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B.1.2. Câbles basse et moyenne tensions résistant aux agressions chimiques et à l'humidité

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Résumé

Le besoin des cables qui sont resistants aux effect des produits chimques et l'humidite est le resultat de la pénétration potantielle de l'humidité et contamination chimique provenant de l'environnement qui est l'environnement des cables. Les gaines qui ont la protection lamellée chimique-humidité avec les endroits qui se surpassent scelles ont été developés pour fournir protection à l'isolation des effets nuisibles des produits chimiques et de l'humidité. Le data de l'adhesion sur la partie scellée apres exposure â de nombreux organiques et inorganiques produits chimiques a confirmé que le sceau est un resultat chimique et barrage util a l'humidité. Ce papier fournira resistance chimique et data applicable pour les cables avec gaine chimique humidité barriere protegeante.

B.1.2. Chemical and moisture resistant medium and low voltage cables

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Abstract

The need for cables that are resistant to the effects of chemicals and moisture results from the potential for moisture penetration and chemical contamination from the environment surrounding the cables. Chemical-moisture barrier laminate sheaths with a sealed overlap have been developed to provide protection to the insulation from the deleterious effects of chemicals and moisture. Adhesion data on the sealed overlap after exposure to various organic and inorganic chemicals has confirmed that the seal is a functional chemical and moisture barrier. This paper will provide chemical resistance and application data on cables with the chemical-moisture barrier sheath.

INTRODUCTION

Cable is the lifeline for the transmission, distribution and control of electrical energy. Cable quality and performance are the keys to the lowest long term cost of ownership. Technologies have been developed in recent years to address the problems of moisture, chemical contamination, fire resistance, shielding and armoring in cables rated through 69 kV. The potential exists for chemical contamination from the environment surrounding the cables. Without protection from chemicals, the insulation system can deteriorate resulting in electrical failure. For cable in power systems, contact with chemicals most often occurs through exposure of the cables to contaminated ground water in ducts or surrounding soil. Spills or seepage from tanks or piping systems are the most frequent sources of the chemicals.

One of the technologies to protect cable from chemicals and moisture consists of a sheath design based on the use of plastic coated metal tapes bonded to a plastic jacket or oversheath. Such a construction is commonly referred to as a "Chemical-Moisture Barrier" (CMB) sheath. The tapes are applied longitudinally and frequently serve a dual function by providing electrical shielding as well as chemical and moisture protection [1].

Low and medium voltage cables with this sheath design have been produced commercially for use in industrial or power system applications where the threat of moisture and chemical contamination exists. Testing of chemical and moisture resistance has been used to verify the use of such sheaths in these applications. Data on the chemical resistance of various types of oversheaths (jackets) was also determined during this testing.

Field experience has shown that the chemical/barrier sheath is effective to protect cable in chemical plants and refineries [2]. For example, for a plant built in 1972 with an underground cable system, all cables have had high failure rates including the armored power cables (welded seam, corrugated, aluminum). For a plant built in 1979, where the 300 volt cables, as well as the 600 volt power and control and the MV cables had CMB sheaths, there have been no cable failures. The effectiveness of the chemical-moisture barrier sheath has been proven in this plant and in others.

CONCEPT

The heart of the chemical-moisture barrier sheath is the plastic coated metallic tape. The tape may be coated on one or both sides. It can be applied either smooth or corrugated. Prior to the extrusion process, the tape is longitudinally formed in line and folded over the core with an overlap of the edges. During the extrusion process for the plastic jacket or oversheath, the plastic at extrusion temperatures melts the coating, thus creating a bond between the coating and the oversheath. The heat from the extrusion process also melts the coatings in the overlap area and seals them together.

The CMB cable may have several components. These are (A) jacket, (B) metallic tape as shield or armor and chemical-moisture barrier, (C) sealed overlap, (D) inner jacket (optional) and (E) the cable core. Benefits provided by the CMB sheath are protection from chemicals, moisture and corrosion plus increased mechanical strength. These benefits will be subsequently reviewed in more detail.

Selection of a suitable overall jacket is an important consideration in specifying CMB cable constructions. The jacket must be adhesively compatible with the coating on the metallic tape. Another key consideration is the degree of ignition suppressance required for the cable. Polyethylene jackets, in a variety of densities and types, are chosen when flame resistance is not a consideration.