Transformer Operation, Testing and Maintenance

Practical Transformer Testing • Fault Diagnosis • Maintenance • Repair

A 3-Day Professional Programme Combining Transformer Theory, Testing, Maintenance and Practical Industry Exposure

DATES
7 – 9 October 2026

TIME
08:30 – 15:30

CPD POINTS
3 Points
Accreditation No. ICMEESA 364-26

O **ATTEND REMOTELY**
Live Online Training
R 11 999 per delegate

H **IN-PERSON**
Birchwood Hotel, Boksburg
R 13 999 per delegate

Introduction

Transformers are critical assets within electrical power generation, transmission and distribution systems, enabling electrical energy to be efficiently transferred between different voltage levels. Their reliable operation is essential to maintaining continuity of supply, system stability and overall electrical network performance.

A transformer failure can have significant consequences, including unplanned outages, equipment damage, production losses, costly repairs and extended downtime. This professional three-day programme provides participants with a comprehensive understanding of transformer operation, construction, characteristics, testing, maintenance, common problems and repair techniques, combining technical knowledge with practical industry exposure.

A key feature of the programme is the Day 3 technical site visit to LHM, where participants gain practical industry exposure to transformer repair and related activities, connecting the principles covered during the programme with real-world transformer inspection, testing, maintenance and repair practices.

Who Should Attend

- Electrical Engineers & Technicians
- Design Engineers
- Project Engineers
- Consulting Engineers
- Electricians
- Maintenance Engineers & Supervisors
- Electrical Maintenance Personnel
- Technical Managers
- Personnel Responsible for Transformer Operation & Maintenance

Course Objectives

- ✓ Understand the fundamental principles governing transformer operation
- ✓ Identify major components, construction features and types of transformers
- ✓ Understand transformer operating characteristics and common operating conditions
- ✓ Apply appropriate transformer testing methodologies
- ✓ Understand the purpose and application of common transformer testing equipment
- ✓ Interpret transformer test results and identify potential problems
- ✓ Understand appropriate transformer maintenance practices
- ✓ Identify common transformer problems and their potential causes
- ✓ Understand basic transformer troubleshooting and repair considerations
- ✓ Recognise important electrical safety requirements when working with transformers
- ✓ Relate theoretical principles to practical inspection, testing, maintenance and repair activities

DAY 1: Transformer Fundamentals, Construction, Operation and Types

Modules 1 to 3

1 Introduction to Transformers

- Definition, purpose and role of transformers in electrical power systems
- Construction: core materials, windings, insulation systems and cooling methods
- Transformer losses: core losses and copper losses
- Types: step-up, step-down, isolation and other transformer types
- Operating principles: electromagnetic induction and voltage transformation ratio
- Includes course assessment

2 Transformer Operation

- Normal and abnormal operating conditions
- Transformer connections: delta and wye/star configurations
- Voltage regulation: definition, importance and contributing factors
- Transformer loading characteristics and load calculations
- Phase shift, its implications and transformer vector groups
- Includes course assessment

3 Transformer Categories and Types

- Categories based on insulating medium, construction, application and use
- Unit, station and auto-transformers
- Includes course assessment
- Distribution, network, arc-furnace, rectifier, power and generator transformers
- Flameproof and explosion-proof mining transformers; dry-type transformers for underground mines

DAY 2: Transformer Testing, Maintenance, Troubleshooting and Safety

Modules 4 to 6

4 Testing of Transformers

- Routine tests: insulation resistance and winding resistance testing
- Special tests: Transformer Turns Ratio (TTR) and power factor testing
- Interpreting test results and identifying potential issues
- Performance tests: short-circuit and open-circuit tests
- Testing equipment: megohmmeters, transformer test sets and power analysers

5 Maintenance of Transformers

- Preventive versus corrective maintenance; impact on performance and lifespan
- Cleaning, insulation care and general transformer maintenance
- Troubleshooting overheating, insulation failures and load imbalances
- Regular visual and thermal inspections
- Monitoring transformer oil quality and oil levels

6 Safety Considerations

- Electrical safety measures and safe working practices around transformers
- Identifying transformer-related hazards
- Electrical hazards and Personal Protective Equipment (PPE)
- Responding to transformer failures and emergency safety considerations

7 Case Studies and Practical Site Visit Preparation

- Analysis of real-world transformer failures and resolutions
- Review of transformer problems, symptoms and corrective actions
- Identification of common transformer failure causes
- Lessons learned from industry case studies

DAY 3: LHM Transformer Repair Facility

Technical Site Visit

Practical Industry Exposure at LHM

The third day of the programme provides practical industry exposure at LHM, allowing participants to observe transformer repair and related activities in a real-world environment, reinforcing the concepts covered during the first two days.

- ★ Observation of transformer repair activities
- ★ Understanding common transformer repair requirements
- ★ Relationship between transformer faults and repair processes
- ★ Review of real-world transformer failure and repair examples
- ★ Transformer inspection and assessment
- ★ Observation of transformer testing activities
- ★ Practical discussion of maintenance and repair considerations

Registration Form

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Live Online

R 13 999
Birchwood Hotel

ATTENDANCE OPTION

☐ **Live Online**
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☐ **In-Person**
Birchwood Hotel, Boksburg — R 13 999 per delegate

BOOKING CONTACT (APPROVING OFFICIAL)

FULL NAME (MR / MRS / MS) _____

POSITION _____

COMPANY NAME _____

VAT NUMBER _____

TELEPHONE _____

EMAIL _____

ADDRESS _____

SIGNATURE _____

DATE _____

FINANCE & PAYMENT

PERSON RESPONSIBLE FOR FINANCE _____

DIRECT TEL NO. _____

DATE OF PAYMENT _____

PURCHASE ORDER / REFERENCE NO. _____

ACCOUNT HOLDER	BANK	BRANCH	ACCOUNT NO.
Independent Training Management (Pty) Ltd	FNB South Africa	Randburg (251650)	62685879276

DELEGATES ATTENDING THIS WORKSHOP

#	FULL NAME	POSITION	EMAIL
1			
2			
3			
4			
5			

TERMS & CONDITIONS

1. **Fees** are current at time of print; Independent Training reserves the right to change them.
2. **Additional delegate rates** apply for bookings made at the same time, on the same course.
3. **Confirmation**: on receipt of this form and payment/PO, you will receive email confirmation with venue details, map and start times.
4. **Attendance**: no learner may attend without proof of payment or an order number.
5. **Substitution**: delegate substitutes may be made at any time at no penalty — please notify us in writing.
6. **Payment** is due 5 working days before the course by cheque or EFT, quoting the invoice reference and organisation name. Cancellations must be emailed to Independent Training; please notify us immediately of any reschedule or cancellation.

CANCELLATION CHARGES

11 – 30 days before course	10%
6 – 10 days before course	20%
4 – 6 days before course	30%
1 – 3 days before course	50%