

Practical

MEDIUM & HIGH VOLTAGE TESTING OF ELECTRICAL EQUIPMENT

for Engineers & Technicians



YOU WILL LEARN HOW TO:

- Types of HV & MV tests performed
- Good industry practice in performing these tests
- The need for testing of MV and HV electrical equipment
- Various types of HV equipment encountered in industry
- Stage wise testing performed on electrical equipment
- Testing equipment used
- The need for good record keeping on tests conducted
- Role of standards on testing approach, test basis and interpretation of results
- National test labs and their importance in quality assurance

WHO SHOULD ATTEND:

- Instrumentation and Control Engineers
- Consulting Engineers
- Electrical Engineers
- Project Engineers
- Maintenance Engineers
- Power System Protection and Control Engineers
- Building Service Designers
- Data Systems Planners and Managers
- Electrical and Instrumentation Technicians



Technology Training that Works

THE WORKSHOP

Testing is an essential activity in any engineer's career. Whatever your role in industry - electrical designer, purchase engineer, manufacturer, installation contractor or maintenance engineer, a solid knowledge of electrical tests to be carried out on a given piece of HV and MV electrical equipment and interpretation of results obtained, is a necessity. This workshop is designed to familiarise you with various aspects of testing general electrical equipment and high voltage testing in particular.

Examples will be used from various international standards regarding the procedures for conducting tests and interpreting the results. The need for keeping proper records of tests conducted both in the initial stages and later during routine maintenance will be discussed.

Some of the tests are too complex to be performed on a routine basis or may require specialised equipment which may not be normally available to user industries or even manufacturers. This is where the services of an independent and accredited test lab is useful. The role of such labs will be briefly discussed.

PRE-REQUISITES

Some working knowledge of basic electrical equipment is required, although this will be covered at the beginning of the course. Real-life experience with such equipment and hands-on testing will enable the workshop to be placed in context.

PRACTICAL SESSIONS

While we are unfortunately not able to access a HV switchyard during the presentation, a mixture of videos, equipment and exercises will be used to illustrate key principles with six sessions.

ON-SITE TRAINING

— contact us for a proposal today

IDC Technologies unique on-site training delivery service can save your company up to 50%, or more, off the total per-head costs associated with delegates attending a public workshop. One of our qualified and experienced Instructors can discuss the content with you, then come to your venue and present a workshop designed to your own specifications!

Why not call or e-mail and ask about having components from a number of courses combined together? It's affordable, effective, convenient and much easier than you may have thought.

"Technology Training that Works" we mean it! Try us soon and see the difference. For more information, or a customized proposal to run any of our practical workshops at your own venue, contact your nearest business development manager for manager (see page 32).

THE PROGRAM

DAY ONE

INTRODUCTION

- HV and MV equipment
- Need for testing
- Purpose of testing
- Categories of tests normally performed

INSULATION TESTING

- Purpose of insulation testing - Why and when is it done?
- Equipment which requires insulation testing
- Insulation to ground and insulation between phases
- Types of insulation testers
- Construction of a tester
- Connections of tester to test equipment
- Safety precautions to be taken during test
- Discharging after test
- Noting of readings and interpretation
- Determining dryness of insulation by insulation test using absorption ratio
- Practical demonstration of insulation testing

HIGH POTENTIAL TESTS

- Purpose of testing
- AC and DC Hipot tests and equipment on which it is done
- Test equipment/block diagram and construction details
- Connections of tester to test equipment
- Safety precautions to be taken during test
- Discharging after test
- Noting of readings and interpretation
- Test voltages for different equipment based on applicable standards
- Precautions to be taken during test
- Discharging after test
- Noting of readings and interpretation
- Practical demonstration of high voltage test equipment

OIL TESTING

- Why does oil need to be tested?
- Dielectric test using high voltage testing kit
- Relation between electrodes and test voltage
- Test voltages as per applicable standards
- Tests of acidity
- Effect of additives
- Other possible uses of oil testing (dissolved gas analysis)
- Improvement of dielectric strength by filtration
- Practical demonstration of oil dielectric testing

DAY TWO

TRANSFORMER TESTING

- Tests to be performed on transformers
 - Insulation/tank oil/tapchanger compartment oil/bushing oil
- Induced over voltage tests
- Winding resistance measurement
- Ratio testing
- Vector group verification
- Tests for transformer losses
- Partial discharge testing
- Tan Delta testing for dryness of winding and bushing
- Instruments to be used for testing
- Practical demonstration

CT TESTING

- Ratio test of current transformers (ct's)
- Test with rated burden
- Polarity testing
- Magnetising current and knee point voltage measurement
- Insulation test and high voltage test
- Instruments to be used for testing
- Practical demonstration

PT TESTING

- Ratio test of potential transformers (pt's)
- Test with rated burden
- Polarity testing
- Magnetising current measurement
- Insulation and HV tests
- Instruments to be used for testing
- Practical demonstration

DUCTOR TESTING

- Description of instrument
- Working principle
- Use of ductor for verifying contact resistance of circuit breakers
- Precautions to be taken during measurement
- Comparing with earlier results for analysis
- Practical demonstration

OTHER MISCELLANEOUS TEST EQUIPMENT

SUMMARY