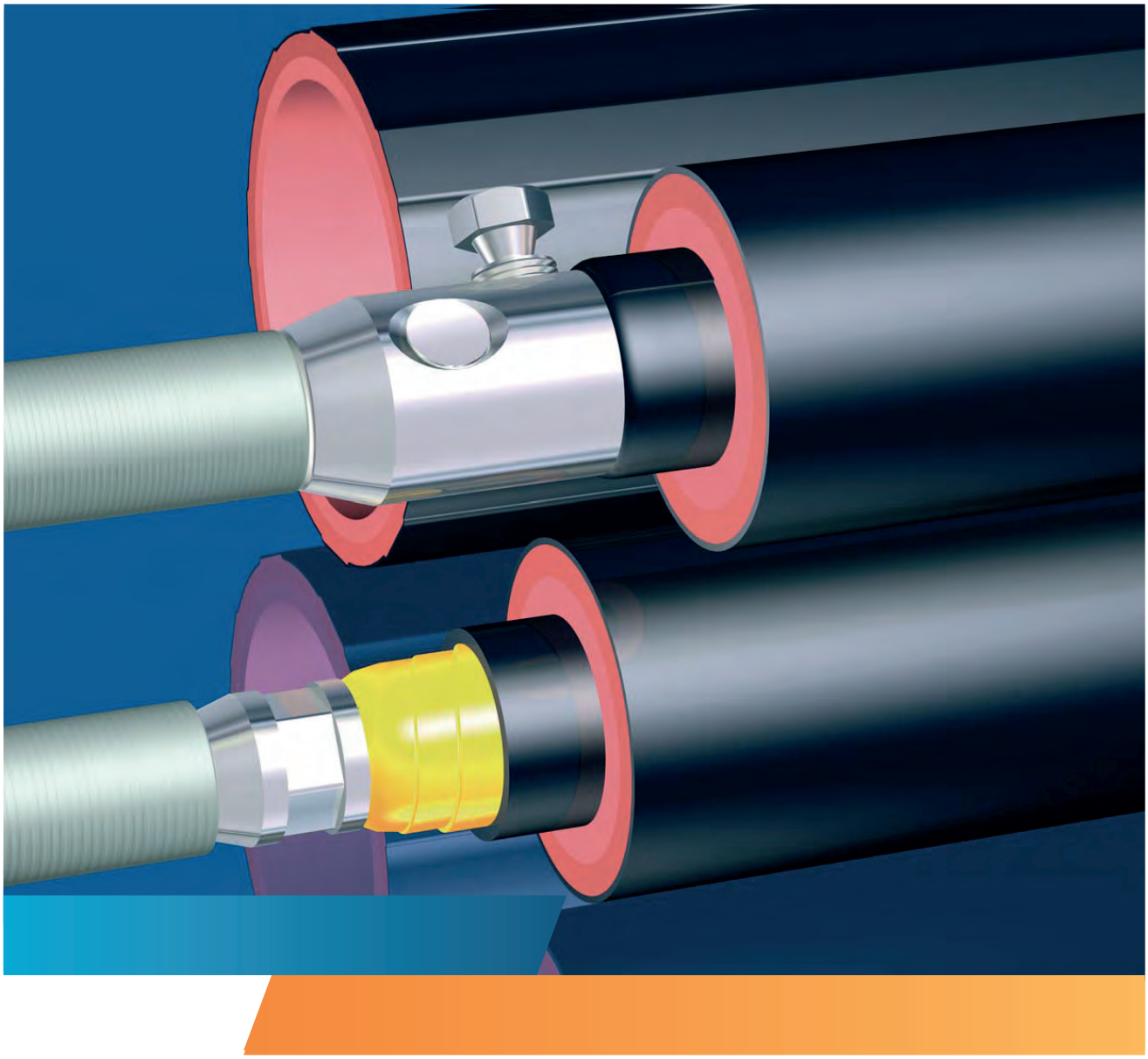
Jointing Tech

JOINTING TECHNOLOGIES DATASHEET



Energy Division

Rayfit
The advanced Raychem heat-shrinkable joint sleeve for medium voltage joints up to 36 kV

Tyco Electronics
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Unit 19, Woking Business Park
Albert Drive, Woking GU21 5JY
Tel: 01483 747747 • Fax: 01483 747001

BRISTOL
The Alpha Centre, Armstrong Way,
Great Western Business Park, Yate, Bristol BS37 5NG
Tel: 01454 322555 • Fax: 01454 323555

NORTON CANES
Unit 15-16, Bellsize Close, Norton Canes,
Staffordshire WS11 9TQ
Tel: 01543 450555 • Fax: 01543 450600

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Rayfit

The advanced Raychem heat-shrinkable joint sleeve for medium voltage joints up to 36 kV

Rayfit represents the new generation of heat-shrinkable jointing technology. It is based on a triple-extruded heat-shrinkable elastomeric joint sleeve component. The system is suitable for paper and polymeric cable constructions and is designed to accommodate modern jointing requirements such as mechanical shear bolt connectors.

Main features

- Triple-extruded body provides a pre-engineered joint unit with fewer kit components
- Advanced shrink behaviour and profile-following are combined with a significant reduction in shrink time
- High recovery forces result in tight electrical interfaces and perfect sealing ability
- Optimised heat transfer due to reduced thermal capacity
- The reduced overall joint diameter provides a slimmer and space-saving profile
- As an alternative to crimp connectors, kits can be selected with mechanical shear bolt connectors for conductor and shield continuity
- Unlimited shelf-life simplifies material logistics and reduces cost
- Exceeds international performance standards including CENELEC HD 629 and IEC 60502 for joints and IEC 61238 for Tyco BSM type mechanical connectors

Modern jointing

Today's jointing technology is required to be simpler and more economical yet provides higher levels of reliability and flexibility for operators who are under increasing pressure to improve network efficiency. Rayfit achieves these objectives and has additional valuable features including:

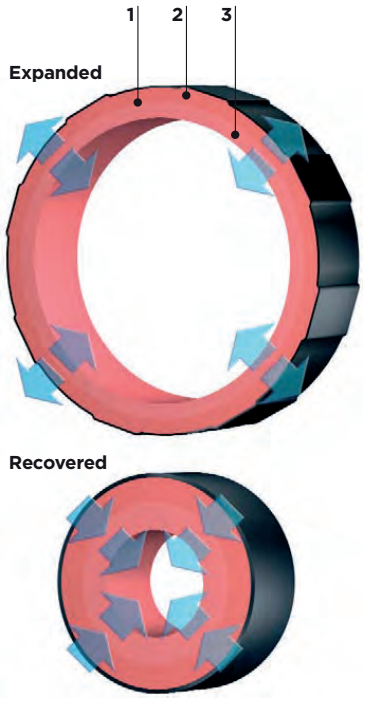
- **high recovery forces**
- **reduced installation time**
- **slim and space-saving design**

Kits are easy to select, will accommodate a variety of cable and conductor types and can include all components necessary to complete the joint. Important among the range of features is the option to include purpose-designed range-taking mechanical shear bolt connectors for conductor and shield wires.

Rayfit joint sleeve

The triple layer heat-shrinkable joint sleeve combines:

1 heat-shrinkable outer conductive layer
2 heat-shrinkable insulation layer
3 elastomeric insulation layer



A triple-extruded hybrid component combining heat-shrink and elastomeric technology

ERIT	ERIC	ERIH
12 kV	24 kV	36 kV

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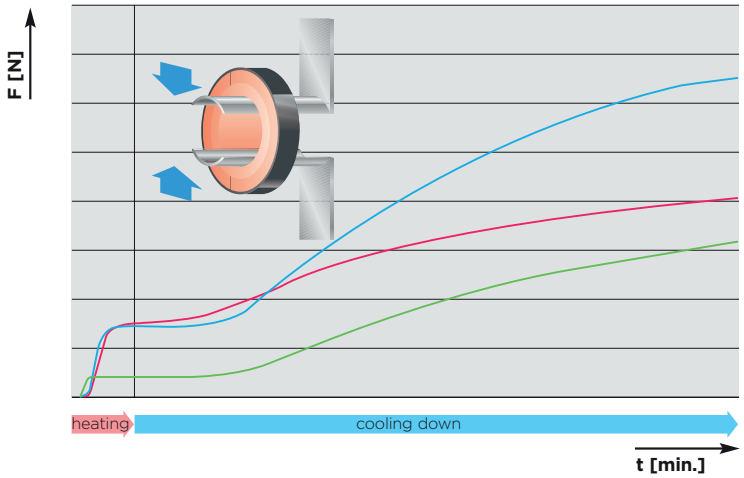
Rayfit joint sleeve

The outer conductive layer and insulating middle layer provide the heat-shrinkable hold-out for the inner elastomeric layer of the joint sleeve. During the heat-shrink installation process, the stored recovery force of the elastomer is released and combines with the recovery force of the heat- shrinkable layers.
As a result, the electrical interfaces are reduced to the minimum and the joint sleeve provides a tight electrical interface.
The elastomeric characteristic of the materials, combined with the rigid outer heat-shrinkable (screen) layers enable the joint to follow the thermally induced dimensional changes of the cable insulation.

Joint sleeve recovery forces during installation

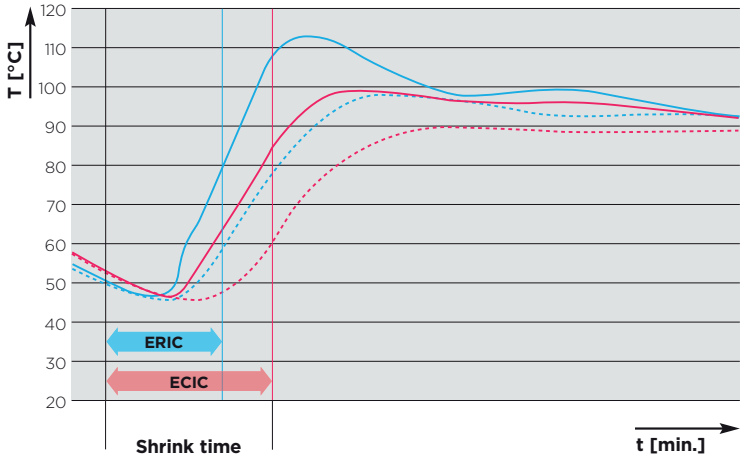
- New triple layer elastomeric ERIT
- Dual layer elastomeric ECIT
- Co-extruded heat-shrinkable sleeve CICM (non elastomeric)



Joint sleeve temperature distribution during installation

New triple layer elastomeric ERIC
- interface stress control to joint sleeve
- interface stress control to cable dielectric

Existing dual layer elastomeric ECIC
- interface stress control to joint sleeve
- interface stress control to cable dielectric



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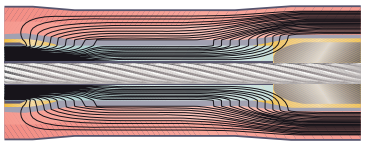
Other jointing elements

Mechanical shear-bolt connectors
Joint kits can be selected to include a Tyco BSM type mechanical shear-bolt connector to ensure a reliable pre-engineered electrical connection for different conductor types and materials.

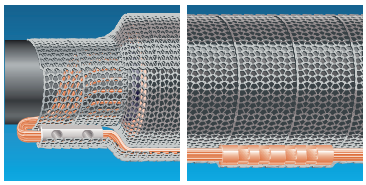
- range-taking sizes cover 25-400 mm² conductor cross-sections for aluminium and copper conductors
- pre-set shear torque provides safe and reliable installation
- removable half shell insert provide core centering
- tin-plated and greased contact surface for corrosion protection
- no need for compression tools or maintenance
- shorter length compared to compression connectors
- tested in accordance with IEC 61238
- excellent tensile performance due to special bolt tip design

Cordless impact wrench for simple and easy installation of mechanical connectors.

Electrical stress control
The stress control sleeves in combination with stress grading mastic at the screen cut provide a precisely defined impedance characteristic which smoothes the electrical field. For ease of installation, mechanical shear-bolt connectors are applied in combination with a stress control patch while joints with compression connectors use mastic tape for void filling and stress grading.



Shield continuity
With mechanical shear-bolt connectors as standard, typical shield wire cross sections up to 35mm² can easily be connected with the connector supplied in the kit. Positioned at the oversheath cut back, the connection provides a smooth profile and resists mechanical damage. There is no need for a crimping tool and its maintenance. Shear bolts provide the required contact force in order to ensure safe installation and reliable performance during load cycling in service as well as during short circuit conditions. An additional layer of copper mesh is applied around the joint to provide effective shielding and protection.



Joint kits for other connector technologies including deep indent and hexagonal compression are available.

Armouring
As some cable designs use a steel wire armour to provide a certain mechanical strength, joint designers have to provide the same performance. A steel wire armour wrap in combination with a heat-shrinkable sleeve or fibre reinforced wraparound are being used to fulfill the impact test requirements as requested e.g. in the CENELEC specification.

Robust outer sealing and protection
Modern cable laying techniques require a robust oversheath replacement capable of withstanding high mechanical stresses during conventional cable laying as well as mechanical impact occurring during the entire cable life. The thick-wall heat-shrinkable tubing is internally coated with a hot-melt adhesive to ensure an effective moisture seal and corrosion protection for the joint. When installed, the joints provide a level of protection and thickness equal to modern cables with PE oversheath. A space saving alternative using a fibre re-enforced wraparound sleeve coated with hot melt adhesive can be selected for installations in manholes and restricted joint bays.

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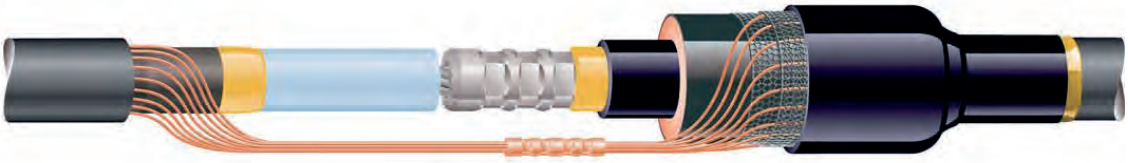
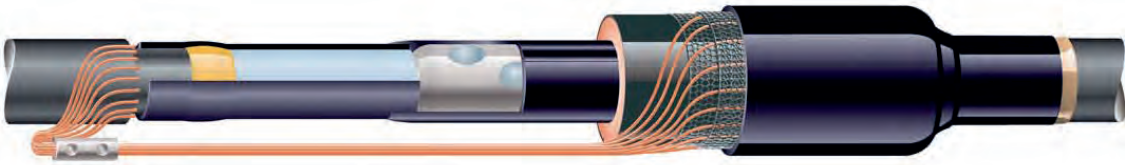
Product families for polymeric insulated cables

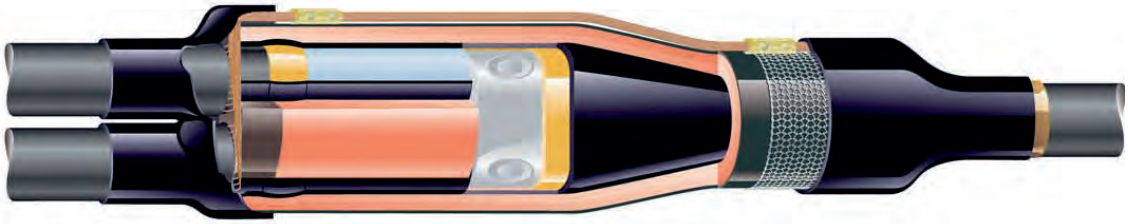
SXSU — **Medium voltage joints up to 36 kV using compression connectors**



MXSU — **Medium voltage joints up to 36 kV including mechanical connectors**

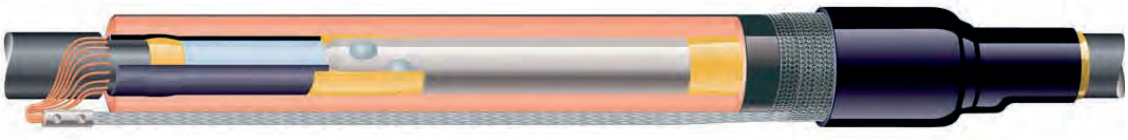


EPKB — **Medium voltage branch joints up to 24 kV including mechanical connectors**



EPKE — **Single core live end seals (stop end) up to 36 kV**

REPJ — **Medium voltage repair joints up to 24 kV including mechanical connectors**



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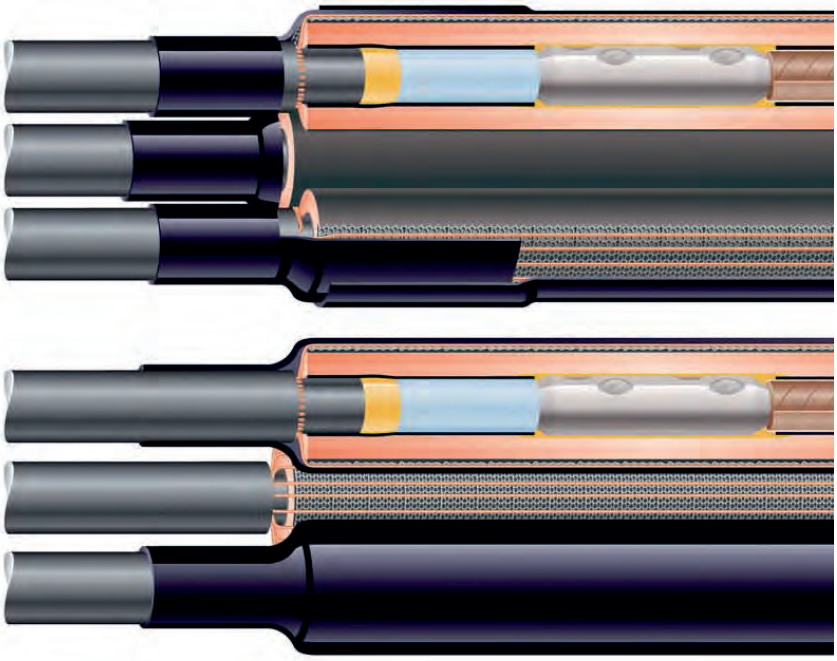
MXSU

Transition joints up to 24 kV including Tyco BSM type mechanical shear bolt connectors

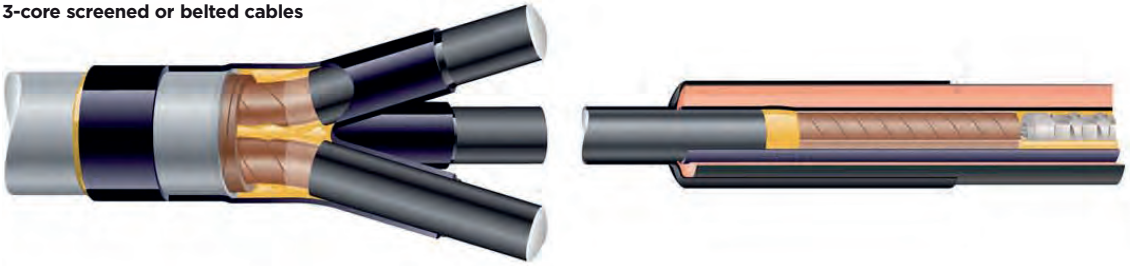


EPKJ-R

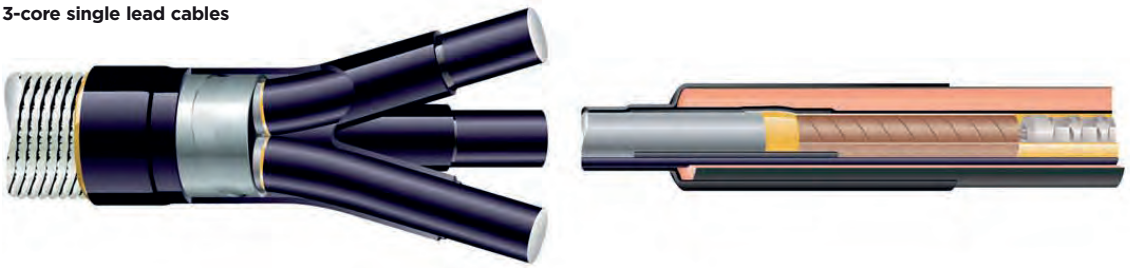
Universal jointing system to connect all common cable types using compression connectors

System technology
Few heat-shrinkable components like oil barrier sleeves, conductive breakouts etc. transfer paper cables into quasi polymeric type allowing the use of the same jointing sleeves.

3-core screened or belted cables



3-core single lead cables



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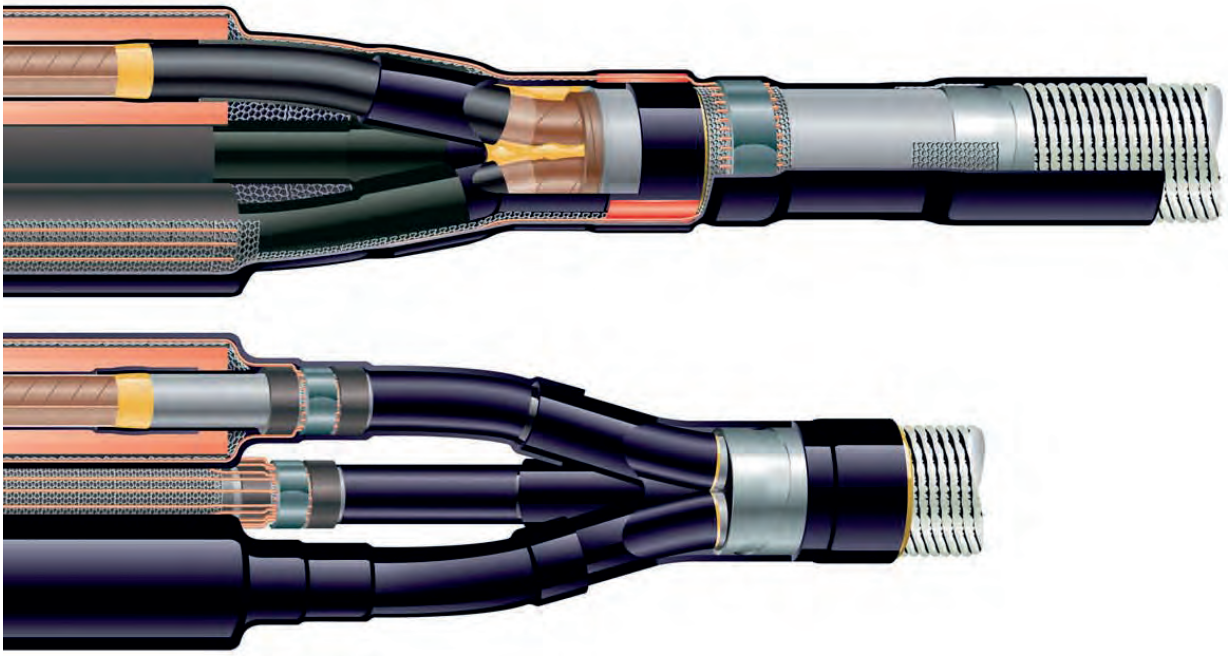

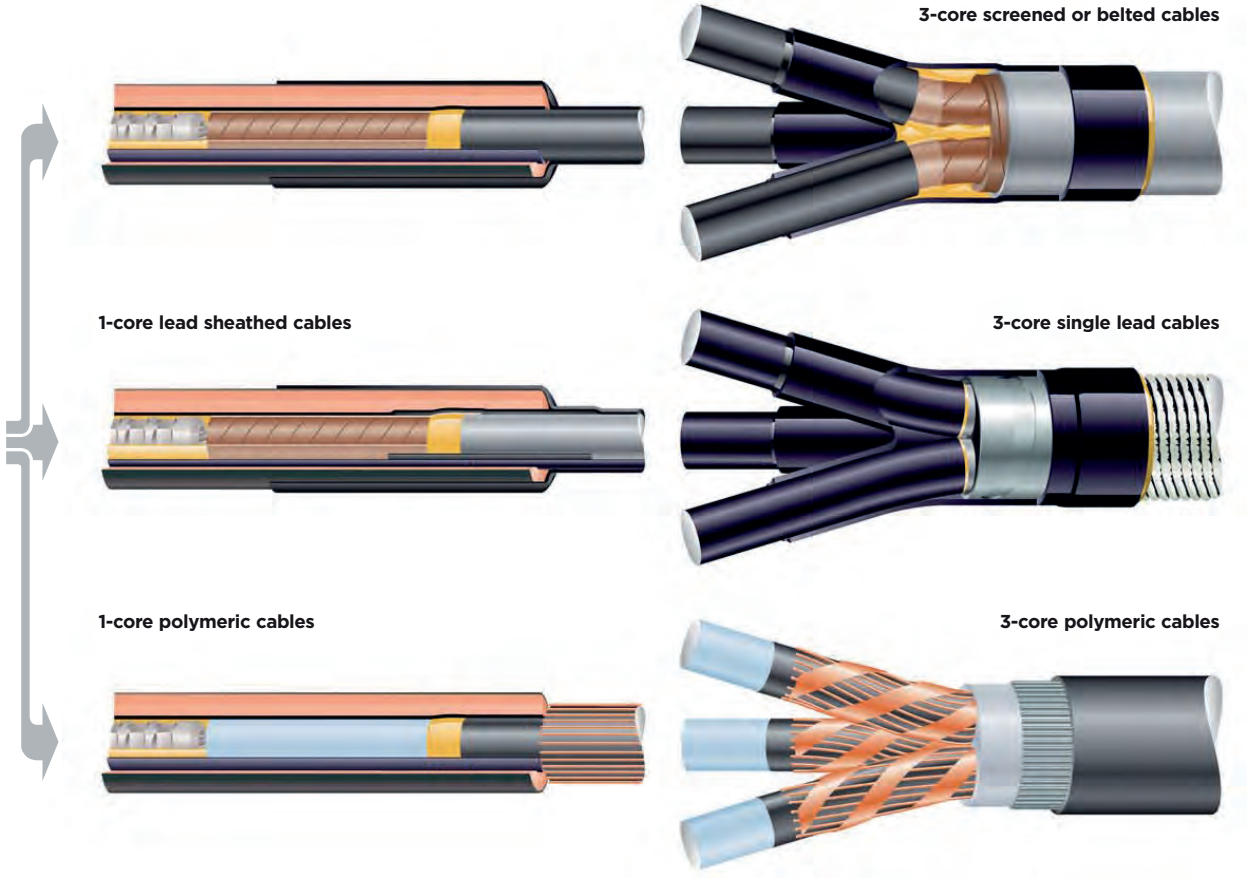

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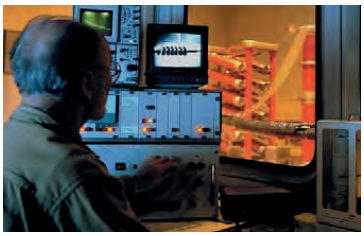
Committed to Quality



ISO 9000 series and ISO 14001 certifications for almost all locations underline our continuing commitment to quality and the environment.
All Energy Division products are subjected to extensive testing from the time they enter our plants as raw material until they leave as finished products. Requalification testing is carried out on a regular basis with installed components. Customers can thus have full confidence in the products, services and data supplied. In many cases, this saves the cost and inconvenience of any further downstream verification.
All our electrical power products meet international specifications, such as IEC, CENELEC, IEEE, and virtually all national standards.

All of the above information, including drawings, illustrations and graphic designs, reflects our present understanding and is to the best of our knowledge and belief correct and reliable. Users, however, should independently evaluate the suitability of each product for the desired application. Under no circumstances does this constitute an assurance of any particular quality or performance. Such an assurance is only provided in the context of our product specifications or explicit contractual arrangements. Our liability for these products is set forth in our standard terms and conditions of sale. Raychem, TE Logo and Tyco Electronics are trademarks.

Energy Division – innovative and economical solutions for the electrical power industry: cable accessories, connectors & fittings, insulators & insulation, surge arresters, switching equipment, lighting controls, Power Measurement and Control.

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Tyco Electronics Raychem GmbH
Energy Division
Finsinger Feld 1
85521 Ottobrunn/Munich, Germany

Phone: +49-89-6089-0
Fax: +49-89-6096345

http://energy.tycoelectronics.com

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