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Communication cable.

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Description

COMMUNICATION CABLE

The present invention relates to a thin communication cable which is non-sensitive to moisture from an electrical point of view. A communication cable is especially intended for use in frequencies up to and including the MHz-region. The cable is provided with at least two electric conductors and a surrounding sheath.

It has been shown that a conventional field thin cable including one, two, or more, pairs of insulated communication wires intended for use at frequencies up to and including the MHz-region, with surrounding sheath, can get an electric line attenuation increase of more than 100% at for instance drizzle at the frequency 1.024 MHz which is considerably more than previously used frequencies. The purpose of the invention is therefore in the first place to provide a communication cable, the electric line attenuation of which holds a low and continuous level also when the cable is subjected to moisture or varying external environment with respect to the weather conditions when using one and the same frequency. This is provided in connection with a communication cable of small diameter of the kind mentioned in the introductory portion first of all thereby that the sheath is composed of three different, mutually combined layers - an internal layer, an external layer and an intermediate layer - and that the intermediate layer consists of a semiconductor material. Said electrical line attenuation can be of the magnitude ≤ 14 dB/km at 1.024 MHz.

Further advantages and characterizing features concerning the new communication cable are apparent from the following description and from the claims.

The Fig. shown on the enclosed drawing discloses a section of a communication cable which is formed according to the principles of the invention.

The communication cable 10 in said Fig. is a so-called two-wire-cable but the invention can, of course, be applicable to a cable with two or more pairs of wires. The communication cable comprises two similar separate electric conductors 12, each consisting of a polyethylene insulated tinned copper wire 14. Moreover, the cable also comprises two tension relieve elements 16, which in this case each consists of a polyethylene insulated stainless steel wire 18. The two insulated conductors 12 and the two insulated steel wires 16 are twisted to a compact quad in a manner known per se. The wires 16 and the conductors 12 are surrounded by a sheath which has been fill extruded around the whole quad.

As is apparent from the Fig. of the drawing the sheath is composed of three different mutually combined layers. The layers consist of plastic, preferably

polyethylene. The internal layer 20 and the external layer 22 are non-conducting but the intermediate layer 24 is semi-conducting.

The assembly has been made by melting the three layers in one single moment but, of course, the use of glue or some other assembly method may be imagined.

The internal layer 20 of polyethylene can have a low density, whilst the external layer 22 shall consist of a durable plastic with a high density or another durable plastic, for instance polyamide. The intermediate layer 24 should have a volume resistivity suitable for the line attenuation level, preferably of the magnitude $10^2 \Omega \text{cm}$, at a temperature of 20° . For the purpose intended it is suitable that the internal layer 20 is between four and six times thicker than the intermediate layer 24.

It should be noticed that the sheath on the whole must be proportionately thin, for the exemplified two-wire-cable about 0.6 mm, in which case the intermediate layer 24 should have a thickness ≤ 0.10 mm.

A communication cable of the kind stated above which has an external diameter of nominally 4.7 mm, gives a line attenuation of 12.8 ± 0.5 dB/km at the temperature 20°C , irrespective of the outer weather conditions.

Claims

1. A thin communication cable (10), including one, two, or more, pairs of insulated communication wires for use at frequencies up to and including the MHz-region, with surrounding sheath (20,22,24) characterized in that the sheath is composed of three different mutually combined layers - one internal insulating layer (20), one external insulating layer (22) and one intermediate layer (24) - and in that the intermediate layer (24) consists of a semiconductor material, so that the cable, as for electrical signal transmission, is non-sensitive to moisture.
2. Communication cable according to claim 1, characterized in that the layers (20, 22, 24) consist of plastic.
3. Communication cable according to claim 1 or 2, characterized in that the three layers (20,22,24) are joined by melting at extrusion in one single step.
4. Communication cable according to any of claims 1-3, characterized in that the internal layer (20) consists of polyethylene with a low density, that the external layer (23) consists of polyethylene with a high density or of polyamide and that the intermediate layer (24) consists of semiconductive polyethylene.

5. Communication cable according to claim 4, characterized in that the volume resistivity of the intermediate layer (24) is of the magnitude $10^2 \Omega \text{ cm}$.
6. Communication cable according to any of claims 1-5, characterized in that the internal layer (20) is between 4 and 6 times the thickness of the intermediate layer (24).
7. Communication cable according to claim 2, characterized in that the layers (20, 22, 24) consist of polyethylene.

Patentansprüche

1. Dünnes Nachrichtenkabel (10) mit einem, zwei oder mehr Paaren von isolierten Nachrichten-
drähten für den Gebrauch bei Frequenzen bis einschließlich dem MHz-Bereich mit einem umgebenden Mantel (20, 22, 24), dadurch gekennzeichnet, daß der Mantel aus drei verschiedenen gegenseitig kombinierten Schichten - einer inneren isolierenden Schicht (20), einer äußeren isolierenden Schicht (22) und einer Zwischenschicht (24) - besteht und daß die Zwischenschicht (24) aus Halbleitermaterial besteht, so daß das Kabel für elektrische Signalübertragung unempfindlich gegen Feuchtigkeit ist.
2. Nachrichtenkabel nach Anspruch 1, dadurch gekennzeichnet, daß die drei Schichten (20, 22, 24) aus Plastik bestehen.
3. Nachrichtenkabel nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die drei Schichten (20, 22, 24) durch Extrusion in einem einzigen Schritt zusammen geschmolzen sind.
4. Nachrichtenkabel nach einem der Ansprüche 1-3, dadurch gekennzeichnet, daß die innere Schicht (20) aus Polyethylen geringer Dichte besteht, daß die äußere Schicht (22) aus Polyethylen hoher Dichte oder aus Polyamid und daß die Zwischenschicht (24) aus halbleitendem Polyethylen besteht.
5. Nachrichtenkabel nach Anspruch 4, dadurch gekennzeichnet, daß der Volumenwiderstand der Zwischenschicht (24) den Wert $10^2 \Omega \text{ cm}$ hat.
6. Nachrichtenkabel nach einem der Ansprüche 1-5, dadurch gekennzeichnet, daß die innere Schicht (20) zwischen 4 und 6 mal die Dicke der Zwischenschicht (24) aufweist.
7. Nachrichtenkabel nach Anspruch 2, dadurch ge-

kennzeichnet, daß die Schichten (20, 22, 24) aus Polyethylen bestehen.

5 Revendications

1. Fin câble de télécommunication (10), comportant une, deux, ou davantage, paires de conducteurs de télécommunication isolées, pour emploi à des fréquences allant jusqu'à et y compris la bande des MHz, comportant une gaine (20, 22, 24) qui l'entoure, caractérisé par le fait que la gaine est composée de trois couches différentes, mutuellement combinées - une couche intérieure isolante (20), une couche extérieure isolante (22) et une couche intermédiaire (24) - et que la couche intermédiaire (24) est constituée d'un matériau semi-conducteur, de sorte que le câble, en tant que câble de transmission de signaux électriques, n'est pas sensible à l'humidité.
2. Câble de télécommunication selon la revendication 1, caractérisé par le fait que les couches (20, 22, 24) sont constituées de plastique.
3. Câble de télécommunication selon la revendication 1 ou 2, caractérisé par le fait que les trois couches (20, 22, 24) sont réunies par fusion à l'extrusion en une seule étape.
4. Câble de télécommunication selon l'une quelconque des revendications 1-3, caractérisé par le fait que la couche intérieure (20) est constituée de polyéthylène basse densité, que la couche extérieure (23) est constituée de polyéthylène haute densité ou de polyamide et que la couche intermédiaire (24) est constituée de polyéthylène semi-conducteur.
5. Câble de télécommunication selon la revendication 4, caractérisé par le fait que la résistivité volumique de la couche intermédiaire (24) est de l'ordre de grandeur de $10^2 \Omega \text{ cm}$.
6. Câble de télécommunication selon l'une quelconque des revendications 1-5 caractérisé par le fait que l'épaisseur de la couche intérieure (20) vaut entre 4 et 6 fois l'épaisseur de la couche intermédiaire (24).
7. Câble de télécommunication selon la revendication 2, caractérisé par le fait que les couches (20, 22, 24) sont constituées de polyéthylène.

