

High voltage testing facilities for EHV and UHV class XLPE cable system

Purpose:

To execute the voltage application test and evaluation of voltage withstand level of aged XLPE cable system for EHV and UHV transmission systems, using a water termination system with ac nominal voltage of 800 kV.

Outline:

XLPE cable systems of EHV and UHV classes play an important role in the underground transmission system in urban areas and apply to the important lines that are required to transmit huge power. Their age is still around or less than 20 years, however, this will be extended to more than 30 years in the coming decade, which is considered to be their expected lifetime. Therefore, it will be necessary to conduct investigation on the voltage withstand strength of both the XLPE cables and their connection systems in the near future. In such investigation, the most important task is to understand long-term aging characteristics and deterioration mechanisms of XLPE cable connection systems. In order to carry out such investigation, it is essential to execute the pre-breakdown discharge detection test for removed XLPE cable system with long-term operation, which requires the water termination systems for EHV and UHV class XLPE cable and the standard capacitance.

Specifications:

- (1) Standard capacitor
 - Nominal voltage: 800 kVrms
 - Capacitance: 50.8 pF
 - Partial discharge level: less than 10 pC
 - Height: 5.5 m
 - Weight: 1300 kg
 - Operational condition: Indoor, movable type
- (2) Water termination system for XLPE cable
 - (a) 154 kV class
 - Nominal voltage: 400 kVrms, 1100 kVimp
 - Partial discharge level: less than 2 pC
 - Maximum cable diameter: 115 mm in diameter of the outer semiconductive layer
 - (b) 275 kV class
 - Nominal voltage: 800 kVrms, 1900 kVimp
 - Partial discharge level: less than 5 pC
 - Maximum cable diameter: 130 mm in diameter of the outer semiconductive layer
 - (c) Water treatment system
 - Water capacity: 0.5 m³ in maximum
 - Maximum water temperature: 60 °C
 - Maximum cooling capacity: 120 kW
- (3) Partial discharge measuring system
 - Portable type partial discharge measuring system with UHF method, high-speed digital oscilloscopes, etc.

Location and Date of Installation:

Yokosuka Area, March 2009



Standard capacitor and water termination system for voltage withstand test of EHV and UHV class XLPE cable system