



High Voltage Underground Power Transmission One Answer to increased Transmission Reliability

Introduction:

Power Transmission closes the gap between Generation and Distribution. The transmission of Power at high voltages 69 through 500kV is typically the domain of overhead lines that meet the eye anywhere in the U.S.. Underground (UG) Transmission using cross-linked polyethylene (XLPE) insulated cable technology is used in congested urban areas and inner cities along with its predecessor, the high pressure, paper-oil insulated pipe type cable. However, with increased transmission needs and the challenges associated with the acquisition of new right of way, utilities and power producers have an alternative in Underground Transmission

Available Technology:

UG Transmission cables (69kV and higher) with XLPE insulation have been in use worldwide since the 1960's. Today, UG XLPE Transmission technology is established worldwide up to 400kV with major projects in Copenhagen, Berlin and other Metro areas and up to 500kV in Japan.

In the U.S., Forte Power Systems designs, manufactures and installs cable systems using XLPE cable technology up to 230kV with 345kV projects available through its partnership with nkt cables in Germany and is the only system provider at the critical 230kV level based in North America.

Typical cables use copper or aluminum conductors. The

insulation system consists of several layers of polyethylene based materials applied by extrusion. Metallic screens and an outer jacket made of polyethylene complete the cable.



Typical 115kV cable rated 200MW

Power transmission capabilities range from 80MW at 69kV to 500MW at 230kV per circuit.

Options do include continuous monitoring of the thermal rating of a cable system by means of distributed temperature sensing using integrated optical fiber.

Cable Systems:

UG Transmission cables are typically installed in Underground ductbanks, invisible to the eye, much like telecom, water, gas or other utilities.



Ductbank – once built invisible

Many uses:

UG Transmission lines can be built where there is no space for overhead lines, thus reinforcing the transmission system where it was thought impossible. They can cross cities, and bodies of water. They are extremely reliable and not vulnerable to ice or wind storms, sagging due to overload, tree growth and similar environmental factors.

Compared to the older pipe type cable still in use, they are virtually maintenance-free and do not contain any hazardous materials such as lead or oil that could become an environmental hazard.

Last, our utility customers in need of more transmission capacity are able to build UG Transmission within much shorter timeframes compared to the permitting process that is required for overhead lines, considering the public resistance many of them face today.

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