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Electric cables.

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An electric cable having a current carrying conductor provided with an extruded polymeric insulating layer, has a layer of a high permittivity material extruded over the whole length of the insulating layer, which layer is covered with semi-conducting tape in contact therewith.

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ELECTRIC CABLES

This invention relates to electric cables, and more particularly to electric cables in which the current carrying conductors are provided with extruded polymeric insulating layers.

5 In known high voltage cables in which the current carrying conductors are provided with extruded polymeric insulation, a layer of polymeric insulation is disposed over the conductor with a first semi-conducting layer between the conductor and insulation and a second semi-
10 conducting layer over the insulation, and a conducting sheath is provided over the second semi-conducting layer to provide an earth screen. It is conventional to co-extrude the semi-conducting layers with the insulating layer whereby the semi-conducting layers are bonded to
15 the insulating layer. The purpose of the semi-conducting layer is to prevent electrical discharges occurring due to voids being present between the inner surface of the insulating layer and the conductor and between the outer surface of the insulating layer and the conducting
20 sheath.

 The semi-conducting layer over the insulating layer has to be removed during jointing or termination of the cable in the region of the joint or termination as it normally has a resistance such that it would carry
25 unacceptable high currents if it were allowed to form a

path between the current carrying conductor and earth
in the joint or termination. Removal of the semi-
conducting layer over the insulating layer therefrom is
a difficult operation which involves the risk of damage
5 being caused to the insulation layer.

To avoid this problem, it has been proposed to
provide over the whole length of the insulation layer a
layer of highly resistive material whose resistance is
voltage dependent instead of a semi-conducting layer
10 since such a voltage dependent resistive layer does not
have to be removed during jointing or termination.
However, this solution suffers from the disadvantage
that material with the appropriate voltage dependent re-
sistivity is not suitable for application by conventional
15 extrusion equipment.

The present invention seeks an alternative solu-
tion in which the semi-conducting layer over the insul-
ating layer is replaced by an alternative layer which can
be readily extruded over the insulating layer but which
20 does not have to be removed during jointing or terminating.

The present invention provides an electric cable
having at least one current carrying conductor provided
with an extruded polymeric insulating layer, over the
whole length of which is an extruded layer of material
25 having a relative permittivity of at least 15, said latter
layer being covered with semi-conducting tape in contact
therewith.

In order that the invention may be well understood
an embodiment thereof, which is given by way of example
30 only, will now be described.

The embodiment comprises a high voltage electric
cable with a single current carrying conductor. A layer
of semi-conducting material is extruded over the conductor.
A layer of polymeric insulating material is extruded over
35 the layer of semi-conducting material and a layer of high

permittivity material, that is a material with a relative permittivity of at least 15 and preferably for example 20 to 30, or even more, is extruded over the layer of insulating material. All three extruded layers extend the
5 whole length of the conductor and the insulating layer is bonded to the layers on each side of it. The three layers may be co-extruded or extruded in separate operations on the cable length.

In order to fulfil its functions of preventing
10 electrical discharges the high permittivity layer is covered with semi-conducting tape which is lapped or longitudinally wrapped around the high permittivity layer in contact with the outer surface thereof. The semi-conducting tape may include a dessicant. Whilst it is preferable
15 that the entire surface of the high permittivity layer be contacted by the semi-conducting tape small breaks in such contact will not give rise to electrical discharges because of the high permittivity of the layer. A conventional metallic earth screen is provided over the
20 semi-conducting tape.

When making a joint or termination the semi-conducting tape over the high permittivity layer is stripped back by simple unwinding or unwrapping thereof to the termination of the earth screen, but since the high
25 permittivity layer will carry negligible current if left in a position at a joint or termination, it does not have to be stripped from the insulation layer. This not only simplifies jointing and terminating operations and eliminates the possibility of damage to the insulation layer's
30 outer surface but also assists stress distribution within the joint or termination as the high permittivity layer tends to reduce the surface gradient at the earth screen termination.

An example of a suitable high permittivity material
35 is nitrile rubber containing anatase.

CLAIMS:

1. An electric cable having at least one current carrying conductor provided with an extruded polymeric insulating layer, over the whole length of which is an extruded layer of material having a relative permittivity
5 of at least 15, said latter layer being covered with semi-conducting tape in contact therewith.
2. A cable as claimed in claim 1, wherein said relative permittivity is 20 or more.
- 10 3. A cable as claimed in claim 1 or 2, wherein said semi-conducting tape includes a dessicant.