

MV Accessories: Choosing Cold Shrink technology over Heat Shrink technology

In the power system, the most critical components are the joints and terminations due to the high failure rate compared to the failure rate of the cables. The most common MV accessories technology is the Heat Shrink technology followed by Cold shrink technology. Although the heat shrink technology is the most used one in the world power system, its demand started to drop due to the high failure rate recorded in previous installation. In recent years, the market shape of MV accessories started to move toward a more safe and reliable solution like the cold shrink technology.

TECHNOLOGY:

In term of technology, there are a major difference between the Cold Shrink and the Heat Shrink technologies. The following table represent a comparison between the two technologies from different aspects:

| Features | Cold Shrink | Heat Shrink |
|-------------------------------------|---|--|
| External Contamination | Low | High |
| Installation Time | 7-10 min | 20-25 min |
| Installation Error (Joints Skills) | Low | High |
| Tools needed | Tool Free Design | Needs torch Hot Work Permits (if installed in hazardous environment) |
| Factory Test | 100% Electrically tested in the factory | Not tested, Different layers supplied in a kit |
| Cost | Higher | Low |
| Safety | High | Low |
| Possibility to Damage the Cable | No chance | Chance to overheat the XLPE Layer |



Figure 1 : Outdoor single core termination

Although the cost of the **Cold Shrink technology** is slightly higher than the cost of the Heat Shrink technology, there are many advantages to use the Cold Shrink technology over the Heat Shrink like the lower possibility of external contamination as the cold shrink products comes with less components inside the kit compared to the Heat Shrink. Also, the needs of the torch (Heat Source) for the installation of the Heat Shrink products increase the chance of damaging the XLPE layer of the cable while applying the heat and increasing the need of safety measure (for ex: Hot Work Permit) in the work site.

Accessories have a higher trend of failure compared to the cables, due to testing that is conducted on the cables in the factory before being released to the site. Cold shrink products are equally tested in the factory, while in the Heat Shrink technology products are not tested and failure are only recognized after they are installed in the power network.

Another crucial factor that affects the performance of the accessories is the installation skills of the jointer. Heat Shrink technology requires more jointer skills to be installed in a correct way due to fact that the application of heat on the termination body is a critical factor. Failure to apply the heat in a homogeneous way and bubbles appeared on the termination body, will lead to a failure.

Cold shrink Technology installation however depends more on the Elasticity of the Cold Shrink material and not on the jointers' skills. The Cold Shrink body will shrink on the cable once the carrier is removed and it will have a uniform pressure on all the termination body. In addition, the time needed to install the Cold Shrink Products is almost one third of the time needed to install the Heat Shrink products which will have a positive effect on the project schedule and will require less jointers working hours.

MATERIAL:

Heat Shrink Products are made of a polymer called Polyolfien. Polyolfien has good resistance to most chemicals and good mechanical protection because it becomes very rigid when heated. However, the negative side of this rigidity is the products inability to expand and contract with the cable. Heat Shrink materials are not suitable to be installed where humidity and UV radiation should be maintained but are good to be used in most industrial/commercial installations where operating temperatures relatively not high and chemical resistance is required.

On the other hand, **Cold Shrink Technology** is made of Silicon or EPDM rubber. Both rubbers have excellent resistivity to Humidity, UV radiation, some chemicals and a very good mechanical and abrasion resistance. In addition, it has the active memory criteria, this means that it can return to its original size and maintain its sealing capability around cables as they expand and contract due to large load-swings or temperature variation.

In conclusion, The friendly and safe use of Cold Shrink Technology has gained the trust of a great number of users worldwide. **Cold Shrink technology** has demonstrated its reliability on service, for example, Prysmian Cold Shrink technology has an extremely low failure rate: <0,0006% and more than 3 Million of Cold Shrink Product installed worldwide. The total cost of ownership of Cold Shrink technology has proven to be the right choice for our customers in all around the world.