



**GCC Electrical
Testing Laboratory**
المفتبر الفليبي لفمص الممدمم الكهريالمية

HVDC Cable Technology and Testing

HVDC technology is becoming more and more important in the transmission field. Cable technology is pretty new and also performances tests are not completely standardized. It is therefore useful to be continuously updated both on the evolution of the technology and on the standardization to be able to properly design or procure the suitable systems.



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Education
Course Code: **E03**



HVDC Cable Technology and Testing

JULY
15 - 26
2018



GCC Electrical Testing Laboratory

المفتبر الفليبي لفمص المعدات الكهربائية

Objectives

The course is aimed at providing basic knowledge on HVDC cable manufacturing, design parameters, system implementation and testing technology. The course allows a comprehensive overview for any engineer who needs to master the technology from the end user point of view.

Addressed to:

Basic design engineer, procurement officers

Duration:

5 Full Days

Location/Venue:

Out of Kingdom

Course Fees:

HVDC Cable Technology and Testing

PROGRAM

The Course program contains the following training outline:

DAY 1	<p>General Parts</p> <ol style="list-style-type: none"> a. HV power cables in General; including Design parameters, Material, Ageing, Testing during the production, PD test (LFPD, HFPD) and Testing during the operation b. Quality assurance, testing, Failures of HV Power Cables; including Causes and risk of power cable system failures, Failure analysis (Degradation mechanisms, process) and Quality assurance measures to increase reliability
DAY 2	<p>General parts - Asset management, Remaining life of HV Power Cables; including Asset management, Determining the remaining lifespan and Life extension</p>
DAY 3	<p>HVDC technology</p> <ol style="list-style-type: none"> c. HVDC Partial discharge measurement technology which includes Principle, Device, Measuring Method and Evaluation. d. HVDC 16. Electrical tests after installation which includes DC voltage test of the over sheath, High Voltage test of insulation Evaluation and DC-voltage test with simultaneous PD-measurement
DAY 4	<p>HVDC technology</p> <ol style="list-style-type: none"> a. Introduction to the HVDC Systems, Reasons for the use of DC transmission, which include Type of HVDC technology: lcc (Line commutated Converters), VSC (voltage source converter), Typical layout of the LCC and VSC converter station. Typical HVDC link configurations, AC/DC conversion principles for LCC converters (12-pulse type) and VSC converters (multi-level type) and LCC vs VSC (pros and cons) b. HVDC Cable System which include the following: <ul style="list-style-type: none"> - Background of the basic cable system design - Industrial best practice, existing and future Present HVDC Technology solutions (Mass Impregnated insulation technology, Polymeric insulation technology) - Ongoing and future development - Laboratory experience to open the doors to realization of real projects - Major considerations for choosing cable design (conductor, insulation, metallic sheath, armour, optic cable for diagnostic purposes) - Typical aspects leading to a potential breakdown (for MI and Extruded insulation system): Possible causes & defects, Scenarios, Location - Typical causes of failures and defects (for MI and Extruded insulation system) - Typical approach for fault analysis (analytical and testing methods)
DAY 5	<p>HVDC Testing Technology</p> <ol style="list-style-type: none"> a. Overview of HVDC laboratory of CESI in Mannheim - Test Facilities required to develop HVDC Cable System, b. Testing of HVDC Cable Systems with Extruded Cables