



**GCC Electrical
Testing Laboratory**

المفتبر الفليبي لفصص المعددات الكهريبالية

New Transformer Procurement Engineering Best Practices

According to the Institute of Asset Management, while only 5-15% of an asset's life-cycle costs are incurred at the procurement phase, more than 80% of those life-cycle costs have been committed, so good procurement processes are critical to having an effective asset management strategy. The significant majority of critical transformers receive some sort of additional surveillance by the end user. Doble has performed transformer procurement consulting services for hundreds of clients purchasing transformers from more than 50 different manufacturing factories in over 20 countries globally. Learn from Doble's extensive global experience.



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Education
Course Code: **EXX1**



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NOVEMBER
25 - 29
2018



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Objectives

Upon completion of this course, the Participant will be able to:

Prepare a transformer specification which scrutinizes the most critical aspects of the transformer design and construction for a customer's specified application.

Perform factory qualification audits which are essential to confirm a manufacturer's ability to meet a purchaser's requirements and expectations.

Understand importance of factory witness inspections to provide independent verification to manufacturer's design and manufacturing processes.

Acquire knowledge essential for witnessing factory tests, preparation of test specification and reviewing certified test reports.

Addressed to:

Electrical engineers working in operations, maintenance, engineering, or other service field in which knowledge of asset design, insulating fluid analysis or electrical testing methods and evaluation is required part of his job responsibility.

Duration:

5 Full Days

Location/Venue:

GCCIA HQ, Dammam

Course Fees:



PROGRAM

The Course program contains the following training outline:

DAY 1 AM

Transformer Basics – electric circuits and design; transformer theory and applications; construction and materials; component and functions.

DAY 1 PM

Transformer Specifications Review – A clear, well-defined specification eliminates variances of interpretation by vendors and results in a proposal and product that meets the customers' intentions and specifications. Many specifications refer to IEEE or IEC Standards for definition, so it is critical to know what the current revision of these standards require. Discussed topics: core/winding arrangement; type of winding & conductors; transformer losses; short circuit forces and stresses, thermal design.

DAY 2

Transformer Vendor Prequalification – An effective procurement system utilizes the preapproval process to identify suitable power transformer vendors and a design review to establish an agreed upon design and procurement process. This preapproval approval process should include factory qualification audits which are essential to confirm a manufacturer's ability to meet a purchaser's requirements and expectations. Discussed topics include: Manufacturer engineering capabilities; engineering tool; factory logistics; detailed manufacturing process and equipment; testing capability and the facilities; storage, packaging and shipping area; quality management at the facility, including procurement, materials used in construction of transformers and document control; facility certifications.

DAY 3

Factory Witness Inspections – Factory inspections are designed to augment the manufacturer's existing Quality Assurance or Quality Control processes at the factory. Factory inspections are not performed to replace or circumvent the internal processes established by the manufacturer, but rather these inspections are inserted into the normal and expected quality program to provide an independent verification and to establish that the supplier's quality system is functioning as designed. Discussed topics include: coils and core inspection; post-processing inspection; pre-tanking inspection.

DAY 4

Factory Acceptance Testing – Significance of various electrical production tests with bulk of material arranged around a typical test plan covering all final factory tests as per appropriate IEEE and IEC standards. For each test, there will be an in-depth discussion of each measurement, physics behind the measurement, setup and test methodology and acceptance criteria. In-depth discussion of each measurement, its purpose and expected results. Discussed topics include: preliminary tests (turns ratio, winding resistance, power factor and capacitance, polarity and phase relation, bushing power factor and capacitance, winding insulation resistance); performance tests (load losses and impedance voltage, no-load losses and excitation current, zero-phase sequence impedance, audible sound test, temperature rise test); dielectric tests (induced voltage, applied potential and impulse test).

Day 5

Wrap up and standard related detailed discussion



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