



400 kV 2500mm² XLPE CABLE SYSTEM PREQUALIFICATION AND TYPE TEST FOR MIDDLE EAST ENVIRONMENT



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ABSTRACT

The IEC 62067 prequalification test is a test made before supplying on a general commercial basis a type of cable system.

In the very case of the 400kV interconnection of the Abu Dhabi Islands, the cable system was subjected to the prequalification test and a type test in view of its use for this contract.

The authors describe the cable system components and how they are designed to match a warm and wet environment. They discuss the AC resistance of the conductor.

They describe the test installation conditions and how they replicate the middle east environment characteristics.

They report about the completion of the type test and the prequalification test.

They describe the 400kV interconnection of the Abu Dhabi Islands project that consists of 2 circuits of 420kV cable systems (Nexans being responsible for one circuit), involving 37.5 km cable, 75 joints and 12 GIS.

KEYWORDS

Qualification tests – IEC 62067 - EHV cables– AC resistance – 420 kV cable systems.

INTRODUCTION

The IEC 62067 prequalification test is a test made before supplying on a general commercial basis a type of cable system [1].

In the very case of the 400kV interconnection of the Abu Dhabi Islands, the cable system was subjected to both the type test and the prequalification test in view of its use for this project.

Moreover, the AC resistance of the 2500mm² copper conductor with insulated wires was measured.

During the prequalification test, the installation conditions were designed to match a wet environment to replicate the middle east environment characteristics.

The authors report about the completion of the type test and the prequalification test and describe the 400kV interconnection of the Abu Dhabi Islands project that consists of 2 circuits of 420kV cable systems (Nexans being responsible for one circuit), involving 37.5 km of cable, 75 joints and 12 GIS terminations.

DESCRIPTION OF THE SYSTEM UNDER TEST

The test concerns a 230/400(420) kV cable system with:

- A 2500 mm² Milliken Copper cable with insulated wires, XLPE insulated 230/400(420) kV,
- A 230/400(420) kV outdoor oil filled composite termination with an EPDM stress cone,
- A 230/400(420) kV oil filled GIS termination with an EPDM stress cone,
- A 230/400(420) kV one-piece premoulded cross bonding EPDM joint, with integrated partial discharge sensor
- A 230/400(420) kV one-piece premoulded straight EPDM joint, with integrated partial discharge sensor.

Cable

The cable is composed of :

- A 2500 mm² Milliken water-tight conductor with enamelled copper wires,
- Semi-conducting tapes on conductor,
- XLPE insulation system : conductor semi-conducting screen - insulation - insulation semi-conducting screen,
- A copper wire screen between swelling semi-conducting tapes,
 - o A water-swellaible semi-conducting bedding,
 - o A helical copper wire screen,
 - o A water-swellaible semi-conducting bedding,
- A lead alloy sheath,
- A HDPE sheath covered by an extruded semi-conducting layer.



Figure 1 : Design of the 400 kV cable