



### **B.1.6. Premiers retours d'expérience et évolution des jonctions de raccordement MT retractables à froid**

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#### **Résumé**

Les jonctions de raccordement de câbles MT, de type rétractable à froid sont maintenant disponibles, et leur emploi se développe rapidement. En version extrudée, la souplesse d'emploi permet des applications très différentes qui sont rappelées. L'expérience acquise sur le terrain a mis en évidence l'importance de la simplicité de montage, du comportement mécanique du support dont le mode de contrôle est expliqué et la préférence pour les versions à électrode intégrée. La méthode ayant permis de mettre au point cette version en conservant les avantages liés à l'extrusion des composants principaux est brièvement présentée.

Le comportement thermique de cette technologie de jonction est intéressant. Une comparaison d'isolation thermique avec des jonctions prémoulées a été effectuée qui montre que cette technologie de jonction a un comportement thermique peu différent de celui du câble. Enfin, il est apparu intéressant de préciser la marge de sécurité en température, au delà des essais de type qui sont normalisés. Deux types d'essais sont présentés ainsi que les résultats obtenus, qui montrent que ces jonctions sont correctement dimensionnées par rapport aux câbles.

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Among the many technologies available for jointing MV cables, such as taping, the use of pre-moulded joints, injecting or casting resin etc., cold shrink and heat shrink techniques are becoming increasingly popular.

The main advantage of these two technologies is the versatility as they are easy to fit, they can be fitted to a wide range of cable sizes and types, and thus are simplifying the choice of the joint for the cables which are to be jointed.

In addition to the ergonomics of jointing, the reliability of these joints must be guaranteed, therefore, it is important that they are pre-tested in the factory. Also these joints must be designed to ensure that they are not sensitive to jointing errors in the field.

Although cold shrink terminations are already widely used, cold shrink joints have proved more difficult to design and manufacture, and have only really come to fruition in the last decade. These joints can be either moulded or extruded, and this paper deals with the extruded version, the design of which has been explained in a previous paper [1-2].

Today, several thousand of these joints are in service around the world and it is interesting to discuss the knowledge that has been gained in a great variety of applications in different countries, concerning the ergonomics of the joint and its inherent performance.

### **B.1.6. First field experience and evolution of cold shrinkable MV joints**

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#### **Abstract**

Cold shrink joints for use on MV cables are now available and the number of installations of this type of joint is rapidly growing. The versatility of the extruded version of this technology allows it to be used in a wide range of applications, which are discussed in this paper. Feed back from the field confirmed the importance of an easy fitting of the joints, the importance of the performance of the carrier and the preference for cold shrink joint with an integrated electrode. The method of control of the carrier is explained. The development of the version with electrode retaining all the advantages of the extrusion process is also briefly explained.

The thermal behaviour of this technology of joint is of interest with regard to service life. A comparison of the thermal behaviour of cold shrink joints and pre-moulded joints has been carried out. It showed that the thermal behaviour of cold shrink joint is better and comparable to that of the cable itself. Finally, it proved interesting to measure the temperature safety margin of these joints, which is not normally obtained during standard type tests and the results confirmed that both the dimensions and design of the joint match up to the performances of the cable itself.

#### **Examples of Applications**

Cold shrink joints can be adapted to a wide range of cable sizes and types. The expansion onto a tearable support allows the same joint model to be installed on either shaped or circular cable cores of different cross sections. The extrusion process used to manufacture the components of the joint allows these components to be adapted to different voltages and to the different connectors lengths which can be used according to local practices. For instance, the connectors currently used in Italy are 20mm longer than those currently used in France, and the joints for each of these countries are accordingly of different lengths also.

The most frequent application of these joints, is on single core cable with synthetic insulation, of tensions Um 24 or 36kV. This version has already passed the VDE 0278, and the IEEE 404 type tests. Figure 1 remembers the basic operations to install such joints and shows the various components expanded on a single tearable support, as well as the means of shrinking onto the cable.