



EAM insulation: Viable alternative for medium-voltage power cable applications

DAVID CAMILLO, GENERAL CABLE CORP.

To meet increasing energy demands, utilities today are upgrading the nation's electrical power infrastructure with underground cabling systems that avoid disrupting the surrounding landscape while meeting regulatory requirements. However, deregulation of the utility industry and the continuous drive to provide affordable, reliable service to customers has sparked the opportunity for medium-voltage cable alternatives. New innovative ethylene-alkene copolymer (EAM) cables may offer the best overall value for performance, reliability and flexibility.

Value proposition

The insulating compounds used in electrical cable construction contribute to the cable's overall performance. Insulation affects a cable's high-temperature operating function, longevity, dielectric loss and flexibility.

Traditionally, medium-voltage power cable producers had two choices for extruded insulation: XLPE (cross-linked polyethylene) and EP (ethylene propylene). Variations such as TRXLPE (tree-retardant cross-linked polyethylene) and EPR (ethylene propylene rubber) insulations have demonstrated years of consistent cable performance. However, research and development has been challenged to identify and test alternative high-end insulating compounds that offer efficient processing characteristics for manufacturing facilities and high performance for utilities. These alternative solutions must enhance easy installation and maintain decades of trouble-free

service life, while providing complete compatibility with existing infrastructures.

Over the past decade, improvements in reactor and catalyst technology have enabled polymer producers to control alkene building blocks and provide EAM. Pelletized EAM processes efficiently, crosslinks effectively, and allows clean-room handling to reduce occurrence of contaminants in the cable. The result is optimized manufacturing processing and handling, which yields a consistent material with excellent electrical and physical properties.

Through its extensive research and development programs dedicated to support the utility market, companies like General Cable Corp. have pioneered filled EAM insulations for medium-voltage cable. By combining these special polymers with the right fillers, stabilizers and cure packages, EAM insulation easily meets or exceeds the performance of traditional TRXLPE and EPR insulations.

Following nearly a decade of evaluation with state-of-the-art testing equipment and facilities, EAM filled insulation is now available. Standards committees have already taken the first steps toward including EAM in their electrical cable standards. Through education and assessment of EAM filled insulation, utilities may conclude that EAM cable is the next generation medium-voltage cabling solution.

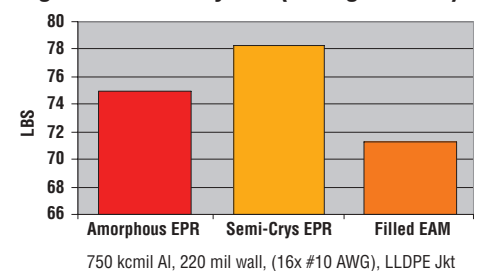
Proven performance

Years of development and testing go into the design and substantiation of any new

technology. World class testing and analytical centers, with a market focus on energy cable technology, have put EAM cables to the test under the most stringent testing protocols using state-of-the-art equipment. The comprehensive test results prove EAM to offer better flexibility, low dielectric loss and thermal stability.

Optimized EAM-based insulation compounds have demonstrated flexibili-

Figure 1: Flexibility test (90 degree bend)



ty characteristics superior to traditional insulations for easy cable handling and reduced installation labor. EAM cables are electrically sound with tests showing improved dielectric loss, excellent heat deformation resistance, and low thermal expansion. For more than four years, EAM cable has exhibited no failure under the Accelerated Cable Life Test at four times the rated voltage and high temperature stress. EAM cables have also displayed excellent results and stability under high temperature testing (MV 105 testing per UL 1072) and accelerated water absorption testing.

Because EAM raw materials are pelletized, ideally manufacturers can

t r a n s m i s s i o n & d i s t r i b u t i o n

process the material in Class 10,000 clean rooms. This maintains compound integrity and reduces contaminants that increase the potential for cable failure. EAM filled insulation passes all industry qualifications, and it has been tested to ensure electrical performance over the life of the cable even in extreme conditions.

An optimum choice

Selecting the right cable for the application and following proper installation guidelines is essential to optimizing costs and maintaining a stable underground power system. Therefore, it is imperative to select cable from leading cable manufacturers that utilize efficient processing and guarantee performance based on solid testing data.

This ensures that both utilities and their customers benefit from optimum energy output, greater product integrity, and consistent reliability every time.

Advancements in technology, combined with the pursuit of long-life, reliable cable designs to support the utility market, have led to the development of EAM filled insulation for medium-voltage cable. To continue providing affordable, reliable service to customers, the time may be on the horizon for the utility market to embrace EAM as a viable alternative in upgrading our nation's power infrastructure. Cleaner raw materials, improved manufacturing processes, and reduced cable handling position EAM cables as the next generation solution. State-of-art testing to

date proves EAM cable's flexibility and overall performance for medium-voltage underground applications. **ELP**

Camillo is a senior research engineer with General Cable Corp. For more information e-mail info@generalcable.com.



General Cable has been designing and manufacturing high quality cables for over 100 years. As the largest energy wire and cable manufacturer in North America, BICC® Brand energy cables are the preferred choice for power generation, transmission and distribution. Visit our website at www.generalcable.com.

> POWER FOR THE NEXT GENERATION

BICC
BRAND

General Cable has been designing and manufacturing cable systems for over 100 years. As the largest energy product supplier in North America, BICC Brand energy cables are the preferred choice for power generation, transmission and distribution.

- General Cable offers a wide range of cables and sizes to meet utility requirements for the finest cables used in a variety of overhead and underground applications.
- General Cable is the largest producer in North America of high quality medium-voltage cables as well as a leader in material technology.
- Our world-class research and development compounding facility as well as testing and analytical center are aligned to support the utility market. General Cable is committed to providing innovative proven products with demonstrated performance benefits.

As an industry leader in a challenging marketplace, General Cable's Utility Group is strategically positioned to provide the utility market with the best service and the best products available—when and where they are needed. We are focused on providing outstanding quality, service and pricing while driving "value" for our customers.

If you need powerful solutions for the next generation, call General Cable today at (800) 237-2726.



4 Executive Boulevard
Suffern, NY 10901
Phone (845) 369-6000 Fax (845) 369-6651
www.generalcable.com

