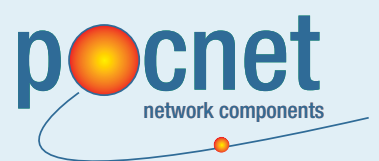




# Transition Joints



Accessories for high voltage  
polymeric cables

## About us

Prysmian Cables & Systems is a world-class multinational company. Founded in 1872 as "Ditta Pirelli & C.", it has achieved a leading position for more than a century of operations in its two key international markets - "Energy Cables and Systems" and "Telecom Cables & Systems".

Prysmian Cables and Systems is the world's largest manufacturer of power and telecommunications cables, with 52 manufacturing facilities in 21 countries in five continents and a market share in excess of 10%.

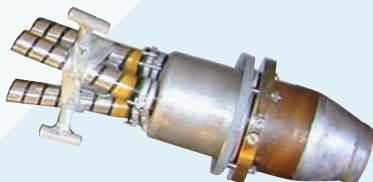
Prysmian Energy Cables and Systems is a global solutions provider, offering a wide range of integrated solutions, such as cable systems, system design and engineering, project management, installation and post-sale services.

Prysmian Energy Cables and Systems concentrates on continuous product innovation and on achieving a competitive edge by focusing on research and development. This is done through Prysmian's own R&D centres and by co-operating with universities, scientific institutions and above all, our customers. Prysmian's world-wide organisation makes and delivers advanced technological solutions to customers anywhere in the world.

Prysmian started manufacturing insulated cables for electric power distribution around 1880 and soon afterwards initiated the development of the first cable accessories.

Prysmian's very long and successful experience in HV and EHV cable systems have lead to the development of a comprehensive range of accessories for extruded dielectric cables.

A relentless R&D effort focused on rubber compounds as well as on electrical design has created accessories for all applications, based on pre-moulded and factory tested joint sleeves and termination stress cones that are recognised worldwide for their unsurpassed reliability.



Three cores Transition Joint - paper insulated side

## Joint core basics

The origin of the current product range of accessories for HV polymeric cables dates back to 1978 when Prysmian, strong of its very long and successful experience in Fluid Filled cable systems developed its first generation of accessories for extruded cable systems.

These accessories are based on pre-moulded electrical components, i.e. stress cones for terminations and one-piece sleeves for joints.

Pre-moulded sleeves and stress cones are currently available for HV polymeric cables from 72.5 kV up to 525 kV and adopt the same design at all voltage classes.

Thanks to its outstanding electrical and mechanical properties, ethylene-propylene rubber (EPR) has been favoured for the rubber mouldings manufacture. After a thorough research on rubber compounds properties, Prysmian developed a proprietary formulation with superior characteristics that is manufactured in-house, which guarantees an unsurpassed reliability of the products.

The mechanical properties of Prysmian special compounds ensure a constant pressure at the cable/moulding interface during the entire lifetime of the accessories, whilst the electrical design has been optimised to minimise the electrical stress concentration in the same area. Prysmian one-piece pre-moulded sleeves and stress cones are completely manufactured in-house.

The moulding process has been refined thanks to the long-standing presence of Prysmian in the rubber industry; each single moulding is mechanically and electrically tested in the factory (the applied electrical test parameters are stricter than those established by the international standards) and certified individually.

Prysmian HV Accessories quality system complies with both ISO 9001 and ISO 14001 standards. Prysmian HV accessories based on EPR mouldings represent a highly reliable solution that is considered a key component in the safe operation of a HV cable system.

The reliability of its HV accessories has made Prysmian the worldwide market leader in terms of design and quality and all major power Utilities consider Prysmian products the benchmark in terms of performance and service.

# Product range

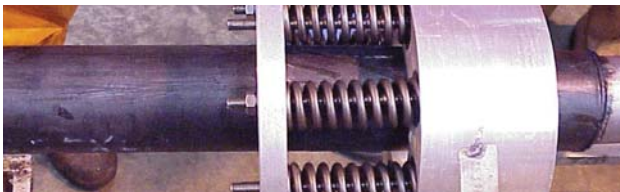
## > Single core transition joints

### Compact design

The transition between single core cables with different designs up to a  $U_{max}$  of 170 kV is performed by using a compact joint.

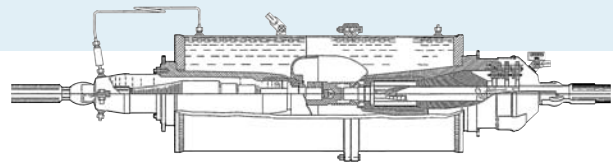
The dry design concept is used on the extruded cable side to allow the connection of a polymeric cable while on the paper insulated side crepe paper is applied to complete the necessary stress relief cone.

The hydraulic separation between the different cables is ensured by utilising an epoxy resin insulator that is manufactured through a strictly controlled production process to guarantee its full reliability under any service condition.



### Back-to-back design

For EHV applications, up to  $U_{max}$  420 kV, the traditional "BACK-TO-BACK" configuration (based on standard oil immersed transformer termination designs) is still preferred because of its unsurpassed reliability.



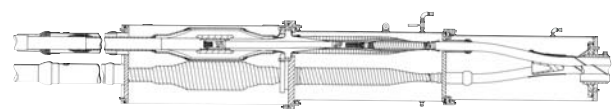
## > Three cores transition joints

When the transition between a three-core paper insulated cable and three single core extruded cables is required, a very specific jointing solution has to be used.

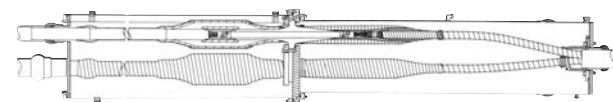
Such a solution is designed to ensure the proper connection between the different cable designs and to guarantee an adequate sealing to avoid any leakage from the paper insulated side.

The connection between the cable conductors (compression method for copper and welding for aluminum) is made by using specifically designed epoxy resin bushings with embedded electrodes that are manufactured under controlled and monitored conditions. A highly specific manufacturing process has been fine-tuned for many years and routine tests on the bushings include high voltage tests and ultrasonic measurements. Premoulded sleeves, one for each core, are used on the extruded cable side whereas on the paper insulated cable side the stress control is carried out by using crepe paper tapes.

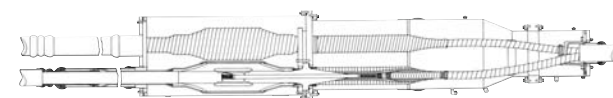
A wide range of three-core transition joints is available depending on the specific circuit requirements.



3/C gas compression cable - to 3 single core polymeric cables



3/C pipe type cable - to 3 single core polymeric cables



3/C fluid filled cable - to 3 single core polymeric cables

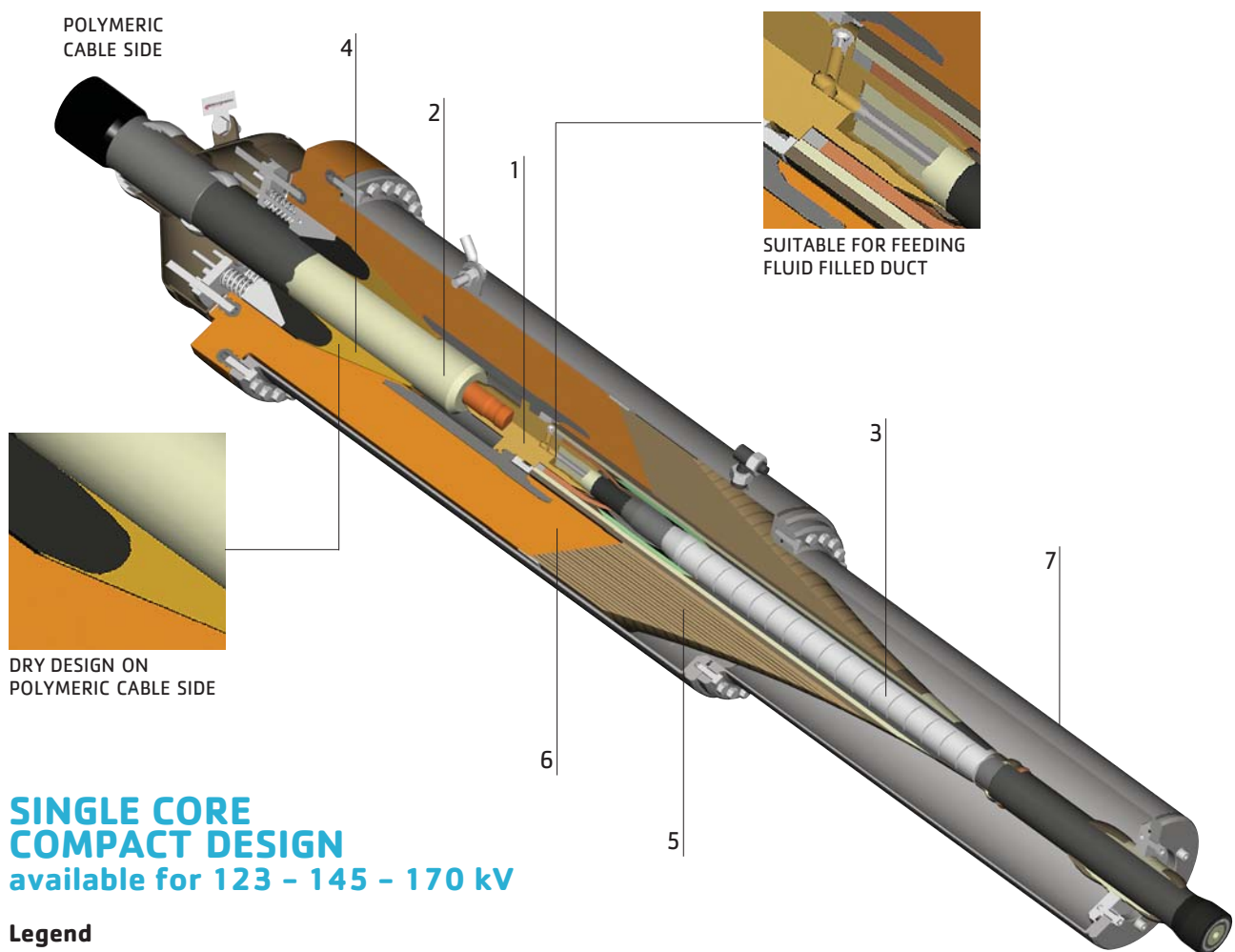
# Transition joints

available from 72,5 kV up to 420 kV

## > Additional features

Following the latest cable design developments and in view of a full system approach, upon specific request Prysmian joints can include:

- > Optical fibres management
- > Partial discharge sensor
- > Connection between conductors made by different materials



## SINGLE CORE COMPACT DESIGN

available for 123 - 145 - 170 kV

### Legend

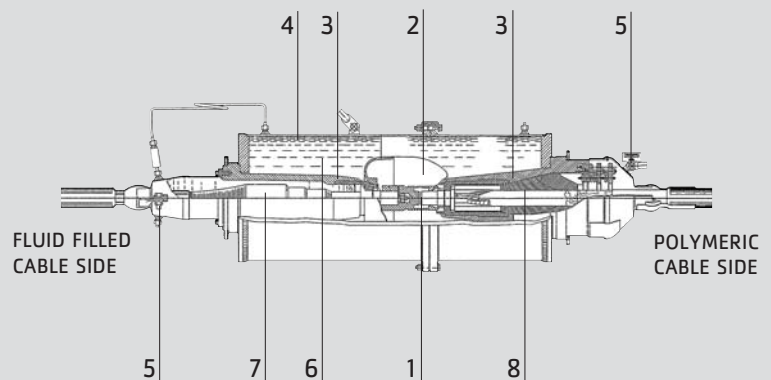
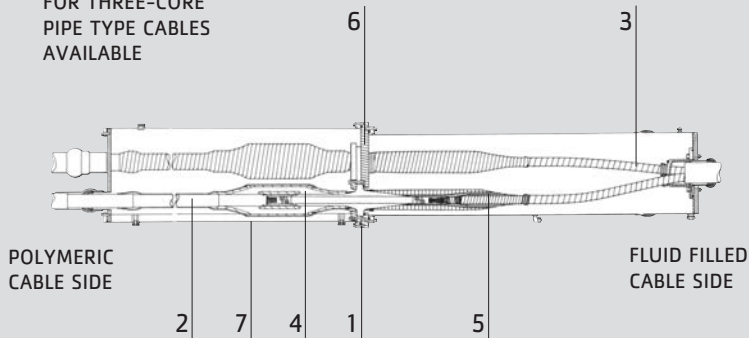
- 1 Conductor connection
- 2 Extruded cable
- 3 Paper insulated cable
- 4 One piece premoulded stress cone (rubber)
- 5 Paper stress cone
- 6 Epoxy resin bushing
- 7 Outer casing (steel)

## THREE-CORE DESIGN available for 72,5 - 123 - 145 kV

### Legend

- 1 Connection bushing
- 2 Single core extruded cable
- 3 Three-core paper insulated cable
- 4 One piece premoulded sleeve
- 5 Paper stress core
- 6 Separation flange (steel)
- 7 Outer casing (steel)

JOINTING SOLUTIONS  
FOR THREE-CORE  
PIPE TYPE CABLES  
AVAILABLE



## SINGLE CORE BACK-TO-BACK DESIGN available for voltage classes

### Legend

- 1 Multi-contact connection (copper)
- 2 Corona shield (copper)
- 3 Insulator (epoxy resin)
- 4 Casing (steel)
- 5 Earthing lug (copper)
- 6 Filling material (insulating oil)
- 7 Paper stress cone
- 8 One piece premoulded stress cone

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