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Laminate sheath power cable insulated with XLPE for flame retardant applications

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Abstract: A laminate sheath with coated copper and a halogen free polyolefin jacket has been developed for low, medium and high voltage cables with insulated conductors of crosslinked polyethylene for industrial applications. A vertical tray flame test was used to evaluate flame performance and the laminate sheath cable met all requirements for propagation and low smoke. Additional benefits from use of the laminate sheath in industrial applications are chemical and moisture protection, mechanical strength and corrosion protection for the metallic shield.

Keywords: Laminate sheath, coated copper, flame retardant, crosslinked polyethylene

Résumé: Une gaine feuilletée avec cuivre enduit et enveloppe en polyoléfine exempte d'halogène a été développée pour les câbles à basse, moyenne et haute tensions avec des conducteurs isolés en polyéthylène réticulé pour les applications industrielles. Un essai d'inflammabilité d'une étagère verticale a été réalisé afin d'évaluer le comportement au feu et la gaine stratifiée a satisfait à toutes les exigences en terme de propagation et de faible pouvoir fumigène. Les autres avantages de la mise en œuvre d'une gaine stratifiée dans les applications industrielles sont la protection contre l'humidité et les produits chimiques, la résistance mécanique et la protection contre la corrosion pour le joint métallique.

mots clés : gaine feuilletée, cuivre enduit, ignifugeant, polyéthylène réticul

1. Introduction

The design parameters for the use of laminate sheaths have evolved since the introduction of coated copper as a combination shield and moisture barrier for low, medium and high voltage power cables[1]. As subsequent material and process developments have progressed, the laminate design has moved from prototype to commercial status [2]. The use of laminate sheaths to replace lead sheaths over solid dielectric cable has been driven by regulatory pressure and the desire for simpler and more cost efficient cable systems [3].

Subsequently the viability of the use of coated copper in a laminate sheath for medium and high voltage cables has been validated [4].

The use of laminate sheaths in industrial power systems has been driven by the need for chemical and moisture protection in underground applications [5]. Underground cable systems are chosen for industrial applications when there is a concern about manufacture of light (volatile) hydrocarbons. For most industrial power systems, however, cables are installed above ground typically in trays and, less frequently, aerially on poles. The above ground use brings an additional concern to light, and that is the concern about flame retardancy of the cables. The purpose of this paper is to describe the material and process developments that have led to the development of flame retardant medium and high voltage cables for industrial applications with conductors insulated with crosslinked polyethylene (XLPE).