

Power Factor Testing

3 Days, 2.1 CEUs

Power factor testing is the most effective and common way to detect insufficient electrical equipment insulation. This test enables technicians to detect equipment insulation problems without making an internal visual inspection.

This course provides training in power factor and dissipation factor testing. Participants will be trained to properly perform the tests and to interpret the findings. Technicians who can perform and evaluate the results of power factor tests can predict and prevent the failure of medium and high voltage transformers, circuit breakers, bushings (transformers and circuit breakers), reclosers, switches, cables, lightning arrestors, liquid insulation, compound or oil filled cable terminations, rotating machinery (motors and generators), voltage regulators, and insulating oils.

This hands-on course is intended for new or experienced electricians and technicians that install, maintain, repair or troubleshoot electrical equipment. The student should have basic knowledge of AC/DC electricity.

Lab and Classroom Attire

AVO Training Institute is committed to the personal safety of each participant and require long pants and ANSI rated "safety-toe" work shoes for lab activities. Lecture courses may involve a tour of a work or shop area and for this reason open-toe shoes and shorts are not considered appropriate attire for the classroom.

Learning Objectives

To receive 2.1 CEUs, participants must attend 3 days of class (21 contact hours) and attain a minimum average grade of 80% ((overall grade will consist of 50% lab practice and 50% final exam). Upon completion of this course the participant will demonstrate that he/she is able to:

- Outline the causes of insulation degradation and failure.
- Summarize the modes of operation.
- Connect leads and perform power factor tests.
- Troubleshoot connections in the event of poor test results.
- Perform temperature corrections and evaluate test results.
- Determine maintenance to be performed based upon the test results.

SCOPE

Day 1* (7 contact hours)

- I. Introduction (0.5 hr)
 - A. Schedule
 - B. Course Outline
- II. Theory of Power Factor Testing (1 hr)
 - A. Power Generation Versus Electrical Testing
 - B. Test Set Operation
 - C. Modes of Operation

- III. Power Factor Testing of Power and Distribution Transformers (1.5 hrs)
 - A. General Safety Precautions
 - B. Definitions
- AM Break
- C. Power Factor Testing of Transformers
- D. Transformer Excitation Current Tests
- E. Transformer System Components

- IV. Power Factor Testing of Circuit Breakers (1 hr)
 - A. Application
 - B. Temperature and Humidity
 - C. Trending
 - D. Oil Circuit Breakers
 - E. SF₆ Circuit Breakers
 - F. Air Frame Circuit Breakers
 - G. Vacuum Circuit Breakers
- Lunch

*Class scheduling times may vary based on discussions and size of class

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SCOPE (cont'd)

Day 2 (7 contact hours)

- V. Power Factor Testing of Bushings (2 hrs)
 - A. Definitions
 - B. Bushing Tests
- AM Break
- VI. Power Factor Testing of Cables and Oil- or Compound-Filled (2.5 hrs) Terminations
 - A. Test Connections
- Lunch
- B. Test Procedure
- C. Test Results
- VII. Power Factor Testing of Surge (Lightning) Arresters (2.5 hrs)
 - A. Test Connections
- PM Break
- B. Test Procedure
- C. Test Results

Day 3 (7 contact hours)

- VIII. Power Factor Tip-Up Test Techniques (0.5 hr)
 - A. Application
 - B. Need for Tip-Up Testing
 - C. How To Perform Tip-Up Test
 - D. Common Problems Encountered While Performing Tip-Up Test
 - E. Sample Case Study
 - F. Limitations
- IX. Power Factor Testing Labs on Available Equipment (6 hrs)
- AM Break
- IX. Power Factor Testing Labs on Available Equipment (cont'd)
- Lunch
- IX. Power Factor Testing Labs on Available Equipment (cont'd)
- PM Break
- IX. Power Factor Testing Labs on Available Equipment (cont'd)
- X. Conclusion (0.5 hr)
 - A. Review
 - B. Final Exam