



Power Transformer

Pre-Commissioning Tests

Course Introduction:

Transformer is the most important equipment in the electrical power transmission and distribution system. In order to ensure availability of uninterrupted power supply, it is essential that the condition of transformer is continuously monitored during service as failure of transformer would result in interruption of power supply resulting loss of industrial production and inconvenience to customers on large scale. On receipt of transformer at site, it is essential to verify the technical suitability for the application and check the healthiness of the transformer before energizing by connecting to the power supply system and loading the same.

This course provides thorough understanding of constructional features of the transformers, various fittings and accessories, specification of materials used in manufacturing and various tests required to be carried out in shop before dispatch and at site before commissioning according to the relevant international standards to ensure trouble free service under the conditions it is likely to experience during service. A special emphasis on real life implementations, case studies requirements/recommendations of international standards and non destructive diagnostic tests for condition monitoring would enhance the knowledge of participants regarding testing and commissioning of transformers.

Course Objective:

This course aims in providing participants clear understanding of the basic constructional features of power transformers, various processes during manufacturing, various fittings and accessories, type tests and routine tests in manufacturers works, pre dispatch precautions, Non destructive diagnostic measurements to assess present condition of transformers, installation at site, pre-commissioning testing including diagnostic tests and commissioning of the transformer and preventive maintenance practices.

Who Should Attend?

Electrical and mechanical/ power engineers, project engineers, maintenance engineers and supervisors and operating staff of electrical sub stations will find this course very useful for enhancing their knowledge related to transformers and its working principles, design, operation & maintenance. The course will also definitely be beneficial for all the other department people concerned with the plant operations, production, maintenance and safety. It could be also useful for the procurement and quality personnel.

Course Outline:

1. Introduction

2. Transformer Categories and Type

- 2.1 Insulating Medium
 - 2.1.1 Dry Type
 - 2.1.2 Liquid-Filled Transformer
- 2.2 Construction
 - 2.2.1 Tank Construction
 - 2.2.2 Core Construction

3. Application and Use

- 3.1 Distribution Transformers
- 3.2 Network Transformer
- 3.3 Arc-Furnace Transformer
- 3.4 Rectifier Transformer
- 3.5 Power Transformer

4. Transformer Fundamentals

- 4.1 Voltage Relationship
- 4.2 Current Relationship
- 4.3 Impedance Relationship
- 4.4 Summary

5 Transformer Polarity, Terminal Markings, and Connections

- 5.1. Single-Phase Transformers
 - 5.1.1 Subtractive Polarity
 - 5.1.2 Additive Polarity
 - 5.1.3 Three-Phase Transformers

6. Transformer Characteristics

7. Preventive Maintenance of Transformers

- 7.1 Transformer Installation, Acceptance, and Maintenance
 - 7.1.1 Unscheduled Maintenance
 - 7.1.2 Ordinary Maintenance
 - 7.1.3 Protective Maintenance
- 7.2 Dry-Type Transformers
 - 7.2.1 Installation
 - 7.2.2 Inspection
 - 7.2.3 Acceptance Tests
 - 7.2.4 Maintenance
 - 7.2.5 Drying-Out Methods

- 7.2.6 Storage
- 7.3 Liquid-Type Transformer
 - 7.3.1 Installation
 - 7.3.2 Inspection
 - 7.3.3 Acceptance Tests
 - 7.3.4 Maintenance
 - 7.3.5 Drying-Out Methods
 - 7.3.6 Storage
 - 7.3.7 Transformer Diagnostic Guide

8. Transformer Testing

- 8.1 AC Hi-Pot Test
- 8.2 TTR Test
 - 8.2.1 Alternative Test for TTR
 - 8.2.2 TTR Capacitor
- 8.3 Polarity Test
- 8.4 Induced Potential Test
- 8.5 FRA
- 8.6 DC Winding Resistance
- 8.7 Transformer Core Ground Test
- 8.8 Polarization Recovery Voltage Test
 - 8.8.1 The Measuring Instrument
 - 8.8.2 Test Setup for Recovery Voltage Measurement on Power Transformers
 - 8.8.3 Evaluation of Measured Polarization Spectra

9. Online Condition Monitoring of Transformers

- 9.1 Online Monitoring of Transformers

10. Online Monitoring of Bushings and Lightning Arrestors

Course Methodology:

A variety of methodologies will be used during the course that includes:

- (30%) Based on Case Studies
- (30%) Techniques
- (30%) Role Play
- (10%) Concepts
- Pre-test and Post-test
- Variety of Learning Methods

- Lectures
- Case Studies and Self Questionnaires
- Group Work
- Discussion
- Presentation

Course Certificate:

International Center for Training & Development (ICTD) will award an internationally recognized certificate(s) for each delegate on completion of training.

Course Fees:

To be advised as per course locations. This rate includes participant's manual, Hand-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Timings:

Daily Course Timings:

08:30 - 08:50	Morning Coffee/Tea
08:50 - 10:20	First Session
10:20 - 10:40	Recess (Coffee/Tea/Snacks)
10:40 - 12:20	Second Session
12:20 - 12:40	Recess (Coffee/Tea/Snacks)
12:40 - 14:30	Last Session