



DEVELOPMENT OF 400KV XLPE CABLE AND ACCESSORIES

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ABSTRACT

A rubber block insulated type joint (hereinafter referred to as RBJ), where the main insulation component is made of cold shrinkable rubber, has become widely used for straight through joints of XLPE cable throughout the world. We have developed factory-expanded RBJ for XLPE cable joints applicable to 400kV underground power transmission line projects. Moreover, an improved outdoor sealing end (hereinafter referred to as EB-A) with the application of the cold shrinkable technology of RBJ was also developed. With these development, 400kV XLPE cable system with our new technology was completed.

KEYWORDS

400kV, XLPE cable, accessory, pre-moulded one-piece type joint, cold shrinkable technology

1. PREFACE

RBJ, where the main insulation component is made of cold shrinkable rubber, has become widely used for straight through joints of XLPE cable throughout the world. RBJ is categorized as PMJ1P ("Pre-moulded One-piece" type Joint). We have previously developed factory-expanded RBJ (we refers to the Smart Power Splicer: SPS) for 110 - 230kV system use and it has been supplied for various customers in the world and used with excellent results.

The quality of the rubber block insulation of SPS can be assured with well-controlled manufacturing process and quality control. One of the noteworthy aspects of SPS is to allow reduction of construction times due to its skill-less assembly processes.

We developed SPS for XLPE cable joints applicable to 400kV underground power transmission lines. Moreover, the improved EB-A was accomplished with the application of the cold shrinkable technology of SPS. The developed cable and accessories underwent Prequalification Test in accordance with IEC62067 in attendance of the reputable independent third party certification authority (CESI, Italy) in 2005. The certificate has been issued from CESI upon successful completion of the test, which included one year heating cycle voltage test as well as a residual performance test, and an examination on the completed cable system. With the acknowledgement of the high quality performance and successful test results by clients, delivery of the product has begun.

This paper describes the specifications and the test results of the developed cable and accessories.

2. SUMMARY OF SPECIFICATION

2.1 Cable

400kV CLZE 1c X 2000mm² (insulation thickness 26mm, lead sheathed) as shown in figure 1 and table 1.

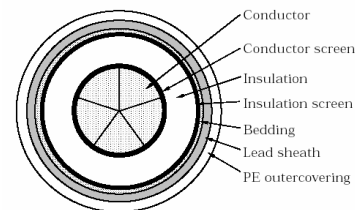


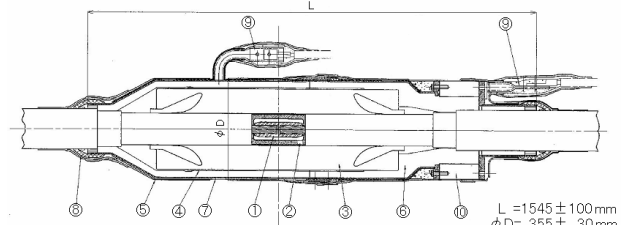
Figure 1: Structure of 400kV XLPE Cable

Table1: Construction of 400kV XLPE Cable

Conductor	Size	mm ²	2000
	Shape	-	Compacted segments
	Diameter	mm	54
Thickness of conductor screen		mm	1.8
Thickness of XLPE Insulation		mm	26
Thickness of insulation screen		mm	1.3
Thickness of bedding		mm	0.5
Thickness of lead sheath		mm	3.2
Thickness of PE outer-covering		mm	5.5
Overall diameter		mm	132
Weight		kg/m	43

2.2 Straight through Joint

SPS-A type (for culvert), shown in figure 2, and SPS-B type (for direct buried) were prepared. The rubber block insulation with cold shrinkable type is expanded and maintained on spiral cores at the factory. This spiral is pulled out from rubber block to form insulation component on the cable insulation at site.



Connector	Water-proof compound
Connector cover	Protector
Rubber block insulator	Taped seal
Shielding layer	Earthing terminal
Protection layer	Insulating section

Figure 2: Straight through Joint (SPS-A type)