



# Training Brochure

**COURSES:**

POWER TRANSFORMER OPERATION MAINTENANCE AND TESTING TRAINING

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POWER QUALITY MEASUREMENT AND ANALYSIS TRAINING

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INFRARED THERMOGRAPHY PRINCIPLE TRAINING

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SAFE OPERATION & MAINTENANCE OF CIRCUIT BREAKERS, SWITCH GEARS AND  
POWER CABLE HIPOT TESTING

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PRINCIPLE OF TRANSFORMER OIL ANALYSIS TRAINING

# POWER TRANSFORMER OPERATION, MAINTENANCE AND TESTING TRAINING.



## INTRODUCTION:

Power transformers are some of the most important (and expensive) pieces of equipment required for a smooth operation of the power system network. The purchase, preparation, assembly, operation and maintenance of transformers represent a large expense to the power system. Determination of performance/condition of power transformers is achieved through periodic testing.

## TARGETED GROUPS:

- Electricians
- Engineers
- Technicians
- Contractors maintaining electrical systems.

## COURSE OBJECTIVES

At the end of this course, the participant will be able to

- Understand the basic operation principle of transformers and identification of various parts with their functions.
- Understanding the different cooling methods of the transformer.
- Understand the principles and procedures used to carry out routine and non-routine maintenance on a power transformer to ensure its continued operational efficiency.
- Generate and interpret reports of the tests carried out on the transformer.

## TARGETED COMPETENCIES

- Knowledge of the working principle of transformers.
- Knowledge of the various parts of a transformer with their functions.
- Understanding the difference between commissioning, inspection and periodic testing of transformers
- Understand the usage of omicron CPC 100 to carry out power transformer testing.
- Understand how to generate report and give recommendations

# POWER QUALITY MEASUREMENT AND ANALYSIS TRAINING



## INTRODUCTION:

The decline in quality of power is a big issue due to increase in the usage of power electronics that uses inverters, an increase of unbalanced loads like large furnaces or rectifiers, and typically complex power distribution due to an increment in power network interconnections for new energy plant.

## TARGETED GROUPS:

- Electricians
- Engineers
- Technicians
- Contractors maintaining electrical systems.

## COURSE OBJECTIVES

At the end of this course, the participant will be able to

- Gain fresh awareness on to design electrical system that will comply with regulatory standards and industry guidelines.
- Understand power issues such as voltage sags, swells, interruptions, harmonics, and transients that can affect the performance of electrical equipment and devices.
- Understand where improvements are needed to enhance the reliability and stability of the electrical supply.
- Understand valuable insights into the root causes of electrical problems and disturbances.

## TARGETED COMPETENCIES

- Knowledge of various types of power quality meter
- Understand the usage of power quality analyzer.
- Understand how to connect power quality analyzer.
- Understand how to use power quality meter software for reporting.
- Understand how to write report and give recommendations.

# INFRARED THERMOGRAPHY PRINCIPLE TRAINING



## INTRODUCTION:

The primary goal of infrared thermography is to confirm machinery is running normally and to detect abnormal heat patterns within a machine, indicating inefficiency and defects. Inspecting mechanical and electrical equipment using infrared thermography is a big advantage for asset managers tasked with condition monitoring.

## TARGETED GROUPS:

- Electricians
- Engineers
- Technicians
- Contractors maintaining electrical systems.

## COURSE OBJECTIVES

At the end of this course, the participant will be able to

- Understand the fundamental principles of infrared thermography.
- To identify anomalies in thermal images.
- To diagnose potential issues and prioritize repair task.
- Understand valuable insights into the root causes of electrical problems and disturbances.

## TARGETED COMPETENCIES

- Knowledge of various types of infrared thermography camera.
- Operation of Infrared Thermography camera
- Proper techniques for taking accurate temperature measurements using infrared thermometers, including considerations for distance, angle, and emissivity settings.
- Interpret temperature measurements obtained from infrared thermography camera and how to identify potential issues or abnormalities based on temperature variations.
- Understand how to write report and give recommendations.

# SAFE OPERATION & MAINTENANCE OF CIRCUIT BREAKERS, SWITCH GEARS AND POWER CABLE HIPOT TESTING



## INTRODUCTION:

Circuit breakers, fused switches, and switchgear in the form of motor Control Centres (MCC) are necessary system items for the electrical control of the electrical plant. The safe use of these devices and associated equipment requires correct initial selection, operation, and maintenance. It is also necessary to have a detailed understanding of how these devices should be installed, the local substation and system ratings, and how the various breakers operate, to enable accurate troubleshooting and subsequent repair.

Safe Operation & Maintenance of Circuit Breakers and Switchgear will equip participants with new or re-freshed skills to ensure that circuit breakers and switchgear are installed, operated safely, and maintained in a fashion that ensures safe and stable operation. Also, they will be able to identify faults and ensure the underlying causes are identified to reduce possible further failures

Testing medium-voltage (MV) cables is an essential part of ensuring the reliability and safety of electrical distribution systems. These cables are typically used for power transmission and distribution in industrial, commercial, and utility settings. Proper testing helps identify any defects, damage, or weaknesses in the cables, preventing potential electrical faults and outages.

Hipot also known as High Voltage or High potential test assesses the cable's ability to withstand high-voltage stress for a specific duration. It helps detect any weaknesses or defects in the cable's insulation under high voltage conditions.

Hipot tests are generally performed on cables to assure that the cable insulation has a minimum level of electrical strength to survive electrical stresses in normal service.

## TARGETED GROUPS:

- Electricians
- Engineers
- Technicians
- Contractors maintaining electrical systems.

## COURSE OBJECTIVES

At the end of this course the participants will be able to:

### **Circuit breakers and Switch gears:**

- Understand the operational characteristics of circuit breakers and switchgear.
- Understand the troubleshooting procedures, as applied to circuit breakers and associated switchgear.
- Improve the capability in the use of test equipment.
- Understand the failure modes and failure analysis as applied to fuses, circuit breakers, and switchgear. Concerning air brake, vacuum, and SF<sub>6</sub> devices.

### **Cable Hipot testing:**

- Understand the different types of power cables used in a power system.
- Understand the different types of tests done to check the integrity of cables.
- Understand What Hipot test is and how it is being done.
- Understand the importance of Hipot testing of cables.
- Exposure to the different brands and types of Hipot testers.
- Understand how to choose the right test voltage range.
- Understand how to interpret the test result.
- Safety practices to observe during and after Hipot testing

Targeted Competencies:

### **Circuit breakers and Switch gears:**

- Knowledge of types of switchgear and disconnectors
- Understanding of electrical systems and their load and fault requirements
- Overview of substation layouts and equipment from 0.4 – 36kV
- Health and Safety and equipment fault voltages during earth fault conditions
- Maintenance, inspection, testing and certification of switching plant
- Understanding electrical hazards, safe working distances, and permits to work
- Recognition of unsafe situations
- Safe earthing of equipment during maintenance, lockouts and labels

### **Cable Hipot testing:**

- Knowledge of Hipot testing of cables.
- Procedures for carrying out the tests.
- Interpretation and analysis of the test result.

# PRINCIPLE OF TRANSFORMER OIL ANALYSIS TRAINING



## INTRODUCTION:

The principle of transformer oil analysis involves assessing the physical and chemical properties of the oil to evaluate the condition of the transformer. By examining factors such as acidity, moisture content, dissolved gases, and contaminants, analysts can detect potential issues such as overheating, insulation degradation, or contamination, helping to prevent transformer failures and optimize maintenance schedules.

## TARGETED GROUPS:

- Electricians.
- Technicians.
- Energy Sector Professionals.
- Training & Education Providers.
- Contractors & Consultants.
- Regulatory Agencies

## COURSE OBJECTIVES

At the end of this course, the participant will be able to

1. Understanding the importance of transformer oil in maintaining transformer health and performance.
2. Learning the principles and techniques of sampling transformer oil correctly.
3. Gaining proficiency in analyzing the physical and chemical properties of transformer oil.
4. Recognizing the significance of different parameters such moisture content, dissolved gases (DGA), breakdown voltage (BDV) and contaminants in assessing transformer condition.

## TARGETED COMPETENCIES

1. Knowledge of various test standard for BDV.
2. Sampling procedure for both BDV and DGA
3. Understand gas formation for DGA test
4. Understand DGA testing methodologies, and its diagnostics.
5. Result analysis for both DGA and BDV
6. Understand how to write report and give recommendation