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#### Application of fifth-generation jacketing technology for improved performance

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**Abstract:** The paper describes a new generation of high density polyethylene for jacketing of power cables. Important aspects, such as laying costs, when choosing a jacketing compound are discussed.

**Keywords:** Polyethylene, jacketing, laying cost, shrinkage, ESCR, Shore D, weather resistance, termite resistance

#### 1. Introduction

When designing a cable, careful attention must be paid to the choice of materials, including the outermost layer. The basic function of a jacket is to protect the cable core during transport, installation and service. The demands on the jacket mean that a number of properties are required, such as good processing, hard surface, good environmental stress crack resistance (ESCR), low shrinkage, good weather resistance and barrier properties.

Polyethylene (PE) resins have, due to their toughness and abrasion resistance, low water absorption as well as surface smoothness, increasingly been used as jacketing material at the expense of polyvinyl chloride (PVC). Conventional low density polyethylene, LDPE, produced in high pressure reactors, was the first PE to be used. During recent years there has been a clear trend towards linear materials, produced in low pressure reactors, with LDPE being replaced with linear low density polyethylene (LLDPE). The high temperature requirement in power cables has resulted in high or medium density polyethylene (HDPE or MDPE) being used in both standard black and coloured versions.

**Résumé:** L'article décrit la dernière génération d'une technologie de gainage de câbles d'énergie en polyéthylène haute densité. Il aborde les aspects essentiels tels que les coûts de pose intervenant dans le choix d'un produit de gainage.

**Mots clés:** Polyéthylène, gainage, coût de pose, retrait, ESCR, Shore D, résistance aux intempéries, résistance aux termites

This paper describes the advantages of the fifth generation of jacketing materials using bimodal high density polyethylene. In particular the subject will be discussed in terms of

- Extrusion processing
- Mechanical protection (hardness, termite resistance)
- Consistently low shrinkage
- Good UV ageing of black and coloured versions
- Improved reliability (installation and service)
- Overall laying cost

#### 2. Materials used as jackets in power cables

Very few cables are supplied without a protective finish, whether the installation is below or above ground. Various materials are used for jackets; such protective coverings may be metallic or non-metallic [1]. Lead represents probably the oldest sheathing material in power cables. The use of aluminium for the sheathing of cables began in the 1940s in Germany. One of the older types of thermosetting jacketing materials used in the past was neoprene rubber [1]. PVC was established as an oversheath for power distribution and transmission cables in the