-Phase Alternators		X	X	X	
Understand the effects of Alternator Frequency		X	X	X	
Fundamentals of a Squirrel Cage Induction Motor		X	X	X	
Understand Pole Polarity and the Left-Hand Rule for Coils		X	X	X	
Understand Mutual Inductance as it Relates to Field Poles		X	X	X	
Understand the Development of the Stator Rotating Field		X	X	X	
Understand How Rotating Field Speed Changes		X	X	X	
Understand Synchronous Speed vs. Slip and RPM		X	X	X	
Understand Stator Field and Rotor Magnetic Field Interaction		X	X	X	
Be Familiar with Torque vs. Slip		X	X	X	
Understand Motor Torque and Current Curves		X	X	X	
Understand Motor Current Components		X	X	X	
Power Factor changes with Motor Loading		X	X	X	
Discuss NEMA Design and Motor Start Current and Torque		X	X	X	
Effective Program Establishment		X	X		X
Motor Tracking		X	X		
Analyzing Motor Circuit Resistance		X	X		
Analyzing Motor Circuit Impedance		X	X		
Analyzing Capacitance to Ground		X	X		
Power Factor Capacitors Individual Load and Bulk Correction		X	X	X	
Analyzing Circuit Impedance		X	X	X	
Familiarity with Surge Testing Capabilities and Impulse Waves		X	X		
Understanding Pulse to Pulse Error Area Ratio		X	X		
Familiarity With IEEE 43- Insulation Testing		X	X		
Insulation Test Procedures and Considerations		X	X		
Factors Effecting Insulation Tests		X	X		
Timed Resistance Tests		X	X		
Polarization Index Testing		X	X		
PI Profile Analysis		X	X		
Step Voltage Testing		X	X		
AC and DC High Potential Testing		X	X		
Rotor Influence Testing		X	X		
Resistance, Inductance, and Impedance – Fault Isolation		X	X		
Current Frequency Response		X	X		
Warehouse Spares and Acceptance Testing		X	X		X
Motor Testing Program Implementation		X	X		X
Determining Criticality and Periodicity for De-energized Testing		X	X		X



ELECTRIC MOTOR TESTING CERTIFICATIONS

Practical Factors and Knowledge Requirements	EMTT	EMTA	EMTAA	MPQA	EMRM
New Motor Acceptance and Baseline Testing		X	X		X
Power Quality Anomaly Familiarity		X	X	X	X
Types of Generated Power and their Unique Impacts		X	X	X	X
Power Generation and Distributions Systems		X	X	X	X
Power Transmission and Sub Stations		X	X	X	X
Understand Linear and Non-linear Loads		X	X	X	X
High-Frequency Unidirectional and Oscillatory Events		X	X	X	
Voltage Fluctuation		X	X	X	
Voltage Sags, Swells, and Transient Over Voltage		X	X	X	
Unbalanced Voltage - Causes and Effects		X	X	X	
Unbalanced Current - Causes and Effects		X	X	X	
Power Factor – Real Power, Apparent Power		X	X	X	
Reactive Current Unbalance and Effects		X	X	X	
Harmonics – Sources and Effects		X	X	X	
Frequency Deviation		X	X	X	
Ground Anomalies and Effects		X	X	X	
NEMA Voltage Unbalance Parameters and De-rating		X	X	X	
NEMA Harmonic Voltage Factor and De-rating		X	X	X	
Procedures for Effective Energized Testing		X	X	X	
Power Quality Data Analysis		X	X	X	
AC Voltage Analysis – RMS, Peak, Crest Factor		X	X	X	
Using Voltage Neutral to Identify Grounds		X	X	X	
Current Analysis		X	X	X	
Use of Current and Impedance Values to Localize Faults		X	X		
Sequence Currents and Effects		X	X		
IEEE 519, IEEE 1159		X	X	X	
Understanding the Fast Fourier Transform FFT		X	X		
Electrical and Current Signature Analysis		X	X		
Purpose of FFT Windows		X	X		
Linear and Logarithmic Spectral Displays		X	X		
Analyzing In Rush Current and Various Starting Profiles		X	X		
Understanding Various Types of Start Circuits and Analysis		X	X		
In Rush and Load Current Correlation for Rotor Bar Anomalies		X	X		
Correlating Start Peak and Transition Current to Isolate Faults		X	X		
Use of Voltage and Current FFTs to Localize Faults		X	X		
Determining Motor Speed Utilizing FFT		X	X		
Calculating RPM and Frequency		X	X		
Analyzing Rotor Anomalies		X	X		
Calculating Field Pole Pass Frequency Sidebands - F _{pp}		X	X		
Determining Rotor Fault Severity		X	X		
Eight ways to Identify Rotor Anomalies Using EMT		X	X		
Understanding Eccentricity and Causes		X	X		

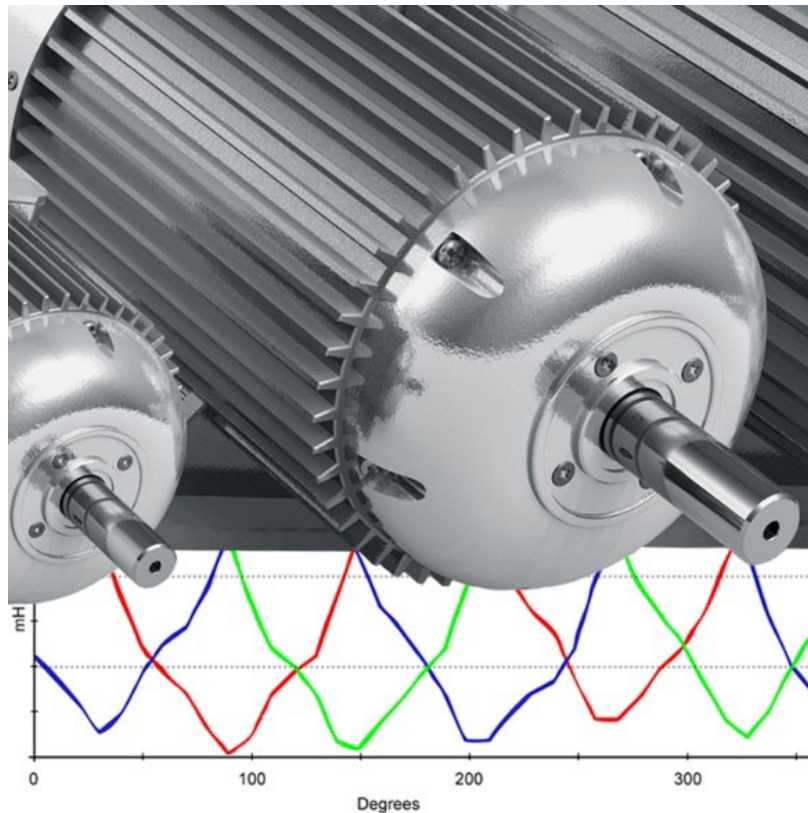


ELECTRIC MOTOR TESTING CERTIFICATIONS

Practical Factors and Knowledge Requirements	EMTT	EMTA	EMTAA	MPQA	EMRM
Calculating and Identifying Static and Dynamic Eccentricity		X	X		
Estimating Number of Rotor Bars		X	X		
FFT Analysis for Unbalance and Misalignment		X	X		
Identifying Rotor Axial Movement		X	X		
Calculating for Faults on Belt Driven Equipment		X	X		
Calculating Blade Pass Frequencies		X	X		
Gear Mesh Frequency Calculations		X	X		
Using Current FFTs to Identify Bearing Faults		X	X		
Safety Considerations for Electric Motor Testing	X	X	X		
DC Motor Construction			X		
DC Motor Operation			X		
Types of DC Motors			X		
DC Motor Testing			X		
Commutator Bar to Bar Testing			X		
Commutator and Brush Maintenance			X		
High Voltage Induction Motor Stator Construction			X		
High Voltage Induction Motor Rotor Construction			X		
High Voltage Motor Testing Considerations			X		
Synchronous Motor Construction			X		
Synchronous Motor Types			X		
Synchronous Motor Operation and Testing			X		
Wound Rotor Motor Construction			X		
Wound Rotor Motor Types			X		
Wound Rotor Motor Operation and Testing			X		
Permanent Magnet Motor Operation and Testing			X		
Servo Motor Operation and Testing			X		
Variable Frequency Drives Operation			X		
Variable Frequency Drives Installation Methods			X		
VFD Line Reactor Purpose and Testing			X		
VFD Testing			X		
Developing a Motor Testing Program					X
Implementing Power Quality Monitoring					X
Assessing Motor Testing Priority and Asset Criticality					X
Developing Routes and Monitoring Frequencies					X
Development and Implementing of Motor Acceptance Testing					X
Storage and Maintenance of Spare Motors					X
Motor Testing Procedures					X
Motor Acceptance for New and Rewound Repaired Motors					X
Motor Asset Management and Software Considerations					X
Training and Certification Program Implementation					X



Electric Motor Testing Training Series Modules



Appendix 2



ELECTRIC MOTOR TESTING CERTIFICATIONS

EMTTS	Topic	EMTT	EMTA	EMTAA	MPQA	EMRM
	Test Technician Supplemental Training Topics					
9S	Motor External Circuitry Purposes and Effects	X				
13S	Circuit Interface, Interlocks, & Connection Considerations*	X				
14S	Medium, High Voltage Connection Interface*	X				
	Determining CT and PT Ratios	X				
	Familiarity with Schematics*	X				
	EMTAA Full Course Modules 1-13		X			
1	DC Theory Review	X			X	
1A	Introduction Review of Ohms Law					
1B	Series Circuits					
1C	Parallel Circuits					
1D	DC Theory Review / Summary					
2	AC Theory Review	X			X	
2A	AC Theory					
2B	Inductance Part 1					
2C	Inductance Part 2					
2D	Capacitance					
2E	Reactance and Impedance Part 1					
2F	Reactance and Impedance Part 2					
3	Transformer Theory	X			X	
3A	Transformer Theory Part 1					
3B	Transformer Theory Part 2					
4	Distribution Apparatus					
4	Distribution Systems				X	
5	Motor Construction					
5A	Stator Core					
5B	Stator Windings and Rotor					
6	Motor Rewind					
6A	Motor Rewind Sequence					
6B	Motor Rewind – Testing and Insulation Treatments					
7	Motor Nameplate					
8	Electric Motor Theory					
8A	Motor Operation and Theory Part 1					
8B	Motor Operation and Theory Part 2					
9	De-Energized Electric Motor Testing					
9A	De-Energized Electric Motor Testing Part 1					
9B	De-Energized Electric Motor Testing Part 2					
9C	De-Energized Electric Motor Testing Part 3					
9D	De-Energized Electric Motor Testing Part 4					
10	Power Quality				X	
10	Power Quality Analysis				X	
11	Energized Electric Motor Testing					
11A	ESA and MCSA Part 1					
11B	ESA and MCSA Part 2					

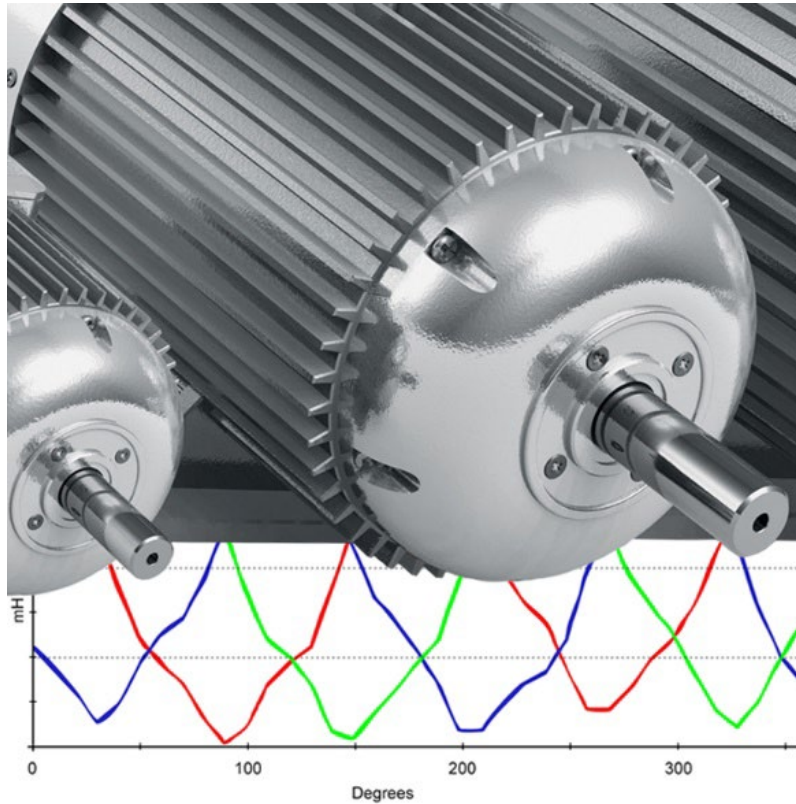


ELECTRIC MOTOR TESTING CERTIFICATIONS

EMTTS	Topic	EMTT	EMTA	EMTAA	MPQA	EMRM
12	Full Course Comprehensive Review					
13	Safety Considerations for EMT				X	
14	Advanced Power Quality Analysis for Motors				X	
	Electric Motor Advanced Analysis Modules 15-21			X		
15	DC Motor Theory					
15A	DC Motor Construction					
15B	DC Motor Operation					
15C	DC Motor Testing					
16	Medium and High Voltage Induction Motors					
16A	Medium and High Voltage Motor Construction					
16B	Medium and High Voltage Motor Operation					
16C	Medium and High Voltage Motor Testing					
17	Synchronous Motors					
17A	Synchronous Motor Construction					
17B	Synchronous Motor Operation					
17C	Synchronous Motor Testing					
18	Wound Rotor Motors					
18A	Wound Rotor Motor Construction					
18B	Wound Rotor Motor Operation					
18C	Wound Rotor Motor Testing					
19	Permanent Magnet Motors – Operation and Testing					
20	Servo Motor Operation and Testing					
21	Variable Frequency Drives					
21A	Variable Frequency Drive Operation					
21B	Variable Frequency Drive Installation					
21C	VFD Testing and Troubleshooting					
21D	Line Reactors Purpose and Testing					
22	Electric Motor Reliability Management					X
22A	Develop a Motor Testing Program					
22B	Implement Power Quality Monitoring					
22C	Assess Motor Testing Priority and Asset Criticality					
22D	Develop Routes and Monitoring Frequencies					
22E	Develop and Implement of Motor Acceptance					
22F	Storage and Maintenance of Spare Motors					
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22H	Motor Acceptance for New and Rewound Repaired Motors					
22I	Motor Asset Management and Software Considerations					
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*See Disclaimer on Page 9

Electric Motor Testing Maintaining Certification





ELECTRIC MOTOR TESTING CERTIFICATIONS

Application for Current Certification Level to be Renewed

Contact Information

Name _____

Address _____

Certification:

Electric Motor Testing Technician (EMTT) _____

Electrical Motor Testing Analyst (EMTA) _____

Electric Motor Testing Advanced Analyst (EMTAA) _____

Power Quality Analyst (MPQA) _____

Electric Motor Reliability Manager (EMRM) _____

Certification Number _____

Expiration Date (month/day/year) _____

Email _____

Cell Phone _____

Company _____

Company Address _____

Supervisor Name _____

Supervisor Phone _____

Supervisor Email _____

Certification Renewal Criteria: At any time in the final six months of certificate validity, certification may be renewed by the certification body for a new five-year period, plus the period of unexpired certification, so long as the certificate holder provides **verifiable** evidence of continued satisfactory work activity without significant interruption.



ELECTRIC MOTOR TESTING CERTIFICATIONS

A minimum of 40 points are required for maintaining Certification. The Snell Group may contact your supervisor or manager to confirm your work responsibilities and activities for the past five years.

1. Motor Test Experience per year (50 credits maximum) * Percentage of time per year in work corresponding to the level of your EMT certification:

<u>Activity Level</u>	<u>Percent</u>	<u>Credits</u>	
Seldom	< 10%	0	
Occasional	11-30%	4	
Part time	31-60%	6	
Predominant	61-80%	8	
Full time	81% +	10	Supervisor
List previous 5 years:	Year	Credits	Initials
	<input style="width: 100%; height: 20px;" type="text"/>	<input style="width: 100%; height: 20px;" type="text"/>	<input style="width: 100%; height: 20px;" type="text"/>
	<input style="width: 100%; height: 20px;" type="text"/>	<input style="width: 100%; height: 20px;" type="text"/>	<input style="width: 100%; height: 20px;" type="text"/>
	<input style="width: 100%; height: 20px;" type="text"/>	<input style="width: 100%; height: 20px;" type="text"/>	<input style="width: 100%; height: 20px;" type="text"/>
	<input style="width: 100%; height: 20px;" type="text"/>	<input style="width: 100%; height: 20px;" type="text"/>	<input style="width: 100%; height: 20px;" type="text"/>
	<input style="width: 100%; height: 20px;" type="text"/>	<input style="width: 100%; height: 20px;" type="text"/>	<input style="width: 100%; height: 20px;" type="text"/>

Total Credits – Work Experience -----

*Motor Analyst Work Experience includes data collection, data analysis, report with conclusions & recommendations, and PdM database setup.

2. RELATED Motor Analyst ACTIVITIES (20 credits maximum)

- A. Writing case study or acceptance criteria (3 credits)
- B. Technical presentation, internal or public (5 credits)
- C. Author motor testing - article in publication (5 credits)
- D. Mentoring of motor testing personnel (5 credits)
- E. Supervision of PdM program for at least one year (7credits)

Total Credits – Related Activities (20 maximum)

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ELECTRIC MOTOR TESTING CERTIFICATIONS

3. CONTINUING EDUCATION AND IMPROVEMENT (30 credits maximum)

Motor Training / Seminar Attendance (0.5 credits per hour or 4.0 credits per day)

Course Title	Organization/Location	Date	Credits

Motor Conference / Meeting Attendance (.025 credit per hour or 4.0 credits per day)

Conference/Course Title	Location	Date	Credits

Total Credits – Continuing Education (30 credits maximum)

Credits Summary

Work Experience (50 credits Maximum)	<input style="width: 90%; height: 20px;" type="text"/>
Related Activities (20 credits Maximum)	<input style="width: 90%; height: 20px;" type="text"/>
Continuing Education (30 credits Maximum)	<input style="width: 90%; height: 20px;" type="text"/>
Total Credits	<input style="width: 90%; height: 20px;" type="text"/>

If your credit total equals or exceeds the number required for your current recertification category, you may qualify for a 5-year renewal period on your certification. The Snell Group will carefully evaluate your application and make the final determination regarding your eligibility. The \$150 processing fee will be charged if you are granted this certification renewal.



ELECTRIC MOTOR TESTING CERTIFICATIONS

Payment

Amount \$150.00

Card Type _____

Card Number _____

Card Expiration Date (month/year) _____

Card V-Code / Security Code _____

Cardholder Name _____

Cardholder Address _____

Date (month/day/year) _____

Card Holder Signature _____ Date: _____

Note: Payment can also be made by company check or purchase order.

Purchase Order Number _____

Billing Address: _____