



CERTIFICATE OF APPROVAL

This is to certify that the Quality Management System of:

Tyco Electronics Raychem GmbH
Finsinger Feld 1, 85521 Ottobrunn
Germany

has been approved by Lloyd's Register Quality Assurance
to the following Quality Management System Standards:

ISO 9001:2008, EN ISO 9001:2008,
BS EN ISO 9001:2008, DIN EN ISO 9001:2008

The Quality Management System is applicable to:

**Design, manufacture and distribution of electrical
network connection and insulation products
and the assembly of surge arrester systems.**

This certificate forms part of the approval identified by certificate number KLN 0910226

Approval
Certificate No: KLN 0910226/A

Original Approval: 18 March 1992

Current Certificate: 1 April 2011

Certificate Expiry: 31 March 2014


Issued by: Lloyd's Register Quality Assurance GmbH
For and on behalf of: Lloyd's Register Quality Assurance Limited



001

This document is subject to the provision on the reverse.

71 Fenchurch Street, London EC3M 4BS, United Kingdom, registration number 1879370

This approval is carried out in accordance with the LRQA assessment and certification procedures and monitored by LRQA.
The use of the UKAS Accreditation Mark indicates Accreditation in respect of those activities covered by the Accreditation Certificate Number 001
Macro Revision 13

ZERTIFIKAT

Hiermit wird bescheinigt, dass das Qualitätsmanagementsystem von:

Tyco Electronics Raychem GmbH
Finsinger Feld 1, 85521 Ottobrunn
Deutschland

durch Lloyd's Register Quality Assurance geprüft und bewertet wurde und den folgenden Normen zum Qualitätsmanagement entspricht:

ISO 9001:2008, EN ISO 9001:2008,
BS EN ISO 9001:2008, DIN EN ISO 9001:2008

Das Qualitätsmanagementsystem ist anwendbar für:

**Entwicklung, Herstellung und Vertrieb von Verbindungs-,
Installations- und Isolationsprodukten für elektrische Netze
und der Zusammenbau von Überspannungsableitern.**

Dieses Zertifikat ist Teil der Zertifizierung mit der Nummer: KLN 0910226

Zertifikat
Registrier-Nr: KLN 0910226/A

Erstmalige Zulassung: 18. März 1992

Bestehendes Zertifikat: 1. April 2011

Dieses Zertifikat ist gültig bis: 31. März 2014



Ausgestellt von: Lloyd's Register Quality Assurance GmbH
Für und im Auftrag von: Lloyd's Register Quality Assurance Limited

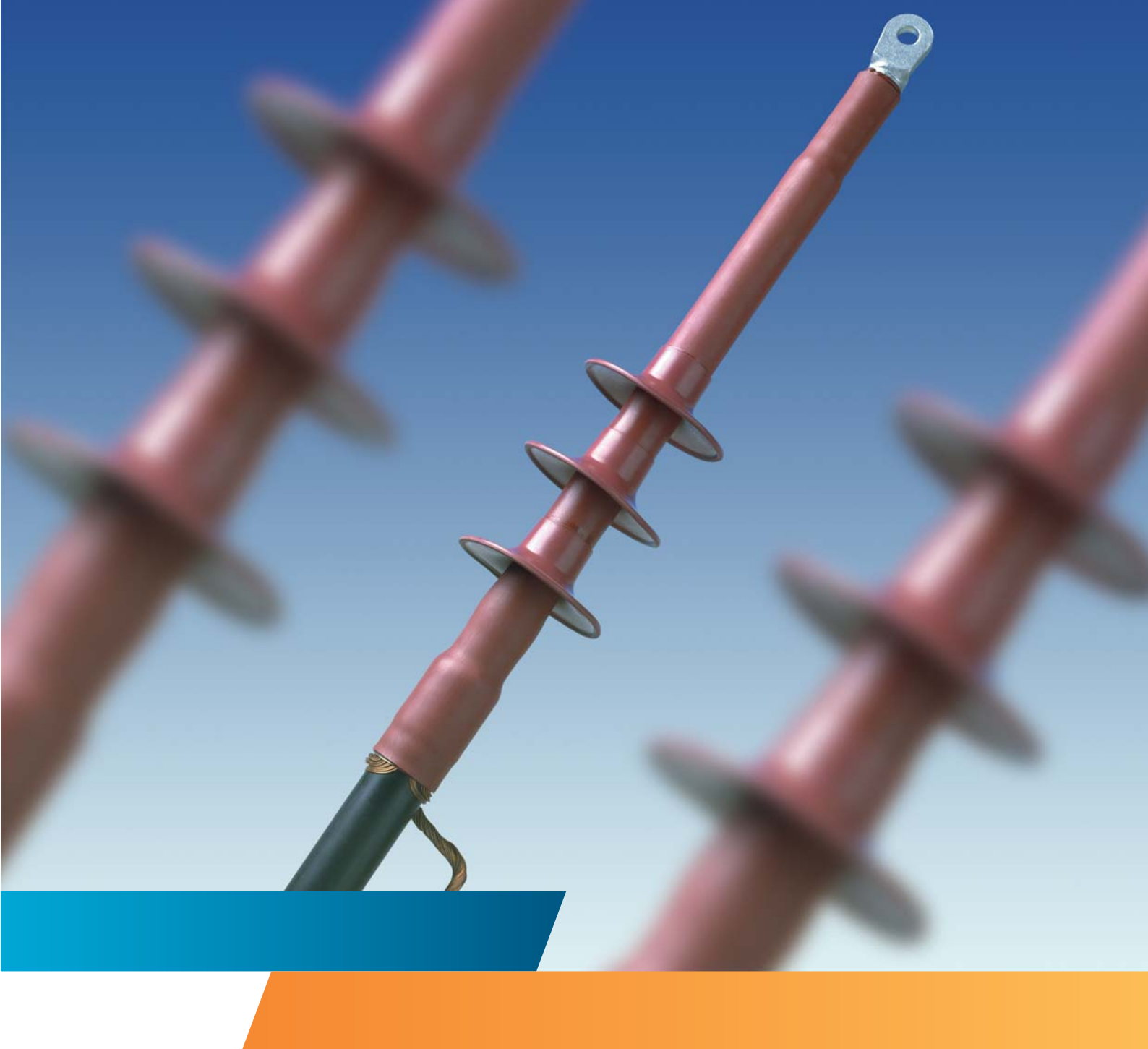


001

Dieses Dokument unterliegt der umseitigen Bestimmung.

71 Fenchurch Street, London EC3M 4BS, United Kingdom, registration number 1879370

Diese Zertifizierung wurde gemäß den LRQA-Verfahren zur Auditierung und Zertifizierung durchgeführt. Diese Verfahren werden von LRQA überwacht.
Die Verwendung des UKAS-Akkreditierungslogos bedeutet, dass LRQA über die Akkreditierung gemäß den im Akkreditierungszertifikat Nr. 001 aufgeführten Aktivitäten verfügt.
Macro Revision 13



Energy Division

Raychem heat-shrinkable
termination system
for cables up to 36 kV

The Raychem universal medium voltage termination system for polymeric and paper insulated cables

Features:

- Universal termination family for 12-36 kV based on Raychem SCTM stress control technology
- All applications for polymeric and MIND paper on 1-core, 3-core, armoured and unarmoured cables
- Red non-tracking Raychem HVOT tubing provides excellent environmental protection
- Can be used in combination with Raychem RICS / RCAB / RSRB switchgear connection systems
- Tested in accordance to CENELEC HD.629.1.S2:2006 and IEC 60502-4

Over the last three decades, engineers in utilities and industry around the world have specified million's of Raychem cable terminations at distribution voltages up to 36 kV. Raychem terminations have become identified with reliability because of their unparalleled long-term performance – where it really counts – in the field. Today there are many changes influencing the distribution of power at medium voltages. For example, the transition to new types of polymeric cable, distribution at higher voltages, and the widespread usage of compact switchgear.

Anticipating these industry changes, we have continued to extend and improve the product range, based on the extensive experience both in the field and at our outdoor test sites in polluted and desert environments. Now these developments are incorporated in a new generation of Raychem heat-shrinkable cable terminations, that are even easier to select and install, without compromising the reliability of proven materials technology. The improved system is simple to use, because the basic termination components and installation steps are the same – even if your network operates with voltages of 7.2 to 36 kV; if you use 12 kV belted paper cable and 24 kV water-blocked single core polymeric cable; whether you make equipment connections in a cable box or in compact switchgear. Let's review the main advantages of the improved system:

Universal selection procedure

- Simplified selection table allows quick selection based on conductor cross section and voltage class for either polymeric or MIND paper insulated cables (For MI draining oil cables, contact your local representative)
- Simple modification codes permit easy specification of optional accessory kits
- Enhanced range-taking ability means that one kit fits more conductor sizes, reducing stocking requirements
- Unlimited shelf life allows stocking of economic quantities without product spoilage

Simplified cable preparation

- Improved treatment of screen cut back is compatible with all state of the art screen removal techniques
- No tapering of insulation required
- No polishing of polymeric insulation surface
- No special preparation of sectored, or eccentric conductors, or of cable that is curved after unreeling from the cable drum
- Cable preparation steps are similar to those for Raychem joints

Simplified installation

- Components are lightweight and non-shattering
- Clear instruction sheets
- Common installation procedure for polymeric and MIND paper cables
- Factory engineered kit permits rapid on-site installation
- No mechanical stress at insulation screen cutback
- Termination accommodates same bending radius as cable
- Visual confirmation of correct assembly sequence possible after installation
- Rain skirts can be installed to allow either top or bottom feed
- No soldering of earthing accessories required

Outstanding long-term reliability

- Fully sealed against water ingress from the environment or from within the conductor strands
- Polymeric materials load cycle with the cable without mechanically stressing termination components and sealants
- Unsurpassed performance in polluted environments, proven over three decades.

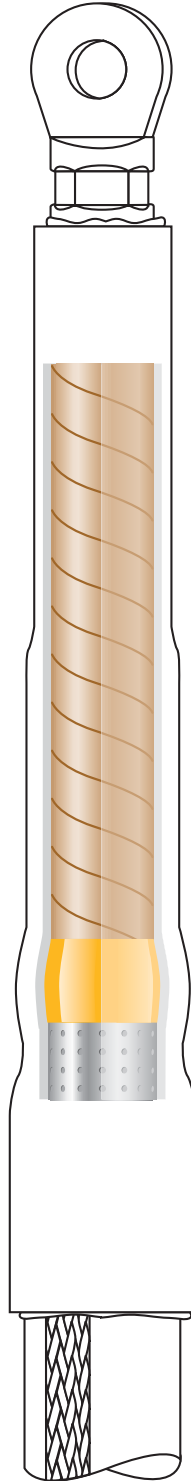
Raychem single core cable termination system



**Polymeric insulated cable
Indoor service**

- void filling compound
- stress control tubing
- non-tracking sleeve with sealant layer

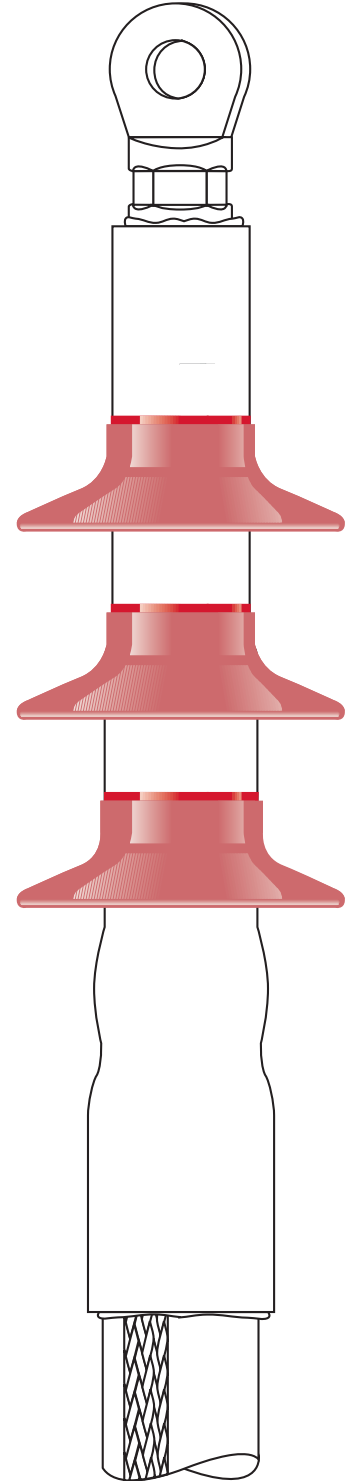
It's the same system for all types of polymeric cable



**Paper insulated cable
(mass impregnated, non-draining)
Indoor service**

- oil barrier, insulating tubing (clear) installed over paper insulation

otherwise, installation is the same as for a polymeric insulated cable

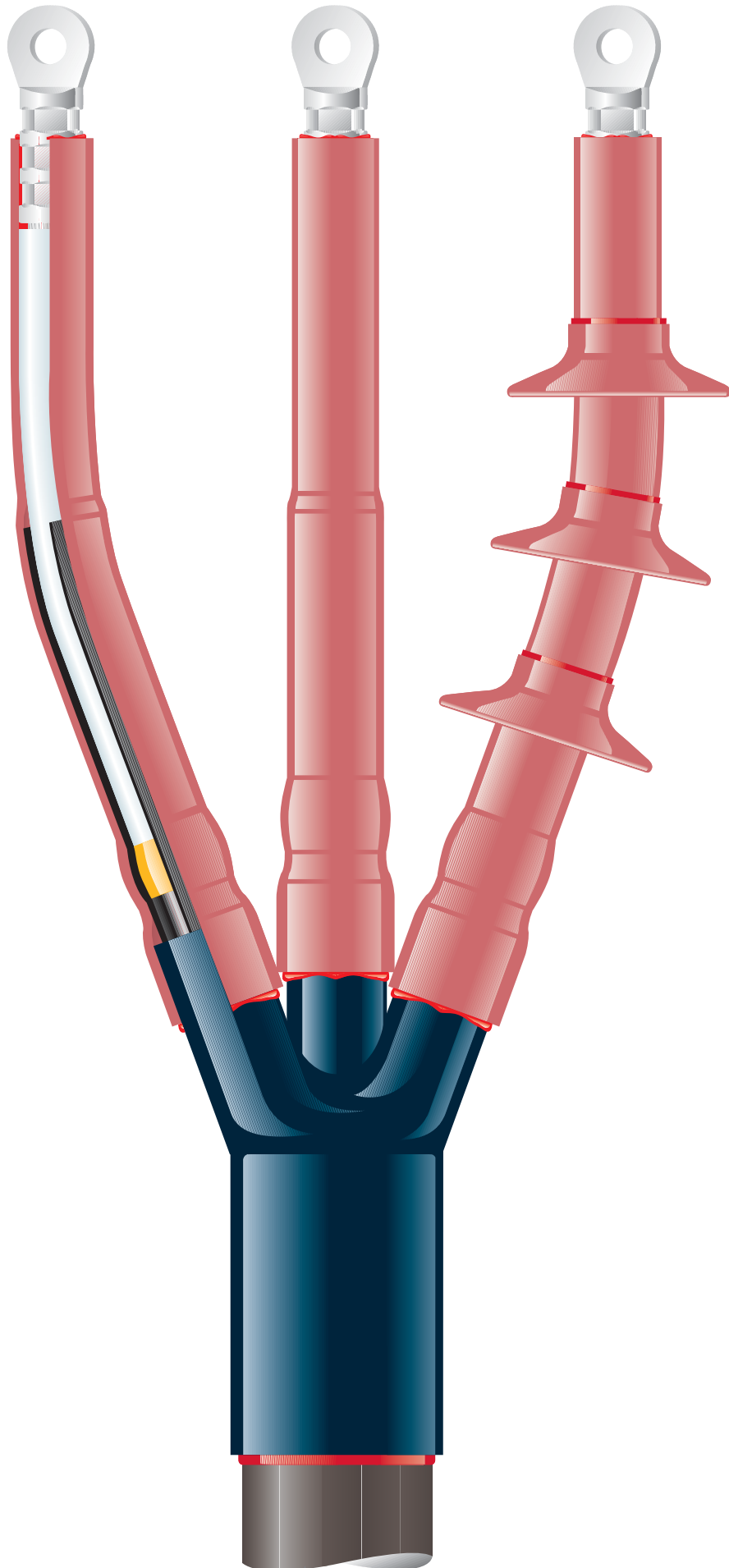


**Polymeric or paper insulated cable
Outdoor service**

- rain skirts installed over non-tracking sleeve

otherwise, installation is the same as for an indoor termination

Raychem three-core cable termination system

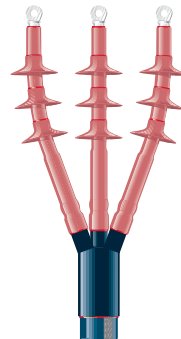
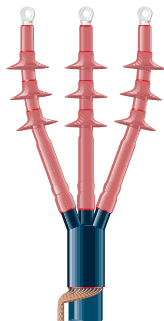
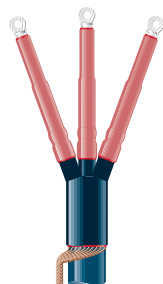
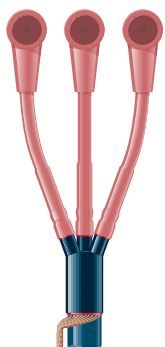
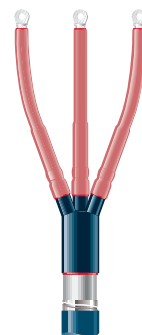
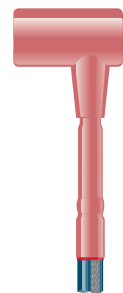
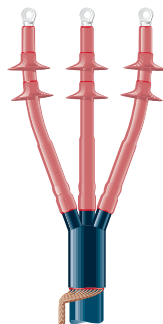
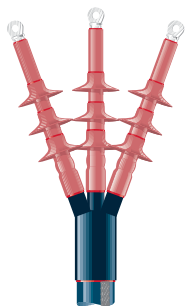


Polymeric or papier insulated cable Indoor or outdoor service

- three-core breakout installed at end of cable oversheath

otherwise, installation steps are the same as for three single core terminations

The Raychem termination system is compatible with all types of armoured cable. The system includes a complete range of solderless accessories for earthing insulation screens and cable armour and for grounding lead sheaths. Also available are insulators and support brackets, insulating boots for equipment connections and glands for easy entry to cable boxes. For more details please refer to the Raychem EPKT (EPP-0282/2) and Raychem I(O)XSU-F (EPP-0795 & 0782) termination brochures. You can ask for our capability brochure (EPP-1102) that exhibits all product families.



A wide range of cable accessories



All our Raychem indoor terminations for polymeric or paper insulated cables can be used with Raychem RICS (Raychem Insulated Connection System).

The Raychem RICS, fully insulated, right-angle and straight adapters make it easy to connect any type of cable to modern compact electrical equipment.

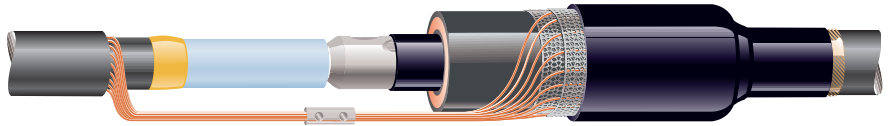
A special RICS, accommodating a ZnO Surge Arrester is now available as well as a low profile, one piece cable termination Raychem IXSU-F, designed specifically for applications with very limited clearances between phases.

We offer the universal jointing system for all types of paper and polymeric cable up to 36 kV.

The same system allows transition joints between different tree-core paper cable and transitions from paper to polymeric cables.

Trifurcations with any combination of cables are also easy with the Raychem jointing system.

For more information about joints and terminations up to 170 kV and other problem-solving products, call your local representative.



While Tyco Electronics and its affiliates referenced herein have made every reasonable effort to ensure the accuracy of the information contained in this catalog, Tyco Electronics cannot assure that this information is error free. For this reason, Tyco Electronics does not make any representation or offer any guarantee that such information is accurate, correct, reliable or current. Tyco Electronics reserves the right to make any adjustments to the information at any time. Tyco Electronics expressly disclaims any implied warranty regarding the information contained herein, including, but not limited to, the implied warranties of merchantability or fitness for a particular purpose. Tyco Electronics' only obligations are those stated in Tyco Electronics' Standard Terms and Conditions of Sale. Tyco Electronics will in no case be liable for any incidental, indirect or consequential damages arising from or in connection with, including, but not limited to, the sale, resale, use or misuse of its products. Users should rely on their own judgement to evaluate the suitability of a product for a certain purpose and test each product for its intended application. In case of any potential ambiguities or questions, please don't hesitate to contact us for clarification. Raychem, TE (logo) and Tyco Electronics are trademarks of the Tyco Electronics group of companies and its licensors.

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.

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>

 **Tyco Electronics**

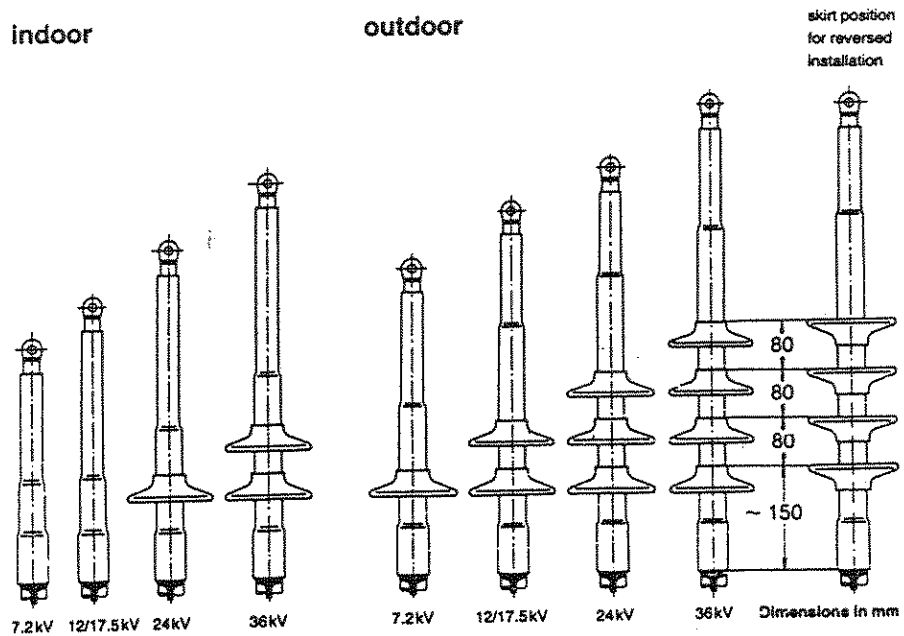
Our commitment. Your advantage.

RAYCHEM TERMINATIONS FOR XLPE CABLE FROM 7.2 KV UP TO 36 KV.

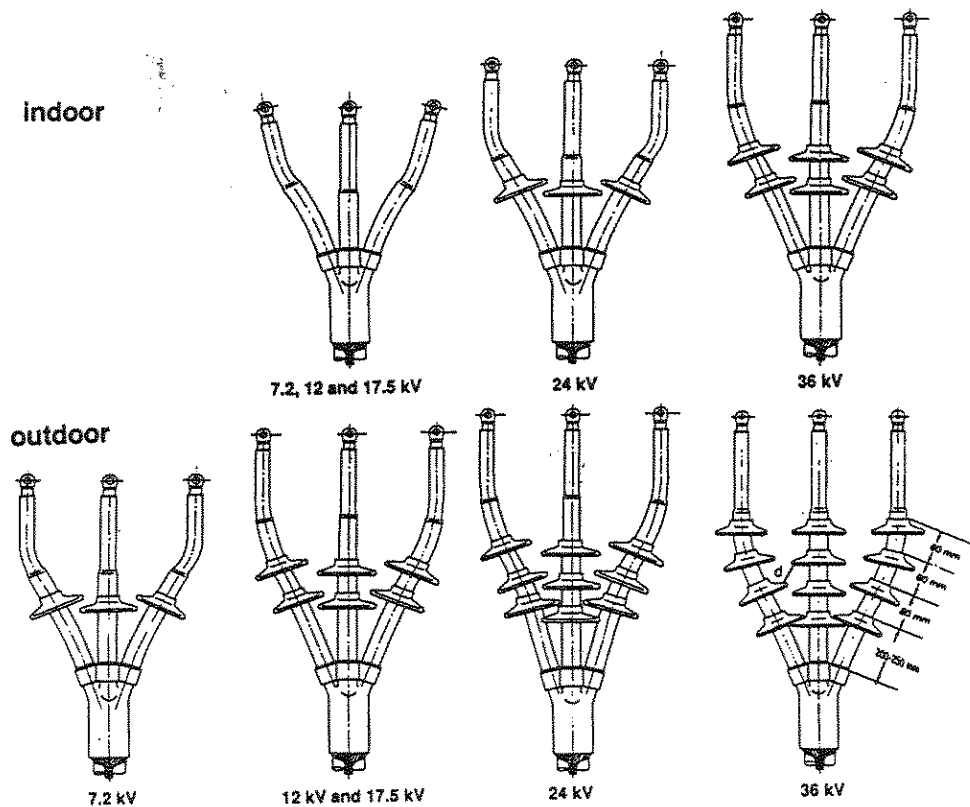
APKT

Termination Selector & Minimum Performance Data

Single Core Termination



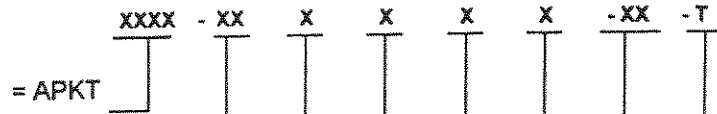
Three Core Termination



APKT - R
Cable Terminations
Rationalized

Part Numbering System

Product Family



Voltage

- up to 7.2 kV
- 12 and 17.5 kV
- 24 kV
- 36 kV

- = 7
- = 17
- = 24
- = 36

Cable Cross Section

7.2 kV mm2	12/17.5 kV mm2	24 kV mm2	36 kV mm2
16 - 50	16 - 35	25 - 35	
70 - 120	50 - 70	50 - 70	35 - 50
150 - 240	95 - 240	95 - 185	70 - 120
300 - 500	300 - 400	240 - 400	150 - 185
630 - 1000	500 - 800	500 - 630	240 - 500
	1000	800 - 1000	630 - 1000

- = A
- = B
- = C
- = D
- = E
- = F

Number of Cores

- Single Core
- 3-Core

- = 1
- = 3

Dielectric or Insulation Type

- XLPE

- = X

Location of Installation

- Indoor
- Outdoor

- = I
- = O

Location of Termination Tail (3-Core only)

- for 450 mm.
- for 650 mm.
- for 800 mm.
- for 1200 mm.

- = H1
- = H2
- = H3
- = H4

Accessories

Not include termination accessories such as cable lug, armour kit, ground connector, bolt & nut,

Ordering Example:

APKT-17C 3X O-H3-T
 Outdoor Termination for 12/17.5 kV, 120 mm2 3-Core XLPE Cable,
 Tail Length 800 mm.

Raychem Termination Kit For XLPE Cable Without Armour

Voltage (kV)	Cable Size (mm ²)	Single Core		Three Core	
		Indoor	Outdoor	Indoor	Outdoor
7.2	16 - 50	APKT 7A1XI-T	APKT 7A1XO-T	APKT 7A3XI-H2-T	APKT 7A3XO-H2-T
	70 - 120	APKT 7B1XI-T	APKT 7B1XO-T	APKT 7B3XI-H2-T	APKT 7B3XO-H2-T
	150 - 240	APKT 7C1XI-T	APKT 7C1XO-T	APKT 7C3XI-H2-T	APKT 7C3XO-H2-T
	300 - 500	APKT 7D1XI-T	APKT 7D1XO-T	APKT 7D3XI-H2-T	APKT 7D3XO-H2-T
	630 - 1000	APKT 7E1XI-T	APKT 7E1XO-T	-	-
12 - 17.5	15 - 35	APKT 17A1XI-T	APKT 17A1XO-T	APKT 17A3XI-H2-T	APKT 17A3XO-H2-T
	50 - 70	APKT 17B1XI-T	APKT 17B1XO-T	APKT 17B3XI-H2-T	APKT 17B3XO-H2-T
	95 - 240	APKT 17C1XI-T	APKT 17C1XO-T	APKT 17C3XI-H2-T	APKT 17C3XO-H2-T
	300 - 400	APKT 17D1XI-T	APKT 17D1XO-T	APKT 17D3XI-H2-T	APKT 17D3XO-H2-T
	500 - 800	APKT 17E1XI-T	APKT 17E1XO-T	-	-
	1000	APKT 17F1XI-T	APKT 17F1XO-T	-	-
24	25 - 35	APKT 24A1XI-T	APKT 24A1XO-T	APKT 24A3XI-H2-T	APKT 24A3XO-H3-T
	50 - 70	APKT 24B1XI-T	APKT 24B1XO-T	APKT 24B3XI-H2-T	APKT 24B3XO-H3-T
	95 - 185	APKT 24C1XI-T	APKT 24C1XO-T	APKT 24C3XI-H2-T	APKT 24C3XO-H3-T
	240 - 400	APKT 24D1XI-T	APKT 24D1XO-T	APKT 24D3XI-H2-T	APKT 24D3XO-H3-T
	500 - 630	APKT 24E1XI-T	APKT 24E1XO-T	-	-
	800 - 1000	APKT 24F1XI-T	APKT 24F1XO-T	-	-
36	35	APKT 36B1XI-T	APKT 36B1XO-T	APKT 36B3XI-H2-T	APKT 36B3XO-H3-T
	50-120	APKT 36C1XI-T	APKT 36C1XO-T	APKT 36C3XI-H2-T	APKT 36C3XO-H3-T
	150 - 185	APKT 36D1XI-T	APKT 36D1XO-T	APKT 36D3XI-H2-T	APKT 36D3XO-H3-T
	240 - 500	APKT 36E1XI-T	APKT 36E1XO-T	APKT 36E3XI-H2-T	APKT 36E3XO-H3-T
	630 - 1000	APKT 36F1XI-T	APKT 36F1XO-T	-	-

Minimum Performance of Raychem Terminations for 1-Core and 3-Core XLPE Cable up to 36 kV.

Test Sequence		Test Voltage					Result
		Highest Voltage for Cable U_m [kV]					
		7.2	12	17.5	24	36	
A.C. Voltage Withstand	1 min	27	35	45	55	75	no breakdown and no flashover
Partial Discharge		4.5	7.5	10.9	15	22.5	≤ 3 pC
		7.2	12	17.5	24	36	≤ 20 pC
Impulse Voltage Withstand	10 positive and 10 negative, 1.2/50 μ s, between each conductor and the grounded screen	Indoor: 60	75	95	125	170	no breakdown and no flashover
		outdoor: 70	95	110	150	200	
Load Cycling	63 cycles 5h heating, 3h cooling Conductor temperature: PE, PVC cables: 75°C XPE cables: 95°C	9	15	22	30	45	no breakdown and no flashover
Partial Discharge		4.5	7.5	10.9	15	22.5	≤ 3 pC
		7.2	12	17.5	24	36	≤ 20 pC
Thermal Short Circuit	1 s symmetrical fault with conductor temperature as for cable specification 1 s earth fault with screen or armour temperature as for cable specification						no visible signs of damage
Load Cycling	repeat	9	15	22	30	45	no breakdown and no flashover
Partial Discharge		4.5	7.5	10.9	15	22.5	≤ 3 pC
		7.2	12	17.5	24	36	≤ 20 pC
Impulse Voltage Withstand	repeat	Indoor: 60	75	95	125	170	no breakdown and no flashover
		outdoor: 70	95	110	150	200	
D.C. Voltage Withstand	30 min	28	48	72	96	144	no breakdown and no flashover
Humidity Indoor terminations	conductivity 800 μ S/cm, 100h spray rate: 0.4 l/m ² /h	4.5	7.5	10.9	15	22.5	no breakdown, no flashover, no visible tracking and no erosion
A.C. Voltage Withstand	4h	14	24	36	48	72	no breakdown and no flashover
Salt-fog outdoor terminations	224 kg/m ³	4.5	7.5	10.9	15	22.5	no flashover
Notes:		1. U_m is the highest phase to phase voltage. All other voltages are stated as phase to ground values.				2. Further details are given in Raychem specification PPS 3013.	