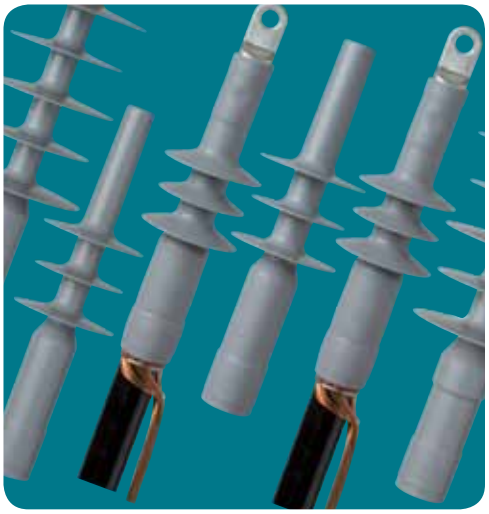





Quick Reference Guide
Raychem Cable Accessories

te.com/energy

Raychem
from TE Connectivity

Contents

Section 1: Heat Shrink Tubings

High Shrink Ratio, Adhesive Lined Polyolefin Tubing

ATUM

Features

- 3:1 and 4:1 shrink ratios allow for connector-to-cable sealing
- Tubing environmentally seals and protects components and interconnections
- Medium wall provides increased mechanical protection
- The adhesive in ATUM tubing bonds to a wide variety of plastics, rubbers, and metals, including polyethylene, aluminium, steel, and copper
- RoHS compliant
- Standard length 1200mm stick

Applications

Environmentally seals and protects a wide variety of electrical applications, including back end connector sealing, breakouts, and connector-to-cable transitions. High expansion ratio makes it possible to repair most damaged cable jackets without removing connectors.

Installation

Minimum shrink temperature: 80°C

Minimum full recovery temperature: 110°C

Operating Temperature Range

-55°C to 110°C

Specifications/Approvals

Series	UL**	Military	Raychem
ATUM	E85381 600V, 110°C	AMS-DTL-23053/4,* Class 3	RW-2063 - Black RK-6024 - Colours and clear

*Formerly MIL-I-23053/4 and MIL-DTL-23053/4. Sizes 3/1, 6/2, 12/4, 24/8, and 40/13 only.
**Black only, except sizes 3/1 and 4/1.

Catalogue Reference	Inside Diameter		Recovered Wall Thickness**	
	Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating	Adhesive Wall after Heating (Nominal)
	(mm)	(mm)	(mm)	(mm)
ATUM-3/1-0-STK	3	1	1.00 ± 0.28	0.5
ATUM-4.5/1.5-0-STK	4.5	1.5	1.10 ± 0.25	0.5
ATUM-6/2-0-STK	6	2	1.00 ± 0.28	0.5
ATUM-9/3-0-STK	9	3	1.40 ± 0.28	0.61
ATUM-12/4-0-STK	12	4	1.78 ± 0.38	0.76
ATUM-19/6-0-STK	19	6	2.25 ± 0.55	0.76
ATUM-24/8-0-STK	24	8	2.54 ± 0.55	1.02
ATUM-40/13-0-STK	40	13	2.54 ± 0.55	1.02
ATUM-4/1-0-STK	4	1	1.00 ± 0.28	0.5
ATUM-8/2-0-STK	8	2	1.00 ± 0.28	0.5
ATUM-12/3-0-STK	12	3	1.40 ± 0.28	0.61
ATUM-16/4-0-STK	16	4	1.78 ± 0.38	0.76
ATUM-24/6-0-STK	24	6	2.25 ± 0.55	0.76
ATUM-32/8-0-STK	32	8	2.54 ± 0.55	1.02
ATUM-52/13-0-STK	52	13	2.54 ± 0.55	1.02

**Wall thickness will be less if tubing recovery is restricted during shrinkage.
For supply to MIL spec, add -MS to ordering description

Flexible, Flame Retardant, Dual Colour, Polyolefin Tubing

DCPT

Features

- 2:1 and 3:1 shrink ratio
- Dual colours (yellow/green) for instant identification
- Co-extrusion of tubing colours, giving colour permanence superior to that of conventional ink marking
- Flame retardant
- Flexibility: able to conform to irregular shapes
- Excellent physical, chemical, and electrical properties that meet industry standards for highly reliable, general purpose tubing
- RoHS compliant

Applications

Used to identify "earth" on wires and in cables, and to jacket and insulate light-duty harnesses. Easily marked by conventional techniques for additional identification of wires and cables.

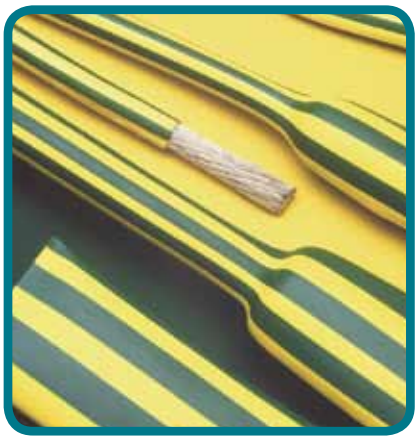
Installation

Minimum shrink temperature: 95°C

Minimum full recovery temperature: 120°C

Operating Temperature Range

-55°C to 135°C



Specifications/Approvals

Series	UL	CSA	Military	Raychem
DCPT	E35586 600V, 125°C	LR31929 600V, 125°C	VG 95343 Pt 5 Type A	RW-2056

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(m)	(mm)	(mm)	(mm)
DCPT-3/1.5-45-SP	300	3	1.5	0.51 ± 0.10
DCPT-6/3-45-SP	150	6	3	0.58 ± 0.10
DCPT-8/4-45-SP	150	8	4	0.64 ± 0.10
DCPT-10/5-45-SP	150	10	5	0.64 ± 0.10
DCPT-12/6-45-SP	150	12	6	0.64 ± 0.10
DCPT-19/9-45-SP	150	19	9	0.76 ± 0.12
DCPT-26/13-45-SP	60	26	13	0.89 ± 0.12
DCPT-38/19-45-SP	60	38	19	1.00 ± 0.12
DCPT-51/19-45-SP	30	51	19	1.02 ± 0.15

**Wall thickness will be less if tubing recovery is restricted during shrinkage.
For supply to MIL spec, add -MS to ordering description

Flexible, Flame Retardant, Mil Spec, Polyolefin Tubing

RNF

Features

- 2:1 shrink ratio
- Superior abrasion and solvent resistance when compared with that of many flexible, general purpose polyolefin tubings
- Excellent physical, chemical, and electrical properties that meet or exceed industrial and military standards for highly reliable, general purpose tubing
- Flexible; conforms to irregular shapes
- Flame-retardant (colours only)
- RoHS compliant
- Available in 1200mm sticks (STK) or spools (SP)

Applications

Designed to provide superior mechanical (abrasion, cut through, and strain relief), thermal, and fluid resistance performance in demanding environments. Widely used to provide insulation and strain relief of wire terminations and connections. Used for jacketing wire bundles and to identify and colour code electrical connections and wire bundles.

Installation

Minimum shrink temperature: 95°C
Minimum full recovery temp: 121°C

Operating Temperature Range

-55°C to 135°C

Specifications/Approvals

Series	UL*	CSA	Military	Raychem
RNF-100 Type 1 (colours)	E35586 600V, 125°C	LR31929 600V, 125°C	AMS-DTL-23053/5*, Class 1 Def. Stan. 59-97 Type 2B	RT-350, Type 1 RK-6001
RNF-100 Type 2 (clear)	-	-	AMS-DTL-23053/5*, Class 2 VG 95343 Pt 5 Type B	RT-350, Type 1 RK-6001

*Formerly MIL-I-23053/5 and MIL-DTL-23053/5.

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(m)	(mm)	(mm)	(mm)
RNF-100-3/64-colour code-(STK) or (SP)	300	1.2	0.6	0.45
RNF-100-1/16-colour code-(STK) or (SP)	300	1.6	0.8	0.45
RNF-100-3/ 32-colour code-(STK) or (SP)	150	2.4	1.2	0.50
RNF-100-1/8-colour code-(STK) or (SP)	150	3.2	1.6	0.50
RNF-100- 3/16 -colour code-(STK) or (SP)	150	4.8	2.4	0.50
RNF-100-1/4-colour code-(STK) or (SP)	75	6.4	3.2	0.65
RNF-100-3/8-colour code-(STK) or (SP)	121	9.5	4.8	0.65
RNF-100-1/2-colour code-(STK) or (SP)	90	12.7	6.4	0.65
RNF-100-3/4-colour code-(STK) or (SP)	60	19.0	9.5	0.76
RNF-100-1-colour code-(STK) or (SP)	60	25.4	12.7	0.89
RNF-100-1-1/4-colour code-(STK) or (SP)	30	32.0	16.0	1.02
RNF-100-1-1/2-colour code-(STK) or (SP)	91	38.0	19.0	1.02
RNF-100-2-colour code-(STK) or (SP)	30	51.0	25.4	1.15
RNF-100-3-colour code-(STK) or (SP)	15	76.0	38.0	1.25
RNF-100-4-colour code-(STK) or (SP)	15	102.0	51.0	1.40

**Wall thickness will be less if tubing recovery is restricted during shrinkage.

Standard colour Code	Clear	Black	Red	Yellow	Green	Blue	White
	X	0	2	4	5	6	9

Flexible, Flame Retardant, General Purpose Polyolefin Tubing

HS

Features

Made from Flame Retardant Polyolefin Material, EziShrink has excellent physical, chemical and electrical properties that meet industry standards for highly reliable heat shrink tubing.

Available in 1200mm sticks (part without suffix) or spools (SP)

Applications

EziShrink Thin Wall Tubing is a high quality, heat shrinkable product for a variety of uses. It is the industry standard for insulation, strain relief, wire bundling and colour coding in both commercial and military applications.

Installation

Minimum shrink temperature: 70°C

Operating Temperature Range

-55°C to 125°C

Specifications/Approvals

Series	UL
HS	E203950 600V, 125°C

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(mm)	(mm)	(mm)	(mm)
HS-colour code-1.2/0.6 (-SP) or blank	200	1.2	0.6	0.22
HS-colour code-1.5/0.8 (-SP) or blank	200	1.5	0.8	0.28
HS-colour code-2/1 (-SP) or blank	200	2	1	0.35
HS-colour code-3/1.5 (-SP) or blank	200	3	1.5	0.40
HS-colour code-4/2 (-SP) or blank	200	4	2	0.50
HS-colour code-6/3 (-SP) or blank	100	6	3	0.55
HS-colour code-10/5 (-SP) or blank	100	10	5	0.60
HS-colour code-12/6 (-SP) or blank	100	12	6	0.60
HS-colour code-20/10 (-SP) or blank	100	20	10	0.80
HS-colour code-25/12 (-SP) or blank	50	25	12	0.90
HS-colour code-30/15 (-SP) or blank	50	30	15	0.90
HS-colour code-40/20 (-SP) or blank	50	40	20	1.00
HS-colour code-50/25 (-SP) or blank	25	50	25	1.00
HS-colour code-80/40 (-SP) or blank	25	80	40	1.46
HS-colour code-100/50 (-SP) or blank	25	100	50	1.46

**Wall thickness will be less if tubing recovery is restricted during shrinkage.

Standard colour Code	Black	Red	Yellow	Green	Blue	White	Green / Yellow
	BK	RD	YO	GN	BU	WH	G/Y

Heat Shrinkable, Halogen Free, Medium Wall Insulating Tubing

MWTM

Features

Raychem MWTM tubing is fast and easily installed, and has proven its long term reliability in harsh climatic conditions and polluted environments.

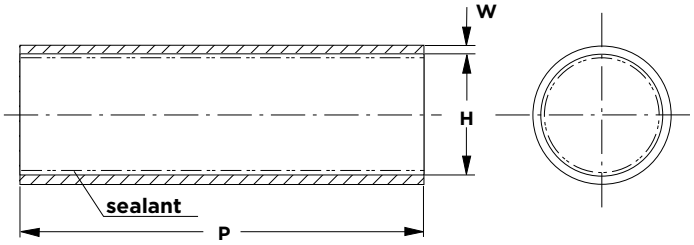
Appropriate to the particular application, our MWTM tubing is available with an inner sealant wall, which melts and flows under the heat and shrinking action of installation. This makes it suitable for either cable oversheath replacement and sealing, or uncoated as an insulating material. The shelf life restrictions usually associated with tapes and resins do not apply, and the completed installation may be taken into service at once.

Lengths

All sizes types are available in the standard lengths: 1000 mm and 1500 mm. Spools and other lengths on request. All lengths subject to standard cutting tolerances.

Coatings

Raychem tubing MWTM is available with or without an inner sealant wall. The sealant exhibits excellent bonding and sealing characteristics to all materials commonly used in the various cable insulation and sheath constructions, such as plastic, rubber, lead and aluminium.



MWTM-25/8-1200/S

- Product type
- Size
- Standard length
- /S = sealant or
- /U without sealant

Catalogue Reference	Application Range		H		W	
	from	to	as supplied	after free recovery	as supplied	after free recovery
	(mm)	(mm)	min	max	nom	min
MWTM-10/3	3.5	9.0	10	3	0.3	1.0
MWTM-16/5	5.5	14.5	16	5	0.3	1.4
MWTM-25/8	9.0	22.5	25	8	0.4	2.0
MWTM-35/12	13.0	31.5	35	12	0.4	2.0
MWTM-50/16	18	45	50	16	0.5	2.0
MWTM-63/19	21	57	63	19	0.6	2.4
MWTM-75/22	24	68	75	22	0.6	2.7
MWTM-85/25	28	77	85	25	0.6	2.8
MWTM-95/29	32	86	95	29	0.7	3.1
MWTM-115/34	37	104	115	34	0.7	3.1
MWTM-140/42	46	126	140	42	0.7	3.1
MWTM-160/50	55	144	160	50	0.7	3.2
MWTM-180/60	66	162	180	60	0.7	3.2
MWTM-245/80 *	88	220	245	80	n.a.	2.4
MWTM-285/135 *	149	255	285	135	n.a.	1.4

* uncoated only

Flexible, General Purpose Medium Wall Elastomeric Tubing

NT

Features

- Remains flexible at temperatures as low as -55°C [-67°F]
- Offers good resistance to abrasion and physical abuse while providing the flexibility and strain relief needed in general purpose harnessing applications
- Resistant to most common fluids and solvents
- RoHS compliant

Applications

Widely used for insulation, strain relief, and abrasion protection on cable harnesses and wire bundles in the commercial electronics industries where a reliable general-purpose tubing is needed. Suitable for applications requiring some exposure to common fluids and solvents.

Installation

Min shrink temp: 90°C

Min full recovery temp: 135°C

Operating Temperature Range

-55°C to 90°C

Specifications/Approvals

Series	Raychem
NT	RT-510

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(M)	(mm)	(mm)	(mm)
NT-1/8-0	30	3.2	1.6	0.69 ± 0.20
NT-3/16-0	30	4.8	2.5	0.84 ± 0.25
NT-1/4-0	30	6.4	3.6	0.89 ± 0.25
NT-3/8-0	30	9.5	5.5	1.01 ± 0.25
NT-1/2-0	30	12.7	7.3	1.21 ± 0.38
NT-5/8-0	30	15.9	9.1	1.32 ± 0.38
NT-3/4-0	30	19.1	10.9	1.44 ± 0.38
NT-7/8-0	30	22.2	12.7	1.65 ± 0.38
NT-1-0	30	25.4	14.5	1.77 ± 0.51
NT-1-1/4-0	30	31.8	18.1	2.20 ± 0.51
NT-1-1/2-0	30	38.1	21.8	2.41 ± 0.51
NT-1-3/4-0	30	44.5	25.4	2.71 ± 0.51
NT-2-0	30	50.8	29	2.79 ± 0.51
NT-3-0	30	76.2	43.4	3.17 ± 0.51
NT-4-0	30	101.6	57.9	3.55 ± 0.51

**Wall thickness will be less if tubing recovery is restricted during shrinkage.

Heat Shrinkable Halogen Free Heavy Wall Insulating Tubing

WCSM

Raychem WCSM is a heat shrinkable heavy wall tubing for insulating and sealing power cables and accessories. In this tubing, the electrical and physical properties of a cable oversheath material are combined with ruggedness and easy installation.

Raychem WCSM's mechanical strength enables immediate back filling of cable trenches after jointing. Widely used to insulate, protect and seal power cable joints, accessories and electrical connections, it is one result of our extensive capability in materials technology. The material used is halogen-free and UV resistant.

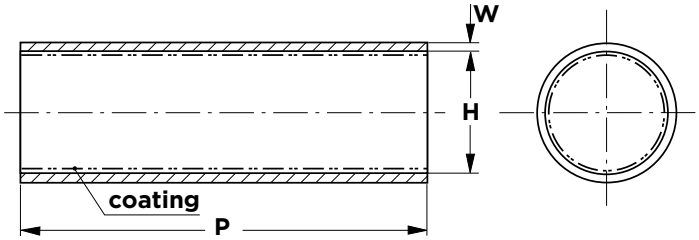
Lengths

All sizes are available in the standard lengths: 1000 mm and 1500 mm.

Sealant

Raychem tubing WCSM are coated with an inner sealant wall. The sealant exhibits excellent bonding and sealing characteristics to all materials commonly used in the various cable insulation and sheath constructions, such as plastic,

rubber, lead, and aluminium.



WCSM-34/8-1200/S

- Product type
- Size
- Standard length
- /S = sealant

Catalogue Reference	Application Range		H		W	
	to	from	as supplied	after free recovery	as supplied	after free recovery
	(mm)	(mm)	min	max	nom	min
WCSM-12/3	10	3.5	12	3	0.8	2.0
WCSM-16/4	14	4.5	16	4	0.9	2.4
WCSM-24/6	22	6.5	24	6	1.0	2.7
WCSM-34/8	31	9	33	8	1.3	4.0
WCSM-48/12	44	13	48	12	1.5	4.5
WCSM-56/16	50	17.5	56	16	1.5	4.4
WCSM-70/20	63	22	70	20	1.4	4.4
WCSM-90/25	81	27	90	25	1.3	4.3
WCSM-110/30	100	33	110	30	1.2	4.3
WCSM-130/35	118	38	130	35	1.2	4.3
WCSM-160/50	144	55	160	50	1.0	4.3
WCSM-180/50	162	55	180	50	1.0	4.3
WCSM-200/50	180	55	200	50	n.a.	4.3
WCSM-250/65	225	70	250	65	n.a.	4.3
WCSM-320/95	295	105	320	95	n.a.	4.3
WCSM-390/110	350	125	390	110	n.a.	4.3

High Performance, Thick Wall, Heat Shrinkable Tubing

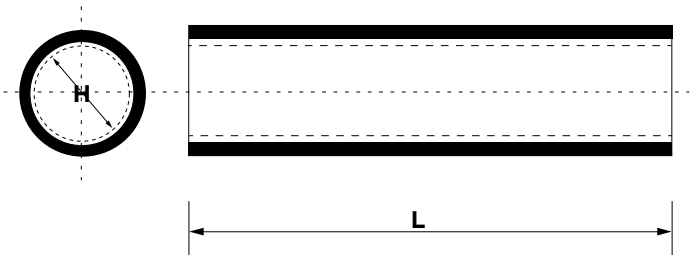
XCSM

- High recovery ratio reducing the number of sizes and inventory costs
- UV stabilised material suitable for aerial and underground applications
- Used where maximum reliability is required, submersible, direct buried installations
- Internally coated with hot melt adhesive or mastic both giving high corrosion and mechanical performance

Lengths

All sizes are available in the standard lengths:

- 250mm
- 500mm
- 750mm
- 1000mm
- 1500mm



XCSM-85/22-1500/S

- Product type
- Size
- Standard length
- /S = sealant

Catalogue Reference	Inside Diameter	
	Min Expanded as Supplied	Max Recovered after Heating
	(mm)	(mm)
XCSM-23/6	23	6
XCSM-30/8	30	8
XCSM-44/12	44	12
XCSM-55/18	55	18
XCSM-85/22	85	22
XCSM-115/30	115	30
XCSM-130/41	130	41
XCSM-160/55	160	55
XCSM-178/60	178	60

High Flex Heavy Wall Heat Shrinkable Tubing

HF

Features

- Offers high flexibility
- Provides excellent insulation and abrasion protection, per U.S. Mine Safety and Health Administration (MSHA) regulations
- Flame-retardant
- RoHS compliant

Applications

Developed for cable jacketing applications where cable flexibility is important, high flex (HF) tubing is good for jacketing cables where sharp bends or turns are required. Also suitable for situations where the cable is subject to motion. Such situations are common for industrial machinery, transportation equipment, robotics, welding, and many other cabling applications. To complete the cable jacket seal, the ends may be sealed for further water and corrosion protection by using available tape sealant or adhesive.

Installation

Min shrink temp: 80°C

Min full recovery temp: 121°C

Operating Temperature Range

-55°C to 90°C

Lengths

All sizes types are available in the standard length of 7500 mm. Other lengths on request.

HF-17 FRX 25

Product type
Size
Flame retardant
Length:
7500mm

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(mm)	(mm)	(mm)	(mm)
HF-04FRX25	7500	10	4	1.52
HF-07FRX25	7500	19	6	1.52
HF-11FRX25	7500	28	10	2.67
HF-13FRX25	7500	33	10	2.67
HF-15FRX25	7500	38	13	3.05
HF-17FRX25	7500	43	13	3.05
HF-20FRX25	7500	51	19	3.56
HF-27FRX25	17500	69	23	3.94

Heat Shrinkable Flame Retarded Heavy Wall Tubing

FCSM

Raychem FCSM heat shrinkable tubing is a tough electrical insulating material which combines flame retarded properties with flexibility, abrasion resistance and a rapid installation technique.

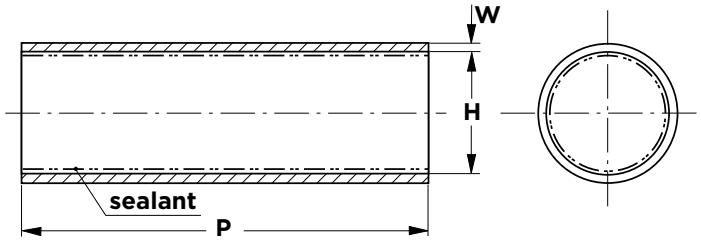
This combination of features has led FCSM tubing to be used in a wide range of demanding applications, in particular to insulate, to protect and to seal flexible cable joints, accessories and connections. Installation is effected by heating above 125°C, which causes the tubing to shrink in diameter while retaining its form. For sealing and corrosion protection purposes, FCSM tubing can be supplied internally precoated with a sealant liner which melts, flows and bonds as the tubing shrinks.

Lengths

All sizes are available in the standard lengths: 1000 mm and 1500 mm.

Sealant

FCSM tubing is available with or without an inner sealant wall. The sealant exhibits excellent bonding and sealing characteristics to all materials commonly used in the various cable insulation and sheath constructions, such as plastic, rubber, lead and aluminium.



FCSM-68/22-1500/S

- Product type
- Size
- Standard length
- /S = sealant or
- /U = without sealant

Catalogue Reference	Application Range		H		W	
	from	to	as supplied	after free recovery	as supplied	after free recovery
	(mm)	(mm)	min	max	nom	min
FCSM-9/3	3.5	8.0	9	3	0.6	2.0
FCSM-19/6	6.5	17.0	19	6	0.7	2.4
FCSM-28/9	10	25.0	28	9	0.8	3.2
FCSM-38/12	13	34.0	38	12	1.0	4.1
FCSM-51/16	17.5	46.0	51	16	1.0	4.1
FCSM-68/22	24	61.0	68	22	1.0	4.1
FCSM-90/30	33	81.0	90	30	1.0	4.1
FCSM-120/40	44	108.0	120	40	1.0	4.1
FCSM-177/63	96	159.0	177	63	1.0	4.1

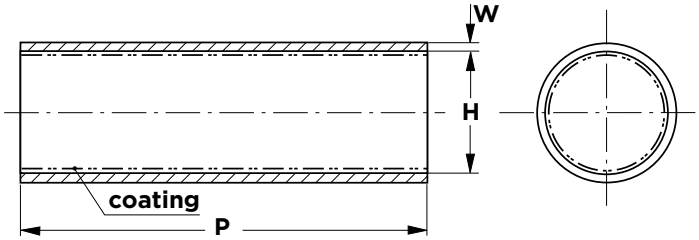
Heat Shrinkable Heavy Wall Flame Retarded Tubing for Nuclear Environments

WCSF

Raychem WCSF tubing is a heavy wall, flame retarded, heat shrinkable tubing. It is precoated with a hot melt, radiation resistant adhesive to provide a positive environmental seal. It is designed for electrical insulating up to 1000 V and general purpose sealing applications where flame retardancy, radiation resistance and severe environmental performance are required.

WCSF tubing is suitable for a wide range of jointing or connection applications for Class 1E wire and cable systems in accordance with IEEE 383. Each connection is individually insulated and sealed. Additionally, the sleeves can also be used for a wide range of related applications including sealing, oversheath replacement and strain relief throughout the plant. They can also be supplied as kits of components for specific applications.

WCSF tubing is already qualified for a 60 year service life to take into account the requirements of the third generation of nuclear power plants



WCSF-70/2-1000/S

- Product type
- Size
- Standard length
- /U = Uncoated or
- /N = Adhesive Coated

Catalogue Reference	Standard Cut Length	Length on Spool (uncoated only)	Application Range		H		W	Note
			from	to	as supplied	after free recovery	as supplied	
	(mm)	(metre)	(mm)	(mm)	min	max	min	
WCSF-050-3/1	1000	30	1.3	1.8	3.3	1.3	0.9	1) 2) 3)
WCSF-070-6/2	1000	30	1.8	4.4 (3.6)*	6.4	1.8	1.9	1) 2)
WCSF-115-9/3	1000	30	2.9	7.3 (5.8)*	8.9	2.9	2.2	1) 2)
WCSF-200-18/5	1000	30	5.1	12.7 (10.2)*	17.8	5.1	2.5	1) 2)
WCSF-300-28/8	1000	15	7.9	19 (15.2)*	27.9	7.6	3.8	1)
WCSF-500-38/13	1000	15	14	32	38.1	12.7	4.3	1)
WCSF-650-50/17	1000	12	18	41	50.8	16.5	4.3	1)
WCSF-1000-76/26	1000	9	28	64	76.2	25.4	4.3	
WCSF-1500-114/38	1000	9	43	97	114.3	38.1	4.3	
WCSF-2500-177/63	1000	9	70	159	177.8	63.5	4.3	

( )* Maximum use range over bolted connections.

1) Fibreglass bolt pads are required for bolted connections in all cases. Recommended bolt pad is EPPA-109N sized as needed.
2)These tubings can be used as splice insulation sleeve and are qualified with 25 mm seal length. All others require 50 mm seal length.
3)When used as a shim or small wire jacketing the use range of WCSF-050-3/1-/N is 1.3 – 2.5 mm.

Heat Shrinkable, Halogen Free, Heavy Wall Tubing for Low Fire Hazard Areas

ZCSM

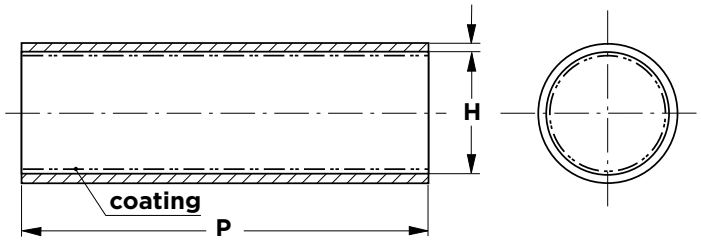
We have developed a range of halogen free, thick wall tubing for use in cable accessories and as insulating tubing in hazardous areas where very high material specifications are required.

This low fire hazard material has been developed using the latest polymer technology to provide low smoke, low toxicity and low acid gas generation while being highly flame retarded and having low calorific value.

Lengths

All sizes are available in the standard lengths:

- 1000mm
- 1500mm



ZCSM-85/22-1500/S

- Product type
- Size
- Standard length
- /S = sealant

Catalogue Reference	Application Range		H		W	
	from	to	as supplied	after free recovery	as supplied	after free recovery
	(mm)	(mm)	min	max	nom	min
ZCSM-8/3	3.5	7.0	8	3	0.6	2.0
ZCSM-16/5	5.5	14.5	16	5	0.7	2.4
ZCSM-24/8	9.0	21.5	24	8	0.9	2.9
ZCSM-32/12	13.0	29.0	32	12	1.0	4.0
ZCSM-45/16	17.5	40.5	45	16	1.0	4.0
ZCSM-60/22	24.0	54.0	60	22	1.0	4.0
ZCSM-70/25	27.5	63.0	70	25	1.0	4.0
ZCSM-85/36	39.5	76.5	85	36	1.0	4.0
ZCSM-120/50	55.0	108.0	120	50	1.0	4.2
ZCSM-180/75	82.5	162.0	180	75	1.0	4.2

Notes

Section 2: Cable Breakouts, End Caps and Repair Sleeves

Heat Shrinkable Halogen Free Cable Caps

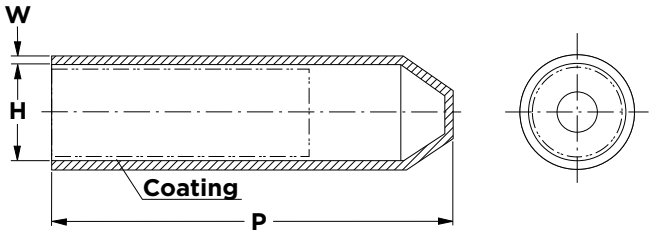
102L

Raychem Cable Caps shrink when heated to tightly fit a range of cable sizes and constructions. At the same time a special sealant also melts and flows under the shrinking action, gripping the cable and ensuring a high integrity moisture seal.

Cable Caps, however, are far more than an exceptionally effective sealing system. Our advances in materials science ensure that these crosslinked halogen free polymer products also provide high quality electrical insulation while at the same time resisting abrasion, weathering, and chemical attack.

Material
Cable Caps are made from materials specially formulated for sealing applications for all commonly used cables and cable sheath materials. The material from which Cable Caps are made contains carbon black to protect it from ultra violet radiation. Please consult your local sales engineer about other applications and Cable Caps made from other materials.

Coating
The sealant can be used on plastic, rubber and paper insulated cables. These Cable Caps are also available uncoated.



Catalogue Reference	H		P	W
	a	b	b	b
	min	max	+15/-10%	±20%
102L011/S	10	4	38	2.0
102L022/S	20	7.5	55	2.8
102L027/S	29	13	93	2.5
102L033/S	35	15	90	3.2
102L044/S	55	25	143	3.9
102L048/S	75	32	150	3.3
102L050/S	93	38	142	4.4
102L055/S	100	45	162	3.8
102L066/S	120	70	145	3.8

Change from /S to /U for Uncoated Cable Caps

Notes:

1. Dimensions in millimeters
   a = as supplied
   b = after free recovery

2. Drawing depicts typical part.

Push on End Caps (Clear)

JOR

Silicone Rubber Cable End Caps

Cable end caps are used to protect cable ends against humidity during transportation and storage. They have high elasticity and toughness against crack propagation. They are weatherproof and resistant against UV rays.

Catalogue Reference	Cable Diameter	Cable Cross Section
	mm	mm²
JOR-60196-B6758	11 - 16	5x2.5
JOR-60198-B6779	16 - 22	4x4 - 5x6
JOR-60197-B6780	20 - 26	4x10 - 5x16
JOR-60200-B6780	23 - 30	5x16 - 4x35
JOR-60210-B6785	30 - 38	4x35 - 4x70
JOR-60220-B6790	38 - 48	4x70 - 4x120
JOR-60230-B6795	46 - 54	4x120 - 4x185

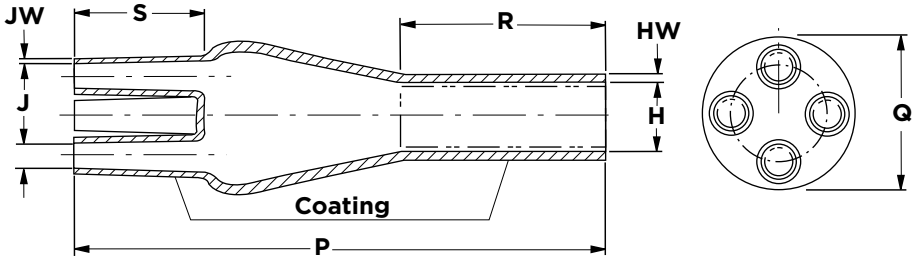
Heat Shrinkable Halogen Free Cable Breakouts 302/402/502

Raychem low voltage breakouts are an easily installed, light weight insulation for sealing the crutches of plastic, paper and rubber insulated cables up to 1 kV. Raychem cable breakouts offer savings in weight, space and time over conventional methods and make overhead installation and cable transport easier.

Requiring no special tools or skills, installation is completed within minutes by simply heating the breakout. The diameter then reduces to tightly grip the outer jacket and the cores. At the same time, the precoated sealant melts and reliably seals the cable crutch against moisture and the environment.
The heat shrinkable feature also means smaller inventories, as each breakout size will shrink to fit several different sizes and types of cables. Made from semi-rigid cross linked halogen free polyolefin, these medium wall breakouts also offer resistance to abrasion, weathering, and atmospheric pollution.

As one of the world's leading manufacturers of heat shrinkable materials, we offer a wide range of tubings and moulded parts for any application where a sealed, protective, insulating or fluid resistant cover is required over uniform or irregularly shaped objects.

Our products are available in a wide variety of materials to meet the demands of the modern electrical power industry.



Catalogue Reference	Number of Cores	H		J		P	R	S	Q	HW	JW
		a	b	a	b	b	b	b	b	b	b
		min	max	min	max	±10%	±10%	±10%	±10%	±20%	±20%
302K333/S	2	28	9.2	15	4.1	90	-	25	15	3.2	1.6
302K224/S	2	48	32	22	7	172	-	70	34	2.0	2.0
302K466/S	2	86	42	40	17	200	-	75	45	2.5	2.5
402W533/S	3	38	13	16	4.2	103	45	28	22	2.7	1.5
402W516/S	3	63	22	26	9	180	85	40	35	3.5	1.5
402W520/S	3	70	25	27	9.5	159	107	52	32	4.0	2.0
402W525/S	3	85	33	32	12	180	130	50	38	3.0	2.5
402W530/S	3	90	43	38	16.2	180	130	50	46	2.7	2.7
402W526/S	3	95	28	44	13	205	90	45	42	3.5	2.5
402W248/S	3	115	45	52	22	240	100	60	64	4.0	2.5
402W545/S	3	124	60	51	24	239	188	51	65	3.0	3.2
402W439/S	3	170	60	60	30	252	90	66	85	4.2	2.6
502S013/S	4	23	9.5	7	2	60	-	17	13	2.0	1.2
502K033/S	4	45	16.5	14	3.4	98	71	25	-	2.5	1.9
502K046/S	4	45	19	20	7	165	75	40	45	3.5	2.0
502K016/S	4	75	25	25	9	217	100	44	50	3.5	2.0
502K020/S	4	80	25	27	9	217	100	44	50	3.5	2.0
502K026/S	4	100	31	40	13.5	223	103	51	50.4	3.5	2.5
502R810/S	3 + 1*	170	60	50*	23*	255	90	65	109	4.0	3.5
***One of 4 outlets dim = 43/19**											

Notes:

1. Dimensions in millimeters
   a = as supplied
   b = after free recovery

2. Drawing depicts typical part.

3. The recommended application range is from 20% above the recovered diameter to 20% below the expanded diameter.

Flexible Cable Repair Kit

CRPS

Raychems CRPS repair strip is a high quality replacement jacket for low and high voltage flexible mining cables. It is a tool free, flexible, flame retardant elastomeric strip that has been specially formulated to provide excellent resistance to abrasion, tearing, and cutting.

- Precoated with a thermoplastic sealant that provides an excellent seal against moisture and corrosive elements
- MSHA approved (No. P-137-13-MSHA)
- Tool-free, flexible, flame retardant elastomeric strip for jacket repair on mining and other flexible cables

Catalogue Reference	Standard Pack	Strip Length	Strip Width
		mm	mm
CRPS-248	20	1219	51
CRPS-260	20	1524	51
CRPS-290	15	2286	51
CRPS-2120	10	3048	51

Recommended coverage area includes 3 inches on either side of damaged area.

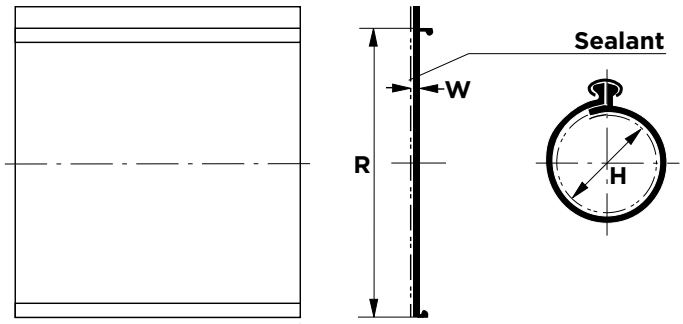
Heat Shrinkable Wraparound System for Plastic or Metal Sheathed Cable Repair

CRSM

CRSM wraparounds are a fast and permanent cable repair and sealing system. The repair sleeve is quickly fitted in place by means of its rail and channel closure. A moisture proof, insulating and tight fitting repair is then obtained in one step by heating, which makes the sleeve diameter shrink and the sealant coating melt and flow into interstices. Because of its heat shrinkability, each CRSM size will fit several different cable diameters. The sealant exhibits excellent bonding and sealing characteristics to all materials commonly used in the various cable and sheath constructions, such as plastic, rubber, lead and aluminium. CRSM wraparounds are made of an abrasion and corrosion resistant semi-rigid material, and are one result of our extensive capability in materials technology.

Lengths
All sizes are available in lengths of:

- 250mm
- 500mm
- 750mm
- 1000mm
- 1500mm



CRSM-53/13-1500/239

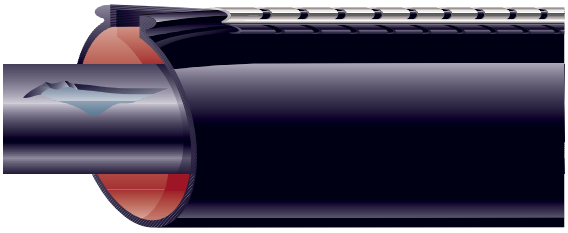
Product type
Size
Standard length
/239 - sealant

Catalogue Reference	Application Range	H		R		W	
		a	b	a	b	a	b
		min	max	min	max	min*	max
CRSM-34/10	11 - 21	35	9	110	35	0.3	2.4
CRSM-53/13	17 - 32	54	15	170	49	0.3	2.0
CRSM-84/20	24 - 50	86	21	270	69	0.3	2.0
CRSM-107/29	31 - 65	108	27	340	90	0.3	2.0
CRSM-143/36	33 - 86	144	28	455	119	0.3	1.8
CRSM-198/55	56 - 120	203	50	640	172	0.3	2.1
CRSM-250/98	103 - 150	257	91	810	314	0.4	1.7

Notes:

1. Dimensions in millimetres
   a = as supplied
   b = after free recovery
   * = at minimum supplied width

2. Max. longitudinal change after free recovery: – 0 - +10%

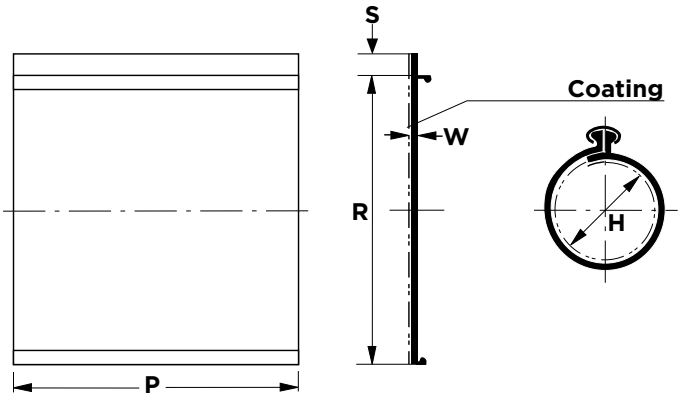


Heat Shrinkable Wraparound System for Rubber Sheathed Cable Repair

MRSM

Raychem wraparounds MRSM are a fast, versatile and permanent repair for damaged flexible cable oversheaths. Since they are heat shrinkable, several cable sizes and types can be repaired by any one size of Raychem MRSM wraparound. This one step installation method ensures a tight, moisture-proof and insulating seal which is reliable and repeatable. Each wraparound is supplied complete with precise instructions for use.

High abrasion resistance, flexibility and insulating properties are combined in the tough modified polyolefin material from which Raychem wraparounds MRSM are made. Quickly fitted in place by means of its rail and channel closure, heating above 125°C causes the repair sleeve to shrink in diameter to fit the cable. At the same time the adhesive liner melts and seals against fluids and dirt, thus completing the job.



MRSM-50/23-250/239

- Product type
- Size
- Standard length
- /239 - adhesive

Catalogue Reference	Application Range	H		R		S	W		P
		a	b	a	b	a	a	b	±15
		min	max	min	max		min	max	mm
MRSM-50/23	25 - 40	50	23	159	72	25	0.8	1.8	250/600
MRSM-73/38	40 - 58	73	38	230	119	25	0.5	1.8	300/600/750
MRSM-100/51	58 - 89	100	51	320	161	25	0.5	1.8	250/600/750

Notes:

1. Dimensions in millimetres
   a = as supplied
   b = after free recovery
   * = at minimum supplied width

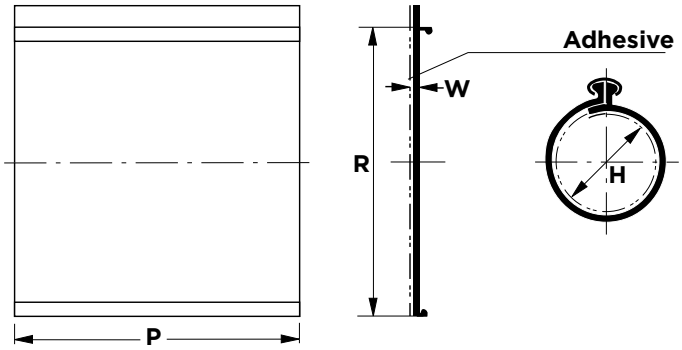
2. Max. longitudinal change after free recovery: – ±10%

3. Other lengths and sizes on request

Fibre Reinforced Repair Sleeve

KL-RFSM

The fibre reinforced wraparound KL-RFSM is used for fast and reliable cable repairs in applications where high mechanical resistance is required. The wraparound is supplied with an adhesive coating. The KL-RFSM wraparounds can also be used as an outer sheath for low and medium voltage joints.



KL-RFSM-45/15-500/123

- Product type
- Size
- Standard length
- /123 - adhesive

Catalogue Reference	Application Range	H		R		P
		a	b	a	b	±15
		min	max	min	max	mm
KL-RFSM-45/15-500/123	15 - 45	50	13	1.5	2.5	500
KL-RFSM-45/15-750/123	15 - 45	50	13	1.5	2.5	750
KL-RFSM-65/20-500/123	20 - 65	71	18	1.5	2.5	500
KL-RFSM-65/20-1000/123	20 - 65	71	18	1.5	2.5	1000
KL-RFSM-95/30-750/123	30 - 95	103	27	1.5	2.5	750
KL-RFSM-95/30-1000/123	30 - 95	103	27	1.5	2.5	1000
KL-RFSM-95/30-1500/123	30 - 95	103	27	1.5	2.5	1500
KL-RFSM-125/40-750/123	40 - 125	135	36	1.5	2.5	750
KL-RFSM-125/40-1000/123	40 - 125	135	36	1.5	2.5	1000
KL-RFSM-125/40-1500/123	40 - 125	135	36	1.5	2.5	1500
KL-RFSM-165/55-750/123	55 - 165	178	50	1.5	2.5	750
KL-RFSM-165/55-1500/123	55 - 165	178	50	1.5	2.5	1500
KL-RFSM-205/65-750/123	65 - 205	222	59	1.5	2.5	750
KL-RFSM-205/65-1500/123	65 - 205	222	59	1.5	2.5	1500
KL-RFSM-205/65-2500/123	65 - 205	222	59	1.5	2.5	2500

Notes:
1. Dimensions in millimetres
   a = as supplied
   b = after free recovery

Fast Splicing Tape Wrap

FSTW

Raychem's FSTW is a thermoplastic rubber tape combined with a butyl rubber sealant specially formulated for underground applications. FSTW is ideal for repairing cable jackets, sealing low voltage splices, and rejacketing MV cable splices.

Saves Time and Money
FSTW provides a complete rejacketing solution in one pass as opposed to the multi-layer construction required when using traditional tape products. It's quick to install. There is no need for separate sealing mastic and tape as it combines sealant and rubber tape in one convenient product.

Tough Protection
FSTW rubber tape is made 13mm thick, which offers strong puncture resistance from underground material and debris. FSTW is rated for use on 90°C rated cables, in underground use in acid or caustic soils, and saltwater environments. It is UV resistant and rated for aerial exposure. Splices made with FSTW qualify to ANSI C119.1.

Environmental Seal
FSTW provides a complete watertight seal for use in submersible applications.

Easy Removal
Mastic is in contact with cable surface only at ends which allows for easy removal.

Catalogue Reference	Standard Length	Width	Thickness
	mm	mm	mm
CPGI-FSTW-2-1-4	1200	51	13
FSTW-2-1-6	1800	51	13

Wrap-around Splice Cover (1000V)

GELWRAP

Raychem's GelWrap closure sleeves quickly and conveniently insulate and seal buried electrical connections rated up to 1000 volts. The robust, yet compact, design is engineered to handle the harsh environments of direct burial and manhole applications. GelWrap sleeves are equally well suited for insulation and jacket repair.

Features

- Installers will appreciate the simple wraparound design and dependable gel sealing performance. Simply wrap and snap the sleeve on any cable in the use range. The gel in the sleeve seals on contact. Installation is literally a snap.
- The factory cured silicone gel sealant in the GelWrap sleeve completely encapsulates the connection. Moisture cannot enter the splice.
- PowerGel sealing gel was specifically developed for the electrical power industry. PowerGel sealing gel is hydrophobic and provides an excellent moisture seal over a wide operating temperature range (-40°C to 95°C).

It is compatible with solid dielectric cable insulations.

Other common uses for GelWrap sleeves

- LV cable repair sleeves
- MV cable jacket repair
- MV splice rejacketing
- Elbow sealing sleeve

Catalogue Reference	Application Range	Sleeve Length	Conductor Size	Max Connector Opening
	mm	mm	mm	mm
GELWRAP-18/4-100	4 – 18	100	4 – 95	25
GELWRAP-18/4-150	4 – 18	150	4 – 95	75
GELWRAP-18/4 -200	4 – 18	200	4 – 95	125
GELWRAP-18/4-250	4 – 18	250	4 – 95	175
GELWRAP-18/4-300	4 – 18	300	4 – 95	225
GELWRAP-33/10-150	10 - 33	150	35 - 240	50
GELWRAP-33/10-200	10 - 33	200	35 - 240	100
GELWRAP-33/10-250	10 - 33	250	35 - 240	150
GELWRAP-33/10-300	10 - 33	300	35 - 240	200
GELWRAP-33/10-350	10 - 33	350	35 - 240	250
GELWRAP-50/20-200	20 - 38	200	250 – 750 (120 - 400)	50
GELWRAP-50/20-250	20 - 38	250	250 – 750 (120 - 400)	100
GELWRAP-50/20-300	20 - 38	300	250 – 750 (120 - 400)	150
GELWRAP-50/20-350	20 - 38	350	250 – 750 (120 - 400)	200
GELWRAP-50/20-400	20 - 38	400	250 – 750 (120 - 400)	250

Gel Wraparound Rejacketing Sleeves (up to 35kV)

GWRS

Cold-applied Gel Wraparound Rejacketing Sleeves quickly and conveniently seal and protect medium voltage cable splices up to 35 kV. GWRS rejacketing closure sleeves can also be used to repair cables with jacket damage. GWRS closure sleeves are designed for manhole, direct buried, or weather exposed applications.

The GWRS closure sleeves can be used over all types and brands of push-on and cold-applied splices when a water-tight cover is required.

The wraparound design reduces installation space because it is not required to position a tube to the side while installing the splice. The result is easier installation in cramped manholes and less digging for direct buried applications.

Catalogue Reference	Application Range	Splice Diameter Use Range	Length	Max Jacket Opening
	mm	mm	mm	mm
GWRS-75/25-750	25 - 55	25-75	750	510
GWRS-75/25-850	25 - 55	25-75	850	610
GWRS-75/25-1050	25 - 55	25-75	1050	810
GWRS-100/40-1050	40 - 70	40-100	1050	810

Note: Add X at the end of the catalog number (e.g. GWRS-100/40-1050x) for external earthing, this kit includes gel strips for sealing neutrals or earth wire exits.

Section 3: Low Voltage Joints and Terminations - up to 1kV

Rayvolve "Roll On" Stub Connection Insulation Kits

RVC

Rayvolve RVC splice cover kits offer the quick and easy "roll-on" way to insulate and seal stub connections in motors and street lights to 1000 volts. The elastomeric Rayvolve cap splice cover provides the required insulation thickness, withstands abrasion, and forms a water resistant seal.

The tool free RVC cap is ideal for installation in cramped motor boxes. It slides on easily and will not leak, unravel, or slip off.

Catalogue Reference	Feeder Size	Bolt Dimensions		Lug Length	Cap Length
		Size	Length		
	mm^2	(max)	(max)	(max)	(nom)
RVC-1V	3 - 25	8	15	45	75
RVC-2V	10 - 70	8	20	70	100
RVC-3V	35 - 95	12	25	75	130
RVC-4V	120 - 240	16	35	125	190

Rayvolve Low Voltage Cable Connection Kits

RVS

Rayvolve RVS kits are the easy, "roll-on" way to insulate and seal cable connections up to 1kV. The gripping force of the specially formulated EPDM elastomer combines with a high-performance sealant to form a reliable, water resistant, insulating sleeve that is UL listed and CSA certified for direct burial applications over in-line compression connectors. In addition, RVS kits are well suited for evaluation in other applications:

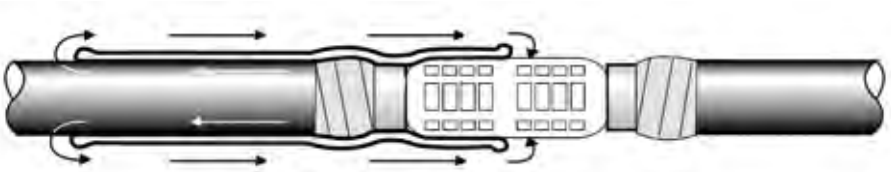
- residential junction blocks
- connections to secondary network protectors
- joint covers for "Y" connections in street lighting circuits
- cable connection for overhead bundled cable
- environmental seals for terminal lugs and insulated airport connectors.

Four sizes of Rayvolve sleeves cover all common low voltage cable types from 10 - 500mm^2.

Easy, tool-free installation

Rayvolve sleeves feature a dual-wall design with an entrapped lubricant, making installation fast and simple. The elastomeric sleeve rolls onto the cable with minimal effort, even at temperatures below -25°C. The cable can be energised immediately after installation. It is ideal for use where gas or electric heating devices are not approved.

Catalogue Reference	Application Range	Cable OD	Max Connector Dim		Sleeve Length
		min - max	Dia	Length	
	(mm^2)	(mm)	min	max	mm
RVS-11	10 - 70	9 - 17	17	127	205
RVS-12	50 - 120	12 - 23	25	114	240
RVS-13	120 - 300	18 - 30	38	178	305
RVS-14	300 - 500	25 - 38	48	229	355



Motor Connection Kit 1kV

GELCAP

Raychem's GelCap motor connection kits provide quick installation, dependable performance, and easy reentry.

GelCap motor connection kits quickly and conveniently insulate, seal, and protect stub splice connections up to 1000 volts. The robust yet compact design was engineered to handle the harsh environment of motor connections. GelCap kits are equally well suited to many other connection applications including street light connections.

Fast and easy installation

GelCap motor connection kits provide for fast installation. Simply push the cover down over the connection and snap the clamp closed. The PowerGel sealing gel is already in the cap, no extra material or grease is required.

Easy reentry

The corner of the stub connection is easy to reenter as the PowerGel sealing gel pulls away leaving a clean connection. Reentry is also safer than other methods because no sharp objects or cutting tools are required for removal of the cap.

PowerGel sealing gel technology

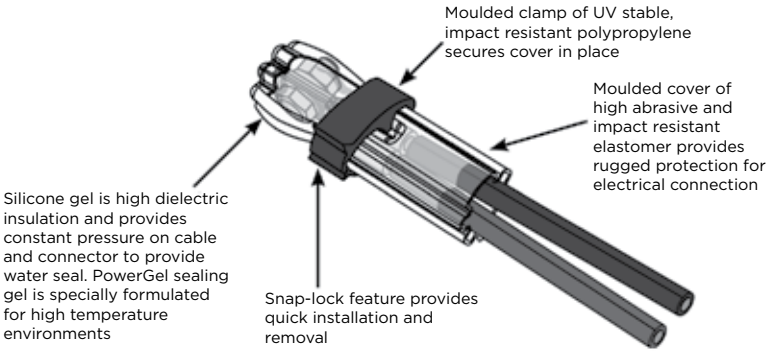
The GelCap motor connection kits feature revolutionary PowerGel sealing gel which provides an excellent moisture seal over a wide temperature range (-40°C to 105°C). PowerGel sealing gel has excellent insulating properties and the added benefit of acting as a vibration damper.

Common uses

- Motor connections
- Street lighting
- Over wire nuts for sealing
- Irrigation systems
- HVAC
- Outdoor lighting

Catalogue Reference	Conductor Size (mm^2)
GELCAP-1	1.5 - 5
GELCAP-2	8 - 35
GELCAP-3	35 - 105
GELCAP-4	125 - 250

Note: For wire sizes 1.31 – 5.26mm^2 the unique design of the "GelCap 1" kit saves space by allowing all three phase connections to be installed in one cover. Product sizes 2, 3, and 4 include one cap per phase.



Stub Connection Kit for Street Lights 1kV

GELCAP SL

Raychem's GelCap SL stub connection kits provide quick installation, dependable performance, and easy reentry.

GelCap SL stub connection kits quickly and conveniently connect, insulate, seal, and protect stub splice connections up to 1000 volts. The robust yet compact design was engineered to handle the harsh environment of motor connections.

Fast and easy installation

GelCap stub connection kits provide for fast installation. Simply push the cover down over the connection and snap the clamp closed. The PowerGel sealing gel is already in the cap, no extra material or grease is required.

Easy reentry

The corner of the stub connection is easy to reenter as the PowerGel sealing gel pulls away leaving a clean connection. Reentry is also safer than other methods because no sharp objects or cutting tools are required for removal of the cap.

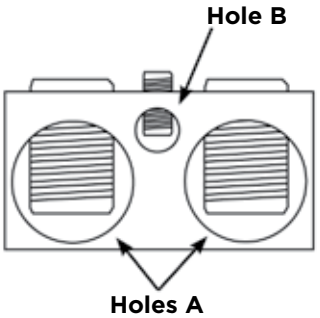
PowerGel sealing gel technology

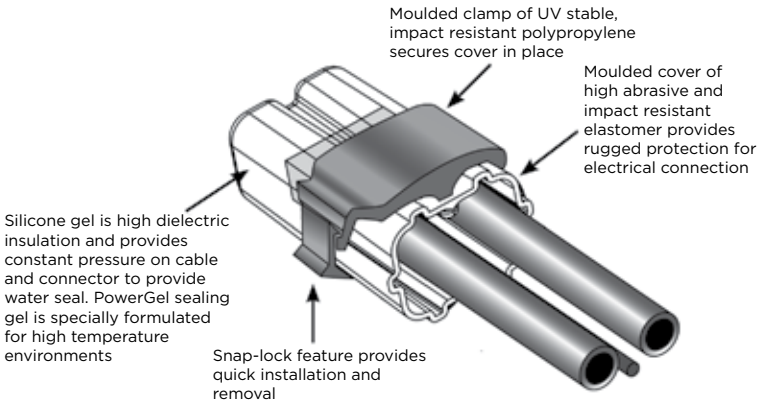
The GelCap stub connection kits feature revolutionary PowerGel sealing gel which provides an excellent moisture seal over a wide temperature range (-40°C to 105°C). PowerGel sealing gel has excellent insulating properties and the added benefit of acting as a vibration damper.

Common uses

- Motor connections
- Street lighting
- HVAC
- Outdoor lighting

Catalogue Reference	Holes A		Hole B	
	Application Range	Rec. Torque Values	Application Range	Rec. Torque Values
	(mm^2)	(N-m)	(mm^2)	(N-m)
GELCAP-SL-2/0-3HOLE	2 - 70	13.6 - 20.3	2 - 10	13.6 - 17





PowerGel Filled Cable Joints for Single and Multi-Core Polymeric Cables 0.6/1kV

RAYGEL

PowerGel filled joint – easy to install, snap-close, clean, cold applied and UV stable

Raychem RayGel offers a reliable sealed joint for underground and overhead applications.

PowerGel sealing gel technology

The cutting edge sealing gel called 'PowerGel', covers and seals the joint quickly and easily, saving both time and effort.

Capacity

Four sizes for straight and branch joints are available, ranging for single core cables from 10 up to 50mm² and for 3 to 5-core cables from 1.5 up to 16mm², for details see selection table.

Easy to install

Closing the rugged RayGel closure is literally a snap. The short lengths also allow for installations in cramped locations. No special tools needed, no rip cords to break, and no trimming, mixing, pouring, or heating is required. RayGel joints can immediately be put into service.

Performance tests

Raychem RayGel joints are qualified to CENELEC HD623, the European specification for buried applications. This includes a three week heat-cycling test with the joint immersed in one metre depth of water. A test report with detailed information is available on request.

Closure material

The polypropylene is halogen-free. A flame retarded version is available on request.

Catalogue Reference	Application Range		Dimensions	Pack Qty
	Main Cable	Branch Cables		
	(mm²)	(mm²)	(mm²)	
Without Connector				
RAYGEL-12	1 x 10-50	1 x 16	86 x 46 x 28	4
RAYGEL-23	4 x 1.5-6	4 x 1.5	145 x 51 x 30	1
RAYGEL-24	4 x 6-16	4 x 2.5	178 x 70 x 41	1
Including Mechanical Connector				
RAYGEL-23-M	4 x 1.5-6	-	145 x 51 x 30	1
RAYGEL-24-M	4 x 6-16	-	178 x 70 x 41	1
Including Mechanical Connector Block				
RAYGEL-22-M-5	3-5 x 1.5-6	-	145 x 56 x 36	1
RAYGEL-24-M-5	3-5 x 6 -10 (16*)	-	178 x 70 x 41	1
RAYGEL-24-M5	3-5 x 2.5-6*	3-5 x 1.5-2.5*	178 x 70 x 41	1

*circular solid conductors only

PowerGel Filled Cable Joints for Single and Multi-Core Polymeric Cables 0.6/1kV Branching

RAYGEL PLUS

Application:

- Street, garden and pool lighting
- Connection of outdoor equipment like pumps, filters, garage door openers, loudspeakers, door intercom systems, etc.
- Frost protection systems
- Cable trays and cable ducts
- Protection of small electronic boards
- And many more...

Features and benefits:

- Quick, easy and clean installation
- Reliable protection against humidity and water
- Suitable for outdoor and direct-buried applications (IP 68)
- Full branch capabilities without cutting of main cables
- Optimised joint design with integrated strain relief
- Easy to install, latchable connector blocks
- Qualified to international joint standard CENELEC EN 50393
- Halogen-free and UV-resistant
- Unlimited shelf life
- Environment-friendly and no subject to labeling requirements
- PowerGel sealing gel technology

The RayGel Plus enclosure, with its revolutionary PowerGel sealing gel, covers and seals the joint quickly and easily, saving both time and effort. PowerGel sealing gel is rated to 90°C continuous temperature and is halogen free with an unlimited shelf life. The RayGel Plus joint series is yet another of TE Connectivity's fieldproven PowerGel filled products for the demanding requirements of the electrical power industry.

Application range

Four sizes for straight and branch joints are available, ranging from 10 up to 50mm² single core- and multi-core cables from 1.5 up to 16mm². For details see Selection Table.

Enclosure design

The halogen free polypropylene enclosure is designed to house straight and branch connections in one solution only. This helps to minimise the required stock level and serves a wide range of applications. RayGel Plus joints can be snap closed by hand due to its flexible wave like gel barriers. A strain relief is integrated within the enclosure and quickly installed with two cable ties. All joints fulfil the requirement of ingress protection class IP68 (push wire connector required for RayGel Plus 0/1 joints)

Catalogue Reference	Application Range		Dimensions LxWxH	Connector Size max. LxWxH
	Main Cable	Branch Cables		
	(mm²)	(mm²)	(mm)	(mm)
Without Connector				
RAYGEL-PLUS-0	2-3 x 1.5-2.5 (1 x 10-50)	2-3 x 1.5 (1 x 10-16)	100 x 37 x 24	26 x 24 x 16
RAYGEL-PLUS-1	3-5 x 1.5-2.5 (1 x 10-50)	3-5 x 1.5 (1 x 10-16)	139 x 51 x 24	26 x 38 x 16
Including Universal Connector Block				
RAYGEL-PLUS-2	3-5 x 1.5-6	3-5 x 1.5-6	233 x 78 x 40	included
RAYGEL-PLUS-3	3-5 x 6-16	3-5 x 6-16	313 x 90 x 47	included

PowerGel Filled Cable Repair Joint for Multi-Core Polymeric Cables 0.6-1kV

RAYGEL REPAIR

Features and Benefits:

- For outdoor and direct-buried applications
- Quick, easy and clean to install, saving both time and effort
- No special tools needed
- Repairs up to 150 mm of damaged cable
- Rugged halogen-free and UV-resistant polypropylene closure
- PowerGel filled for reliable insulation and sealing in just one step
- Rated to 90°C continuous operating temperature at the cores
- No shelf life limitation
- Performance of RayGel-24 joint is qualified according to European standard EN 50393

The Raychem RayGel Repair Joint consists of two RayGel-24 joint closures and a special pre-assembled kit of two connector blocks and the connection wires. The joint is typically used on multi-core cables with round solid conductors and cross sections from 5 x 2.5 mm^2 up to 5 x 16 mm^2.

Catalogue Reference	Application Range		Pack Qty
	Main Cable (mm^2)	Branch Cables (mm^2)	
RAYGEL-24-RE16	5 x 2.5	5 x 16	1

Gel Filled Cable Joint including Mechanical Connector Block

GELBOX

Uniquely easy to install, snap close, clean, cold applied and UV stable PowerGel-filled closure including a sealed mechanical shear bolt insulation piercing connector block

Excellent cold applied seal

The Raychem GelBox offers a state of the art sealed joint for underground and direct buried applications.

PowerGel sealing gel technology

The GelBox closure and the connector block, with their revolutionary PowerGel sealing gel, cover and seal the joint quickly and easily, saving both time and effort. PowerGel sealing gel is rated to 90°C continuous temperature with an unlimited shelf life.

Capacity

The Raychem GelBox covers a wide application range of 4-core cables from 6 to 25mm^2 for both aluminium and copper conductors, stranded or solid and in addition 35mm^2 with round solid aluminium conductors. Size transitions or transitions from copper to aluminium are also possible.

Performance tests

The GelBox is qualified to CENELEC HD623, the European specification for buried applications. This includes a three week heat-cycling test with the joint immersed in one metre depth of water. A test report with detailed information is available on request.

Easy to install

Closing the rugged GelBox closure is literally a snap. No special tools needed, no rip cords to break, and no trimming, mixing, pouring, or heating is required. The GelBox can immediately be put into service.

Catalogue Reference	No of Cores	Application Range Solid/Stranded Conductors	
		min	max
		(mm^2)	(mm^2)
GELBOX-25	4	4 x 6	4 x 25
GELBOX-25-5	5	5 x 6	5 x 16

Submersible Secondary Connectors for URD Distribution 1kV

GELPORT

Demand the best

- Corrosion resistance
- No loose parts due to one piece housing
- Gel-filled cable entry ports provide a reliable cable seal
- PowerGel sealing gel seals out harsh environments
- Rugged, impact resistant housing stands up to rough installations
- Clear view back allows for easy positive visual indication of wire position in connector

Fast, reliable installation - every time

The GelPort connection system represents a revolutionary product for secondary connectors. Strip the cable and push it into the gel-filled cable port. The cable is encapsulated in gel and instantly sealed. It's that simple.

PowerGel sealing gel

PowerGel sealing gel was specifically developed for the electrical power industry. It consists of a chemically cross-linked silicone elastomer with silicone oil. PowerGel sealing gel is hydrophobic and provides an excellent moisture seal over a wide operating temperature range (-40° C to 95° C). It is compatible with solid dielectric cable insulation and connector deoxidizing greases and has excellent insulation properties.

Catalogue Reference	Clear View	Number of Ports	Conductor Range	Length	Width	Height
			(mm^2)	(mm)	(mm)	(mm)
GPRT-350-3P	-C	3	2 - 150	117	97	89
GPRT-350-4P	-C	4	2 - 150	149	97	89
GPRT-350-5P	-C	5	2 - 150	180	97	89
GPRT-350-6P	-C	6	2 - 150	212	97	89
GPRT-350-8P	-C	8	2 - 150	276	97	89
GPRT-350/4P-500/1P	-C	5 Hybrid		180	97	89
		4	2 - 150			
		1	16 - 250			
GPRT-350/6P-500/2P	-C	8 Hybrid		276	97	89
		6	2 - 150			
		2	16 - 250			

Gel In-Line Splice Kit 1kV

GILS

Super-easy, snap-close, gel-filled closure

Best cold-applied seal

The GILS gel in-line splice kit offers a state-of-the-art sealed splice for both underground, buried and overhead applications.

PowerGel sealant technology

The GILS closure, with its revolutionary PowerGel sealing gel, covers and seals the splice quickly and easily, saving both time and effort. PowerGel sealant is rated to 95°C.

Capacity

The kit's range-taking mechanical connector splices aluminium and copper cables. Since everything is included in one convenient kit (even the connectors) you will not get caught without all the right equipment.

Easy to install

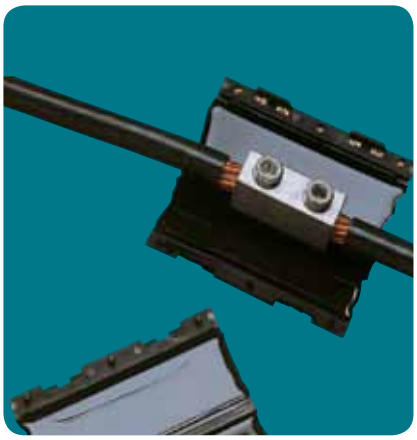
Closing the rugged GILS closure is literally a snap. Small housings allow for installation in cramped locations.

Re-enterable

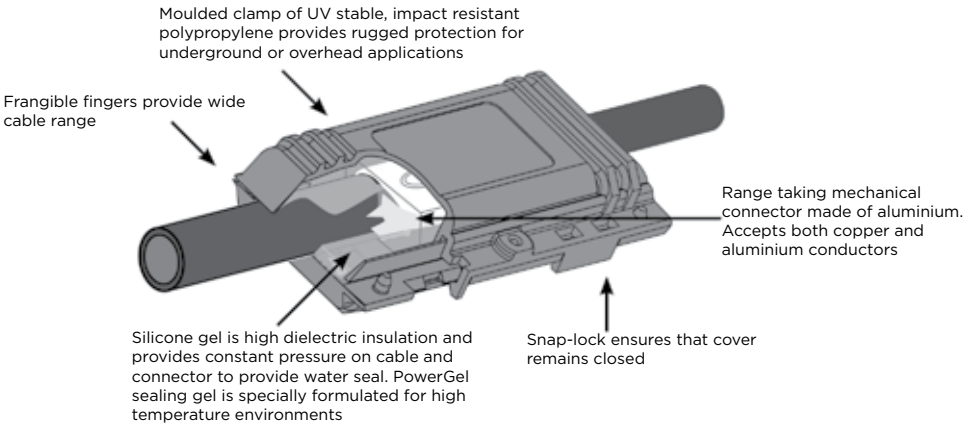
The GILS closure is simple to re-enter because the PowerGel sealant pulls away leaving a clean connection.

Tools required

5/16" Allen wrench or a torque wrench and a knife.



Catalogue Reference	Application Range	Rec. Torque	Length	Width	Height
	(mm^2)	Nm	(mm)	(mm)	(mm)
GILS-4/0	33 - 107	30	108	51	30
GILS-350	50 - 150	30	180	71	40



Gel H-Frame Closure 1kV

GHFC

Raychem's GHFC gel H-frame closure provides a fast and simple method for insulating and environmentally sealing low voltage cable taps and splices made with H-frame compression connectors. The closure utilises Raychem's innovative PowerGel sealing gel to protect the connection from moisture ingress, corrosion, and pollution.

The low voltage H-frame closure is ideal for both underground and overhead applications and is especially useful for street lighting applications.

Simply place the connection on the closure and press the closure together. It's that easy - no tapes, mastics, tools, or mixing are required. The closure can be easily installed with one hand, even while wearing high voltage gloves.

Saves time and money

No taping or tools required.

Installs in seconds

Hinged closure allows for one-step installation. Just snap closed.

Provides water tight seal

Designed to maintain full insulating value in direct-buried applications.

Re-enterable

Silicone gel easily peels away leaving a clean connection.

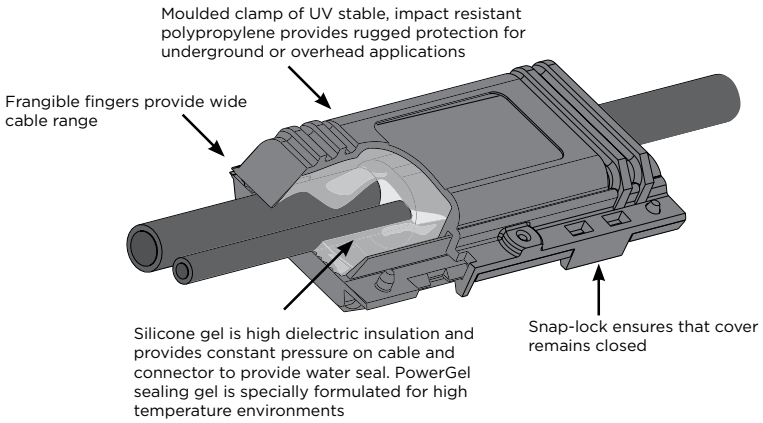
Broad use range

Ideal for street lighting and service applications.

Provides rugged protection

UV resistant. Qualified for temperatures from -40°C to 90°C. Impact and abrasion resistant.

Catalogue Reference	Conductor Range		Die	Standard Package
	Main	Tap		
	(mm^2)	(mm^2)		
GHFC-1-90	16 - 35	2.5 – 10	"BG"	10 each
GHFC-2-90	35 - 70	2.5 – 16	"O"	10 each
GHFC-2.5-90	50 - 95	16 - 85	"D"	30 each
GHFC-3-90	185	95	"N"	6 each



Gel Filled Junction Box IP68 including Terminal Strip

GUROSIL

Application

The GUROSIL Gel filled OBO Junction Box T40 is designed to protect electrical connections from the ingress of water used in rooms with high humidity effects as well as in outdoor applications. GUROSIL Gel is a soft-elastic hardening, amber cold casting compound that is based on hydrocarbon resins. Quick and clean casting is simple with the help of customary caulking guns, so no special tools are required. It is easy to remove, repairable and self-resealing. Electrical connections can be tested and repaired quickly where required, even after installation had been finished.

Features and Benefits

- IP68 proven casting system
- Provides reliable protection against humidity, mechanical shock and vibration
- Quick, easy and clean to install using customary caulking guns
- Very good electrical insulation
- Soft-elastic, transparent, self-repairing and self-resealing
- Easy to remove (GUROSIL Gel)
- Halogen-, silicon- and isocyanate-free
- Environment-friendly and not subject to labelling requirements

Catalogue Reference	Standard Package
JOR-53800	Junction Box, Terminal Strip and GUROSIL Gel Cartridge incl. Mixer
JOR-53801	GUROSIL Gel Cartridge incl. Mixer, 250ml
JOR-40203	Turbo Mixer for Gurosil

Technical Data:

Application:	Rooms with high humidity effect or outdoor use
Protection Class:	IP68, tested up to 18m water depth for over 1000h
Nominal Voltage:	400V
Dielectric Strength:	>20kV/mm
Cable Diameter:	6 x 1mm^2, 5 x 1.5mm^2 or 4 x 2.5mm^2 per connection
Cable Entry:	7 x M25 including plug-in seals for cable diameter 4-20mm
Terminal System:	Terminal block 4mm^2, 5-poles, pluggable
Enclosure Material:	Shock-resistant and flame retardant plastic material
Enclosure Colour:	Light grey (RAL 7035)
Dimensions:	L x W x H: 90 x 90 x 52mm

Inline Joints for Polymeric Cables up to 1kV

EPKJ POLY

While fully comparable in ease and speed of installation to other modern methods, Raychem joints also eliminate mixing, pouring and topping-up delays, as they require no jointing compound or resin. This feature cuts out curing time and enables the joints to be buried immediately. As the joint components are of heat-shrinkable material, they can also be held in stock in varying climatic conditions without risk of long-term deterioration.

Installation

Applying equally well to both armoured and unarmoured cables, the Raychem technique achieves insulating and sealing in one step by heating. This causes tubing, slipped over the cores before jointing, to shrink to tightly fit the connectors and insulation. At the same time the heat causes the sealant, supplied already precoated on the inside of the tubing, to melt and flow. The high integrity bond thus formed seals out moisture and corrosion, follows the thermal expansion of the cable, and can be reliably made on a range of core sizes and connector types without special skills or procedures.

Single Core Cables - Single and Double Insulated

Catalogue Reference	Size of Conductor	Cable Core Insulation	Connector Width or Bolt Length Range	
		Min Dia	Dia. Max	Length Max
	(mm^2)	(mm)	(mm)	(mm)
S1	1 - 2.5	2.9	6	25
S2	4 - 10	4	11	70
S3	16 - 35	6	16	70
S4	50 - 95	9	25	130
S5	120 - 150	12	30	130
S6	185 - 300	16	40	150
S7	400 - 630	22	50	170

2, 3 & 4 Core Cables without Armours with/without ECC

Catalogue Reference	Size of Conductor	Number of Cores	Nominal Cable O.D	Connector Width or Bolt Length Range	
			Min	Dia. Max	Length Max
	(mm^2)		(mm)	(mm)	(mm)
AUST-M1	1.5 - 6	2, 3, 4	9	10	35
AUST-M2	10 - 16	2, 3, 4	12	11	50
AUST-M3	16 - 35	2, 3, 4	16	16	70
AUST-M4	50 - 70	3, 4	22	25	110
AUST-M5	95 - 150	3, 4	30	35	130
AUST-M6	185 - 300	3, 4	40	45	150

2, 3 & 4 Core Cables with Steel Wire Armours with/without ECC

Catalogue Reference	Size of Conductor	Number of Cores	Nominal Cable O.D	Connector Width or Bolt Length Range	
			Min	Dia. Max	Length Max
	(mm^2)		(mm)	(mm)	(mm)
AUST-M1	1.5 - 6	2, 3, 4	9	10	35
AUST-M2	10 - 16	2, 3, 4	12	11	50
AUST-M3	16 - 35	2, 3, 4	16	16	70
AUST-MA7	50 - 70	3, 4	30	25	110
AUST-MA8	95 - 120	3, 4	34	35	130
AUST-MA9	150 - 185	3, 4	40	35	130
AUST-MA10	240 - 300	3, 4	50	45	150

Multi Core Cables with Armours

Catalogue Reference	Number of Cores	Diameter Over Inner Sheath		Overall Diameter	
		Min	Max	Min	Max
		(mm)	(mm)	(mm)	(mm)
ECKJ-0017	4 - 7	9	15	14	23
ECKJ-0018	8 - 14	10	18	15	26
ECKJ-0019	15 - 21	18	26	24	35
ECKJ-0020	22 - 40	23	36	30	45
ECKJ-0021	41 - 75	32	44	39	55

Multi Core Cables without Armours

Catalogue Reference	Number of Cores	Overall Diameter	
		Min	Max
		(mm)	(mm)
ECKJ-0266	4 - 7	9	19
ECKJ-0267	8 - 14	12	22
ECKJ-0268	15 - 21	16	27
ECKJ-0269	22 - 40	22	35
ECKJ-0270	41 - 75	26	44
ECKJ-0271	76 - 100	26	60

Inline Joints for Polymeric Cables to Paper Cables up to 1kV

EPKJ TRANS

The problem of connecting plastic insulated power cables to existing paper insulated ones has led to the requirement for an insulating and sealing system with proven service records of reliability for jointing each of the two cable types.

Installation

The heat shrinkable design of the joint enables a dependable seal to be made easily at the end of the paper insulated cable. To keep water out and oil in, the cores are protected with heat shrinkable tubing and the cable crutch sealed with a heat shrinkable breakout. Adhesive precoated on the inside of the breakout melts and flows during the shrinking action to form a lasting barrier on the tubing covered cores and the cable's metal sheath.

The conductors can be jointed with either mechanical, compression or soldered connectors, which are then insulated by shrinking adhesive lined thick walled tubing over them, at the same time finally sealing the cores of both cables.

Joints for 4 Core Cables without Armour using Standard Connectors

Catalogue Reference	Size of Conductor (mm²)
EPKJ-0903	10 - 16
EPKJ-0910	25 - 50
EPKJ-0917	70 - 150
EPKJ-0924	185 - 300

Joints for 4 Core Cables withArmour using Solder or Crimp Connectors

Catalogue Reference	Size of Conductor (mm²)
EPKJ-0828	16 - 25
EPKJ-0835	35 - 50
EPKJ-0842	70 - 150
EPKJ-0856	185 - 300

Heat Shrinkable Termination Systems for MI/ MIND Paper & Plastic Ins Cables for up to 1kV

EPKT

With millions of installations throughout the world, Raychem cable terminations for up to 1 kV are acknowledged to be more reliable and quicker to install than conventional systems.

Ease of installation

Installed by way of heat shrinking, the Raychem system saves time, eliminates special equipment and simplifies work overhead and work in confined spaces. Varying cable constructions can be easily accommodated, and every kit typically covers three to four cable sizes. Thus inventories are reduced and stock keeping minimised.

4 Core Plastic Cables Wire Armour

Catalogue Reference	Size of Conductor	Cable Core Diameter	Diameter over Armour	Overall Diameter
	(mm^2)	(mm)	(mm)	(mm)
EPKT-0003	4 - 16	4 - 9	19	15 - 26
EPKT-0019	25 - 50	8 - 15	31	22 - 39
EPKT-0035	70 - 150	12 - 23	49	36 - 59
EPKT-0051	185 - 300	18 - 31	66	41 - 79
EPKT-0067	500	25 - 38	82	65 - 90

4 Core Plastic Cables without Wire Armour

Catalogue Reference	Size of Conductor	Cable Core Diameter	Overall Diameter
	(mm^2)	(mm)	(mm)
EPKT-0015	4 - 35	4 - 9	17 - 43
EPKT-0031	25 - 70	8 - 18	20 - 43
EPKT-0047	70 - 150	10 - 23	26 - 68
EPKT-0063	185 - 400	15 - 38	33 - 90

Multi Core Cables without Armours with/without ECC

Catalogue Reference	Size of Conductor	Cable Core Diameter	Diameter over Metal Sheath
	(mm^2)	(mm)	(mm)
EPKT-0453	4 - 16	4 - 7	13 - 17
EPKT-0461	16 - 35	6 - 9	16 - 23
EPKT-0469	35 - 70	8 - 13	22 - 30
EPKT-0477	70 - 150	12 - 18	29 - 42
EPKT-0485	150 - 300	18 - 25	41 - 57

Heat Shrinkable 1kV Branch Joints

BMHM

The Rayligator branch joint system uses a pressure resistant mastic to fill the entire joint area. The mastic ensures good sealing to the plastic insulation as well as to the metal connector

Rayligator joints are tough

The outer heat shrinkable sleeve is reinforced with rugged fibres giving a tough joint. The mastic fills the joint area and prevents any ingress of water.

Rayligator joints are easy to install

Simply apply the mastic around the joint area and cover it with the outer heat-shrinkable sleeve. Heat the sleeve with a suitable torch until the green indicator colour disappears. Heating is completed within a few minutes even in cold weather.

Rayligator joints have no shelf life restriction

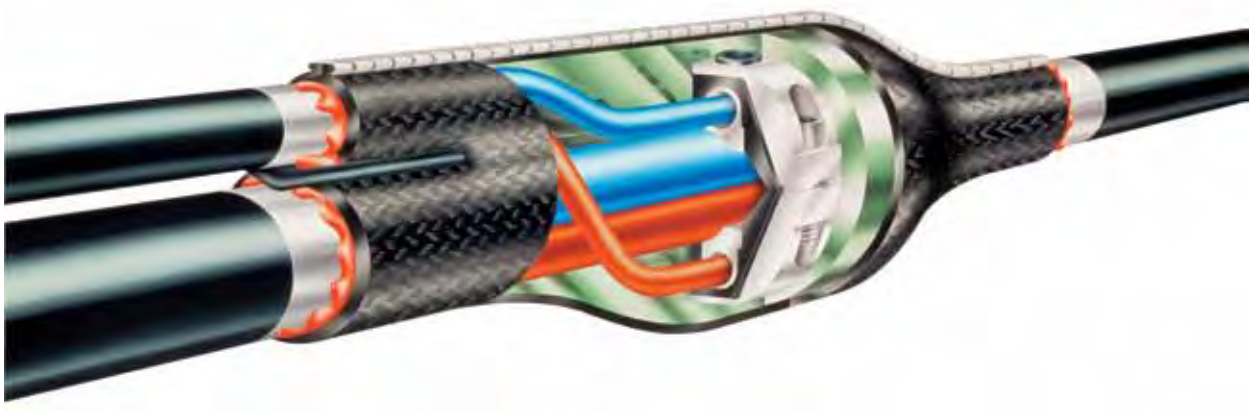
You don't have to worry about the expiry date as with conventional two component fillers since the mastic has an unlimited shelf-life.

Rayligator joints are clean

Because the kit contains no liquids, the hazards associated with handling conventional two component or bitumen fillers are eliminated.

Catalogue Reference	Cross Section		Multi-Core Connector	Dimensions	
	Main Cable	Branch Cable	Max Diameter	Length	Diameter
	(mm^2)	(mm^2)	(mm)	(mm)	(mm)
BMHM-1001-4B1*	16 - 185	6 - 95	115	500	135
BMHM-1001-4C1	95 - 185	6 - 95	115	500	135
BMHM-1001-4D2	95 - 240	6 - 150	135	560	155

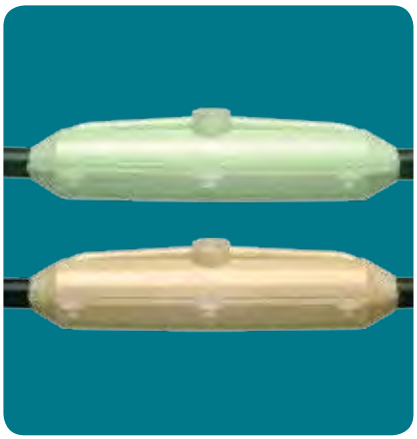
* The application range of this kit can also be covered with the kit BMHM-4C1 and a separately ordered black mastic EPPA 206-4-250 as a shim.



Filled Joints for Armoured and Unarmoured Power and Control Cables up to 1kV

PXE

Range taking joint kits with few components for quick and simple installation
• Clear, robust, snap-together joint shells for easy positioning and filling
• Joint Insulation, sealing and mechanical protection provided by proven two-part filler materials supplied in convenient foil packs
• Choice of kits with or without screw connectors for copper and aluminium conductors
• Core separator to ensure adequate clearance between conductor connectors
• Easy-to-follow pictorial installation instruction
• Earth bonding components included in kits for armoured cables
• Abrasive cloth, sealing tape and protective gloves included in the kit
• Performance tested to European standard EN 50393



Straight joints for armoured and unarmoured cables (Conductor screw connectors included)

Catalogue Reference Unarmoured	Catalogue Reference Armoured	4 Core Cable Conductor Size*	Cable Entry Diameter
		(mm^2)	(mm)
PXE-SU2-C1	PXE-SW2-C1	1.5 - 6	6 - 27
PXE-SU4-C1	PXE-SW4-C1	10 - 16	16 - 37
PXE-SU5-C1	PXE-SW5-C1	16 - 35	20 - 44
PXE-SU6-C1	PXE-SW6-C1	35 - 70	26 - 52
	PXE-SW7-C1	95 - 120**	35 - 67
PXE-SU7-C1		95 - 150**	35 - 67

* Joints are suitable for use with 2 & 3 core cables of these sizes but build-up of cable diameter may be necessary.
**Suitable also for 3 core cables up to 185 mm^2.

Resin Filled Joints for Armoured Power Cables up to 1kV

TSJ / TBJ

- A comprehensive range of resin filled straight joints and branch joints for low voltage armoured power cables with conductor sizes up to 300 mm^2
- Designed with generous dimensions to accommodate modern mechanical connectors needing no special installation tooling
- Insulation, sealing and mechanical protection provided by proven and qualified two-part resin supplied in convenient foil packs
- Clear rigid joint shells to aid correct installation
- Armour continuity bonding components included in every kit
- Qualified to national and international performance standards

Catalogue Reference		Cable Conductor Size				Cable Entry Diameter	
Straight Joints	Branch Joints	2 & 3 Core		4 Core		min	max
		(mm^2)	(mm^2)	(mm^2)	(mm^2)	(mm)	(mm)
TSJ-6	**TSJ-6**	1.5	10	1.5	6	9	21
TSJ-16	**TBJ-16**	10	25	10	16	15	27
TSJ-35	**TBJ-35**	35	50	25	35	21	33
TSJ-70	**TBJ-70**	70	95	50	70	29	41
TSJ-120	**TBJ-120**	120	150	95	120	39	57
TSJ-185	**TBJ-185**	185	240	150	185	49	67
TSJ-300	**TBJ-300**	300	-	240	300	59	77

Low Voltage 2 & 4 Way Link Box

LINKBOX

Application

Low voltage underground 2 and 4 way link boxes are used for connecting and switching adjacent sections of low voltage 3 or 4 core cable from 70mm² to 300mm². They are supplied complete with a plastic foundation pad, outer enclosure set and concrete filled.

Features and Benefits

- Compact modular concept reduces weight and space required for link box positioning, making installation possible in congested areas whilst reducing excavation and reinstatement costs
- Retained ABS moulded lid replaces the traditional cast iron diving bell lid, which reduces weight and is non conductive making operation safer.
- Integrated locking facility combined with the lid retaining system and toolbox, with fail safe positioning and operation.
- Clear vacuum-formed body shell allows both easy cable installation and inspection prior to resin fill. Shell designed for crossing 300mm² cores with sufficient resin coverage
- Single resin casting eliminates moisture ingress issues that are associated with multiple cast link boxes
- Reduced number of connections improves electrical performance and product longevity
- Error-proof factory assembly due to torque and system control software and zero-fault technology

Standards

- BS EN 50393:2006
- EA Technology draft specification for 2 and 4 way underground link boxes
- BS EN 60947-1:2004
- ER C81/4 1999
- Pit frame and cover meet B125 EN124 standards

Catalogue Reference	Description	Conductor Range	Weight
		mm²	(kg)
BAH-028110129	2-Way 3-Core Mk3 Linkbox	70-300	39
BAH-028110130	4-Way 3-Core Mk3 Linkbox	70-300	100
BAH-028110128	2-Way Multicable Mk3 Linkbox	70-300	42
BAH-028110141	2-Way 3-Core Mk3 Link Box Double Bolt Version	70-300	39
BAH-028110142	4-Way 3-Core Mk3 Link Box Double Bolt Version	70-300	100
BAH-028110145	2-Way 3 & 4-Core Untailed Mk3 Linkbox	70-300	40
BAH-028110146	4-Way 3 & 4-Core Untailed Mk3 Linkbox	70-300	102

Casting Materials for Low and Medium Voltage Cable Joints

GUROFLEX

The function of a casting material is to insulate electrical connections in underground cables and prevent water ingress from outside the joint or from within the cable.

GUROFLEX is an environmentally friendly, easy to handle, two-component, cold casting material based on hydrocarbons. Due to its elasticity, it is well-suited to accommodate thermal expansion of insulated cables, thereby preventing tears, breaks and cracks that could permit water ingress. It is an excellent insulating material with water-repellent properties. It covers and adheres to metal components and protects them from corrosion.

Why is GUROFLEX unique?

Compared with other resin types such as polyurethane and epoxy systems, GUROFLEX is easy to process and has outstanding properties; it is environmentally friendly, non-hazardous and generates no heat during curing. Furthermore, GUROFLEX is resistant to low temperatures and can be stored at temperatures as low as –20°C. Processing is possible at temperatures as low as –10°C. Its low water absorption makes GUROFLEX moisture-resistant during curing and avoids the formation of foam or bubbles when it comes in contact with water.

Where can GUROFLEX be used?

GUROFLEX is suited for use in all cable joint systems with robust closures up to 1 kV. It is qualified according to CENELEC HD 623. It is suitable for filled XLPE, PE, PVC and paper-insulated cables. GUROFLEX is available in double chamber bags and cans of various sizes.

Technical data	GUROFLEX
Density	component A 1.36 g/cm³ component B 0.94 g/cm³
Viscosity at 20°C	component A 5000 mPa.s component B 5000 mPa.s
Dielectric strength	> 10 kV/mm Minimum storage temperature –20°C Minimum installation temperature –10°C
Shore hardness A	~ 20
Shelf life	2 years at 23°C
Colour	green

Catalogue Reference	Volume
GUROFLEX-MV-C1000	10.0L
GUROFLEX-MV-C430B	4.3L
GUROFLEX-MV-C530	5.3L

Casting Materials for Low and Medium Voltage Cable Joints

RAPID

The function of a casting material is to insulate and protect electrical connections in underground cable joints and to prevent water ingress from outside the joint or from within the cable.

RAPID type resins are two component, polyurethane type casting materials. All three materials are hydrophobic, elastic polyurethane resins, meeting the requirements of HD 631.1 S2 and EN 50393. They have excellent insulation properties and are well suited for all cable jointing systems.

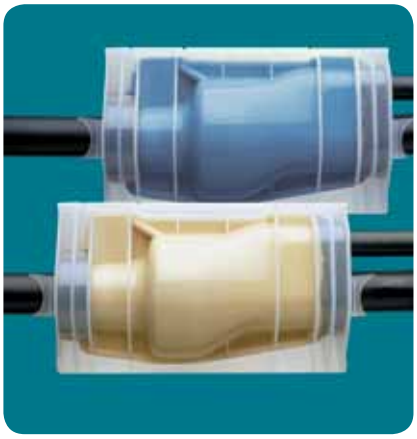
Why is RAPID unique?

Their outstanding properties include excellent hydrolytic stability and most impressive hydrophobic characteristics. Foaming problems during curing are avoided, even in a relatively high humidity environment. This ensures long-term stability under service conditions. Furthermore, RAPID systems have an excellent curing profile at various temperatures, which allows easy handling and curing, summer and winter alike.

Permanent elasticity ensures long term stability and accommodation of cable movement. As a result of the cross-linking reaction, the resin bonds strongly to functional parts, preventing the creation of voids between hardened resin and cable insulation.

Where is RAPID used?

RAPID 3010 is suited for use in all low and medium voltage cable joint systems (classification according HD 631.1 S2: LMP/LI-W; MMP/MI-W). RAPID 4300 is suited for all low voltage cable joint systems and for medium voltage systems where mechanical protection and protection against water ingress is required (classification according HD 631.1 S2: LMP/LI-W; MMP-W).



Technical data	RAPID 4300	RAPID 3010	RAPID 6000
Type	Polyurethane MDI	Polyurethane MDI	Polyurethane HDI
Colour	beige	blue	beige
Shelf life	24 months	24 months	24 months
Reaction temperature	60 °C	80 °C	35 °C
Gel time @ 23 °C	15 mins	13 mins	25 mins
Storage temperature	5 °C minimum/ 40 °C maximum	5 °C minimum/ 40 °C maximum	5 °C minimum/ 35 °C maximum
Hardness	30 Shore D	44 Shore D	40 Shore A
Tensile strength	4 MPa	8 MPa	1 MPa
Elongation at break	30 %	45 %	20 %

Wall Mounted Connection Boxes for LV Service Cables

WMCB

WMCB jointing kits are wall-mounted ('under-eaves') connection boxes for single-phase service cables.

The boxes are made of UV-resistant high density polyethylene and require no filling with resin or other insulating or sealing material. Phase connections are insulated and sealed in well-proven gel joint boxes firmly located within the housing. These connections are therefore effectively double insulated and mechanically protected.

The housing boxes have been designed to resist unauthorised penetration and contact with live parts.

WMCB jointing kits are available in two sizes:

- smaller size is designed for CNE* connections up to 35 mm^2 (SNE* up to 25 mm^2)
- larger size is for SNE or CNE connections up to 35 mm^2

Each of the two sizes accommodates straight or branch connections. Completed connections can be fully re-entered.

- CNE – Combined Neutral/Earth. Cables have circumferential copper wire neutral/earth conductor.
- SNE - Separate Neutral/Earth. Cables have circumferential copper wire conductor divided into earth (un-insulated) and neutral (insulated).

Features and Benefits

- Resin-free system
- Double insulation for phase connection
- Designed for CNE and SNE cables
- Proven gel insulation and sealing for phase connection
- Unobtrusive low-profile design
- Fully re-enterable
- Ingress protection category IP35
- Phase connectors suitable for Cu/Al conductors
- Sheath-stripping guide marks moulded in housing base
- Adjustable wall mounting
- Resistant to unauthorised entry
- Provision for security seals
- Tested to relevant performance standards

Catalogue Reference	Cable Size - Straight and Branch Connections			External Dimensions
	1ph CNE	1ph SNE	Cable Diameter	Length x Height x Width
	(mm^2)	(mm^2)	(mm)	(mm)
WMCB35CNE	16 - 35	16 & 25	5 - 17	230 x 150 x 50
WMCB35SNE	16 - 35	16 - 35	10 - 23	300 x 190 x 50

Section 4: Medium Voltage Terminations - up to 42kV

COLD APPLIED

HEAT SHRINK

Silicone Push On Termination with Integrated Stress Control for Single Core Polymeric Cables up to 36/42kV

MVTI / MVTO

Features

- Integrated geometrical stress cone
- Suitable for hexagonal/deep indent crimp and mechanical lugs according to IEC 61238
- Compact design
- Long creepage distance
- Easy to install
- Reduced waste for disposal
- Tested in accordance to CENELEC HD.629.1.S2:2006 and IEC 60502-4
- Manufactured according to ISO 9001 and ISO 14001

Benefits

- Outstanding weathering, UV and ozone Resistance
- Chemically resistant
- Resistant to fungi
- Excellent electrical properties including good tracking resistance and high dielectric strength
- Hydrophobic (water repelling)
- Non-Flammable
- Self Extinguishing
- Retains performance over wide temperature range –55 to +180°C
- Highly elastic material with good resistance to permanent set
- No shelf-life issues
- All components have full traceability of raw materials

Application range

The product line is designed for polymer cables from 25 to 300 mm² for 12 kV and 24 kV, 35 to 400 mm² for 36 kV and 50 to 400mm² for 42 kV.

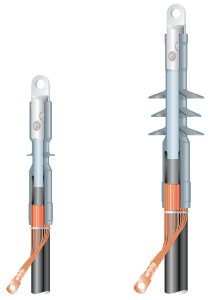
Technical Data

Technical Data	11kV	22kV	33/44kV
Cable insulation diameter (mm)	13.7 – 30.4	17.0 – 34.6	24.0 – 45.0
Cross section range (mm²)	25 – 300	25 – 300	35/50 – 400
Max system voltage U_m (kV)	12	24	36/42
Basic impulse level (kV)	95	125	194/200*
Partial discharge at 2 U_0 (pC)	<1	<1	<1
AC Voltage withstand, 5 min (kV)	28.5	57	81/94
DC Voltage withstand, 15min (kV)	38	76	108/120

The terminations meet the CENELEC HD 629.1.S2:2006 specification *170 kV BIL for 35 – 150 mm² Indoor termination MVTI-6121, 81 kV AC, 108 kV DC

11kV Single Core Push On Termination with Mechanical Connectors

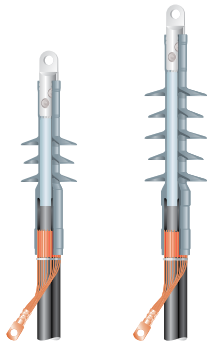
Catalogue Reference Indoor	Catalogue Reference Outdoor	Voltage	Cross Section	Diameter over Insulation
		kV	(mm²)	(mm)
MVTI-3121-ML-1-13	MVTO-3121-ML-1-13	11	25 - 95	13.7 - 20.8
MVTI-3121-ML-1-17	MVTO-3121-ML-1-17	11	25 - 95	13.7 - 20.8
MVTI-3121-ML-2-13	MVTO-3131-ML-2-13	11	35 - 150	14.8 - 24.3
MVTI-3121-ML-2-13	MVTO-3131-ML-2-17	11	35 - 150	14.8 - 24.3
MVTI-3131-ML-4-13	MVTO-3131-ML-4-13	11	95 - 240 (300)*	18.6 - 30.4
MVTI-3131-ML-4-17	MVTO-3131-ML-4-17	11	95 - 240 (300)*	18.6 - 30.4



* the kits suits 300mm² solid Al conductor

22kV Single Core Push On Termination with Mechanical Connectors

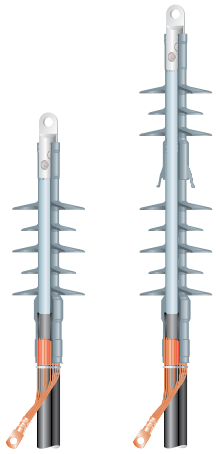
Catalogue Reference Indoor	Catalogue Reference Outdoor	Voltage	Cross Section	Diameter over Insulation
		kV	(mm²)	(mm)
MVTI-5121-ML-1-13	MVTO-5121-ML-1-13	22	25 - 95	17.9 - 25.0
MVTI-5121-ML-1-17	MVTO-5121-ML-1-17	22	25 - 95	17.9 - 25.0
MVTI-5131-ML-4-13	MVTO-5131-ML-4-13	22	95 - 240 (300)*	23.5 - 34.6
MVTI-5131-ML-4-17	MVTO-5131-ML-4-17	22	95 - 240 (300)*	23.5 - 34.6
MVTI-5131-ML-5-13	MVTO-5131-ML-5-13	22	120 - 300**	24.3 - 34.6
MVTI-5131-ML-5-17	MVTO-5131-ML-5-17	22	120 - 300**	24.3 - 34.6



* the kits suits 300mm² solid Al conductor
** the kit suit 300mm² round stranded conductor

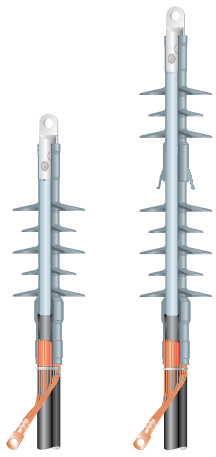
33kV Single Core Push On Termination with Mechanical Connectors

Catalogue Reference Indoor	Catalogue Reference Outdoor	Voltage	Cross Section	Diameter over Insulation
		kV	(mm²)	(mm)
MVTI-6121-ML-2-13	-	33	35 - 150	24 - 33.5
MVTI-6121-ML-2-17	-	33	35 - 150	24 - 33.5
MVTI-6131-ML-2-13	MVTO-6131-ML-2-13	33	95 - 150	27.8 - 33.5
MVTI-6131-ML-2-17	MVTO-6131-ML-2-17	33	95 - 150	27.8 - 33.5
MVTI-6131-ML-4-13	MVTO-6131-ML-4-13	33	95 - 240	27.8 - 37.6
MVTI-6131-ML-4-17	MVTO-6131-ML-4-17	33	95 - 240	27.8 - 37.6
MVTI-6141-ML-5-13	MVTO-6141-ML-5-13	33	120 - 300	29.3 - 39.6
MVTI-6141-ML-5-17	MVTO-6141-ML-5-17	33	120 - 300	29.3 - 39.6
MVTI-6141-ML-6-13	MVTO-6141-ML-6-13	33	185 - 400	32.4 - 42.8
MVTI-6141-ML-6-17	MVTO-6141-ML-6-17	33	185 - 400	32.4 - 42.8



42kV Single Core Push On Termination with Mechanical Connectors

Catalogue Reference Indoor	Catalogue Reference Outdoor	Voltage	Cross Section	Diameter over Insulation
		kV	(mm²)	(mm)
MVTI-7131-ML-2-13	MVTO-7131-ML-2-13	42	50 - 150	27 - 36.5
MVTI-7131-ML-2-17	MVTO-7131-ML-2-17	42	50 - 150	27 - 36.5
MVTI-7131-ML-4-13	MVTO-7131-ML-4-13	42	95 - 240	29.9 - 41.0
MVTI-7131-ML-4-17	MVTO-7131-ML-4-17	42	95 - 240	29.9 - 41.0
MVTI-7141-ML-5-13	MVTO-7141-ML-5-13	42	120- 300	30.6 - 43.4
MVTI-7141-ML-5-17	MVTO-7141-ML-5-17	42	120- 300	30.6 - 43.4
MVTI-7141-ML-6-13	MVTO-7141-ML-6-13	42	185 - 400	33.8 - 45
MVTI-7141-ML-6-17	MVTO-7141-ML-6-17	42	185 - 400	33.8 - 45



11kV Dimensions as Delivered

Catalogue Reference	Voltage	Height Housing	Creepage Distance	Flashover Distance	Diameter over Sheds	Installed Length L_1*
	kV	(mm)	(mm)	(mm)	(mm)	(mm)
MVTI-3121	11	232	253	235	39	225
MVTI-3131	11	232	253	235	43	245
MVTO-3121	11	276	379	281	61	270
MVTO- 3131	11	276	412	284	76	290

22kV Dimensions as Delivered

Catalogue Reference	Voltage	Height Housing	Creepage Distance	Flashover Distance	Diameter over Sheds	Installed Length L_1*
	kV	(mm)	(mm)	(mm)	(mm)	(mm)
MVTI-5121	22	276	412	284	76	270
MVTI-5131	22	276	412	284	80	290
MVTO-5121	22	355	675	368	97	350
MVTO-5131	22	355	676	369	101	370

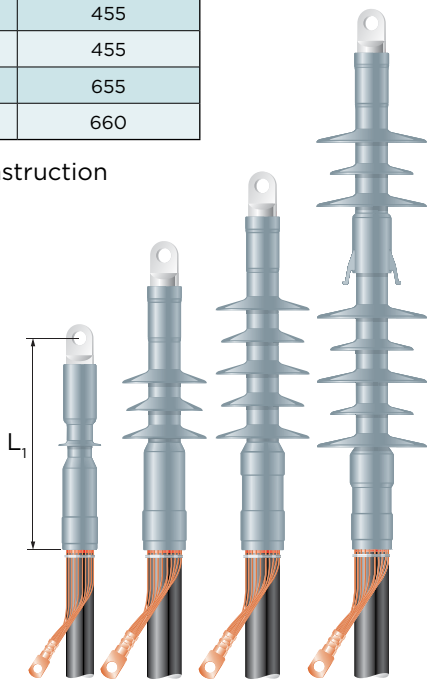
33kV Dimensions as Delivered

Catalogue Reference	Voltage	Height Housing	Creepage Distance	Flashover Distance	Diameter over Sheds	Installed Length L_1*
	kV	(mm)	(mm)	(mm)	(mm)	(mm)
MVTI-6121	33	355	676	369	101	370
MVTI-6131	33	420	878	482	140	455
MVTI-6141	33	420	878	482	140	455
MVTO-6131	33	645	1360	730	140	655
MVTO-6141	33	645	1360	730	140	660

42kV Dimensions as Delivered

Catalogue Reference	Voltage	Height Housing	Creepage Distance	Flashover Distance	Diameter over Sheds	Installed Length L_1*
	kV	(mm)	(mm)	(mm)	(mm)	(mm)
MVTI-7131	42	420	878	482	140	455
MVTI-7141	42	420	878	482	140	455
MVTO-7131	42	645	1360	730	140	655
MVTO-7141	42	645	1360	730	140	660

* Terminations with mechanical lug type BLMT, and depending on cable construction



Cold Applied Trifurcation System for 3 Core Polymeric MV Cable and TFTI(O) up to 36kV

TFRK

Features

- Suitable for three core armoured and unarmoured cables with copper tape or copper shield wires
- Adjustable tail length
- Tested in accordance to IEC 60502-4
- Easy to install

Benefits

- Excellent UV and Ozone Resistance
- Hydrophobic
- Non-Flammable
- Self Extinguishing

Trifurcation system

The breakout and the core protection sleeves are made of high quality silicone rubber that has excellent mechanical, hydrophobic, properties.

The system is designed for indoor and outdoor use in all climate conditions. Electrodes that are picking up the leakage current protect the trifurcation system from electrical activity on its surface.

The components combined to provide the important functions required for all medium voltage products:

- Protection against sharp edges over the armour and earthing leads
- Sealing function
- Installability

Insulation material

The material used has undergone thoroughly testing in the development stage, yielding a silicone rubber with exceptional weathering properties. The formulation is based on proven silicon compounds, exhibiting excellent stability and long-term performance, under severe environmental conditions. It delivers outstanding, mechanical strength, elasticity weatherability properties.

Application range

The components will suit three core armoured (DSTA, AWA, SWA) and unarmoured cables from 25 to 400 mm2 . This coverage is achieved with only two sizes of breakouts and core protection tubes for the voltage classes 7.2kV up to 36kV.

Installation

Each kit contains an easy-to-follow installation instruction with excellent visuals of the installation steps. Installation is both fast and simple.

Test reports

The products are tested at IEH, in Karlsruhe, Germany in accordance with IEC 60502-4.

Quality

All components have full traceability of raw materials and manufacture according to ISO 9001 and ISO 14001.

Dimensions as Delivered

Catalogue Reference	Diameter over Cable Jacket		Diameter over Copper Tape / Core Screen	
	min	max	min	max
	(mm)	(mm)	(mm)	(mm)
TRFK-S-H1	22	50 - 150	32 - 89	280
TRFK-L-H3	22	185 - 300	70 - 114	280

Core Protection Sleeve

Catalogue Reference	Tube Length Fully Recovered	Dia. over Copper Tape / Core Screen	
		min	max
	(mm)	(mm)	(mm)
CNTT-38/11-200-2	200	15	32
CNTT-38/11-400-2	400	15	32
CNTT-45/25-200-2	200	30	39
CNTT-45/25-400-2	400	30	39

Application Range

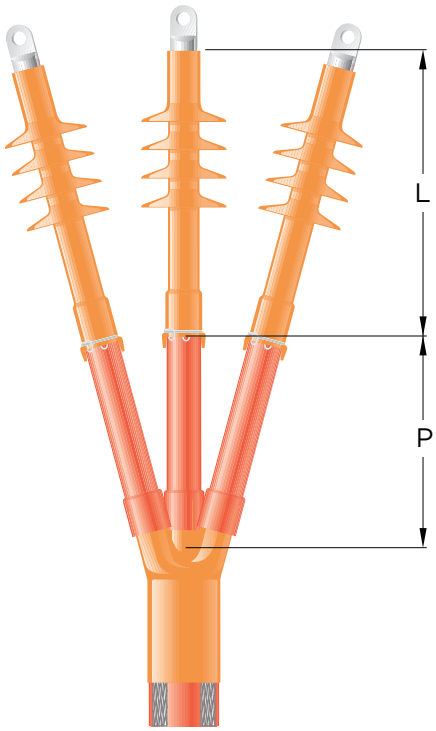
Catalogue Reference	Range Cable Entry		Finger		Tail Length	Voltage Class		
	min	max	min	max		11kV	22kV	33kV
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm^2)	(mm^2)	(mm^2)
TRFK-S-H1	32	89	15	32	400	25 - 185	50 - 150	50
TRFK-S-H2	32	89	15	32	600	25 - 185	50 - 150	50
TRFK-S-H3	32	89	15	32	800	25 - 185	50 - 150	50
TRFK-L-H1	70	114	30	39	400	150 - 400	185 - 300	70 - 120
TRFK-L-H2	70	114	30	39	600	150 - 400	185 - 300	70 - 120
TRFK-L-H3	70	114	30	39	800	150 - 400	185 - 300	70 - 120

11kV Trifurcation Kit

Catalogue Reference	Voltage Class	Tail Length	Indoor	Outdoor	Cable Cross Section
		P	L	L	
		(mm)	(mm)	(mm)	(mm)
TRFK-S-H1	11	400	~ 270	~ 280	25 - 185
TRFK-S-H2	11	600	~ 270	~ 280	25 - 185
TRFK-S-H3	11	800	~ 270	~ 280	25 - 185
TRFK-L-H1	11	400	~ 270	~ 280	150 - 400
TRFK-L-H2	11	600	~ 270	~ 280	150 - 400
TRFK-L-H3	11	800	~ 270	~ 280	150 - 400

22kV Trifurcation Kit

Catalogue Reference	Voltage Class	Tail Length	Indoor	Outdoor	Cable Cross Section
		P	L	L	
		(mm)	(mm)	(mm)	(mm)
TRFK-S-H1	22	400	~ 280	~ 390	50 - 150
TRFK-S-H2	22	600	~ 280	~ 390	50 - 150
TRFK-S-H3	22	800	~ 280	~ 390	50 - 150
TRFK-L-H1	22	400	~ 280	~ 390	185 - 300
TRFK-L-H2	22	600	~ 280	~ 390	185 - 300
TRFK-L-H3	22	800	~ 280	~ 390	185 - 300



33kV Trifurcation Kit

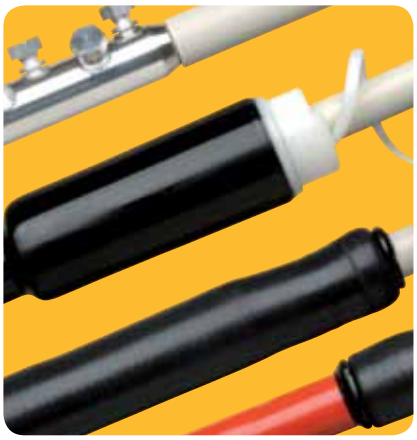
Catalogue Reference	Voltage Class	Tail Length	Indoor	Outdoor	Cable Cross Section
		P	L	L	
		(mm)	(mm)	(mm)	(mm)
TRFK-S-H1	33	400	~ 390	~ 640	50
TRFK-S-H2	33	600	~ 390	~ 640	50
TRFK-S-H3	33	800	~ 390	~ 640	50
TRFK-L-H1	33	400	~ 390	~ 640	70 - 120
TRFK-L-H2	33	600	~ 390	~ 640	70 - 120
TRFK-L-H3	33	800	~ 390	~ 640	70 - 120

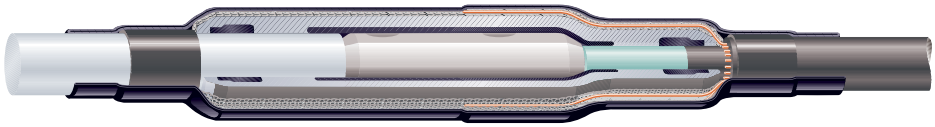
MV Cold Shrinkable End Seal for Polymeric Insulated Cables up to 42 kV

CSER

Features

- Pre-expanded, single piece silicone rubber joint body with high mechanical expansion properties allows a wide application range
- Electrical stress control of the screen cut area by integrated conductive geometrical stress cones
- Electrical stress control of the connector area by an integrated screened connection area (Faraday cage)
- Pre-expansion on a well-known and easily to install holdout system
- Easy-to-install end seal with short installation time
- Dual-wall Rayvolve sleeve with specially formulated EPDM elastomer
- High performance sealant provides a reliable moisture seal and corrosion protection
- Polypropylene rod with high stiffness and breaking strength
- Exceeds CENELEC HD 629.1, requirements which include IEC, BS, VDE and other international specifications





CSER cold shrinkable end seal with mechanical connector

Catalogue Reference	Voltage	Application range*	Diameter over core insulation	Diameter over outer sheath	Diameter over conductor**
	kV	(mm²)	(mm)	(mm)	(mm)
CSER-12B/1XU	12	95 - 240	18.6 - 28.4	26.0 - 39.0	11.0 - 19.2
CSER-12C/1XU	12	185 - 300	23.2 - 32.6	30.0 - 44.0	15.5 - 23.1
CSER-24B/1XU	24	35 - 150	18.9 - 28.5	26.0 - 39.0	6.8 - 15.0
CSER-24C/1XU-M1	24	95 - 240	23.5 - 32.6	30.0 - 44.0	11.0 - 19.2
CSER-24C/1XU-M2	24	120 - 300	24.3 - 34.6	32.0 - 46.0	12.7 - 23.1
CSER-36D/1XU	36 (42)	95 - 240	27.8 - 37.6	35.0 - 48.0	11.0 - 19.2

* The application range given in the table is based on polymeric insulated cables according to IEC 60502 with stranded circular conductors. Due to different conductor dimensions and constructions the minimum and maximum application range may be extendable. Please contact your local sales representative.
** The diameter over conductor is needed only for kits including TE BSM connectors. The values given in the selection table refer to aluminium stranded circular conductors and may change for other materials and shapes.

Cold Pour Insulating Compound for Medium Voltage Applications

GUROFLEX

GUROFLEX MV is a two-component cold-pour insulating compound. After mixing and pouring it cures to a soft rubbery solid that will not melt or flow. It has excellent electrical characteristics and is suitable for a wide range of bulk insulation applications in medium voltage electrical power equipment.

Because GUROFLEX MV is a cold pour material there are none of the serious hazards associated with the heating and pouring of conventional bitumen or oil-based insulating compounds.

One of the outstanding advantages of its chemical make-up is that GUROFLEX MV is non-hazardous and does not contribute to environmental problems. The liquid components and mixed compound are not subject to any safety classification and no special measures are required for transportation, handling or disposal of waste.

The principal application for GUROFLEX MV is as a filling compound for cable termination boxes and bus bar enclosures associated with transformers, switchgear and motors. It is the ideal solution for non-air-clearance cable boxes where the phase metalwork cannot be satisfactorily insulated with heat shrink GUROFLEX MV Cold Pour Insulating Compound for Medium Voltage Applications components, tapes or other applied insulation. GUROFLEX MV will also solve problems with air clearance enclosures caused by hostile environmental conditions (persistent humidity, chemical pollution etc.).

GUROFLEX MV has been thoroughly tested to the requirements of CENELEC cable accessory performance standard HD 629.1 (including the requirements of IEC 60502-4) for rated voltages up to 12 kV. Additional testing has included impulse voltage withstand at 125 kV. Performance qualification for applications at rated voltage 36 kV is in progress.

GUROFLEX MV is compatible with all commonly used terminations for MV polymeric and paper cables. It is also unaffected by the presence of oil based residues of traditional hot-pour filling compounds. The curing reaction is not affected by the presence of water and the cured compound has very low moisture absorption.

GUROFLEX MV is supplied as a kit comprising secure cans, a mixing spatula and a mixing/pouring instruction. Recommended shelf-life of the components is 2 years. Mixing takes about 3 minutes and can be aided by the use of a power driven stirrer. No heat is involved, and the curing compound does not generate heat. No 'topping-up' is needed and the equipment can be energised immediately after filling. Once the compound has cured to a cross-linked solid there is no possibility of leakage from gaskets or cable glands.

The curing reaction of GUROFLEX MV is relatively insensitive to temperature, making it feasible to mix and pour the compound in very cold or hot ambient conditions. The compound will cease to flow about one hour after mixing.

The cured compound can be cut out of the enclosure if connections have to be changed at a later date. No heat is required.

Further information

Please ask your local TE representative or distributor for:

- *Performance testing reports*
- *Technical data sheet*
- *Installation Instruction*
- *Questions and Answers*
- *Safety data sheets*

Product Details

Catalogue Reference	Pack Type
GUROFLEX-MV-C430B	4.3L box
GUROFLEX-MV-C530	5.3L Tin
GUROFLEX-MV-C1000	10L Tin

Raychem Plug In Termination System up to 42kV for Gas Insulated Switchgear

RPIT

Features

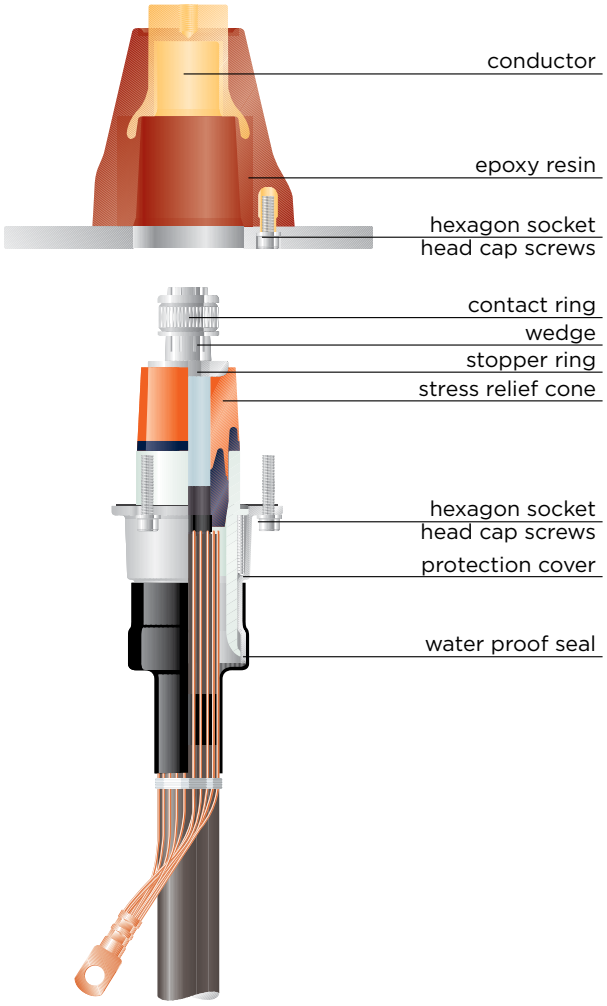
- Separable inline connection for high current, gas insulated switchgears up to 42 kV
- Termination mates interfaces in accordance to EN50180 and EN50181 for inner cone connections
- The contact parts are designed for stranded circular aluminium or copper conductors in accordance to IEC-60228

Technical Information

The increasing popularity of gas insulated switchgear called for the development of appropriate connection systems to standardised bushings in accordance to EN50181. TE Connectivity has developed two systems, one is related to the outer cone and the other one to the inner cone system. Later is used in power switch gear and power transformers.

TE Connectivity has several decades of experience in the field of hermetically insulated termination systems for medium voltage applications. Thus the bushings designed for gas insulated switchgear meet the standard EN50181 for connection type size 2 (800 A) and size 3 (1250 A) at operating voltage 12 kV up to 36 (42) kV.

The basic construction of the mating termination follows well known design principles and incorporates a lamellate contact system which ensures reliable current transmission via a cone clamp to the conductor. The interface between silicone body of the termination and the bushing is kept permanently sealed via the pressure of a spring between the insulator and the flange of the termination cover. The termination cover is sealed at the flange area with well known sealing methods and at the cable side with heat shrinkable tubing against ingress of moisture.



Cable Terminations

Catalogue Reference	Voltage	Nominal Current	Size	Cross Section	Diameter Over Conductor	Diameter Over Insulation
	kV	(A)		(mm)	(mm)	(mm)
RPIT-321x	12	800	2	95 - 300	11.0 - 21.6	19.3 - 30.4
RPIT-521x	24	800	2	50 - 300	7.7 - 21.6	20.2 - 34.6
RPIT-621x	36	630	2	50 - 185	7.7 - 16.8	25.2 - 35.1
RPIT-331x	12	1250	3	240 - 630	17.8 - 32.5	26.4 - 29.6
RPIT-531x	24	1250	3	150 - 630	13.9 - 32.5	26.5 - 45.6
RPIT-631x	36 / 42	1250	3	95 - 630	11.0 - 32.5	28.5 - 49.2

Note: Product is available with and without test point

Bushing Parts

Catalogue Reference	Size	Modification
RPIS-2-IS	Size 2 (800A)	without test point
RPIS-2-IS-VD	Size 2 (800A)	with test point
RPIS-3-IS	Size 3 (1250A)	without test point
RPIS-3-IS-VD	Size 3 (1250A)	with test point

Insulating Cap

Catalogue Reference	Size
RPIC-2	Size 2
RPIC-3	Size 3

Heat Shrinkable Medium Voltage Terminations for Indoor and Outdoor Applications for Polymeric Cables up to 42kV

IXSU / OXSU

Raychem heat shrinkable medium voltage terminations IXSU-F/ OXSU-F are widely acknowledged in the industry and feature an unique integrated ZnO-based stress control system, flexibility of usage for crimp or mechanical lugs, unlimited shelf life and range-taking kits.

Designed for both indoor and outdoor applications

The components combine to provide the important functions required for all medium voltage products: electrical performance, stress control and moisture sealing. The proprietary materials used in our cable accessories are designed for optimised manufacturing, and to provide exceptional product performance in the harshest of service environments. Variations and differences can exist amongst base polymer grades and additives. Compounds consist of polymers, additives and fillers that highly influence the properties of the base material. The formulation, the compounding procedures, material processing, product design and assembly all contribute to the overall product performance.

Polymeric insulation

The materials used in the Raychem termination generation of products have undergone many years of development, yielding a polymeric material with outstanding electrical and weathering properties. The formulation is based on polymer compounds, and has proven to be stable and functional over several decades under severe environmental conditions. The formulation offers exceptional tracking and erosion resistance, mechanical strength, weatherability and dielectric properties.

One piece termination

The Raychem stress control material IXSU-F/OXSU-F is a recently formulated electrical stress control compound, that is based on extensive experience with Raychem ceramic semiconductor technology (ZnO). The ZnO-based stress control system is integrated in heat shrinkable insulating tubing. This stress control system fills any irregularities, bonds to the insulation and provides superb electrical performance.

Product range

The product line is designed for polymer cables from 10 to 1200 mm^2 and up to 42 kV. This coverage is achieved with a minimum number of design variants. The products are fully tested in accordance with IEEE-48, IEC 60502-4 and the CENELEC HD629.1S1 specification. For cable box applications, the Raychem termination IXSU-F can be combined with either Raychem elastomeric bushing boot (RCAB) or Raychem insulated connection system (RICS) to fit most types of switchgear bushing currently available. For pole top applications, we can supply Raychem termination OXSU-F along with polymeric support insulators (EPBI), Polygarde metal oxide surge arresters (HDA), and most fittings required for installation. All raw materials of Raychem IXSU-F/ OXSU-F are fully traceable.

11kV Termination for Crimp Lug
Screened Single Core Plastic and Rubber Cable

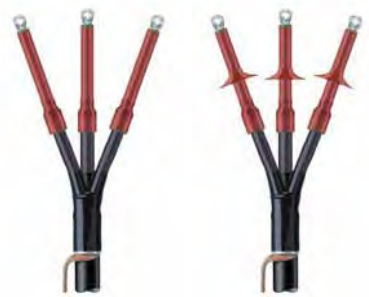
Catalogue Reference Indoor	Catalogue Reference Outdoor	Cross Section (mm²)	Diameter over Insulation (mm)
IXSU-F3111	OXSU-F3111	10 – 35	16.3
IXSU-F3121	OXSU-F3121	25 – 95	13.7 – 20.8
IXSU-F3131	OXSU-F3131	95 – 240	18.6 – 28.4
IXSU-F3141	OXSU-F3141	240 – 500	25.7 – 36.2
IXSU-F3151	OXSU-F3151	500 – 800	34.0 – 42.2
IXSU-F3161	OXSU-F3161	800 – 1200	39.5 – 50.0

11kV Termination with Mechanical Lug
Screened Single Core Plastic and Rubber Cable

Catalogue Reference Indoor	Catalogue Reference Outdoor	Cross Section (mm²)	Diameter over Insulation (mm)
IXSU-F3111-ML-1-13	OXSU-F3111-ML-1-13	25 – 35	13.7 – 16.3
IXSU-F3111-ML-1-17	OXSU-F3111-ML-1-17	25 – 35	13.7 – 16.3
IXSU-F3121-ML-1-13	OXSU-F3121-ML-1-13	25 – 95	13.7 – 20.8
IXSU-F3121-ML-1-17	OXSU-F3121-ML-1-17	25 – 95	13.7 – 20.8
IXSU-F3131-ML-4-13	OXSU-F3131-ML-4-13	95 – 240	18.6 – 28.4
IXSU-F3131-ML-4-17	OXSU-F3131-ML-4-17	95 – 240	18.6 – 28.4
IXSU-F3131-ML-5-13	OXSU-F3131-ML-5-13	120 – 300	20.1 – 30.4
IXSU-F3131-ML-5-17	OXSU-F3131-ML-5-17	120 – 300	20.1 – 30.4
IXSU-F3141-ML-6-13	OXSU-F3141-ML-6-13	185 – 400	23.2 – 33.6
IXSU-F3141-ML-6-17	OXSU-F3141-ML-6-17	185 – 400	23.2 – 33.6
IXSU-F3151-ML-7-17	OXSU-F3151-ML-7-17	500 – 630	34.4 – 40.0
IXSU-F3151-ML-7-21	OXSU-F3151-ML-7-21	500 – 630	34.4 – 40.0

11kV Termination for Crimp Lug
Screened 3 Core Plastic and Rubber Cable without Armour

Catalogue Reference Indoor	Catalogue Reference Outdoor	Cross Section (mm²)	Tail Length (mm)
IXSU-F3301	OXSU-F3301	10 – 16	450
IXSU-F3304	OXSU-F3304	10 – 16	1200
IXSU-F3311	OXSU-F3311	16 – 35	450
IXSU-F3314	OXSU-F3314	16 – 35	1200
IXSU-F3321	OXSU-F3321	25 – 70	450
IXSU-F3324	OXSU-F3324	25 – 70	1200
IXSU-F3331	OXSU-F3331	95 – 240	450
IXSU-F3334	OXSU-F3334	95 – 240	1200
IXSU-F3341	OXSU-F3341	240 – 500	450
IXSU-F3344	OXSU-F3344	240 – 500	1200



11kV Termination with Mechanical Lug
Screened 3 Core Plastic and Rubber Cable without Armour

Catalogue Reference Indoor	Catalogue Reference Outdoor	Cross Section	Tail Length
		(mm²)	(mm)
IXSU-F3311-ML-1-13	OXSU-F3311-ML-1-13	12 - 35	450
IXSU-F3311-ML-1-17	OXSU-F3311-ML-1-17	12 - 35	450
IXSU-F3314-ML-1-13	OXSU-F3314-ML-1-13	12 - 35	1200
IXSU-F3314-ML-1-17	OXSU-F3314-ML-1-17	12 - 35	1200
IXSU-F3321-ML-1-13	OXSU-F3321-ML-1-13	25 - 70	450
IXSU-F3321-ML-1-17	OXSU-F3321-ML-1-17	25 - 70	450
IXSU-F3324-ML-1-13	OXSU-F3324-ML-1-13	25 - 70	1200
IXSU-F3324-ML-1-17	OXSU-F3324-ML-1-17	25 - 70	1200
IXSU-F3331-ML-4-13	OXSU-F3331-ML-4-13	95 - 240	450
IXSU-F3331-ML-4-17	OXSU-F3331-ML-4-17	95 - 240	450
IXSU-F3334-ML-4-13	OXSU-F3334-ML-4-13	95 - 240	1200
IXSU-F3334-ML-4-17	OXSU-F3334-ML-4-17	95 - 240	1200
IXSU-F3341-ML-6-13	OXSU-F3341-ML-6-13	300 - 400	450
IXSU-F3341-ML-6-17	OXSU-F3341-ML-6-17	300 - 400	450
IXSU-F3341-ML-6-21	OXSU-F3341-ML-6-21	300 - 400	450
IXSU-F3344-ML-6-13	OXSU-F3344-ML-6-13	300 - 400	1200
IXSU-F3344-ML-6-17	OXSU-F3344-ML-6-17	300 - 400	1200
IXSU-F3344-ML-6-21	OXSU-F3344-ML-6-21	300 - 400	1200

22kV Termination for Crimp Lug
Screened Single Core Plastic and Rubber Cable

Catalogue Reference Indoor	Catalogue Reference Outdoor	Cross Section	Diameter over Insulation
		(mm²)	(mm)
IXSU-F5121	OXSU-F5121	25 – 70	17.9 – 23.4
IXSU-F5131	OXSU-F5131	70 – 240	21.9 – 32.6
IXSU-F5141	OXSU-F5141	185 – 400	27.4 – 37.8
IXSU-F5151	OXSU-F5151	400 – 800	35.1 – 46.9
IXSU-F5161	OXSU-F5161	1000 – 1200	49.4 – 56.0

22kV Termination with Mechanical Lug
Screened Single Core Plastic and Rubber Cable

Catalogue Reference Indoor	Catalogue Reference Outdoor	Cross Section	Diameter over Insulation
		(mm²)	(mm)
IXSU-F5121-ML-1-13	OXSU-F5121-ML-1-13	25 – 95	17.9 – 25.0
IXSU-F5121-ML-1-17	OXSU-F5121-ML-1-17	25 – 95	17.9 – 25.0
IXSU-F5131-ML-4-13	OXSU-F5131-ML-4-13	95 – 240	23.0 – 32.6
IXSU-F5131-ML-4-17	OXSU-F5131-ML-4-17	95 – 240	23.0 – 32.6
IXSU-F5131-ML-5-13	OXSU-F5131-ML-5-13	120 – 300	24.3 – 34.6
IXSU-F5131-ML-5-17	OXSU-F5131-ML-5-17	120 – 300	24.3 – 34.6
IXSU-F5141-ML-6-13	OXSU-F5141-ML-6-13	120 – 300	24.3 – 34.6
IXSU-F5141-ML-6-17	OXSU-F5141-ML-6-17	185 – 400	27.4 – 37.8
IXSU-F5141-ML-6-21	OXSU-F5141-ML-6-21	185 – 400	27.4 – 37.8
IXSU-F5151-ML-7-17	OXSU-F5151-ML-7-17	500 – 630	37.9 – 44.0
IXSU-F5151-ML-7-21	OXSU-F5151-ML-7-21	500 – 630	37.9 – 44.0

22kV Termination for Crimp Lug
Screened 3 Core Plastic and Rubber Cable without Armour

Catalogue Reference Indoor	Catalogue Reference Outdoor	Cross Section (mm^2)	Tail Length (mm)
IXSU-F5311	**OXSU-F5311**	10 - 25	450
IXSU-F5314	**OXSU-F5314**	10 - 25	1200
IXSU-F5321	**OXSU-F5321**	25 - 50	450
IXSU-F5324	**OXSU-F5324**	25 - 50	1200
IXSU-F5331	**OXSU-F5331**	70 - 185	450
IXSU-F5334	**OXSU-F5334**	70 - 185	1200
IXSU-F5341	**OXSU-F5341**	185 - 400	450
IXSU-F5344	**OXSU-F5344**	185 - 400	1200

22kV Termination with Mechanical Lug
Screened 3 Core Plastic and Rubber Cable without Armour

Catalogue Reference Indoor	Catalogue Reference Outdoor	Cross Section (mm^2)	Tail Length (mm)
IXSU-F5321-ML-1-13	**OXSU-F5321-ML-1-13**	25 - 50	450
IXSU-F5321-ML-1-17	**OXSU-F5321-ML-1-17**	25 - 50	450
IXSU-F5324-ML-1-13	**OXSU-F5324-ML-1-13**	25 - 50	1200
IXSU-F5324-ML-1-17	**OXSU-F5324-ML-1-17**	25 - 50	1200
IXSU-F5331-ML-4-13	**OXSU-F5331-ML-4-13**	95 - 185	450
IXSU-F5331-ML-4-17	**OXSU-F5331-ML-4-17**	95 - 185	450
IXSU-F5334-ML-4-13	**OXSU-F5334-ML-4-13**	95 - 185	1200
IXSU-F5334-ML-4-17	**OXSU-F5334-ML-4-17**	95 - 185	1200
IXSU-F5341-ML-6-13	**OXSU-F5341-ML-6-13**	185 - 400	450
IXSU-F5341-ML-6-17	**OXSU-F5341-ML-6-17**	185 - 400	450
IXSU-F5341-ML-6-21	**OXSU-F5341-ML-6-21**	185 - 400	450
IXSU-F5344-ML-6-13	**OXSU-F5344-ML-6-13**	185 - 400	1200
IXSU-F5344-ML-6-17	**OXSU-F5344-ML-6-17**	185 - 400	1200
IXSU-F5344-ML-6-21	**OXSU-F5344-ML-6-21**	185 - 400	1200

33kV Termination for Crimp Lug
Screened Single Core Plastic and Rubber Cable

Catalogue Reference Indoor	Catalogue Reference Outdoor	Cross Section (mm^2)	Diameter over Insulation (mm)
IXSU-F6131	**OXSU-F6131**	50 – 120	24.5 – 32.0
IXSU-F6141	**OXSU-F6141**	150 – 400	30.8 – 42.8
IXSU-F6151	**OXSU-F6151**	500 – 800	42.6 – 53.4

33kV Termination with Mechanical Lug
Screened Single Core Plastic and Rubber Cable

Catalogue Reference Indoor	Catalogue Reference Outdoor	Cross Section (mm^2)	Diameter over Insulation (mm)
IXSU-F6131-ML-2-13	**OXSU-F6131-ML-2-13**	35 - 120	24.0 - 32.0
IXSU-F6141-ML-5-13	**OXSU-F6141-ML-5-13**	150 - 300	30.8 - 39.6
IXSU-F6141-ML-5-17	**OXSU-F6141-ML-5-17**	150 - 300	30.8 - 39.6
IXSU-F6141-ML-6-13	**OXSU-F6141-ML-6-13**	185 - 400	32.4 - 42.8
IXSU-F6141-ML-6-17	**OXSU-F6141-ML-6-17**	185 - 400	32.4 - 42.8
IXSU-F6141-ML-6-21	**OXSU-F6141-ML-6-21**	185 - 400	32.4 - 42.8
IXSU-F6151-ML-7-17	**OXSU-F6151-ML-7-17**	500 - 630	42.6 - 49.2
IXSU-F6151-ML-7-21	**OXSU-F6151-ML-7-21**	500 - 630	42.6 - 49.2

33kV Termination for Crimp Lug
Screened 3 Core Plastic and Rubber Cable without Armour

Catalogue Reference Indoor	Catalogue Reference Outdoor	Cross Section	Tail Length
		(mm²)	(mm)
IXSU-F6332	OXSU-F6332	50 - 120	650
IXSU-F6334	OXSU-F6334	50 - 120	1200
IXSU-F6342	OXSU-F6342	150 - 300	650
IXSU-F6344	OXSU-F6344	150 - 300	1200
IXSU-F6352	OXSU-F6352	400 - 500	650
IXSU-F6354	OXSU-F6354	400 - 500	1200
IXSU-F5341	OXSU-F5341	185 - 400	450
IXSU-F5344	OXSU-F5344	185 - 400	1200

33kV Termination with Mechanical Lug
Screened 3 Core Plastic and Rubber Cable without Armour

Catalogue Reference Indoor	Catalogue Reference Outdoor	Cross Section	Tail Length
		(mm²)	(mm)
IXSU-F6332-ML-2-13	OXSU-F6332-ML-2-13	50 - 120	650
IXSU-F6334-ML-2-13	OXSU-F6334-ML-2-13	50 - 120	1200
IXSU-F6342-ML-5-13	OXSU-F6342-ML-5-13	150 - 300	650
IXSU-F6342-ML-5-17	OXSU-F6342-ML-5-17	150 - 300	650
IXSU-F6344-ML-5-13	OXSU-F6344-ML-5-13	150 - 300	1200
IXSU-F6344-ML-5-17	OXSU-F6344-ML-5-17	150 - 300	1200
IXSU-F6352-ML-6-13	OXSU-F6352-ML-6-13	400	650
IXSU-F6352-ML-6-17	OXSU-F6352-ML-6-17	400	650
IXSU-F6352-ML-6-21	OXSU-F6352-ML-6-21	400	650
IXSU-F6354-ML-6-13	OXSU-F6354-ML-6-13	400	1200
IXSU-F6354-ML-6-17	OXSU-F6354-ML-6-17	400	1200
IXSU-F6354-ML-6-21	OXSU-F6354-ML-6-21	400	1200

Heat Shrinkable Termination System for Cables up to 36kV

EPKT

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.

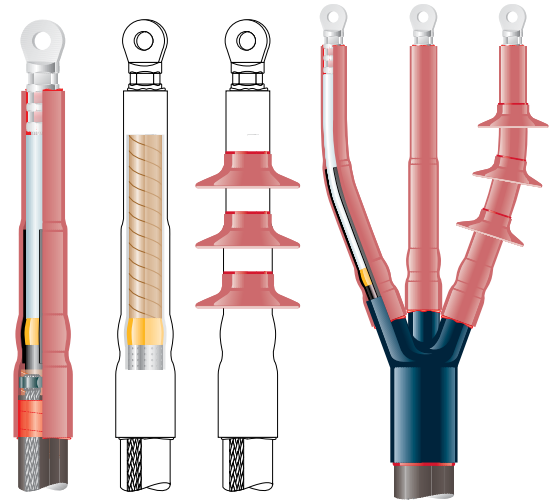
Terminations System Designer

This worksheet enables you to arrive at a part number for an EPKT termination.
Choose one figure from the left-hand column of each table.

Typical part number:

EPKT- 17C3MOH3

Voltage (Umax)
Cable size
Number of cores
Dielectric
Location
Length (3-core-cables)



Voltage in kV	
7	for 7.2 kV
17	for 12 kV & 17.5 kV
24	for 24 kV
36	for 36 kV

Size in mm²	7.2 kV	12 kV & 17.5 kV	24 kV	36 kV
A	16 - 35	16 - 25	-	-
B	50 - 95	35 - 70	25 - 50	-
C	120 - 185	95 - 185	70 - 185	50 - 95
D	240 - 400	240 - 400	240 - 300	120 - 185
E	500 - 1000	500 - 800	400 - 630	240 - 500
F	-	1000	800 - 1000	630 - 1000

Number of Cores	
1	for single core
3	for three core

Dielectric	of insulation type
X	for plastic eg. XLPE, EPDM, EPR, etc
M	for MIND non-draining paper (not applicable for draining paper cables)

Location	of the termination
I	for INDOOR
O	for OUTDOOR

Length (only 3 Core)	of the terminated portion (tail)
H1	for 450mm long
H2	for 650mm long (min for 17.kV outdoor and 36kV indoor)
H3	for 800mm long (min for 24kV outdoor and 36kV outdoor)
H4	for 1200mm long

Live End Seal

MXSE

- Range extension kits up to 1000mm²
- Possible voltage class extension up to 36kV
- Installation procedure and design very close to MXSU
- Application can be extended to 3 core and paper cable applications

Catalogue Reference	Voltage (kV)	Cross Section (mm²)
MXSE-3131	11	70 - 240
MXSE-3141	11	240 - 400
MXSE-3151	11	500
MXSE-3161	11	630
MXSE-3171	11	800
MXSE-3181	11	1000
MXSE-5131	22	70 - 240
MXSE-5141	22	240 - 400
MXSE-5151	22	500
MXSE-5161	22	630
MXSE-5171	22	800
MXSE-5181	22	1000
MXSE-6131	33	70 - 240
MXSE-6141	33	240 - 400
MXSE-6151	33	500
MXSE-6161	33	630
MXSE-6171	33	800
MXSE-6181	33	1000

Section 5: Medium Voltage Joints - up to 42kV

COLD APPLIED

HEAT SHRINK

Cold Shrinkable Straight Joints for Polymeric Insulated Cables up to 36kV

CSJR / CSJH

Features

- Pre-expanded, single piece silicone rubber joint body with high mechanical expansion capability allows a wide application range
- Electrical stress control of the screen cut area by integrated conductive geometrical stress cones
- Electrical stress control of the connector area by an integrated screened connection area (Faraday cage)
- Pre-expansion on a well-known and easy-to-install holdout system
- Choice of outer sealing and protection systems
- Easy to install joint system with short installation time
- Exceeds CENELEC HD 629.1, requirements which include IEC, BS, VDE and other international specifications
- Mechanical shear bolt connectors to IEC 61238-1 with wide application range for conductor and wire shield can be supplied with the kit
- Proven shield continuity concept

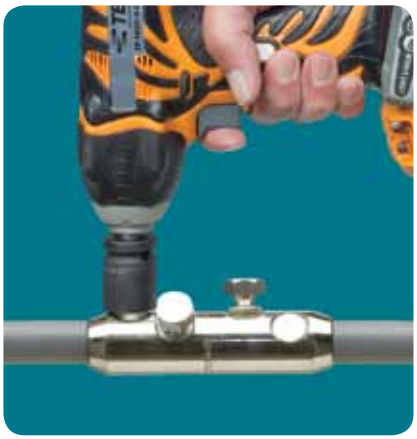
Mechanical shear bolt connectors
CSJR/CSJH joints are available with TE Connectivity's BSM mechanical connectors fitted with shear head bolts to ensure a reliable connection for different conductor materials, shapes and types used in today's network. The pre-set shear torque of the bolts ensures that the correct contact pressure is always achieved.

Pre-expanded silicone joint body
The silicone rubber joint body is delivered in a pre-expanded condition on a spiral holdout system. Silicone materials with excellent mechanical properties allow high expansion forces and therefore guarantee a wide application range. Integrated stress control mechanism and conductive outer layer provide exceptional electrical performance. The joint body can be easily removed from the spiral holdout with low release forces, particularly designed for joint applications.

Electrical stress control
Electrical stress control is fully integrated in the silicone joint body by well defined conductive areas. Conductive cones with an exactly defined geometrical design over the screen cut area provide excellent electrical stress control. The electrical stress control of the connector area is made with an integrated conductive screen performing as a Faraday cage. The coverage of voids and edges at the connection area with void fillers is not necessary.

Shield continuity
Typical shield wire cross sections up to 35 mm^2 can easily be connected by either mechanical or compression connectors. Positioned at the oversheath cut-back, the connection provides a smooth profile resistant to mechanical damage. Additional layers of copper mesh are applied around the joint to provide shielding and protection.

Outer sealing and protection
CSJx joints are available with alternative re-jacketing methods. CSJR joints include a dual-wall Rayvolve sleeve with entrapped lubricant. The elastomeric sleeve rolls onto the cable and over the joint area. The gripping force of the specially formulated EPDM elastomer combined with a high performance sealant forms a reliable moisture seal and corrosion protection for the joint system. On CSJH joints the outer sealing and protection is provided by a thick-wall, heat shrinkable tubing. Effective moisture seal and corrosion protection for the joint is ensured by the co-extruded hot melt adhesive. When installed, the heat shrinkable tubing provides a similar level of protection as the PE oversheath of modern cables.



Cold Shrinkable Inline Joints with Rayvolve EPDM Sleeve as Outer Protection

Catalogue Reference	Voltage	Applicable Range*	Diameter Over Core Insulation	Diameter Over Outer Sheath	Diameter Over Conductor **
	kV	(mm)	(mm)	(mm)	(mm)
CSJR-12B/1XU-1XU-M	12	95 - 240	18.6 - 28.4	26.0 - 39.0	11.0 - 19.2
CSJR-12C/1XU-1XU-M	12	185 - 300	23.2 - 32.6	30.0 - 44.0	15.5 - 23.1
CSJR-12D/1XU-1XU-M	12	240 - 400	25.7 - 33.6	33.0 - 45.0	17.8 - 24.6
CSJR-12E/1XU-1XU-M1	12	500	34.4 - 36.2	43.0 - 48.0	25.7 - 27.6
CSJR-12E/1XU-1XU-M2	12	630	38.0 - 40.0	47.0 - 52.0	29.3 - 32.5
CSJR-24B/1XU-1XU-M	24	35 - 150	18.9 - 28.5	26.0 - 39.0	6.8 - 19.2
CSJR-24C/1XU-1XU-M1	24	95 - 240	23.5 - 32.6	30.0 - 44.0	11.0 - 19.2
CSJR-24C/1XU-1XU-M2	24	120 - 300	24.3 - 34.6	32.0 - 46.0	12.5 - 21.6
CSJR-24D/1XU-1XU-M	24	185 - 400	27.4 - 37.8	35.0 - 49.0	15.5 - 24.6
CSJR-24E/1XU-1XU-M1	24	500	37.9 - 40.6	46.0 - 52.0	25.7 - 27.6
CSJR-24E/1XU-1XU-M2	24	630	41.0 - 44.0	56.0 - 57.0	29.3 - 32.5
CSJR-36D/1XU-1XU-M	36	95 - 240	27.8 - 37.6	35.0 - 48.0	11.0 - 19.2
CSJR-36E/1XU-1XU-M1	36	240 - 400	34.9 - 42.8	42.0 - 54.0	17.8 - 24.6
CSJR-36E/1XU-1XU-M2	36	500	42.6 - 45.6	51.0 - 57.0	25.7 - 27.6
CSJR-36E/1XU-1XU-M3	36	630	45.8 - 49.2	56.0 - 61.0	29.3 - 32.5

Cold Shrinkable Inline Joints with WCSM Heat Shrinkable Sleeve as Outer Protection

Catalogue Reference	Voltage	Applicable Range*	Diameter Over Core Insulation	Diameter Over Outer Sheath	Diameter Over Conductor **
	kV	(mm)	(mm)	(mm)	(mm)
CSJH-12B/1XU-1XU-M	12	95 - 240	18.6 - 28.4	26.0 - 39.0	11.0 - 19.2
CSJH-12C/1XU-1XU-M	12	185 - 300	23.2 - 32.6	30.0 - 44.0	15.5 - 23.1
CSJH-12D/1XU-1XU-M	12	240 - 400	25.7 - 33.6	33.0 - 45.0	17.8 - 24.6
CSJH-12E/1XU-1XU-M1	12	500	34.4 - 36.2	43.0 - 48.0	25.7 - 27.6
CSJH-12E/1XU-1XU-M2	12	630	38.0 - 40.0	47.0 - 52.0	29.3 - 32.5
CSJH-24B/1XU-1XU-M	24	35 - 150	18.9 - 28.5	26.0 - 39.0	6.8 - 19.2
CSJH-24C/1XU-1XU-M1	24	95 - 240	23.5 - 32.6	30.0 - 44.0	11.0 - 19.2
CSJH-24C/1XU-1XU-M2	24	120 - 300	24.3 - 34.6	32.0 - 46.0	12.5 - 21.6
CSJH-24D/1XU-1XU-M	24	185 - 400	27.4 - 37.8	35.0 - 49.0	15.5 - 24.6
CSJH-24E/1XU-1XU-M1	24	500	37.9 - 40.6	46.0 - 52.0	25.7 - 27.6
CSJH-24E/1XU-1XU-M2	24	630	41.0 - 44.0	56.0 - 57.0	29.3 - 32.5
CSJH-36D/1XU-1XU-M	36	95 - 240	27.8 - 37.6	35.0 - 48.0	11.0 - 19.2
CSJH-36E/1XU-1XU-M1	36	240 - 400	34.9 - 42.8	42.0 - 54.0	17.8 - 24.6
CSJH-36E/1XU-1XU-M2	36	500	42.6 - 45.6	51.0 - 57.0	25.7 - 27.6
CSJH-36E/1XU-1XU-M3	36	630	45.8 - 49.2	56.0 - 61.0	29.3 - 32.5

* The application range given in the table is based on polymeric insulated cables according to IEC 60502 with stranded circular conductors.
Due to different conductor dimensions and/or cable constructions the minimum and maximum application range may be extendable. Please contact your local sales representative.

** The diameter over conductor is needed only for kits including TE BSM connectors. The values given in the selection table refer to aluminium circular conductors and may change for other materials and shapes.

Cold Shrinkable "All in One" Straight Joint for Polymeric Insulated Cables up to 42kV

CSJA

Features

- Joint body, earthing system and rejacketing pre-expanded on one holdout system
- Single piece silicone rubber joint body with high mechanical expansion capability allows a wide application range
- Electrical stress control of the screen cut area by integrated conductive geometrical stress cones
- Electrical stress control of the connector area by an integrated screened connection area (Faraday cage)
- Well-known and easy-to-install holdout system • Short parking distance required
- Easy-to-install joint system with short installation time
- Exceeds CENELEC HD 629.1, requirements which include IEC, BS, VDE and other international specifications
- Mechanical shear bolt connector to IEC 61238-1 is supplied with the kit
- Proven shield continuity concept

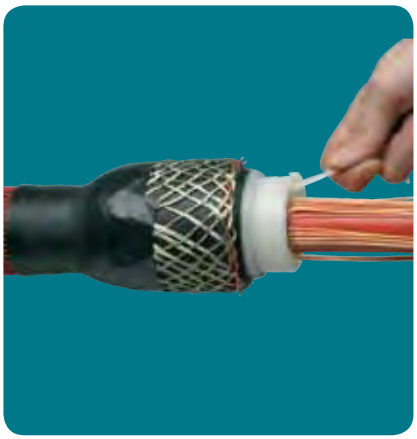
Mechanical shear bolt connectors
CSJA joints are provided with TE's BSM mechanical connectors fitted with shear head bolts to ensure a reliable connection for different conductor materials, shapes and types used in today's network. The pre-set shear torque of the bolts ensures that the correct contact pressure is always achieved. The specially designed contact surface on the inside of the connector breaks up any oxide layer and ensures reliable service over the entire life of the joint. Different sizes of mechanical connectors with wide application ranges are available. The connectors have been tested in accordance with IEC-61238-1 class A.

Pre-expanded silicone joint body
The silicone rubber joint body is delivered in a pre-expanded condition on a spiral holdout system. Silicone materials with excellent mechanical properties allow high expansion forces and therefore guarantee a wide application range. Integrated stress control mechanism and conductive outer layer provide exceptional electrical performance. The joint body can be easily removed from the spiral holdout with low release forces, particularly designed for joint applications.

Electrical stress control
Electrical stress control is fully integrated in the silicone joint body by well defined conductive areas. Conductive cones with an exactly defined geometrical design over the screen cut area provide excellent electrical stress control. The electrical stress control of the connector area is made with an integrated conductive screen performing as a Faraday cage. The coverage of voids and edges at the connection area with void fillers is not necessary.

Shield continuity
The integrated pre-expanded copper mesh is connected to the cable screens by constant force roll springs. This connection method reliably operates during load-cycling and thermal short circuits of the conductors on all cable types regardless of whether the oversheath is PVC or PE. It provides a smooth profile which is resistant to mechanical impacts. The solderless earth connection has more than 25 years service experience in Raychem joint systems used worldwide.

Outer sealing and protection
The CSJA joint has an integrated outer protection system which is already expanded onto the joint body and requires no additional parking distance. The EPDM sleeve combined with a high performance sealant forms a reliable moisture seal and corrosion protection. It is easy to install by just rolling out the flipped back rejacketing.

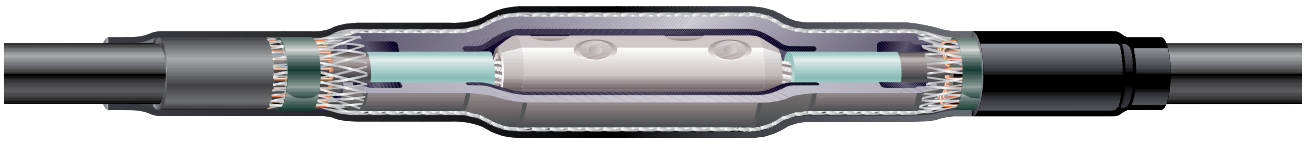


CSJA Joint with Mechanical Connector

Catalogue Reference	Voltage	Applicable Range*	Diameter Over Core Insulation	Diameter Over Outer Sheath	Diameter Over Conductor **
	kV	(mm)	(mm)	(mm)	(mm)
CSJA-12B/1XU-1XU-M	12	95 - 240	18.6 - 28.4	26.0 - 39.0	11.0 - 19.2
CSJA-12C/1XU-1XU-M	12	185 - 300	23.2 - 32.6	30.0 - 44.0	15.5 - 23.1
CSJA-12D/1XU-1XU-M	12	240 - 400	25.7 - 33.6	33.0 - 45.0	17.8 - 24.6
CSJA-12E/1XU-1XU-M1	12	500	34.4 - 36.2	43.0 - 48.0	25.7 - 27.6
CSJA-12E/1XU-1XU-M2	12	630	38.0 - 40.0	47.0 - 52.0	29.3 - 32.5
CSJA-24B/1XU-1XU-M	24	35 - 150	18.9 - 28.5	26.0 - 39.0	6.8 - 19.2
CSJA-24C/1XU-1XU-M1	24	95 - 240	23.5 - 32.6	30.0 - 44.0	11.0 - 19.2
CSJA-24C/1XU-1XU-M2	24	120 - 300	24.3 - 34.6	32.0 - 46.0	12.5 - 21.6
CSJA-24D/1XU-1XU-M	24	185 - 400	27.4 - 37.8	35.0 - 49.0	15.5 - 24.6
CSJA-24E/1XU-1XU-M1	24	500	37.9 - 40.6	46.0 - 52.0	25.7 - 27.6
CSJA-24E/1XU-1XU-M2	24	630	41.0 - 44.0	56.0 - 57.0	29.3 - 32.5
CSJA-36D/1XU-1XU-M	36	95 - 240	27.8 - 37.6	35.0 - 48.0	11.0 - 19.2
CSJA-36E/1XU-1XU-M1	36	240 - 400	34.9 - 42.8	42.0 - 54.0	17.8 - 24.6
CSJA-36E/1XU-1XU-M2	36	500	42.6 - 45.6	51.0 - 57.0	25.7 - 27.6
CSJA-36E/1XU-1XU-M3	36	630	45.8 - 49.2	56.0 - 61.0	29.3 - 32.5

* The application range given in the table is based on polymeric insulated cables according to IEC 60502 with stranded circular conductors.
Due to different conductor dimensions and/or cable constructions the minimum and maximum application range may be extendable. Please contact your local sales representative.

** The diameter over conductor is needed only for kits including TE's BSM connectors. The values given in the selection table refer to aluminium circular conductors and may change for other materials and shapes.

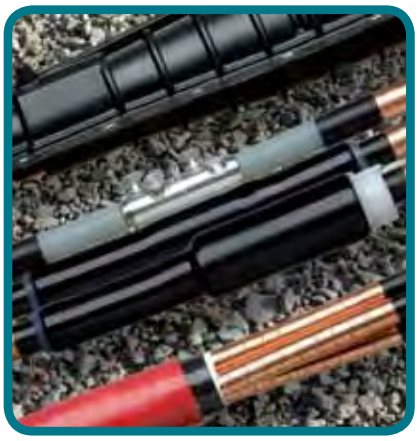


MV Cold Shrinkable Joint for 3 Core Cables with Resin Encapsulation

CSJT-H

Features

- Pre-expanded, single piece silicone rubber joint body with high mechanical expansion capability allows a wide application range
- Electrical stress control of the screen cut area by integrated conductive geometrical stress cones
- Electrical stress control of the connector area by an integrated screened connection area (Faraday cage)
- Pre-expansion on a well-known and easy-to-install holdout system
- Proven shield continuity concept
- Fast and easily filled resin outer sealing and protection system providing effective impact resistance
- Hard-elastic polyurethane-type encapsulation with excellent insulation properties, hydrolytic stability and hydrophobic characteristics
- Exceeds CENELEC HD 629.1, requirements which include IEC, BS, VDE and other international specifications

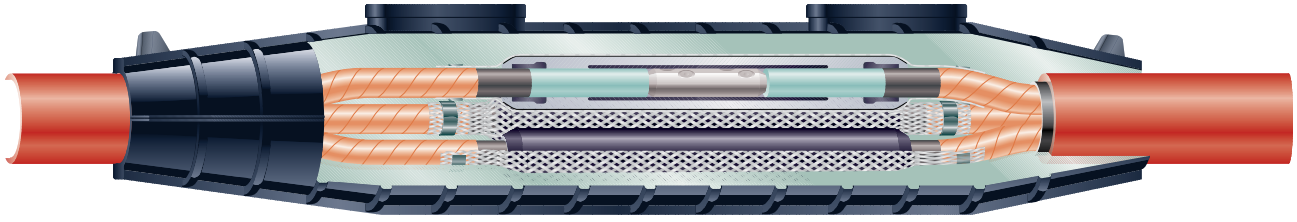


CSJA Joint with Mechanical Connector

Catalogue Reference	Voltage	Applicable Range*	Diameter Over Core Insulation	Diameter Over Outer Sheath	Admissible Connector Dimensions	
	kV	(mm)	(mm)	(mm)	Max Length (mm)	Max Dia (mm)
CSJT-12B/3XU-3XU-H	12	95 - 240	18.6 - 28.4	50.0 - 100.0	145.0	33.0
CSJT-12C/3XU-3XU-H	12	185 - 300	23.2 - 32.6	50.0 - 100.0	145.0	37.0
CSJT-24B/3XU-3XU-H	24	35 - 185	18.9 - 30.1	50.0 - 100.0	145.0	33.0
CSJT-24C/3XU-3XU-H	24	95 - 300	23.5 - 34.6	50.0 - 100.0	145.0	37.0

* The application range given in the table is based on polymeric insulated cables according to IEC 60502 with stranded circular conductors.
Due to different conductor dimensions and/or cable constructions the minimum and maximum application range may be extendable. Please contact your local sales representative.

Note: CSJT-H 3-core joints can be supplied with compression connectors or TE's mechanical BSM connectors.
CSJT-H 3-core joints can be modified for different armour types and/or wire shield cables.
Please contact your local sales representative.



MV Cold Shrinkable Joint for 3 Core Cables with Heat Shrinkable Protection

CSJH

Features

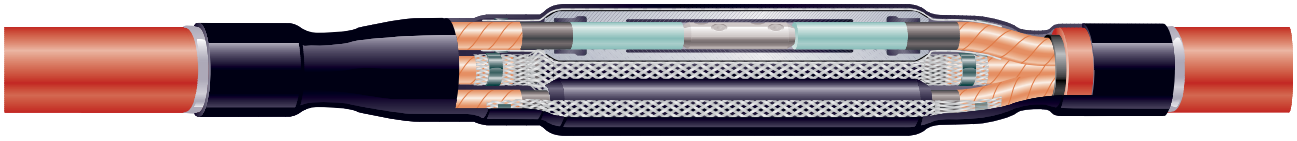
- Pre-expanded, single piece silicone rubber joint body with high mechanical expansion capability allows a wide application range
- Electrical stress control of the screen cut area by integrated conductive geometrical stress cones
- Electrical stress control of the connector area by an integrated screened connection area (Faraday cage)
- Pre-expansion on a well-known and easy-to-install holdout system
- Proven shield continuity concept
- The WCSM heat shrinkable outer protection provides effective impact resistance.
- Hot melt adhesive ensures an effective moisture seal and corrosion protection
- Exceeds CENELEC HD 629.1, requirements which include IEC, BS, VDE and other international specifications

CSJH 3 Core Joint without Connector

Catalogue Reference	Voltage	Applicable Range*	Diameter Over Core Insulation	Diameter Over Outer Sheath	Admissible Connector Dimensions	
	kV	(mm)	(mm)	(mm)	Max Length (mm)	Max Dia (mm)
CSJH-12B/3XU-3XU	12	95 - 240	18.6 - 28.4	50.0 - 120.0	145.0	33.0
CSJH-12C/3XU-3XU	12	185 - 300	23.2 - 32.6	50.0 - 120.0	145.0	37.0
CSJH-24B/3XU-3XU	24	35 - 185	18.9 - 30.1	50.0 - 120.0	145.0	33.0
CSJH-24C/3XU-3XU	24	95 - 300	23.5 - 34.6	50.0 - 120.0	145.0	37.0

* The application range given in the table is based on polymeric insulated cables according to IEC 60502 with stranded circular conductors.
Due to different conductor dimensions and/or cable constructions the minimum and maximum application range may be extendable. Please contact your local sales representative.

Note: CSJH 3-core joints can be supplied with compression connectors or TE mechanical BSM connectors.
CSJH 3-core joints can be modified for armoured and/or wire shield cables.
Please contact your local sales representative.



MV Cold Applied Transition Joint for 3 Core Paper Insulated Cables to Polymeric Insulated Cables

CATJ

Features

- Entirely cold-applied solution with cold shrinkable silicone joint body and oil blocking materials
- Novel crutch filling and core sealing materials providing high quality oil blocking properties
- Electrical stress control of the screen cut area by integrated conductive geometrical stress cones
- Electrical stress control of the connector area by an integrated screened connection area (Faraday cage)
- Well known and easy to install holdout system • Proven solderless shield continuity concept
- Exceeds CENELEC HD 629.2 requirements which include IEC, BS, VDE and other international standards like IEEE-404
- Mechanical shear bolt connector to IEC 61238-1 supplied with the kit

Paper core sealing
The cold shrinkable silicone tubing provides excellent oil-sealing property. Non-spiral holdouts over the paper cores prevent damage to paper insulation layers. Screening is provided as conductive outer layer on the oil-blocking tubing. The paper cable is thus sealed and free from electrical stress between the phases independent from the voltage level.

Cable crutch filling
Oil-barrier material in the crutch and novel sealing tapes create an improved oil barrier. On top of the sealing, the red pressure tape forces air out to prevent discharge and ensures proper filling of the crutch. After installation, the pressure tape holds the oil-blocking filler in place to resist internal cable pressure.

Connector seal
In the connector area additional oil-blocking double-layer tapes are used to keep oil in the paper insulated cable. In combination with TE's BSM mechanical connectors reliable connection for different conductor shapes and types is ensured.

Pre-expanded silicone joint body
The silicone rubber joint body is delivered in a pre-expanded condition on a spiral holdout system. Silicone materials with excellent mechanical properties allow high expansion forces and therefore provide a wide application range. Integrated stress control mechanism and conductive outer layer provide high electrical performance. The joint body can be easily removed from the spiral holdout with low release forces, particularly designed for joint applications.

Shield continuity
Positioned at the lead sheath the cables screens are connected by a constant force roll spring. The roll spring ensures a tool free installation and provides a reliable contact force for excellent performance during load cycle and short circuit conditions. This solderless earth connection is a proven concept and has more than 25 years service experience

Resin encapsulation
The fast and easily filled resin outer sealing and protection system provides effective impact resistance. The hard-elastic polyurethane-type encapsulation has excellent insulation properties, hydrolytic stability and hydrophobic characteristics. The resin encapsulation provides a reliable moisture seal and corrosion protection.

3 Core Paper to Single Core Polymeric

Catalogue Reference	Voltage	Applicable Range*	Diameter Over Core Insulation Polymeric Cable	Dimensions Over Core Insulation Paper Cable	Diameter Over Conductor **
	kV	(mm)	(mm)	(mm)	(mm)
CATJ-12B/1XU-3SB	12	95-240	18.6 – 28.4	17.1 – 29.5	11.0 – 19.2
CATJ-12C/1XU-3SB	12	185-300	23.2 – 32.6	29.5 – 33.6	15.5 – 23.1
CATJ-24C/1XU-3SB	24	95-240	23.5 – 32.6	21.3 – 34.5	11.0 – 19.2
CATJ-36D/1XU-3SB	36 (42)	95-240	27.8 – 37.6	29.3 – 36.1	11.0 – 19.2

3 Core Paper to 3 Core Polymeric

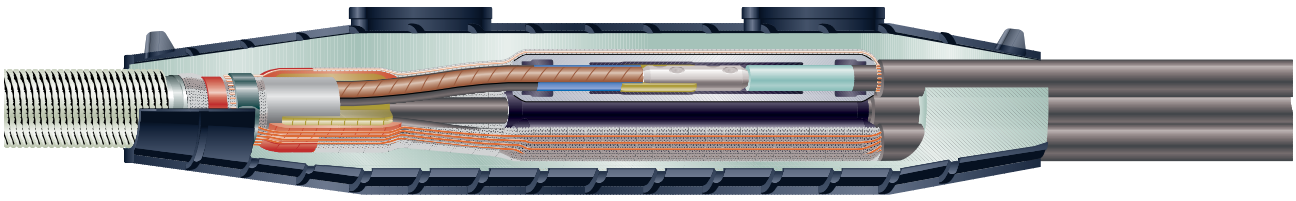
Catalogue Reference	Voltage	Applicable Range*	Diameter Over Core Insulation Polymeric Cable	Dimensions Over Core Insulation Paper Cable	Diameter Over Conductor **
	kV	(mm)	(mm)	(mm)	(mm)
CATJ-12B/3XU-3SB	12	95-240	18.6 - 28.4	17.1 - 29.5	11.0 - 19.2
CATJ-12C/3XU-3SB	12	185-300	23.2 – 32.6	29.5 – 33.6	15.5 - 23.1
CATJ-24C/3XU-3SB	24	95-240	23.5 – 32.6	21.3 -34.5	11.0 - 19.2
CATJ-36D/3XU-3SB	36 (42)	95-240	27.8 – 37.6	29.3 – 36.1	11.0 - 19.2

For all applications the diameter of the outer sheath should be within 50 mm to 120 mm

* The application range given in the table is based on polymeric insulated cables according to IEC 60502 with stranded circular conductors. Due to different conductor dimensions and/or cable constructions the minimum and maximum application range may be extendable. Please contact your local sales representative.
**The values given in the selection table refer to aluminium circular conductors and may change for other materials and shapes.

Possible adaptations of Raychem CATJ MV cold applied transition joints
- Applications for other cross sections and system voltages are available on request.
- CATJ cold applied transition joints can be modified for armoured and/or for tape shielded cables.
- CATJ cold applied transition joint system is also available for single core applications.
- CATJ cold applied transition joints can be adopted for paper-paper connections.

Please contact your local sales representative.



MV Cold Shrinkable Branch Joint for Polymeric Insulated Cable

CSBJ

Features

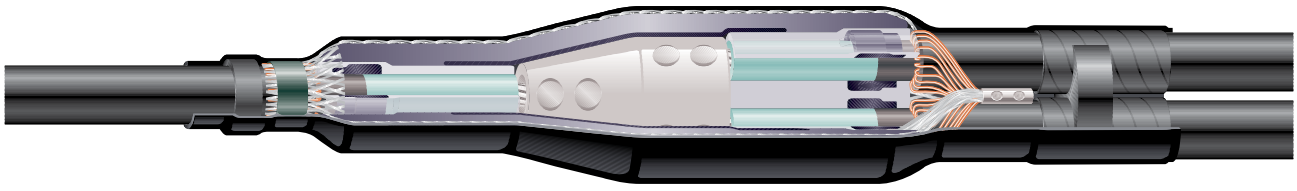
- Single piece silicon rubber push-on adaptors for easy installation
- Joint body, earthing system and rejacketing pre-expanded on one holdout system.
- Well-known and easy-to-install holdout system
- Short parking distance required
- Electrical stress control of the screen cut area by integrated conductive geometrical stress cones
- Electrical stress control of the connector area by an integrated screened connection area (Faraday cage)
- Mechanical shear bolt connector is supplied with the kit
- Exceeds CENELEC HD 629.1, requirements which include IEC, BS, VDE and other international specifications

CSJB with Mechanical Connector

Catalogue Reference	Voltage	Applicable Range*	Diameter Over Core Insulation	Diameter Over Outer Sheath	Diameter Over Conductor
	kV	(mm)	(mm)	(mm)	(mm)
CSBJ-12F/1XU-2XU-M	12	95 - 240	18.6 - 28.4	26.0 - 39.0	11.0 - 19.2
CSBJ-24F/1XU-2XU-M	24	95 - 240	23.5 - 32.6	30.0 - 44.0	11.0 - 19.2

* The application range given in the table is based on polymeric insulated cables according to IEC 60502 with stranded circular conductors.

Due to different conductor dimensions and/or cable constructions the minimum and maximum application range may be extendable. Please contact your local sales representative.



Filled Joint for Belted or Screened, MI or MIND, 3 Core, Paper Insulated Cables up to 12kV

EFSJ

The Raychem EFSJ series of filled joints are problem solving products based on materials science expertise. The main features of the joints are:

- Heat shrink compound box
- No pouring of hot compounds
- Lightweight and low profile
- Versatile and easy to install

Many utilities today are installing polymeric cables as standard. Nevertheless, much of the existing network, and a substantial proportion of new installations are 12 kV paper insulated, MIND or MI cable. It is widely recognised that heat shrinkable cable accessories are the answer to jointing the new polymeric cables due to their ease of installation and reliability.
For paper cables, the Raychem EFSJ system offers joints that:

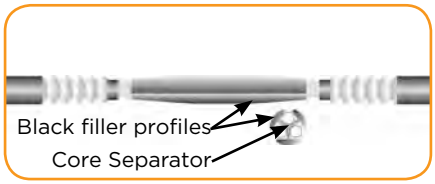
- Simplify installation
- Accommodate transitions to polymeric cables
- Are compatible with proven jointing practices

Primary insulation over the connectors is provided with proven heat shrinkable insulating sleeves. The bulk filling medium is a cold applied mastic compound, fully compatible with the materials that are used to impregnate paper cables. The compound is contained in a low profile, heat shrinkable casing – a shrinkable compound box. During installation of the heat shrinkable casing the compound flows and fills, ensuring a fully blocked joint. The result is a joint that can be made quickly and reliably without the need to handle heavy, metal joint cases and without the requirement to pour hot compounds and oils.

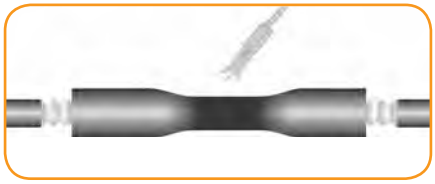
The EFSJ is versatile. It is factory engineered for use on belted or screened, three-core, paper insulated, MI and MIND cables. Each basic joint kit can accommodate several cable sizes, so only four kits are required for the range of cross sections from 16 to 300 mm^2.

Transitions between paper cables of different cross sections and from paper to polymeric cables are achieved simply by the use of add on transition modules. Mechanical kits are available that eliminate the requirement for plumbing in connecting cable sheaths.

1. Insulating sleeves are shrunk over the connectors.



2. The cold-applied mastic compound is placed over the insulated cores.



3. The heavy, dual walled, insulating/conducting sleeve is shrunk down.

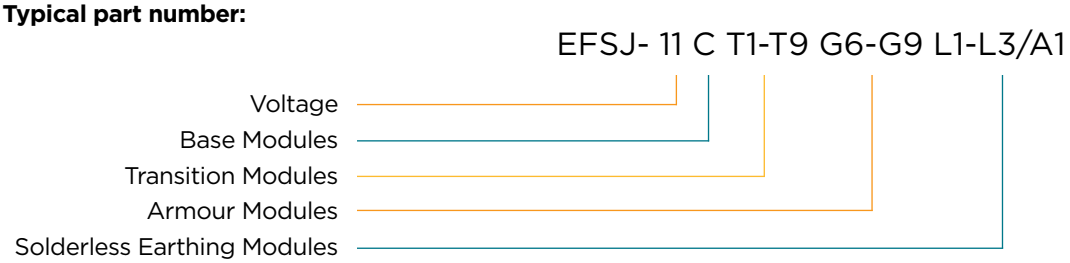
4. The copper earth braid and steel armour wrap are installed.

5. The outer sealing sleeves are shrunk down. The cable can be energised at once.

Joint System Designer

This worksheet enables you to arrive at a part number for an EFSJ straight or transition joint.
Choose one figure from the left-hand column of each table.

Typical part number:



Voltage in kV	
11	for 6.6 - 11kV

Base Modules - always choose the module to suit the largest cable size

Size in mm²	7.2 kV	12 kV & 17.5 kV
EFSJ-A	25 - 50	16 - 50
EFSJ-B	70 - 120	50 - 95
EFSJ-C	120 - 240	95 - 185
EFSJ-D	240 - 300	185 - 300

For transition joints only

Transition Modules - 3 core paper to single core polymeric

Size in mm²	6.6 kV	11 kV
EFSJ-T1	25 - 70	16 - 50
EFSJ-T2	70 - 120	50 - 95
EFSJ-T3	120 - 185	95 - 185
EFSJ-T4	185 - 300	185 - 300

Transition Modules - 3 core paper to 3 core polymeric

Size in mm²	6.6 kV	11 kV
EFSJ-T6	25 - 70	16 - 50
EFSJ-T7	70 - 120	50 - 95
EFSJ-T8	120 - 185	95 - 185
EFSJ-T9	185 - 300	185 - 300

Steel Wire Armour Modules for 3 core polymeric

Size in mm²	6.6 kV	11 kV
EFSJ-G6	25 - 70	16 - 50
EFSJ-G7	95 - 120	70 - 95
EFSJ-G8	150 - 185	120 - 185
EFSJ-G9	240 - 300	240 - 300

Mechanical Earth Kits for Lead Sheath (Max 10kA Earth Fault Level)

Size in mm²	6.6 kV	11 kV
EFSJ-L1	25 - 50	16
EFSJ-L2	70 - 120	25 - 70
EFSJ-L3	150 - 300	95 - 300

Mechanical Earth Kits for Aluminium Sheath

Size in mm²		11 kV
EFSJ-A1		50 - 300

Paper Insulated Cables Inline and Transitions

Module	3 Core Paper or 1/3 Core Plastic	3 Core Paper	to	3 Core Paper	1 Core Plastic	3 Core Plastic with Armour	3 Core Plastic without Armour
	(mm^2)	(mm^2)		(mm^2)	(mm^2)	(mm^2)	(mm^2)
EFSJ-SP1	70 - 95		to	16 - 35			
EFSJ-SP2	120 - 185		to	16 - 70			
EFSJ-SP3	240 - 300		to	16 - 50			
EFSJ-SP4	240 - 300		to	70 - 95			
EFSJ-SP5	240 - 300		to	120 - 150			
EFSJ-SY1		70 - 95	to		16 - 35		
EFSJ-SY1		120 - 185	to		16 - 70		
EFSJ-SY2		240 - 300	to		16 - 50		
EFSJ-SY3		240 - 300	to		70 - 95		
EFSJ-SY4		240 - 300	to		120 - 150		
EFSJ-SX1		70 - 95	to			16 - 35	
EFSJ-SX1		120 - 185	to			16 - 70	
EFSJ-SX2		240 - 300	to			16 - 50	
EFSJ-SX3		240 - 300	to			70 - 95	
EFSJ-SX4		240 - 300	to			120 - 150	
EFSJ-SX1		70 - 95	to				16 - 35
EFSJ-SX5		120 - 185	to				16 - 70
EFSJ-SX6		240 - 300	to				16 - 50
EFSJ-SX7		240 - 300	to				70 - 95
EFSJ-SX8		240 - 300	to				120 - 150

Example: EFSJ-11-A
11kV 3 core paper cable inline joint 16 - 50mm^2
Example: EFSJ-11-B and EFSJ-T2
11kV 3 core paper cable to 3 single core XLPE transition joint 50 - 95mm^2
Example: EFSJ-11-C and EFSJ-T8 and EFSJ-G8
11kV 3 core paper cable to 3 core XLPE with steel wire armours transition joint 120 - 185mm^2
Example: EFSJ-11-D and EFSJ-T9 and EFSJ-SP4
11kV 3 core paper cable 70mm^2 to 3 core XLPE cable 300mm^2

Heat Shrinkable Joints for Screened Plastic and Rubber Insulated Cables up to 36kV

EPKJ

For jointing plastic insulated cables for up to 36 kV we offer a system based on heat shrinkable materials which are fast and simple to install, eliminates shelf life limitations even in severe climates and permits immediate back-filling of the trench and re-energise.

Reliability in installation
The insulating, screening and electrical field control layers of the joint are made of cross-linked polymeric materials with precisely defined electrical characteristics. The cross-linking process results in an “elastic memory”, activated simply by heating. The memory then causes the components to shrink to a predetermined diameter; the correct insulation thickness is thus achieved in one step automatically.

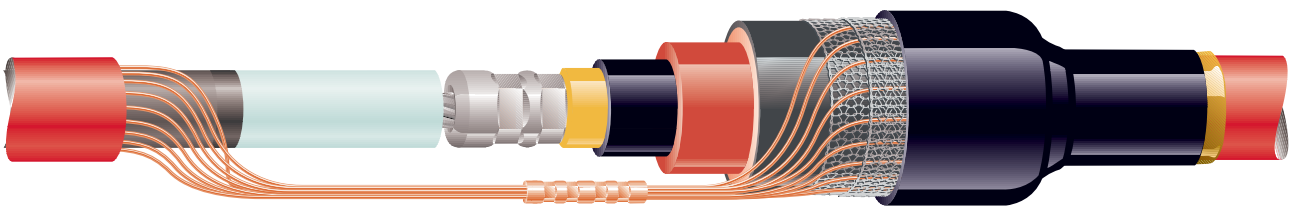
A simple fast jointing technique
The joint components are supplied as a pre-engineered set of heat shrinkable tubings, which means the cable fitter does not have to check the thickness or length of the system. Our system thus ensures accurate installation work while enabling the joint to be installed in significantly less time than many alternative techniques.

Proven technology
The long term performance of Raychem heat shrinkable materials has been demonstrated by well proven Raychem termination system. Millions of cable accessory installations for up to 36 kV in some of the severest service conditions have confirmed their reliability under high electrical, thermal and environmental stress.

A universal system
Cable preparation and installation techniques for Raychem medium voltage joints are identical to those for Raychem heat shrinkable terminations. The same basic design is also shared by Raychem joints for MIND paper insulated cables for up to 36 kV. In this respect, again, the heat shrinkable system sets new standards of efficiency and simplicity for the cable fitter’s work.

Rational stock keeping
The performance and ease of installation of Raychem high voltage heat shrinkable materials are not sensitive to storage time or normal storage conditions. A few kits cover the standard size range of cables, including single core cables for 36 kV up to 630 mm2, allow the use of various types of connectors and shrink to fit either round or sector-shaped cores and different constructions.

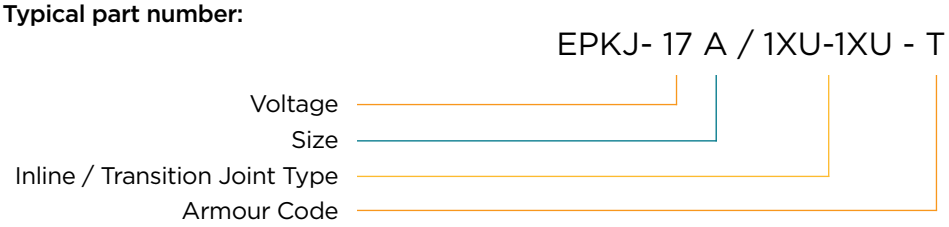
Mechanical strength
For steel wire or tape armoured cables Raychem joints incorporate a lightweight impact resistant galvanised steel joint case which is quick to install and provides earth fault current capacity. Heat shrinkable sleeves provide outer sealing and corrosion protection of the joint.



Joint System Designer

This worksheet enables you to arrive at a part number for an EPKJ straight or transition joint.
Choose one figure from the left-hand column of each table.

Typical part number:



Voltage in kV	
17	up to 17.5 kV
24	24 kV
36	36 kV

Size

Size in mm²	12 kV	17.5 kV	24 kV	36 kV
A	35 - 70	25 - 50	25	50 - 70
B	95 - 185	70 - 150	35 - 70	95 - 150
C	240 - 400	185 - 300	95 - 240	185 - 400
D	500 - 630	400 - 500	300 - 400	500 - 630

Inline Joint Type

1XU - 1XU	Single Core Plastic without Armour
1XU - 3XU	Single Core to 3 Core Plastic without Armour
3XU - 3XU	3 Core Plastic without Armour
1HL - 1HL	Single Core HSL Paper
1HL - 3HL	Single Core HSL to 3 Core HSL Paper
1HL - 3SB	Single Core HSL Paper to 3 Core S/B Paper
3HL - 3HL	3 Core HSL Paper
3HL - 3SB	3 Core HSL Paper to 3 Core S/B Paper
3SB - 3SB	3 Core Screened / Belted

Transition Joint Type

1XU - 1HL	Single Core Plastic to Single Core HSL Paper
1XU - 3HL	Single Core Plastic to 3 Core HSL Paper
1XU - 3SB	Single Core Plastic to 3 Core S/B Paper
3XU - 1HL	3 Core Plastic to 1 Core HSL Paper
3XU - 3HL	3 Core Plastic to 3 Core HSL Paper
3XU - 3SB	3 Core Plastic to 3 Core S/B Paper

Armour Code

T	Tape Armour
W	Wire Armour

Jointing System up to 36kV Complete with Mechanical Connectors

MXSU
MXAW
MXSW

MXSU is based on a joint design using mechanical connectors

- Mechanical connectors for conductor and wire shield are supplied with the kit
- Kits are widely range taking and cover most conductor constructions including their tolerances
- No crimping tools or tool maintenance required
- Short and space saving design for installation
- Improves installation reliability
- Has unlimited shelf life, simplifies material logistics and reduces cost
- Avoids bulky waste and costly waste disposal
- Exceeds international performance standards including CENELEC HD 629 or IEC 60502-4 for joints

Modern jointing
Today's jointing technology must achieve higher levels of reliability and flexibility to meet the demand of operators who are under increasing pressure to improve network efficiency. In an environment with less engineering resources for product selection, outsourced services, emphasis on repair time and a variety of cable and conductor types in the network, a universal joint including range taking screw connectors ensures reliable application and service.

Mechanical shear bolt connectors
All joint kits incorporate a Raychem designed screw connector with shear head bolts to ensure a reliable pre-engineered electrical connection for the different conductor materials, shapes and types used in today's network. The connectors have been tested in accordance with IEC 61238-1 class A.

Electrical stress control
The stress control tubing at each cable end in combination with the yellow stress grading mastic at the screen cut provide a precisely defined impedance characteristic which smooths the electrical field. For ease of installation, a stress control patch is applied around the mechanical connector to provide a similar function.

Shield continuity
Typical shield wire cross sections up to 35mm^2 can easily be connected with the mechanical 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. Two 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.

Rayfit joint body
The conductive outer layer together with the insulating middle layer represent the heat shrinkable hold out for the inner elastomeric layer of the joint body. During the shrinking process the stored recovery force of the elastomeric layer is released and adds up to the recovery force generated by the heat shrinkable outer layers of the joint body.

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 time. 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 the similar level of protection and thickness as modern cables with PE oversheath. All voltage sheath testing commonly used today after cable laying or as control test methods have easily been passed.

11kV MXSU-3

Single Core Cable with Wire Shield without Armour

Catalogue Reference	Voltage	Size Range	Diameter Conductor	Diameter Over Core Insulation	Diameter Cable Oversheath
	kV	(mm²)	(mm)	(mm)	(mm)
MXSU-3111	11	25 - 95	5.2 - 12.0	13.2 - 21.8	23 - 32
MXSU-3121	11	70 - 150	8.7 - 15.0	17.6 - 24.3	25 - 38
MXSU-3131	11	95 - 240	10.3 - 19.2	17.6 - 29.4	26 - 40
MXSU-3132	11	150 - 300	12.9 - 21.6	21.6 - 30.4	29 - 43
MXSU-3141	11	240 - 400	17.8 - 24.6	25.7 - 32.6	33 - 47
MXSU-3151	11	500	25.5 - 27.6	33.8 - 37.2	44 - 50
MXSU-3161	11	630	29.0 - 32.5	37.5 - 40.0	47 - 54
MXSU-3171	11	800	32.0 - 33.8	39.5 - 42.6	52 - 57
MXSU-3181	11	1000	38.5 - 39.2	45.0 - 47.6	59 - 64

Size Transition Joints including Dual Range Mechanical Connectors

Catalogue Reference	Voltage	Size Range	Lower Range		Upper Range		Min. Diameter Cable Over Sheath
			Diameter Conductor	Diameter Over Core Insulation	Diameter Conductor	Diameter Over Core Insulation	
	kV	(mm²)	(mm)	(mm)	(mm)	(mm)	(mm)
MXSU-3131-T2	11	25/95 - 95/240	5.2 - 12.0	13.2 - 21.8	10.3 - 19.2	17.6 - 29.4	23
MXSU-3141-T4	11	95/240 - 185/400	10.3 - 19.2	17.6 - 29.4	15.5 - 24.6	23.2 - 32.6	26
MXSU-3151-T6	11	185/400 - 500	15.5 - 24.6	23.2 - 32.6	25.5 - 27.6	33.8 - 37.2	33
MXSU-3161-T6	11	185/400 - 630	15.5 - 24.6	23.2 - 32.6	29.0 - 32.5	37.5 - 40.0	33
MXSU-3161-T7	11	500 - 630	25.5 - 27.6	33.8 - 37.2	29.0 - 32.5	37.5 - 40.0	44

3 Core Cable with Wire Shield without Armour

Catalogue Reference	Voltage	Size Range	Diameter Conductor	Diameter Over Core Insulation	Diameter Cable Oversheath
	kV	(mm²)	(mm)	(mm)	(mm)
MXSU-3311	11	25 - 95	5.2 - 12.0	13.2 - 21.8	40 - 61
MXSU-3321	11	70 - 150	8.7 - 15.0	17.6 - 24.3	45 - 68
MXSU-3331	11	95 - 240	10.3 - 19.2	18.5 - 29.4	53 - 77
MXSU-3332	11	150 - 300	12.9 - 21.6	21.6 - 31.4	59 - 85
MXSU-3341	11	185 - 400	14.8 - 24.6	21.6 - 34.6	59 - 85

Screened 1 Core to 3 Core Plastic Insulated Cables without Armour 12kV

Catalogue Reference	Voltage	Size Range	Diameter Conductor	Diameter Over Core Insulation	Diameter Cable Oversheath
	kV	(mm²)	(mm²)	(mm)	(mm)
MXSU-3311-1C	11	25 - 95	5.2 - 12.0	13.2. - 21.8	42.5 - 61.0
MXSU-3321-1C	11	70 - 150	8.7 - 15.0	17.6 - 24.3	45.0 - 68.0
MXSU-3331-1C	11	95 - 240	10.3 - 19.2	18.5 - 29.4	53.0 - 77.0
MXSU-3332-1C	11	150 - 300	12.9 - 21.6	21.6 - 31.4	59.0 - 85.0
MXSU-3341-1C	11	240 - 400	15.5 - 24.6	23.9 - 34.6	70.0 - 105.0

11kV MXSU-12

Transition Joints from 1 Core Polymeric Cable without Armour to 3 Core Belted or Screened Paper Cable

Catalogue Reference	Voltage	Single Core Polymeric Cable	Three Core Belted/ Screened Paper Cable
		Size Range	Size Range
	kV	(mm²)	(mm²)
MXSU-12A/1XU-3SB	11	25 - 95	25 - 70
MXSU-12B/1XU-3SB	11	70 - 150	70 - 120
MXSU-12C/1XU-3SB	11	95 - 240	95 - 185
MXSU-12D/1XU-3SB	11	150 - 300	150 - 240
MXSU-12E/1XU-3SB	11	240 - 400	240 - 300

Catalogue Reference	Single Core Polymeric Cable		Three Core Belted/ Screened Paper Cable		
	Diameter over Core insulation	Diameter Cable Oversheath	Diameter over Core insulation	Diameter over Lead sheath	Diameter Cable oversheath
	(mm)	(mm)	(mm)	(mm)	(mm)
MXSU-12A/1XU-3SB	13.2 - 21.8	23 - 32	12.6 - 17.2	30 - 36	36 - 46
MXSU-12B/1XU-3SB	17.6 - 24.5	26 - 37	16.0 - 20.4	33 - 43	41 - 53
MXSU-12C/1XU-3SB	17.6 - 29.4	26 - 41	17.9 - 23.7	39 - 48	49 - 58
MXSU-12D/1XU-3SB	21.6 - 31.4	29 - 43	20.0 - 26.1	43 - 53	52 - 64
MXSU-12E/1XU-3SB	25.0 - 34.6	33 - 47	24.7 - 28.6	48 - 64	58 - 72

Transition Joints from 1 Core Polymeric Cable without Armour to 3 Core H.S.L. Type Paper Cable

Catalogue Reference	Voltage	Single Core Polymeric Cable	Three Core HSL Type Paper Insulated Cable
		Size Range	Size Range
	kV	(mm²)	(mm²)
MXSU-12A/1XU-3HL	11	25 - 95	25 - 95
MXSU-12B/1XU-3HL	11	70 - 150	70 - 150
MXSU-12C/1XU-3HL	11	95 - 240	95 - 240
MXSU-12D/1XU-3HL	11	150 - 300	150 - 300
MXSU-12E/1XU-3HL	11	240 - 400	240 - 400

Catalogue Reference	Single Core Polymeric Cable		Three Core HSL Type Paper Insulated Cable		
	Diameter over Core insulation	Diameter Cable Oversheath	Diameter over Core insulation	Diameter over Lead sheath	Diameter Cable oversheath
	(mm)	(mm)	(mm)	(mm)	(mm)
MXSU-12A/1XU-3HL	13.2 - 21.8	23 - 32	12.6 - 18.9	17 - 24	46 - 58
MXSU-12B/1XU-3HL	17.6 - 24.5	26 - 37	16.0 - 21.9	21 - 27	55 - 70
MXSU-12C/1XU-3HL	17.6 - 29.4	26 - 41	17.9 - 26.1	22 - 29	57 - 76
MXSU-12D/1XU-3HL	21.6 - 31.4	29 - 43	20.0 - 28.5	25 - 31	70 - 80
MXSU-12E/1XU-3HL	25.0 - 34.6	33 - 47	24.7 - 31.5	27 - 34	73 - 86

22kV MXSU-5

Single Core Cable with Wire Shield without Armour

Catalogue Reference	Voltage	Size Range	Diameter Conductor	Diameter Over Core Insulation	Diameter Cable Oversheath
	kV	(mm²)	(mm)	(mm)	(mm)
MXSU-5101	22	10 - 35	3.7 - 7.5	15.0 - 22.0	17 - 33
MXSU-5111	22	25 - 95	5.2 - 12.0	17.9 - 26.0	25 - 38
MXSU-5121	22	50 - 150	7.2 - 15.0	20.2 - 29.5	28 - 41
MXSU-5131	22	95 - 240	10.3 - 19.2	23.0 - 33.6	30 - 43
MXSU-5132	22	150 - 300	12.9 - 21.6	25.0 - 35.5	33 - 48
MXSU-5141	22	240 - 400	17.8 - 24.6	29.9 - 38.8	35 - 49
MXSU-5151	22	500	25.5 - 27.6	37.2 - 41.6	48 - 54
MXSU-5161	22	630	29.0 - 32.5	39.2 - 44.7	50 - 58
MXSU-5171	22	800	32.0 - 33.8	44.8 - 46.9	58 - 61
MXSU-5181	22	1000	38.5 - 39.2	49.4 - 53.2	64 - 67

Size Transition Joints including Dual Range Mechanical Connectors

Catalogue Reference	Voltage	Size Range	Lower Range		Upper Range		Min. Diameter Cable Over Sheath
			Diameter Conductor	Diameter Over Core Insulation	Diameter Conductor	Diameter Over Core Insulation	
	kV	(mm²)	(mm)	(mm)	(mm)	(mm)	(mm)
MXSU-5131-T2	22	25/95 - 95/240	5.2 - 12.0	17.9 - 26.0	10.3 - 19.2	23.0 - 33.6	25
MXSU-5141-T4	22	95/240 - 240/400	10.3 - 19.2	23.0 - 33.6	17.8 - 24.6	29.9 - 38.8	30
MXSU-5151-T6	22	185/400 - 500	15.5 - 24.6	27.4 - 38.8	25.5 - 27.6	37.2 - 41.6	35
MXSU-5161-T6	22	185/400 - 630	15.5 - 24.6	27.4 - 38.8	29.0 - 32.5	39.2 - 44.7	35
MXSU-5161-T7	22	500 - 630	25.5 - 27.6	37.2 - 41.6	29.0 - 32.5	39.2 - 44.7	48
MXSU-5171-T8	22	630 - 800	29.0 - 32.5	39.2 - 44.7	32.0 - 33.8	44.8 - 46.9	50
MXSU-5181-T8	22	630 - 1000	29.0 - 32.5	39.2 - 44.7	38.5 - 39.2	49.4 - 53.2	50

3 Core Cable with Wire Shield without Armour

Catalogue Reference	Voltage	Size Range	Diameter Conductor	Diameter Over Core Insulation	Diameter Cable Oversheath
	kV	(mm²)	(mm)	(mm)	(mm)
MXSU-5311	22	25 - 95	5.2 - 12.0	17.9 - 26.0	48 - 72
MXSU-5321	22	50 - 150	7.2 - 15.0	20.2 - 29.5	55 - 80
MXSU-5331	22	95 - 240	10.3 - 19.2	23.0 - 33.6	62 - 89
MXSU-5332	22	150 - 300	12.9 - 21.6	25.0 - 35.5	70 - 96
MXSU-5341	22	185 - 400	14.8 - 24.6	27.0 - 38.8	76 - 105

Screened 1 Core to 3 Core Plastic Insulated Cables without Armour 12 & 24kV

Catalogue Reference	Voltage	Size Range	Diameter Conductor	Diameter Over Core Insulation	Diameter Cable Oversheath
	kV	(mm²)	(mm²)	(mm)	(mm)
MXSU-5311-1C	22	25 - 95	6 - 12.0	18.5 - 26.0	52.5 - 71.5
MXSU-5321-1C	22	50 - 150	7.2 - 15.0	20.2 - 29.5	55.0 - 80.0
MXSU-5331-1C	22	95 - 240	10.3 - 19.2	23 - 33.6	62.5 - 89.0
MXSU-5332-1C	22	150 - 300	12.9 - 21.6	25 - 35.5	70.0 - 96.0
MXSU-5341-1C	22	240 - 400	15.5 - 24.6	28.1 - 38.8	76.0 - 105.0

22kV MXSU-24

Transition Joints from 1 Core Polymeric Cable without Armour to 3 Core H.S.L. Type Paper Cable

Catalogue Reference	Voltage	Single core Polymeric Cable	Three core HSL Type Paper Insulated Cable
		Size Range	Size Range
	12kV	(mm²)	(mm²)
MXSU-24A/1XU-3HL	22	25 - 95	25 - 95
MXSU-24B/1XU-3HL	22	50 - 150	50 - 150
MXSU-24C/1XU-3HL	22	95 - 240	95 - 240
MXSU-24D/1XU-3HL	22	150 - 300	150 - 300
MXSU-24E/1XU-3HL	22	240 - 400	240 - 400

Catalogue Reference	Single core Polymeric Cable		Three core HSL Type Paper Insulated Cable		
	Diameter over Core insulation	Diameter Cable Oversheath	Diameter over Core insulation	Diameter over Lead sheath	Diameter Cable oversheath
	(mm)	(mm)	(mm)	(mm)	(mm)
MXSU-24A/1XU-3HL	17.6 - 26.0	24 - 38	17.0 - 23.5	20 - 27	52 - 69
MXSU-24B/1XU-3HL	19.5 - 28.5	27 - 41	18.5 - 26.5	22 - 32	58 - 77
MXSU-24C/1XU-3HL	22.5 - 33.0	31 - 44	22.5 - 31.0	25 - 35	68 - 86
MXSU-24D/1XU-3HL	25.0 - 34.6	33 - 46	25.0 - 33.1	28 - 37	72 - 91
MXSU-24E/1XU-3HL	29.4 - 38.8	38 - 50	29.4 - 36.1	34 - 39	84 - 94

Transition Joints from 1 Core Polymeric Cable without Armour to 3 Core Belted or Screened Paper Cable

Catalogue Reference	Voltage	Single core Polymeric Cable	Three core Belted/ Screened Paper Cable
		Size Range	Size Range
	12kV	(mm²)	(mm²)
MXSU-24A/1XU-3SB	22	25 - 95	25 - 70
MXSU-24B/1XU-3SB	22	50 - 150	70 - 120
MXSU-24C/1XU-3SB	22	95 - 240	95 - 185
MXSU-24D/1XU-3SB	22	150 - 300	150 - 240
MXSU-24E/1XU-3SB	22	240 - 400	240 - 300

Catalogue Reference	Single core Polymeric Cable		Three core Belted/ Screened Paper Cable		
	Diameter over Core insulation	Diameter Cable Oversheath	Diameter over Core insulation	Diameter over Lead sheath	Diameter Cable oversheath
	(mm)	(mm)	(mm)	(mm)	(mm)
MXSU-24A/1XU-3SB	17.6 - 26.0	24 - 38	17.0 - 21.9	39 - 49	48 - 60
MXSU-24B/1XU-3SB	19.5 - 28.5	27 - 41	18.5 - 26.5	39 - 53	49 - 62
MXSU-24C/1XU-3SB	22.5 - 33.0	31 - 44	22.5 - 28.5	48 - 62	55 - 70
MXSU-24D/1XU-3SB	25.0 - 34.6	33 - 46	25.4 - 31.7	52 - 64	60 - 75
MXSU-24E/1XU-3SB	29.4 - 38.8	38 - 50	29.4 - 33.1	60 - 70	70 - 84

33kV MXSU-6

Single Core Cable with Wire Shield without Armour

Catalogue Reference	Voltage	Size Range	Diameter Conductor	Diameter Over Core Insulation	Diameter Cable Oversheath
	kV	(mm²)	(mm)	(mm)	(mm)
MXSU-6111	33	35 - 95	6.0 - 12.0	24.0 - 30.0	32 - 43
MXSU-6121	33	70 - 150	8.7 - 15.0	26.2 - 34.5	34 - 44
MXSU-6131	33	150 - 300	13.9 - 21.6	31.1 - 39.6	38 - 53
MXSU-6141	33	240 - 400	17.8 - 24.6	36.2 - 42.8	40 - 54
MXSU-6151	33	500	25.5 - 29.2	40.1 - 46.6	52 - 60
MXSU-6161	33	630	29.0 - 32.5	45.8 - 50.5	55 - 68
MXSU-6171	33	800	32.0 - 33.8	50.1 - 53.4	62 - 66
MXSU-6181	33	1000	38.5 - 39.2	55.7 - 58.8	69 - 73

Size Transition Joints including Dual Range Mechanical Connectors

Catalogue Reference	Voltage	Size Range	Lower Range		Upper Range		Min. Diameter Cable Over Sheath
			Diameter Conductor	Diameter Over Core Insulation	Diameter Conductor	Diameter Over Core Insulation	
	kV	(mm²)	(mm)	(mm)	(mm)	(mm)	(mm)
MXSU-6141-T4	33	95/240 - 240/400	10.3 - 19.2	27.8 - 37.6	17.8 - 24.6	36.2 - 42.8	35
MXSU-6151-T6	33	185/400 - 500	15.5 - 24.6	32.4 - 42.8	25.5 - 27.6	40.1 - 46.6	40
MXSU-6161-T6	33	185/400 - 630	15.5 - 24.6	32.4 - 42.8	29.0 - 32.5	45.8 - 50.5	40
MXSU-6161-T7	33	500 - 630	25.5 - 27.6	40.1 - 46.6	29.0 - 32.5	45.8 - 50.5	52
MXSU-6171-T8	33	630 - 800	29.0 - 32.5	45.8 - 50.5	32.0 - 33.8	50.1 - 53.4	55
MXSU-6181-T8	33	630 - 1000	29.0 - 32.5	45.8 - 50.5	38.5 - 39.2	55.7 - 58.8	55

3 Core Cable with Wire Shield without Armour

Catalogue Reference	Voltage	Size Range	Diameter Conductor	Diameter Over Core Insulation	Diameter Cable Oversheath
	kV	(mm²)	(mm)	(mm)	(mm)
MXSU-6311	33	35 - 95	6.0 - 12.0	24.0 - 30.0	59.0 - 77.2
MXSU-6321	33	70 - 150	8.7 - 15	26.2 - 34.5	73.0 - 85.0
MXSU-6331	33	150 - 300	13.9 - 21.6	31.1 - 39.6	83.0 - 100.0
MXSU-6341	33	240 - 400	17.8 - 24.6	36.2 - 42.8	92.0 - 110.0
MXSU-6351	33	500	25.5 - 29.2	40.1 - 46.6	100.0 - 120.0

Screened 1 Core to 3 Core Plastic Insulated Cables without Armour 24kV

Catalogue Reference	Voltage	Size Range	Diameter Conductor	Diameter Over Core Insulation	Diameter Cable Oversheath
	kV	(mm²)	(mm²)	(mm)	(mm)
MXSU-6311-1C	33	35 - 95	6.0 - 12.0	24.0 - 30.0	59.0 - 77.2
MXSU-6331-1C	33	150 - 300	13.9 - 21.6	31.1 - 39.6	83.0 - 100.0
MXSU-6341-1C	33	185 - 400	15.9 - 24.6	32.0 - 42.8	85.0 - 110.0

MXAW & MXSW

Joints for Polymeric Insulated Cable with Aluminium Wire Armour Including Mechanical Connectors

Catalogue Reference	Voltage	Size Range	Diameter Conductor	Diameter Over Core Insulation	Diameter Cable Oversheath
	kV	(mm^2)	(mm)	(mm)	(mm)
MXAW-5131	22	95 - 185	10.3 - 17.6	23.0 - 31.2	37 - 43
MXAW-5132	22	150 - 300	12.9 - 21.6	25.8 - 34.6	40 - 48
MXAW-5141	22	240 - 400	17.8 - 24.6	29.4 - 38.8	44 - 54
MXAW-5151	22	500	25.5 - 27.6	37.2 - 41.6	48 - 56
MXAW-5161	22	630	29.0 - 32.5	39.2 - 44.7	50 - 60

Three Core Screened Polymeric Insulated Cable with Steel Wire Armour and Copper Tape Shield

Catalogue Reference	Voltage	Size Range	Diameter Conductor	Diameter Over Core Insulation	Diameter Cable Oversheath
	kV	(mm^2)	(mm)	(mm)	(mm)
MXSW-3331	11	95 - 240	10.3 - 19.2	17.6 - 29.4	62 - 80
MXSW-3332	11	150 - 300	12.9 - 21.6	22.0 - 31.4	68 - 85

Catalogue Reference	Voltage	Size Range	Diameter Conductor	Diameter Over Core Insulation	Diameter Cable Oversheath
	kV	(mm^2)	(mm)	(mm)	(mm)
MXSW-5331	22	95 - 240	10.3 - 19.2	23.0 - 33.6	72 - 90
MXSW-5332	22	150 - 300	12.9 - 21.6	25.0 - 35.5	80 - 95

Heat Shrinkable Airfield Lighting Cable Joints for Screened and Unscreened Cables

EAKJ

Features

- High performance joint material
- Compact design
- Connector included

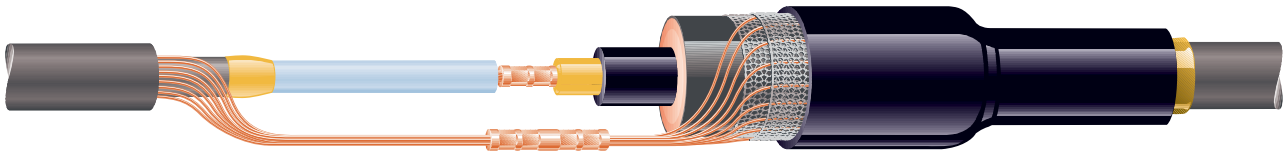
Features

- Applicable for 4 kV and 7 kV lighting systems
- Easy and safe installation
- Unlimited shelf life

A simple fast jointing technique
The joint components are supplied as a pre-engineered set of heat shrinkable tubings. Cable preparation and installation techniques on the EAKJ are identical with medium voltage jointing systems.
The cross-linked polymeric materials provide highest performance also on smallest cross sections. The long-term performance of Raychem's heat shrinkable materials has been well proven by millions of jointing systems up to 72 kV.

EAKJ Airfield Lighting Cable Joints

Catalogue Reference	Voltage	Cross Section	Cable
	kV	(mm^2)	
EAKJ-12A/1XU-1XU	6/10 (12) kV	6	Single Core Screened
EAKJ-2257	3.6/6 (7.2) kV	6	Single Core Unscreened



Heat Shrinkable Medium Voltage Branch Joints for Single Core Polymeric Cables up to 24kV

MXSB

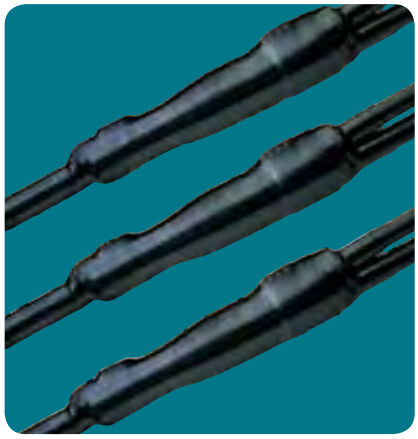
Features

- Shear bolt connector
- Connector and insulation in one kit
- Range taking kit
- Compact, robust and buriable

Features

- No special installation tools or dies needed
- No other engineering required
- Wide range of application
- Space saving, low total costs

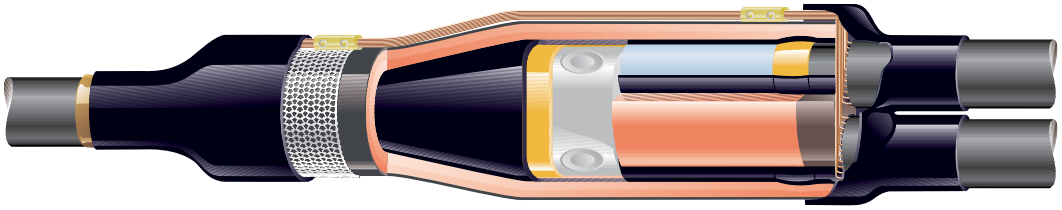
MXSB joints use shear bolt connectors to simplify the interconnection of conductors. Heat shrinkable insulating components supply pre-engineered thicknesses of insulation and stress control material. This is a major step forward in comparison with traditional taping solutions.



MXSB Branch Joints

Catalogue Reference	Voltage	Conductor Cross Section	Diameter Conductor	Diameter over Core insulation	Diameter Cable Oversheath
	kV	(mm^2)	(mm)	(mm)	(mm)
MXSB-12B/1XU-2XU	12	70 - 185	8.7 - 16.8	17.6 - 25.9	25 - 39
MXSB-12C/1XU-2XU	12	150 - 300	13.9 - 23.1	22.3 - 30.4	28 - 43
MXSB-24B/1XU-2XU	24	70 - 185	8.7 - 16.8	21.9 - 30.1	30 - 39
MXSB-24C/1XU-2XU	24	120 - 300	12.7 - 23.1	25.0 - 34.6	32 - 48

For other combinations of cable sizes or information for 36 kV cables, please contact your local sales representative.



Section 6: Insulating Covers, Tapes and Tubings

INSULATING COVERS

LOW VOLTAGE TAPES AND TUBING

MEDIUM VOLTAGE TAPES AND TUBING

CREEPAGE EXTENDERS

Bushing Connection Animal Cover

BCAC

These insulating covers are designed to prevent animal caused outages on bushings ranging from 11 to 33kV. They fit a wide range of bushing sizes and are suitable for substation and distribution applications.

Reliable Outage Protection

TE's' insulating covers have been successfully eliminating outages from all types of animals for years. These covers have been designed to provide the same great protection with enhanced features.

Fast and Versatile Installation

These BCACs are fast and easy to install. No trimming is required and they fit a wide range of bushing skirt diameters (see chart below). If needed, they can be installed on energised equipment as well. The feathered edges of these covers allow for conductor exits in both vertical and horizontal directions. These same edges act as thermal scan sites for true temperature evaluation of the covered hardware.

High Performance Material

Superior high-voltage outdoor materials are used in the BCAC cover design. The rugged, non tracking, UV-resistant polymer ensures long-term performance even in the most extreme environmental conditions.

Product Details

Catalogue Reference	Max. Shed Diameter	Cover Height
	(mm)	(mm)
BCAC-5D/8(B12)	122	203
BCAC-7D/10(B6)	172	266
BCAC-8D/14(B6)	203	355

Bus Connection Insulating Covers

BCIC

Designed to protect energised conductors or busbar from flashovers due to contact from birds, squirrels and other wildlife. BCIC parts are made from a UV stable, track resistant, high performance Raysulate material to ensure years of reliable service.

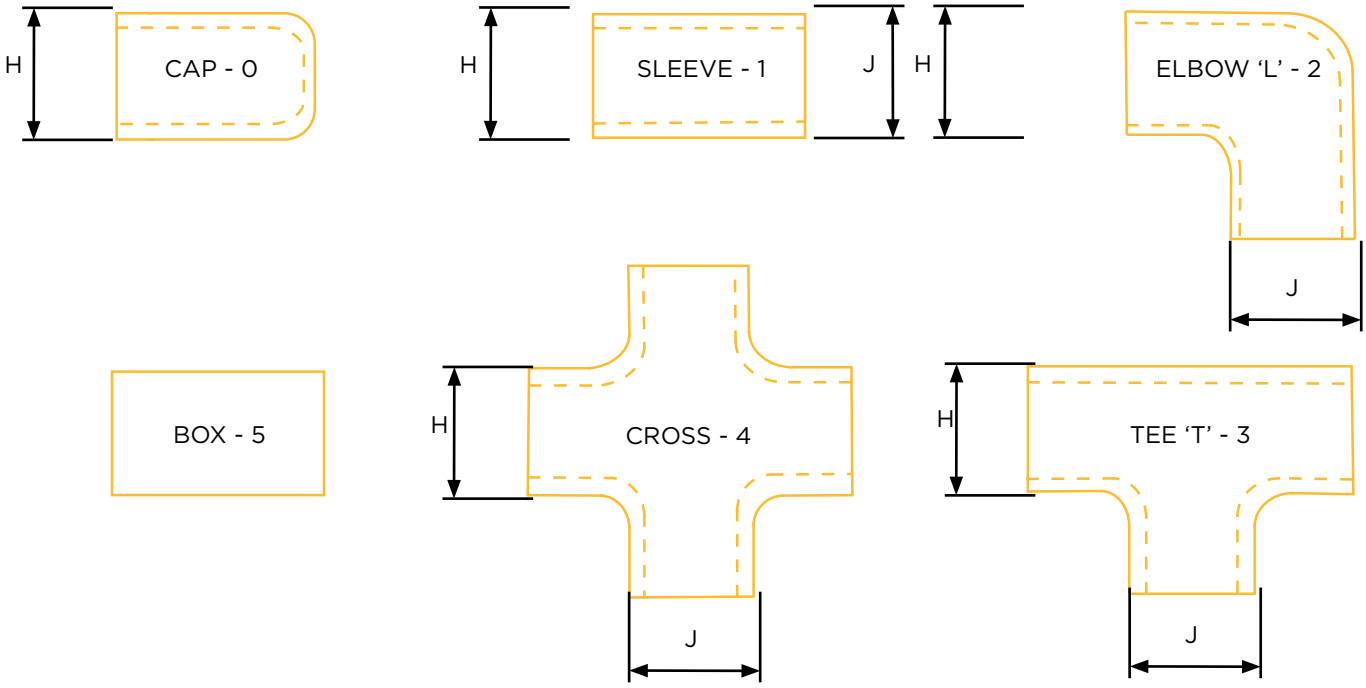
A variety of different shapes and sizes are available to cover circuit breaker bushings, bus standoff insulators, capacitors, transformer bushings, voltage regulators, potential transformers and more.

Installation can be made quickly in the field by trimming the entry and exit holes to the required dimensions. The BCIC covers can be reentered for other maintenance needs and then reused, thus lowering overall lifetime costs.

Refer to the BCIC Quick Reference Guide for more details.

BCIC - X X X X

- Represents its geometry (see below)
- Represents diameter (mm) H/50 (e.g. 130 mm = 3)
- Represents diameter (mm) J/50 (e.g. 180 mm = 4)
- Mod code: used to distinguish two similar parts. (e.g. BCIC-3331 and BCIC-3332 have H = 140 mm and H = 160 mm -without the mod code, they would have the same part number).



Bus Insulator Squirrel Guard for Energised Installations

BISG

This improved isolation guard prevents animal-caused outages in electrical substation equipment.

Reliable Outage Prevention

BISG discs have been successfully eliminating outages from squirrels, raccoons, possums, cats and other animals in substations for years. The BISG-24 guard has been designed to provide the same great protection with added features.

Same High Performance Material

Superior high voltage outdoor materials are used in the BISG-24 guard design. The rugged, non-tracking, UV-resistant polymer ensures long term performance even in the most extreme environmental conditions.

Faster, Easier Installation

The BISG-24 guard can be installed on energised equipment by one person. The new design incorporates a wedge device which makes hot-stick installations on vertical and horizontal mounted insulators quick and easy.

Size Range/Secure

The BISG-24 guard fits insulator core diameters ranging from 62mm through 125mm. The "grill" type design allows easy field modifications for even larger diameters (see your local TE sales representative for details). For tight phase-to-phase insulator applications, the BISG outside diameter can be reduced by trimming along the grill ribs.

The BISG continues to maintain excellent mechanical resistance to power arcs and high wind speeds.

"Invisible" Appearance

The "invisible" design allows excellent visibility of switch blades and other equipment components through the guard


BISG-24


BISG-60

Product Details

Catalogue Reference	Application	Insulator Core Diameter Range	Overall Product Diameter*
		(mm)	(mm)
BISG-60/115-02-(S10)	Dead - Hand Installed	25 - 115	580
BISG-60/115-03-HOT(B10)	Live - Hot Stick Applied	25 - 115	580
BISG-24-01(B10)	Dead - Hand Installed	62 - 125	610

* Overall product diameter can be trimmed down to 430mm for BISG-60, and 406mm diameter for BISG-24

Medium Voltage Line Cover

MVLC

Outage Prevention

The MVLC line cover provides state of the art insulation to help prevent electrical outages caused by trees or wildlife coming into contact with distribution lines.

Cost Effective

The MVLC cover is designed to insulate existing bare lines without costly conductor replacement expenditures or additional line hardware. The MVLC cover may be applied selectively on problem spans when temperatures are above 0˚C.

Live, Consistent Installation

TE has designed a special tool that ensures fast and reliable application of the MVLC cover. The tool allows application on energised lines. It attaches directly to the overhead conductor and remains stationary in a single location on each span. The tool may be manually or automatically operated, using a hand crank or with the aid of a gasoline powered drill. The tool forms, closes, and feeds the MVLC cover along the conductor with speed and consistency. The MVLC hand tool also allows for quick installation on short lengths of conductors, especially in substations.

Wide Use Range

Three sizes cover conductors from 16 - 800mm^2. Higher performance product available. A mastic sealed version of the product is available for 25 kV or higher performance at 15 kV.

High Voltage Material

The MVLC cover material formulation is based on TE's Raychem products field-proven experience with HV products in harsh environments. The MVLC material is UV stable as well as tracking and erosion resistant. The MVLC cover is electronically cross-linked to create an extremely robust insulation system, ensuring many years of reliable operation in the harshest environments.

Product Details

Catalogue Reference	Voltage Class (kV)	Spool Length (m)	Conductor Size (mm^2)	Substation Installation Tool	Overhead Installation Tool
MVLC-14-A/U	15	Up to 99	100	MVLC-HAND-TOOL-14	MVLC-14-TOOL-100
MVLC-14-A/241	25	Up to 99	100	MVLC-HAND-TOOL-14	MVLC-14-TOOL-100
MVLC-18-A/U	15	Up to 185	75	MVLC-HAND-TOOL-02	MVLC-18-TOOL-03-2006
MVLC-18-A/241	25	Up to 185	75	MVLC-HAND-TOOL-02	MVLC-18-TOOL-03-2006
MVLC-38-A/U	15	Up to 800	50	MVLC-HAND-TOOL-02	MVLC-38-TOOL-03-2006
MVLC-38-A/241	25	Up to 800	50	MVLC-HAND-TOOL-02	MVLC-38-TOOL-03-2006

Overhead Line Insulating Channel

OLIC

OLIC is a 'clip-on' insulating channel which provides flashover protection for overhead lines. Installation of OLIC prevents power outages from swinging conductors and intermittent contact with birds, animals and trees. OLIC is made from a track-resistant, cross-linked polymer of high dielectric strength. Installation is simple, requiring no heat and no tools, making OLIC ideal for retrofit applications. OLIC-O sections clip over the conductor and are held in place with UV stabilised plastic tie-wraps. OLIC-C sections clip over the conductor and are held in place with a removable and re-usable closure rail.

Applications

OLIC-O and OLIC-C are suitable for use on overhead line conductors with diameter from 4 mm to 25 mm. Both channels are available in 1 m and 3 m lengths. These can be cut easily to form a range of shapes and linked together to form long lengths. OLIC has passed test programmes set by Raychem and utilities for applications up to 15 kV (OLIC-O) and 24 kV (OLIC-C).

Live line working

OLIC-O has been installed by one large utility using live-line working techniques.

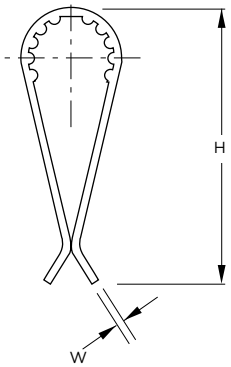
Features/benefits

- Clip-on, tool-free installation allows easy retrofit application
- Modular design permits re-enterable and re-usable applications
- High dielectric strength provides good protection against accidental line flashovers
- UV-resistance and weather resistance gives maintenance-free lifetime
- Raychem's high voltage test programme assures long term reliability
- Mechanically robust polymer design is lightweight and vandal resistant

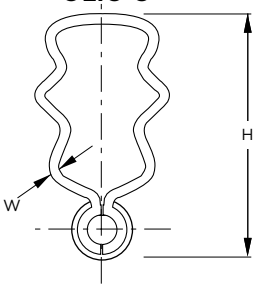
Product Details

Catalogue Reference	Dimension H nom.	Dimension W min	Length
	(mm)	(mm)	(mm)
OLIC-O-1000	85	1.5	1000
OLIC-O-3000	85	1.5	3000
OLIC-C-1000	76	1.5	1000
OLIC-C-3000	76	1.5	3000

OLIC-O



OLIC-C



Overhead Line Insulation Tape

OLIT

OLIT tape is an adhesive-lined, heat shrinkable insulating tape which has been helically preformed to make it easy to install on overhead conductors. When the tape is wrapped around the conductor and shrunk down by the application of heat, the adhesive melts and amalgamates the overlapping layers of tape together thus producing, in effect, a wraparound tube. Although self-amalgamating, OLIT tape does not adhere to metal allowing easy removal for maintenance.

Applications

OLIT tape provides overhead line insulation for the prevention of faults caused by swinging conductors and intermittent contact with tree branches, birds and animals. OLIT tape provides flashover protection up to 17.5 kV or 25 kV if a second layer of tape is applied.

Features/benefits

- Compatible with all other products in the Raychem MV insulation enhancement system
- Remains flexible at low temperatures
- High dielectric strength, weather and track-resistance ensure excellent electrical performance
- Continuous operating temperature up to 70°C
- Suitable for indoor and outdoor use
- Preformed into a spiral for easy installation on overhead conductors
- Easily and cleanly removed for maintenance
- Can be stored indefinitely at temperatures up to 50°C without loss of performance

Product Details

Catalogue Reference	Conductor Outside Diameter	Conductor Size	Spool Length	Conductor Length Insulated per Piece
	(mm)	(mm^2)	(mm^2)	(mm)
OLIT-M	7	35	8	6.7
OLIT-M	9	50	8	6.2
OLIT-M	12	95	8	5.3
OLIT-M	15	150	8	4.4

Note: Maximum longitudinal change after free recovery: -30 %.

Medium Voltage Conductor Covers for Outage Prevention

MVCC

Raysulate Medium Voltage Conductor Covers (MVCC) provide high quality electrical insulation for substation leads and jumpers. These covers are made from a non-tracking silicone material that is suitable for harsh medium voltage outdoor environments. MVCC covers are split for easy installation.

Features

- The MVCC's flexibility allows installation on tight bends which makes it ideal for substation applications.
- MVCC covers are designed to protect energised conductors from flashovers due to contact from birds and animals.
- The Medium Voltage Conductor Cover is suitable for applications up to 25 kV phase to earth.
- Two sizes are currently available and will fit conductors with diameters ranging from 12 - 28mm.

Product Details

Catalogue Reference	Conductor Diameter Range	Colour	Length
	(mm)	(mm)	(mm)
MVCC-10/.40	11	Red	30.4
MVCC-G-10/.40	11	Gray	30.4
MVCC-19/0.750	12 - 19	Red	15.2
MVCC-G-19/0.750	12 - 19	Gray	15.2
MVCC-25/1.0	19 - 28	Red	7.6
MVCC-G-25/1.0	19 - 28	Gray	7.6

Low Voltage Busbar Insulating Heat Shrink Tape

LVBT

LVBT is an adhesive-coated, low-voltage heat shrinkable tape.

One wrap insulates straight and bent bars in retrofit applications where tubing cannot be used. In addition, LVBT easily insulates unusual connections and geometries in the factory or field.

Features/benefits

- Adhesive layer fuses the tape layers but does not stick to bus or hardware, providing tough insulation up to 1 kV in accordance with ANSI C37.20–1987 and up to 3.6 kV in accordance with
- IEC specifications
- Rated to ANSI/IEEE C37.20-1987
- UL-recognised to Standard 224 (file E137417), 600 V-125°C-VW.1
- Rated Voltage: 1kV

Product Details

Catalogue Reference	Roll Width	Roll Length
	(mm)	(mm)
LVBT-1-R	25	7500
LVBT-2-R	50	7500
LVBT-4-R	100	7500

Note: Maximum longitudinal change after free recovery: -30 %.

Rectangular Busbar*

Catalogue Reference	Bus Width	Bus Length Insulated per Roll	Rolls / Standard Pack
	(mm)	(mm)	
LVBT-1-R	25	1200	8
LVBT-2-R	50	1500	4
LVBT-2-R	75	1100	4
LVBT-2-R	100	800	4
LVBT-2-R	150	600	4
LVBT-4-R	200	900	4

*Maximum thickness: 15mm

Square Busbar

Catalogue Reference	Bus Width	Bus Length Insulated per Roll	Rolls / Standard Pack
	(mm)	(mm)	
LVBT-2-R	25	2000	4
LVBT-2-R	50	1000	4
LVBT-2-R	75	600	4
LVBT-4-R	100	1000	2
LVBT-4-R	150	600	2
LVBT-4-R	200	900	4

Round Busbar

Catalogue Reference	Bus Diameter	Bus Length Insulated per Roll	Rolls / Standard Pack
	(mm)	(mm)	
LVBT-1-R	12	2600	8
LVBT-2-R	25	2600	4
LVBT-2-R	50	1300	4
LVBT-2-R	75	900	4
LVBT-4-R	100	1300	2
LVBT-4-R	200	900	4

Low Voltage Busbar Insulation Tubing

LVIT

LVIT is a black, medium wall, flame retarded heat-shrinkable tubing suitable for insulating busbars up to 1 kV. This highly flexible tubing can be used on a variety of curved and bent busbars of both circular and rectangular cross-section. LVIT tubing can be easily installed in a factory environment using an oven or in the field using a gas torch or hot air. LVIT tubing is manufactured in UV resistant material, making it suitable for both indoor and outdoor applications.

Applications

LVIT is suitable for both enclosed and exposed busbars and for connections in switchgear, substations, motor control centres and other electrical equipment.

Features/benefits

- Flame retarded
- Continuous operating temperature rating up to105°C
- High shrink ratio reduces inventory and simplifies product selection
- Suitable for indoor and outdoor applications
- Electrical and mechanical performance are retained after cleaning with hydrocarbon solvent
- Good thermal emissivity and contact with busbars means no derating is needed
- Can be stored indefinitely at temperatures up to 50°C without loss of performance
- UL approved
- Rated Voltage: 1kV

Product Details

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(m)	(mm)	(mm)	(mm)
LVIT-30/10-A/U	60	30	10	1.5
LVIT-75/25-A/U	30	75	25	1.5
LVIT-150/50-A/U	30	150	50	1.5
LVIT-235/105-A/U	25	235	105	1.5

**Wall thickness will be less if tubing recovery is restricted during shrinkage.

Low Fire Hazard Busbar Insulation Tubing

ZBIT

ZBIT is a halogen free, black, medium wall, heat shrinkable tubing which insulates busbars and other equipment to the same fire safety standards as modern Low Fire Hazard specified cables. The ZBIT range of busbar insulation tubings uses the latest Low Fire Hazard zero halogen polymer technology.

LSF performance

This provides ZBIT with exceptionally high flame retardancy and Low Smoke and Fume performance. This significantly reduces potential dangers to people from toxic smoke and reduced visibility. Equipment is also protected from corrosive fumes. Low Smoke and Fume and Low Fire Hazard systems are increasingly specified for places such as railways, buildings, power plants, ships, oil and gas production installations and chemical plants. ZBIT tubing can be easily installed using an oven, gas torch or hot air.

Applications

ZBIT is ideal for enclosed and exposed busbars and connections in substations, switchgear, motors and other electrical equipment. All sizes of ZBIT are suitable for aluminium or copper busbars of rectangular or round cross sections.

Features/benefits

- Zero-halogen material has low toxicity index and acid gas generation
- Low smoke and fume formulation improves visibility in emergencies and reduces acid gas
- High flame retardants helps fire containment
- Continuous operating temperature up to 105°C
- Radiation cross linked polymer technology gives good solvent resistance
- Good thermal emissivity and contact with busbars means no derating is required
- Extremely high split resistance and excellent flexibility
- Can be stored indefinitely at temperatures up to 50°C without loss of performance
- Rated Voltage: 3.6kV

Product Details

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(m)	(mm)	(mm)	(mm)
ZBIT-55/22	30	55	22	1.5
ZBIT-80/35	20	80	35	2.0
ZBIT-130/55	25	130	55	2.0

**Wall thickness will be less if tubing recovery is restricted during shrinkage.

Medium Wall Busbar Insulation Tubing 25kV

BPTM

BPTM is a medium wall, heat shrinkable tubing which provides insulation enhancement and protection against flashover and accidentally induced discharge. Particularly useful in confined spaces BPTM tubing can be used on both circular and rectangular copper or aluminium busbars. On application of heat the tubing shrinks snugly over the busbar profile ensuring that the required minimum wall thickness is obtained. BPTM tubing can be installed easily during large scale production using an oven or in the field using a gas torch or hot air. BPTM tubing is manufactured from a non-halogen based polymer which has excellent performance in high voltage environments and greatly reduces the noxious and corrosive effects in fire situations.

Applications

The use of BPTM tubing allows equipment designers the freedom to reduce air spacing between busbars, such as in the manufacture of switchgear cabinets where space is at a premium. BPTM provides flashover protection up to 25 kV.

Features/benefits

- Excellent flexibility, can be installed on a wide range of curved or bent busbars without cracking or creasing
- High shrink ratio reduces inventory and simplifies product selection
- Exceptional insulation and long term reliability even at high continuous operating temperatures
- Extremely durable, resists damage from solvents, ultraviolet light, weathering, mechanical impact and general wear and tear
- Suitable for indoor and outdoor use
- Excellent anti-tracking properties
- Good thermal emissivity and contact with busbars means no derating is required
- Flame retardant and non-halogen based material reduces flammability and the toxic and corrosive effects in fire situations
- Rated Voltage: 25kV

Product Details

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(m)	(mm)	(mm)	(mm)
BPTM-15/6-A/U-4	30	15	6	1.90
BPTM-30/12-A/U-4	30	30	12	2.20
BPTM-50/20-A/U-4	30	50	20	2.35
BPTM-75/30-A/U-4	20	75	30	2.35
BPTM-100/40-A/U-4	25	100	40	2.35
BPTM-120/50-A/U-4	25	120	50	2.80
BPTM-175/70-A/U-4	15	175	70	2.80
BPTM-205/110-A/U-4	10	205	110	2.80
BPTM-235/130-A/U-4	20	235	130	3.10

**Wall thickness will be less if tubing recovery is restricted during shrinkage.

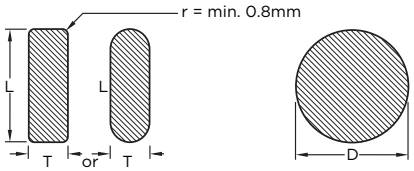
Clearance Reduction

The tables indicate the clearance reductions which are possible using BPTM tubing. These are derived from BIL, AC withstand, DC withstand and discharge extinction tests. These clearances should not be adopted without testing by the user. Sharp electrodes and unusual geometries may require wider clearances.

Rated Voltage	Phase - Phase	Phase - Earth	IEC 71-2 Air Clearance
(kV)	(mm)	(mm)	(mm)
Round Busbars			
12	55	65	120
17.5	70	85	160
24	95	125	220
36	150	205	320
Rectangular Busbars			
12	65	75	120
17.5	85	105	160
24	115	150	220
36	200	285	320

Product Selection

BPTM should normally be used on the following busbar sizes.



Product Size	Rectangular bars		Round bars	
	L + T (mm)		D (mm)	
	min.	max.	min.	max.
BPTM-15/6	12	18	6.5	12
BPTM-30/12	22	38	13.5	25
BPTM-50/20	36	65	22	43
BPTM-75/30	55	95	33	63
BPTM-100/40	70	130	44	86
BPTM-120/50	90	165	55	105
BPTM-175/70	125	235	80	150
BPTM-205/110	200	276	127	190
BPTM-235/130	235	315	150	220

Key Product Specifications	Test Method	Requirement
Thermal endurance	IEC 216	105 °C min.
Accelerated ageing **- Tensile strength** **- Ultimate elongation**	ISO 188, ASTM D2671	168 hrs @ 120 °C 10 MPa min. 300% min.
Comparative tracking index	IEC 112, VDE 0303/1	KA 3c
Dielectric strength	ASTM D149, IEC 243	180 kV/cm min. @ 2 mm 150 kV/cm min. @ 2.5 mm 120 kV/cm min. @ 3 mm
Low temperature flexibility	ASTM D2671 Procedure C	No cracking after 4 hrs @ -40 °C
Smoke index	NES 711	Less than 120
Acid gas generation	Raychem PPS 3010 4.23	Less than 1% by weight

Heavy Wall Busbar Insulation Tubing 36kV

BBIT

BBIT is a thick wall, heat shrinkable tubing which provides insulation enhancement and protection against flashover and accidentally induced discharge. Particularly useful in confined spaces, BBIT tubing can be used on both circular and rectangular copper or aluminium busbars. On application of heat the tubing shrinks snugly over the busbar profile ensuring that the required minimum wall thickness is obtained. BBIT tubing can be installed easily during large scale production using an oven or in the field using a gas torch or hot air. BBIT tubing is manufactured from a non-halogen based polymer which has excellent performance in high voltage environments and reduces the noxious and corrosive effects in fire situations.

Applications

The use of BBIT tubing allows equipment designers the freedom to reduce air spacing between busbars, such as in the manufacture of switchgear cabinets where space is at a premium. BBIT tubing provides flashover protection up to 36 kV.

Features/benefits

- Excellent flexibility means BBIT can be installed on a wide range of curved or bent busbars without cracking or creasing
- Exceptional insulation and long term reliability even at high continuous operating temperatures
- Extremely durable, resists damage from solvents, ultraviolet light, weathering, mechanical impact and general wear and tear
- Suitable for indoor and outdoor use
- Excellent anti-tracking properties
- Good thermal emissivity and contact with busbars means no derating is required
- Flame retardant and non-halogen based material reduces flammability and the toxic and corrosive effects in fire situations
- Can be stored indefinitely at temperatures up to 50°C without loss of performance
- Rated Voltage: 36kV

Product Details

Catalogue Reference	Standard Length (spool)	Inside Diameter		Recovered Wall Thickness**
		Min Expanded as Supplied	Max Recovered after Heating	Total Wall after Heating
	(m)	(mm)	(mm)	(mm)
BBIT-25/10-A/U	25	25	10	3.6
BBIT-40/16-A/U	20	40	16	3.6
BBIT-65/25-A/U	15	65	25	3.6
BBIT-100/40-A/U	15	100	40	3.6
BBIT-150/60-A/U	15	150	60	3.6
BBIT-175/80-A/U	10	175	80	3.6

**Wall thickness will be less if tubing recovery is restricted during shrinkage.

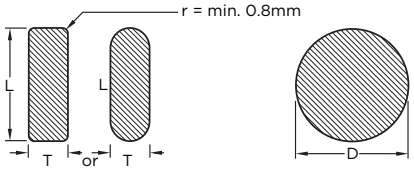
Clearance Reduction

The tables indicate the clearance reductions which are possible using BPTM tubing. These are derived from BIL, AC withstand, DC withstand and discharge extinction tests. These clearances should not be adopted without testing by the user. Sharp electrodes and unusual geometries may require wider clearances.

Rated Voltage	Phase - Phase	Phase - Earth	IEC 71-2 Air Clearance
(kV)	(mm)	(mm)	(mm)
Round Busbars			
12	30	40	120
17.5	45	60	160
24	60	90	220
36	100	160	320
Rectangular Busbars			
12	35	45	120
17.5	55	65	160
24	70	100	220
36	140	190	320

Product Selection

BPTM should normally be used on the following busbar sizes.



Product Size	Rectangular bars		Round bars	
	L + T (mm)		D (mm)	
	min.	max.	min.	max.
BBIT-25/10	17	28	11	20
BBIT-40/16	28	45	18	32
BBIT-65/25	44	69	28	47
BBIT-100/40	69	102	44	72
BBIT-150/60	102	148	65	105
BBIT-175/80	133	196	85	125

Key Product Specifications	Test Method	Requirement
Thermal endurance	IEC 216	105 °C min.
Accelerated ageing **- Tensile strength** **- Ultimate elongation**	ISO 188, ASTM D2671	168 hrs @ 120 °C 10 MPa min. 300% min.
Comparative tracking index	IEC 112, VDE 0303/1	KA 3c
Dielectric strength	ASTM D149, IEC 243	180 kV/cm min. @ 2 mm 150 kV/cm min. @ 2.5 mm 120 kV/cm min. @ 3 mm
Low temperature flexibility	ASTM D2671 Procedure C	No cracking after 4 hrs @ -40 °C
Smoke index	NES 711	Less than 120
Acid gas generation	Raychem PPS 3010 4.23	Less than 1% by weight

High Voltage Busbar Insulation Tape

HVBT

TE's HVBT is a heat shrinkable, adhesive coated tape which provides insulation enhancement and protection against accidentally induced discharge. HVBT tape is designed to combine the integrity of a heat shrinkable tubing with the versatility of a wraparound product. HVBT is quick and easy to install. Upon application of heat the tape shrinks down and the adhesive lining melts amalgamating the overlapping layers together, producing a complete lap to lap seal. A single layer of HVBT tape, two-thirds overlapped, will provide AC voltage withstand (flashover protection) to at least 17.5 kV increasing to 25 kV if a second layer is applied.
Although HVBT tape will stick to itself and other insulating materials it will not adhere to metal or porcelain allowing easy removal for maintenance.

Applications

HVBT tape offers a simple and effective solution to the problems of retrofit insulation of busbars particularly where existing equipment cannot be dismantled. It can be used for indoor and outdoor applications and is easily installed over a wide variety of shapes including complex connections.

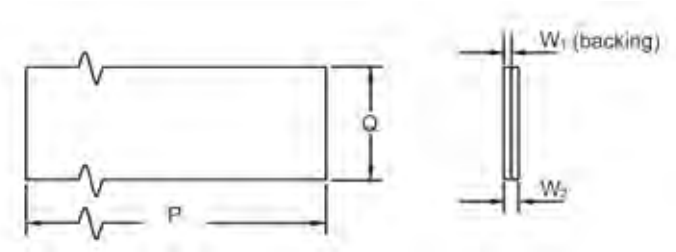
- Rated Voltage: 36kV

Product Details

Catalogue Reference	Dimensions				
	Q a min	W_1 a min	W_1 b min	W_2 b min	Spool Length P
	(mm)	(mm)	(mm)	(mm)	(m)
HVBT-12-A	25	0.38	0.56	0.86	10
HVBT-14-A	50	0.38	0.56	0.86	10
HVBT-15-A	75	0.38	0.56	0.86	10
HVBT-16-A	100	0.38	0.56	0.86	10

Clearance Reduction

Rated Voltage	Phase - Phase	Phase - Earth	IEC 71-2 Air Clearance
(kV)	(mm)	(mm)	(mm)
Round Busbars			
12	55	65	120
17.5	70	85	160
24	95	125	220
36	150	205	320
Rectangular Busbars			
12	65	75	120
17.5	85	104	160
24	115	150	220
36	200	285	320



High Voltage Insulation Sheets

HVIS

HVIS is an adhesive coated, heat shrinkable sheet which provides insulation enhancement and protection against accidently induced discharge. When heated the HVIS sheet shrinks in two directions to tightly conform to complex shapes. A Raychem void filling mastic, S1061, can be added to ensure that even protruding shapes are insulated. A Raychem sealing mastic, S1085, can also be applied to provide an environmentally sealed connection. The sheet can be cut to size on site and loosely secured in place with clamps and brackets available from us. Once installed, the clamps and brackets can be removed and re-used. HVIS sheet will provide flashover protection up to 17.5 kV or up to 25 kV if the void-filling mastic is applied underneath the sheet, or up to 36 kV if a double layer of HVIS is used. Re-usable joint covers can also be made to allow access or maintenance when required.

Applications

HVIS sheet will cover almost any size or shape of busbar joint, making it ideal for insulating busbar tees, elbows and other connections where tubing and tape cannot be used.

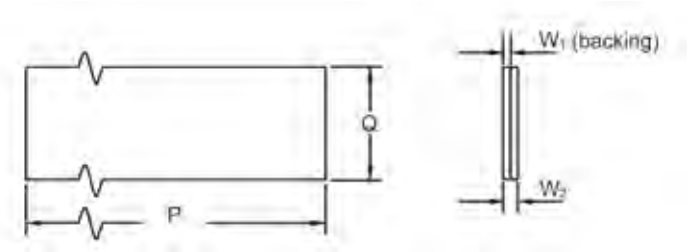
- Rated Voltage: 36kV

Product Details

Catalogue Reference	Dimensions			
	Q a min	W_1 a min	W_2 b min	Length P
	(mm)	(mm)	(mm)	(m)
HVIS-05	660	1.5	2.4	0.5
HVIS-10	660	1.5	2.4	10.0
S1061-8-300	60	-	-	0.3
S1085-1-300	20	-	-	0.3
HVIS-TOOLS-01	(basic clamp and bracket kit)			
HVIS-TOOLS-02	(extended clamp and bracket kit)			

Clearance Reduction

Rated Voltage	Phase - Phase	Phase - Earth	IEC 71-2 Air Clearance
(kV)	(mm)	(mm)	(mm)
Round Busbars			
12	55	65	120
17.5	70	85	160
24	95	125	220
36	150	205	320
Rectangular Busbars			
12	65	75	120
17.5	85	104	160
24	115	150	220
36	200	285	320



Interphase Insulating Barrier Board

RRBB

RRBB board is a red, non-structural, interphase barrier for switchgear applications. The RRBB board is made from a homogeneous polymer and has excellent track resistance, especially after a power-arc. It can be easily fabricated into a shape; it produces less nuisance dust and less tooling wear than other boards.

It is a tough insulating board that can be secured to the underside of structures to insulate them from live equipment where there are reduced clearances. Raychem RRBB can be easily cut, drilled or formed on site to allow fitting to complex structures.

Product Details

Catalogue Reference	Dimensions		
	Width (mm)	Length (mm)	Thickness (mm)
RRBB-6-1.25Mx1.25M-B	1220	1220	6
RRBB-2440/1220-6.2-BP	1220	2440	6

High Voltage Creepage Extenders

HVCE

Raysulate Creepage Extenders increase the flashover performance of insulators by reducing the surface electric stress, reducing the leakage current and increasing the electric strength of the insulators. Installation of creepage extenders:

Increases creepage length

This increases electric strength by reducing leakage current and surface stress.

Improves insulator shape

The increased shed diameter improves strike distance and improves heavy wetting performance by creating an umbrella effect.

Bonds to insulator surface

The extender adhesive has been specially formulated to strongly bond to the existing porcelain or glass skirt. Thus, the assembly needs only periodic inspection and will be effective many times longer than grease.

Rugged

Extenders are designed to be resistant to conventional spray washing techniques and will withstand all normal handling abuse and extreme weather conditions.

Simple to install

Just degrease the insulator and shrink the extender with a gas torch or hot air gun. Raychem can provide installation training.

Product Details

Catalogue Reference	Dimensions	Application Range		
	Min. Internal Dia. of the Extender (as supplied)	Max. Shed Dia. of Insulator	Min. Shed Dia. of Insulator	Nominal Creepage Extension per Extender
	(mm)	(mm)	(mm)	(mm)
HVCE-100/ 80-01	115	100	80	100
HVCE-120/100-01	135	120	100	100
HVCE-140/120-01	155	140	120	100
HVCE-160/140-01	180	160	140	100
HVCE-183/161-01	205	183	161	100
HVCE-205/184-01	230	205	184	100
HVCE-226/206-11	241	226	206	100
HVCE-247/227-11	262	247	227	100
HVCE-268/248-11	283	268	248	100
HVCE-289/269-11	304	289	269	100
HVCE-310/290-11	325	310	290	100
HVCE-331/311-11	346	331	311	100
HVCE-352/332-11	367	352	332	100
HVCE-373/353-11	388	373	353	100
HVCE-394/374-11	409	394	374	100

High Voltage Creepage Extenders - Wraparound

HVCE-WA

TE has now added a range of cold applied wraparound creepage extenders to its list of Raychem heat shrink creepage extenders (HVCE's). This will considerably reduce installation time in situations where heavy metal work or complicated connection geometry makes disconnection on the insulator or bushing difficult.

Cold-applied wraparound creepage extenders work the same way as conventional extenders but leave a gap where the extender has stretched open allowing it to wrap around the porcelain or glass skirt onto which it is installed. Typically the gap is between 20mm and 30mm. Although it may appear to offer the leakage current an easy path along the insulator or bushing profile, extensive testing and field application clearly prove otherwise.

Application Range

Each extender is tailored to suit the insulator or bushing profile used. There is a wide range of extenders already available, many of which fit the more commonly used profiles. When an extender is required for a previously unused profile, it is straight forward to create.

The range already covers many insulator and bushing profiles from approximately 150mm to 500mm in diameter. There is no upper voltage limit to the use of creepage extenders with applications in use >250kV a.c. and d.c.

Product Details

Catalogue Reference	Shed Diameter of Insulator (mm)	Standard Pack (pcs/box)
HVCE-WA-109-01-FT(B6	109	6
HVCE-WA206-01 (B6)	206	6
HVCE-WA-216-01 (B6)	216	6
HVCE-WA-248-01 (B6)	248	6
HVCE-WA-251-01 (B6)	251	6
HVCE-WA-267-01 (B6)	267	6
HVCE-WA-280-01-FT (B6)	280	6
HVCE-WA-303-01 (B6)	303	6
HVCE-WA-319-01 (B6)	319	6
HVCE-WA-320-01 (B6)	320	6
HVCE-WA-330-01 (B6)	330	3
HVCE-WA-341-01 (B6)	340	6
HVCE-WA-356-01(B6)	356	6
HVCE-WA-367-01 (B6)	367	6
HVCE-WA-393-01 (B6)	393	6
HVCE-WA-440-01 (B6)	440	6
HVCE-WA-452-01 (B6)	452	6
HVCE-WA-501-01 (B6)	501	6
HVCE-WA-528-01 (B6)	528	3
HVCE-WA-611-01 (B6)	611	6

Other sizes available on request

Section 7: Cable Glands and Duct Seals

Cabinet Feedthrough Seals

CFTS

CFTS seals are heat shrinkable molded part for moisture sealing applications where cable enters enclosures, such as cabinets or connection boxes.

CFTS seals:

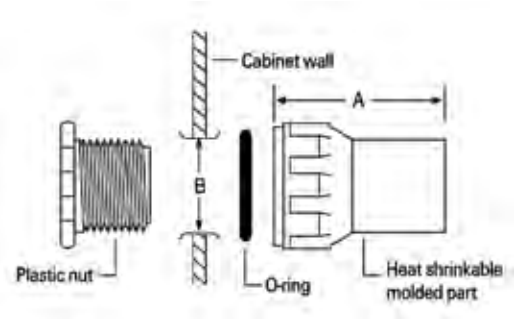
- Are suitable for environments that have existing periodic pressure difference and/or temperature differential.
- Are precoated with a thermoplastic adhesive that seals around the entering cable. The O-ring creates the water/air seal at the cabinet entry.
- Utilise a rigid plastic that, when inserted through the cabinet wall, protects the entering cable from abrasion or cut-through

Ordering information

1. Select the appropriate catalogue number based on cable diameter.
2. CFTS seals are a three-part assembly: rigid plastic nut, elastomeric O-ring, and heat shrinkable molded part.
3. CFTS molded parts are precoated with a thermoplastic adhesive.
4. Use CFTS seals with a maximum cabinet wall thickness of 0.20 in (5 mm).
5. Standard package: 5 kits/box.
6. Related test report: EDR-5212.

Product Details

Catalogue Reference	Cable Diameter	A - Length of Molded Part	B - Clearance (knockout) hole size
	(mm)	(mm)	(mm)
CFTS-1	5 - 10	70	25
CFTS-2	6 - 17	70	25
CFTS-3	14 - 25	95	35
CFTS-4	20 - 37	114	51
CFTS-5	37 - 61	178	89



Cable Glands for Plastic and Paper Cables with and without Armour

EAKT

The connection of cables to medium voltage equipment can be problematic if the cable box is dimensioned for compound filling. In a wide range of boxes where the distance from bushing to baseplate is a limiting factor, this problem may now be overcome with the Raychem cable gland.

Simple Installation

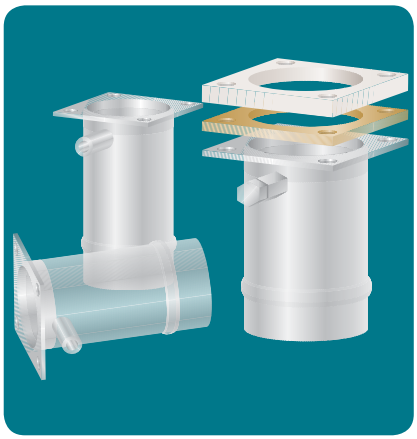
The gland is a simple bolt on modification which significantly reduces the minimum box height required. This allows cables to be connected in many British-type boxes without requiring compound, using the easy and efficient Raychem heat shrinkable termination technique.

Kitted Components

To match stud spacing to BS 2562, Raychem cable glands are available in two sizes, complete with fixing bolts. Also included in each kit are screw clips to fasten the armour to the gland, an adhesive coated heat shrinkable sleeve to insulate the assembly and protect it from corrosion, and illustrated installation instructions.

Separate Earthing

Where it is required to separate the cable earth from the equipment earth, the Raychem cable gland can be obtained with an additional insulating spacer and bolts.



Product Details - Cable Glands for Plastic and Paper Insulated Cables

Internal Gland Diameter	Catalogue Reference			
(mm)	Multicore Cables	Multicore Cables Insulated Gland	Multicore Cables Split Gland	1 Core Cables (Aluminium Gland)
65	EAKT-1605			EAKT-1608
95	EAKT-1606	EAKT-1607	SMOE-50153	

Duct Sealing System

RDSS

- Easily and quickly installed
- Provides watertight duct seal
- Helps prevent flooding
- Installs with water flowing

The RDSS duct seal is an inflatable duct sealing system that wraps around cables in the ducts of manholes or exchange vaults. The product effectively seals power cable ducts, stopping or preventing water from leaking into the manhole or vault.

The RDSS duct seal is suitable for use with polyethylene or lead sheath cables in the plastic, concrete, or steel ducts of wall feed-through systems.

RDSS duct seal also seals around unjacketed concentric neutral cable. It permits cable movement and thermal expansion while retaining its sealing properties. The RDSS duct seal system has been tested in severe environmental conditions and is water and airtight up to 50 kPa (equivalent to 16.7ft water head). Request test report EDR-5253.

The product can be easily and quickly installed, even in flowing water. The RDSS duct seal is inflated with air or CO2 gas and conforms to the irregular geometry of cable and ducts. It is easy to remove as well, even in adverse field conditions.

Standard kits accommodate a wide range of cable diameters, as well as empty ducts and ducts with multiple cables. The RDSS duct seal system is environmentally friendly: no hazardous chemicals are used to create the seal. It is made from chemical and bacteria resistant materials and will provide a reliable, durable long lasting seal.

Improve your service and reduce your maintenance costs with RDSS duct seals from TE Connectivity.

RDSS-IT-16:
The inflation tool uses CO2 gas cylinders. The CO2 gas cylinders contain 16 gr. CO2. One cylinder will inflate 3 pcs. of RDSS-100 duct seals in vacant ducts. If ducts are occupied with cables, more inflations per cylinder can be performed. The tool is designed with an ON/OFF switch and has an automatic pressure monitoring system of 45 ± 3 psi (3,0 ± 0,2 bar).

E7512-0160:
16 gr. CO2 gas cylinders for RDSS-IT-16 tool. Each gas cylinder inflates approx. 5 pcs of RDSS-100 duct seals. Each box contains 10 gas cylinders.

RDSS-IGG-SR-AS:
The inflation gun connects to a pressurized air bottle, pump or compressor, with an outlet pressure of 60 to 150 psi (4 to 10 bar) to feed the inflation gun. The inflation gun is designed with a safety relief valve and audible signal device to facilitate the installation.

Size Selection Guide

For ducts containing three or more cables, one RDSS duct seal clip for every two cables is required.

Duct Inner Diameter	Number of Cables in Duct / Maximum Cable Bundle Diameter					
	0, 1, or 2 Cables		3 or 4 Cables		5, 6, or 7 Cables	
32	RDSS-45	13	RDSS-45, 1 RDSS-CLIP-45	8	RDSS-45, 2 RDSS-CLIP-45	3
38	RDSS-45	25	RDSS-45, 1 RDSS-CLIP-45	20	RDSS-45, 2 RDSS-CLIP-45	15
45	RDSS-45	32	RDSS-45, 1 RDSS-CLIP-45	27	RDSS-45, 2 RDSS-CLIP-45	22
50	RDSS-60	30	RDSS-60, 1 RDSS-CLIP-75	25	RDSS-60, 2 RDSS-CLIP-75	20
57	RDSS-60	41	RDSS-75, 1 RDSS-CLIP-75	36	RDSS-75, 2 RDSS-CLIP-75	31
64	RDSS-75	38	RDSS-75, 1 RDSS-CLIP-75	33	RDSS-75, 2 RDSS-CLIP-75	28
70	RDSS-75	46	RDSS-75, 1 RDSS-CLIP-75	41	RDSS-75, 2 RDSS-CLIP-75	36
75	RDSS-75	56	RDSS-75, 1 RDSS-CLIP-75	50	RDSS-75, 2 RDSS-CLIP-75	46
83	RDSS-100	56	RDSS-100, 1 RDSS-CLIP-100	50	RDSS-100, 2 RDSS-CLIP-100	46
89	RDSS-100	66	RDSS-100, 1 RDSS-CLIP-100	61	RDSS-100, 2 RDSS-CLIP-100	56
95	RDSS-100	74	RDSS-100, 1 RDSS-CLIP-100	69	RDSS-100, 2 RDSS-CLIP-100	64
100	RDSS-100	80	RDSS-100, 1 RDSS-CLIP-100	75	RDSS-100, 2 RDSS-CLIP-100	70
108	RDSS-100	89	RDSS-100, 1 RDSS-CLIP-100	85	RDSS-100, 2 RDSS-CLIP-100	79
114	RDSS-100	89	RDSS-100, 1 RDSS-CLIP-100	85	RDSS-100, 2 RDSS-CLIP-100	79
121	RDSS-125	97	RDSS-125, 1 RDSS-CLIP-125	92	RDSS-125, 2 RDSS-CLIP-125	87
125	RDSS-125	104	RDSS-125, 1 RDSS-CLIP-125	98	RDSS-125, 2 RDSS-CLIP-125	93
133	RDSS-150†	109	RDSS-150†, 1 RDSS-CLIP-150	104	RDSS-150†, 2 RDSS-CLIP-150	98
140	RDSS-150†	120	RDSS-150†, 1 RDSS-CLIP-150	114	RDSS-150†, 2 RDSS-CLIP-150	109
146	RDSS-150†	124	RDSS-150†, 1 RDSS-CLIP-150	119	RDSS-150†, 2 RDSS-CLIP-150	114
150	RDSS-150†	129	RDSS-150†, 1 RDSS-CLIP-150	124	RDSS-150†, 2 RDSS-CLIP-150	120
159	RDSS-150†	138	RDSS-150†, 1 RDSS-CLIP-150	133	RDSS-150†, 2 RDSS-CLIP-150	125
165 - 210mm Ducts in this range require the use of RDSS-AD-210 adapter. Contact TE for application information.						

†See Ordering information below.
*Maximum cable range is the sum of the diameters of all cables in the duct plus 0.2” for each RDSS duct seal clip
**Sealing RDSS-150 in a duct that is empty or contains a cable less than 2.4” (60mm) in outside diameter requires a RDSS-AT/AP-150 device. This device and instructions for its installation are available in a separate kit.

Duct Inside Diameter	1 x RDSS-AD-210 + RDSS-125 Cable Diameter	2 x RDSS-AD-210 + RDSS-125 Cable Diameter	1 x RDSS-AD-210 + RDSS-150 Cable Diameter	2 x RDSS-AD-210 + RDSS-150 Cable Diameter
	(mm)	(mm)	(mm)	(mm)
135	0*			
140	0 - 40			
145	0 - 50			
150	0 - 65			
160	0 - 91			
165	0 - 103			
170	70 - 110	0*	60 - 107	
180	80 - 120	0 - 50	60 - 118	
185	90 - 130	0 - 65	60 - 129	
190		0 - 83	60 - 135	
195		0 - 95	60 - 139	
205		75 - 115	115 - 155	60 - 112
210		80 - 120	120 - 160	60 - 118

* Empty ducts only
Suitable for empty ducts
With cables only
Duct seals: Do not inflate the duct seal outside the duct!

Notes

Section 8: Switchgear Connections (Straight & Elbows)

HEAT SHRINKABLE

PUSH ON ELBOWS

Inline and Right Angle Bushing Boots

RSRB

Insulating boots are moulded parts which are shrunk over the connection between the cable lug and bushing to insulate them. They are used in switchgear and transformers with compound filled boxes where the clearances are insufficient for operation in air or to protect against flash over due to rodents or extreme humidity.

A full range of insulating boots are available up to 17.5 kV.

Straight Boots

Catalogue Reference	Application Range (mm²)
RSRB-4022	10 - 35
RSRB-4024	50 - 95
RSRB-4026	120 - 300

Right Angle Boots - Long

Catalogue Reference	Application Range (mm²)
RSRB-4042	10 - 35
RSRB-4044	50 - 95
RSRB-4046	120 - 300

Right Angle Boots - Short

Catalogue Reference	Application Range (mm²)
RSRB-4062	10 - 35
RSRB-4064	50 - 95
RSRB-4066	120 - 300

Note:

1. Long boots are 110 mm long over the bushing. The short boots are 90 mm long.
2. Insulating boot kits are also available for up to 36 kV applications.

For such requirements please refer to your local sales representative.

Elastomeric Insulating Bushing Boot 17.5kV

RCAB-41

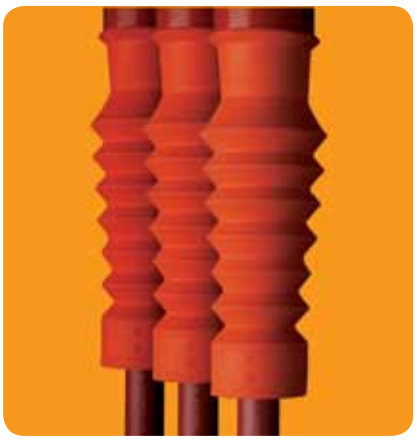
Raychem elastomeric insulating boots are moulded parts which fit over the connection between the cable lug and the inline or right-angled equipment bushing to improve phase-to-phase and phase-to-earth insulation. They are used in switchgear and transformer cable boxes where the air clearances are insufficient for normal operation, or to protect against flashover due to rodents or high humidity. The non-tracking elastomeric housing has excellent erosion resistance, dielectric properties and environmental resistance, giving superb performance in areas of high humidity and electrical stress. RCAB boots work in combination with all Raychem termination product lines including both elastomeric and traditional heat shrink technology. RCAB boots are quick and easy to install and do not require any taping of the bushing or the termination. The boot can easily be removed and reinstalled without the need for additional material or tooling, allowing access to the bushing connection for test purposes. The universal screw EXRM-1366 is available on request.

Features

- Tool free application
- High performance insulation material
- Excellent track and erosion resistance
- Removable and re-installable

Benefits

- Simple and easy installation
- Unlimited shelf life
- Connection can be energised immediately after installation
- One product for inline and right angle application



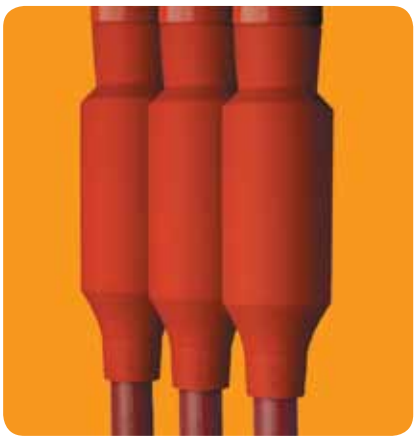
EXRM-1366

Catalogue Reference	Max System Voltage	Basic Impulse Level	Collar Size	Bushing Dia.	Bushing Type	Application Range
	(kV)	(kV)		(mm)	(A)	(mm²)
RCAB-4110	17.5	95	No. 1	31 - 45	-	35 - 400
RCAB-4120	17.5	95	None	46 - 70	400/630	35 - 400

Elastomeric Insulating Bushing Boot 24kV

RCAB-51

Raychem elastomeric insulating boots are moulded parts that fit over the connection between the cable lug and the inline equipment bushing to provide phase-to-phase and phase-to-earth insulation. They are used in switchgear and transformer cable boxes where air clearances are insufficient for normal operation, and they also protect against flashover caused by rodents or high humidity. The non-tracking elastomeric housing has excellent erosion resistance, dielectric properties and environmental resistance, giving superb performance in areas of high humidity and electrical stress. RCAB boots can be used with all Raychem heat shrink terminations. RCAB boots are quick and easy to install and eliminate taping of the bushing or termination. The boot can be removed and reinstalled easily without the need for additional material or tooling for convenient access to the bushing connection for test purposes.



Features

- Tool free application
- High performance insulation material
- Excellent track and erosion resistance
- Removable and re-installable

Benefits

- Simple and easy installation
- Unlimited shelf life
- Connection can be energised immediately after installation

Catalogue Reference	Max System Voltage	Basic Impulse Level	Bushing Dia.	Bushing Type	Application Range
	(kV)	(kV)	(mm)	(A)	(mm^2)
RCAB-5120	24	125	46 - 61	400 / 630	35 - 300

Insulated T-Adapter for SF_6-Insulated Switchgear with Bushings 12kV

RICS-3

This insulated adapter provides perfect sealing, electrical insulation and an electrical connection between all Raychem terminations and SF_6-insulated switchgear up to 12 kV. It is designed to fit bushing profiles according to EN 50181 type C.

Design

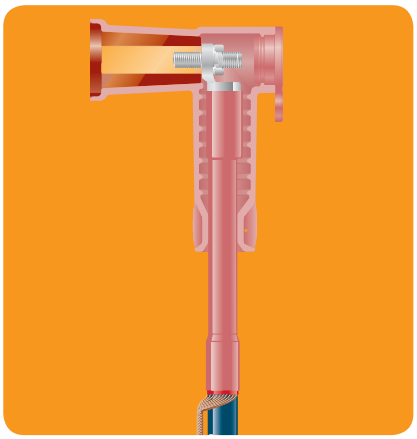
Raychem elastomeric RICS adapters are moulded parts which fit over the connection between the cable lug and the right angled bushing of a gas insulated switchgear, where the air clearances are insufficient for normal operation. The non-tracking elastomeric housing has excellent erosion resistance, dielectric properties and environmental resistance, giving superb performance in areas of high humidity and electrical stress. RICS adapters are quick and easy to install and work in combination with all Raychem termination product lines. The adapter can easily be removed and reinstalled without the need for additional material or tooling, allowing access to the bushing connection for test purposes.

Installation

The elastomeric body is simply pulled over a termination, even with bulky mechanical lugs, and covers a wide cross section range of 70-300 mm^2. A terminal stud with nut connects the cable lug of the termination with the bushing. The back end of the adapter is reliably sealed by a easy to remove, snap-in elastomeric cap.

Performance Tests

The RICS adapter is tested to CENELEC HD 629.1 S2:2006 and GOST requirements, including tests like AC, DC (60kV), BIL (95kV), long term loadcycling at AC voltage 16kV phase/earth (2.5*U0). All voltage tests were performed in confined metallic enclosures to generate highest electrical stresses. To test for electrical and moisture sealing in worst possible condition, even load-cycling under water with a test voltage of 16 kV phase/earth ($2.5*U_0$) was successfully passed.



RICS Adapter Selection table with most common Raychem Terminations

Catalogue Reference	Application Range (mm^2)	Term. for Polymeric Cables incl. Mech. Lugs
RICS-3133	70 - 150	IXSU-F3131-ML-2-17
RICS-3133	95 - 240	IXSU-F3131-ML-4-17
RICS-3133	120 - 300	IXSU-F3131-ML-5-17

Packaging

The insulating body, fixing bolts, terminal stud and cap are supplied in a 3-phase set complete with installation instruction.

Cable terminations with lugs for M16 studs have to be ordered separately.

Adapters for other types of bushing and for other cable are available on request.

If required, a separate test rod is available to apply test voltage directly onto the cable stud inside the RICS adapter.

Ordering descriptions are RICS-5002-50-24 for a 290 mm version and RICS-5002-50-25 for the long 390 mm version

(2 normal, 1 long version needed for 3 phase testing).

Raychem Insulated Adapter Termination System RICS for SF_6-Insulated Switchgear up to 24 kV

RICS-5

Tests

The adapters conform to IEC 540, VDE 0278 and ANSI IEEE 386 specifications, as well as to the Raychem specification PPS 3013. The test requirements and results are summarized in Raychem Test Report PPR 1106, which is available on request. The insulated adapter termination system provides perfect sealing, electrical insulation and an electrical connection between Raychem terminations and SF6-insulated switchgear up to 24 kV. Its lead-in insulator (630 A) conforms to DIN 47636 and ANSI IEEE 386. The cable box of the switchgear must be provided with suitable protection against electric shock. The insulating adapter is compatible with all Raychem terminations.

T-adapter with or without surge arrester

Design

Thick walled insulator made of high quality elastomer with sealing face over the te mination, bushing cone and plug. The electrical connection is made with a terminal stud and the cable lug of the termination. Two cable connection is possible. A special plug which allows cable testing without disconnecting the adapter is also offered. The design of the adapter for connecting the surge arrester is basically identical. The elastomer insulator has an additional lead-in duct for the surge arrester. Details of the surge arresters can be found in the brochure EPP-0533.

Scope of supply (for three phases) Insulator, plug, terminal stud, small accessories and installation instructions.

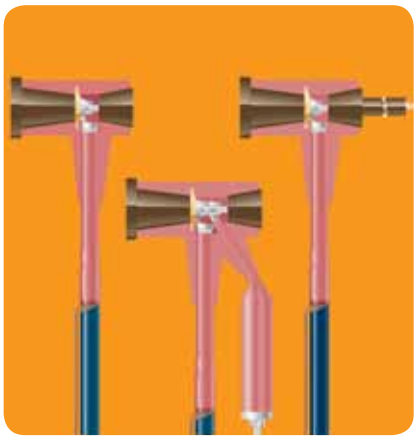
Straight adapter

Design

A thick walled, heat-shrinkable insulating sleeve provides a hermetic seal over the cone of the bushing and the termination. The adapter area is smoothed with a meltable filler strip.

Scope of supply (for three phases) Heat-shrinkable insulating sleeving, filler strip, small accessories and installation instructions. Terminal stud and lug must be enclosed.

For selection information, please contact TE Connectivity.



Plug in Termination System for Gas Insulated Switchgear 42kV

RPIT

Features

- Separable inline connection for high current, gas insulated switchgears up to 42 kV
- Termination mates interfaces in accordance to EN50180 and EN50181 for inner cone connections
- The contact parts are designed for stranded circular aluminium or copper conductors in accordance to IEC-60228

Technical Information

The increasing popularity of gas insulated switchgear called for the development of appropriate connection systems to standardised bushings in accordance to EN50181. TE has developed two systems, one is related to the outer cone and the other one to the inner cone system. Later is used in power switch gear and power transformers. TE has several decades of experience in the field of hermetically insulated termination systems for medium voltage applications. Thus the bushings designed for gas insulated switchgear meet the standard EN50181 for connection type size 2 (800 A) and size 3 (1250 A) at operating voltage 12 kV up to 36 (42) kV.

The basic construction of the mating termination follows well known design principles and incorporates a lamellate contact system which ensures reliable current transmission via a cone clamp to the conductor. The interface between silicone body of the termination and the bushing is kept permanently sealed via the pressure of a spring between the insulator and the flange of the termination cover. The termination cover is sealed at the flange area with well known sealing methods and at the cable side with heat-shrinkable tubing against ingress of moisture.

Selection Table

Screened separable connection system 12 kV with mechanical lugs

Catalogue Reference	Size	Nominal Current	System Voltage	Cross Section	Dia over Conductor	Dia over Insulation
		(A)	(kV)	(mm^2)	(mm)	(mm)
RPIT-321x	2	800	12	95 - 300	11.0 - 21.6	19.3 - 30.4
RPIT-521x	2	800	24	50 - 300	7.7 - 21.6	20.2 - 34.6
RPIT-621x	2	630	36	50 - 185	7.7 - 16.8	25.2 - 35.1
RPIT-331x	3	1250	12	240 - 630	17.8 - 32.5	26.4 - 29.6
RPIT-531x	3	1250	24	150 - 630	13.9 - 32.5	26.5 - 45.6
RPIT-631x	3	1250	36 / 42	95 - 630	11.0 - 32.5	28.5 - 49.2

Screened Adaptor System 250 amp - 24kV

RSES-52
RSSS-52

Raychem separable screened adaptors are designed to connect single core polymeric cables to medium voltage equipment (transformers, switchgears, motors etc.) up to 24 kV. Made of crosslinked EPDM and protected with a minimum 3 mm moulded conductive shield connected to earth, Raychem deadbreak adaptors are suitable for both indoor and outdoor installations. Their wide application range allows a minimum number of bodies to cover several different cable cross sections without the need for additional cable adaptors. The cut back dimensions for all cable sizes are the same for RSSS and RSES.

Raychem screened adaptors are equipped with a capacitive test point to ensure that the circuit is not energised before disconnection. The capacitive test point is protected by a conductive cap. A range of high strength bimetallic compression connectors tested to VDE 0220 are offered to connect both aluminium and copper conductor cables. After cable preparation and lubrication, the Raychem Screened Adaptors can simply be slid into place under virtually all conditions. A separable mounting system provides for an easy installation of the adaptor onto the bushing.

In addition, Rayvolve tubing or heat shrink phase marking sleeves are offered as an option, to provide a superior environmental seal.

Rayvolve Sealing

Cold applied technology. Rayvolve is used in conjunction with a pressure sensitive mastic and is simply rolled into place. Thus a reliable moisture seal is achieved. The use of Rayvolve is particularly recommended for applications where a torch is unavailable or cannot be used.

Heat Shrinkable Sealing

Moisture seal and phase marking. A reliable moisture can also be produced by using a mastic in conjunction with a heat shrinkable sleeve. This solution has the additional advantage of providing phase marking. A standard torch carried by most jointers is used.

Selection Tables

Screened Elbow Adaptors

Diameter Over Insulation	Cross Section (Al or Cu Conductor)						
	16 mm²	25 mm²	35 mm²	50 mm²	70 mm²	95 mm²	120 mm²
13.5 - 17.4 mm	RSES-5201	RSES-5202	RSES-5203	RSES-5205	-	-	-
16.3 - 20.8 mm	RSES-5211	RSES-5212	RSES-5213	RSES-5215	RSES-5217	RSES-5219	-
19.6 - 24.1 mm	-	-	RSES-5223	RSES-5225	RSES-5227	RSES-5229	RSES-5224
23.1 - 27.7 mm	-	-	-	RSES-5235	RSES-5237	RSES-5239	RSES-5234
27.9 - 33.5 mm	-	-	-	-	-	RSES-5249	RSES-5244

Screened Elbow Adaptors

Diameter Over Insulation	Cross Section (Al or Cu Conductor)					
	16 mm²	25 mm²	35 mm²	50 mm²	70 mm²	95 mm²
13.5 - 17.4 mm	RSSS-5201	RSSS-5202	RSSS-5203	RSSS-5205	-	-
16.3 - 20.8 mm	RSSS-5211	RSSS-5212	RSSS-5213	RSSS-5215	RSSS-5217	RSSS-5219
19.6 - 24.1 mm	-	-	RSSS-5223	RSSS-5225	RSSS-5227	RSSS-5229
21.0 - 26.5 mm	-	-	-	RSSS-5255	RSSS-5257	RSSS-5259

Add mod. code -R to kit number for cold applied tubing Rayvolve.

Add mod. code -P to kit number for heat shrink tubing with phase marking.

Screened Separable Elbow Connection System 400 amp - 24kV

RSES-54

Raychem RSES screened, separable elbow connectors are designed to connect single and three core polymeric cables to medium voltage gas insulated switchgear and other equipment using CENELEC bushings specified for 400 A up to 24 kV.

Made of a highly modified silicone rubber and protected by a thin walled outer conductive screen connected to earth, RSES elbow connectors are equally suited for indoor and outdoor installation. Supporting a wide application range, the design incorporates one body and two stress cone adapters to cover all cross sections from 25 to 240 mm². The overall and cut back dimensions are designed to take up minimum space in the terminal box. RSES elbow connectors are equipped with a capacitive test point for determining whether the circuit is energised. This test point is protected by a conductive cap.

After cable preparation and lubrication, the stress control adapter is simply slid into place, followed by the screened connector body. These two components can be installed under virtually any conditions. A separable mounting system ensures easy installation of the connector onto the bushing. All kits include high performance multi-range mechanical or deep indent compression lugs matching the design of the RSES elbow connector.

Selection table

Screened separable elbow connection system with deep indent compression lugs

Catalogue Reference	Cross Section	12kV Dia. Core Insulation
	(mm²)	(mm)
RSES-5460	25	12.7 - 25.0
RSES-5461	35	12.7 - 25.0
RSES-5462	50	12.7 - 25.0
RSES-5463	70	12.7 - 25.0
RSES-5464	95	12.7 - 25.0
RSES-5465	120	12.7 - 25.0
RSES-5476	150	21.2 - 34.6
RSES-5477	185	21.2 - 34.6
RSES-5478	240	21.2 - 34.6

Catalogue Reference	Cross Section	24kV Dia. Core Insulation
	(mm²)	(mm)
RSES-5460	25	12.7 - 25.0
RSES-5461	35	12.7 - 25.0
RSES-5462	50	12.7 - 25.0
RSES-5463	70	12.7 - 25.0
RSES-5474	95	21.2 - 34.6
RSES-5475	120	21.2 - 34.6
RSES-5476	150	21.2 - 34.6
RSES-5477	185	21.2 - 34.6
RSES-5478	240	21.2 - 34.6

Screened separable elbow connection system with mechanical lugs and shear bolts

Catalogue Reference	Cross Section	12kV Dia. Core Insulation
	(mm²)	(mm)
RSES-5454	150 - 240	21.2 - 34.6

Catalogue Reference	Cross Section	24kV Dia. Core Insulation
	(mm²)	(mm)
RSES-5454	95 - 240	21.2 - 34.6

Screened Separable Elbow Connection System 400 amp - 36kV

RSES-64

Raychem RSES screened, separable elbow connectors are designed to connect single- and three-core polymeric cables to medium voltage gas insulated switchgear and other equipment using CENELEC bushings Type “B” specified for 400 A up to 36 kV.

Made of a highly modified silicone rubber and protected by a thin walled outer conductive screen connected to earth, RSES elbow connectors are equally suited for indoor and outdoor installation. Supporting a wide application range, the design incorporates one body and two stress cone adapters to cover all cross sections from 50 to 300 mm². The overall and cut-back dimensions are designed to take up minimum space in the terminal box. RSES elbow connectors are equipped with a capacitive test point for determining whether the circuit is energised. This test point is protected by a conductive cap.

After cable preparation and lubrication, the stress control adapter is simply slid into place, followed by the screened connector body. These two components can be installed under virtually any conditions.

A separable mounting system ensures easy installation of the connector onto the bushing.

All kits include high performance multi-range mechanical lugs matching the design of the RSES elbow connector.

Selection Table

Screened separable elbow connection system with mechanical lugs and shear bolts

Catalogue Reference	Cross Section	24kV Dia. Core Insulation
	(mm²)	(mm)
RSES-6451	70 - 95	22.4 - 35.5
RSES-6452	95 - 240	22.4 - 35.5
RSES-6454	185 - 300	22.4 - 35.5

Catalogue Reference	Cross Section	36kV Dia. Core Insulation
	(mm²)	(mm)
RSES-6451	50 - 95	22.4 - 35.5
RSES-6452	95 - 150	22.4 - 35.5
RSES-6453	120 - 240	28.9 - 42.0
RSES-6455	185 - 300	28.9 - 42.0

Screened Separable Elbow Connection System 630 / 800 amp - 24kV

RSTI-58

Raychem RSTI-58 screened separable connectors are designed to connect single- and three-core polymeric cables to medium-voltage gas insulated switchgear and other equipment using CENELEC bushings type "C" specified for 630/1250 A up to 24 kV.

Made of a highly modified silicone rubber and protected by a thin-walled outer conductive screen connected to earth, RSTI-58 connectors are equally suited for indoor and outdoor installation. Supporting a wide application range, the design incorporates one body and two stress cone adapters to cover all cross-sections from 25 to 400 mm². The overall and cut-back dimensions are designed to take up minimum space in the terminal box. RSTI-58 connectors are equipped with a capacitive test point for determining whether the circuit is energised. This test point is protected by a conductive cap.

After cable preparation and lubrication, the stress control adapter is simply slid into place, followed by the screened connector body. These two components can be installed under virtually any conditions.

A separable mounting system ensures easy installation of the connector onto the bushing.

All kits include high performance multi-range mechanical or DIN compression lugs matching the design of the RSTI-58 connector.

Selection table

Screened separable connection system with DIN compression lugs

Catalogue Reference AL	Catalogue Reference CU	Cross Section (mm²)	12kV Dia. Core Insulation (mm)
RSTI-5810	RSTI-5830	25	12.7 - 25.0
RSTI-5811	RSTI-5831	35	12.7 - 25.0
RSTI-5812	RSTI-5832	50	12.7 - 25.0
RSTI-5813	RSTI-5833	70	12.7 - 25.0
RSTI-5814	RSTI-5834	95	12.7 - 25.0
RSTI-5815	RSTI-5835	120	12.7 - 25.0
RSTI-5826	RSTI-5846	150	21.3 - 34.6
RSTI-5827	RSTI-5847	185	21.3 - 34.6
RSTI-5828	RSTI-5848	240	21.3 - 34.6
RSTI-5829	RSTI-5849	300	21.3 - 34.6

Catalogue Reference AL	Catalogue Reference CU	Cross Section (mm²)	24kV Dia. Core Insulation (mm)
RSTI-5810	RSTI-5830	25	12.7 - 25.0
RSTI-5811	RSTI-5831	35	12.7 - 25.0
RSTI-5812	RSTI-5832	50	12.7 - 25.0
RSTI-5813	RSTI-5833	70	12.7 - 25.0
RSTI-5824	RSTI-5844	95	21.3 - 34.6
RSTI-5825	RSTI-5845	120	21.3 - 34.6
RSTI-5826	RSTI-5846	150	21.3 - 34.6
RSTI-5827	RSTI-5847	185	21.3 - 34.6
RSTI-5828	RSTI-5848	240	21.3 - 34.6
RSTI-5829	RSTI-5849	300	21.3 - 34.6

Screened separable connection system with mechanical lugs and shear bolts

Catalogue Reference	Cross Section (mm²)	12kV Dia. Core Insulation (mm)
RSTI-5851	35 - 95	12.7 - 25.0
RSTI-5852	95 - 120	12.7 - 25.0
RSTI-5853	95 - 240	17.0 - 32.6
RSTI-5854	150 - 240	21.3 - 34.6
RSTI-5855	185 - 300	21.3 - 34.6
RSTI-5856	240 - 400	21.3 - 34.6

Catalogue Reference	Cross Section (mm²)	24kV Dia. Core Insulation (mm)
RSTI-5851	35 - 70	12.7 - 25.0
RSTI-5853	95 - 185	17.0 - 32.6
RSTI-5854	95 - 240	21.3 - 34.6
RSTI-5855	185 - 300	21.3 - 34.6

Screened Separable Coupling System 630 / 800 amp - 24kV

RSTI-CC-58

Features

- The screened coupling connector is designed to mate with the rear end of the base screened connector system RSTI-58 designed for 24 kV.
- The insulation of the coupling connector is made of a highly modified silicone rubber characterised by high tracking resistance, elongation at break and nonflammability.
- A thin walled screen is permanently bonded onto the insulation and protects the connection system against accidental contact.
- The screened coupling connector need not be removed for oversheath testing.
- The combination of screened connector and coupling connector exceeds CENELEC HD 629.1 S2 requirements, which include BS, VDE and other international specifications.
- The combination of screened connector and coupling connector fits 630/1250 A bushings type "C" as specified by EN50180 and EN50181.
- The compact design supports the use of double "T" connections inside standard terminal boxes.
- The wide application range covers cable cross-sections from 25 to 400 mm².
- Conductor connection with mechanical or DIN lugs.
- Easily accessible rear plug with capacitive test point.
- Few accessories required for system test and earth connection.
- Complete kit including lugs for easier installation and storage.

Selection Table

Screened separable coupling connection system with mechanical lugs and shear bolts

Catalogue Reference	Cross Section	12kV Dia. Core Insulation
	(mm²)	(mm)
RSTI-CC-5851	35 - 95	12.7 - 25.0
RSTI-CC-5852	95 - 120	12.7 - 25.0
RSTI-CC-5853	95 - 240	17.0 - 32.6
RSTI-CC-5854	150 - 240	21.3 - 34.6
RSTI-CC-5855	185 - 300	21.3 - 34.6
RSTI-CC-5856	240 - 400	21.3 - 34.6

Catalogue Reference	Cross Section	24kV Dia. Core Insulation
	(mm²)	(mm)
RSTI-CC-5851	35 - 70	12.7 - 25.0
RSTI-CC-5853	95 - 185	17.0 - 32.6
RSTI-CC-5854	95 - 240	21.3 - 34.6
RSTI-CC-5855	185 - 300	21.3 - 34.6

Screened separable coupling connection system with DIN compression lugs

Catalogue Reference AL	Catalogue Reference CU	Cross Section	12kV Dia. Core Insulation
		(mm²)	(mm)
RSTI-CC-5810	RSTI-CC-5830	25	12.7 - 25.0
RSTI-CC-581 1	RSTI-CC-5831	35	12.7 - 25.0
RSTI-CC-5812	RSTI-CC-5832	50	12.7 - 25.0
RSTI-CC-5813	RSTI-CC-5833	70	12.7 - 25.0
RSTI-CC-5814	RSTI-CC-5834	95	12.7 - 25.0
RSTI-CC-5815	RSTI-CC-5835	120	12.7 - 25.0
RSTI-CC-5826	RSTI-CC-5846	150	21.3 - 34.6
RSTI-CC-5827	RSTI-CC-5847	185	21.3 - 34.6
RSTI-CC-5828	RSTI-CC-5848	240	21.3 - 34.6
RSTI-CC-5829	RSTI-CC-5849	300	21.3 - 34.6

Catalogue Reference AL	Catalogue Reference CU	Cross Section	24kV Dia. Core Insulation
		(mm²)	(mm)
RSTI-CC-5810	RSTI-CC-5830	25	12.7 - 25.0
RSTI-CC-581 1	RSTI-CC-5831	35	12.7 - 25.0
RSTI-CC-5812	RSTI-CC-5832	50	12.7 - 25.0
RSTI-CC-5813	RSTI-CC-5833	70	12.7 - 25.0
RSTI-CC-5824	RSTI-CC-5844	95	21.3 - 34.6
RSTI-CC-5825	RSTI-CC-5845	120	21.3 - 34.6
RSTI-CC-5826	RSTI-CC-5846	150	21.3 - 34.6
RSTI-CC-5827	RSTI-CC-5847	185	21.3 - 34.6
RSTI-CC-5828	RSTI-CC-5848	240	21.3 - 34.6
RSTI-CC-5829	RSTI-CC-5849	300	21.3 - 34.6

Screened Separable Connection System 630 / 800 amp - 42kV

RSTI-68

Raychem RSTI screened separable connectors are designed to connect single and three core polymeric cables to medium-voltage gas insulated switchgear and other equipment using CENELEC bushings Type C_1=630 A and C_2=1250 A, specified up to 42 kV.

Made of a highly modified silicone rubber and protected by a thin walled outer conductive screen connected to earth, RSTI connectors are equally suited for indoor and outdoor installation.

Supporting a wide application range, the design incorporates one body and two stress cone adapters to cover all cross-sections from 35 to 400 mm². The overall and cut back dimensions are designed to take up minimum space in the terminal box. RSTI connectors are equipped with a capacitive test point for determining whether the circuit is energised. A conductive cap protects this test point.

Selection Table

Screened separable connection system 36 kV and 42 kV with mechanical lugs and shear bolts

Catalogue Reference	Cross Section	24kV Dia. Core Insulation
	(mm²)	(mm)
RSTI-6851	35 - 95	22.4 - 35.5
RSTI-6852	95 - 150	22.4 - 35.5
RSTI-6853	120 - 240	28.9 - 42.0
RSTI-6855	185 - 300	28.9 - 42.0
RSTI-6856	240 - 400	28.9 - 42.0

Screened separable connection system 36 kV and 42 kV with DIN compression lugs

Catalogue Reference AL	Catalogue Reference CU	Cross Section	12kV Dia. Core Insulation
		(mm²)	(mm)
RSTI-6811	RSTI-6821	50	22.4 - 35.5
RSTI-6812	RSTI-6822	70	22.4 - 35.5
RSTI-6813	RSTI-6823	95	22.4 - 35.5
RSTI-6814	RSTI-6824	120	22.4 - 35.5
RSTI-6815	RSTI-6825	150	28.9 - 42.0
RSTI-6816	RSTI-6826	185	28.9 - 42.0
RSTI-6817	RSTI-6827	240	28.9 - 42.0
RSTI-6818	RSTI-6828	300	28.9 - 42.0

Screened Separable Coupling Connection System 630 / 800 amp - 42kV

RSTI-CC-68

Features

- The screened coupling connector is designed to mate with the rear end of the base screened connector system RSTI designed for 42 kV.
- The insulation of the coupling connector is made of a highly modified silicone rubber characterised by high tracking resistance, elongation at break and non-flammability.
- A thin walled screen is permanently bonded onto the insulation and protects the connection system against accidental contact.
- The screened coupling connector need not be removed for oversheath testing.
- The combination of screened connector and coupling connector exceeds CENELEC HD 629.1 S1 requirements, which include BS, VDE and other international specifications.
- Design of combination fits 630 A and 1250 A bushings (Interface "C1" and "C2") as specified by EN 50180 and EN 50181.
- The compact design supports the use of double "T" connections inside standard terminal boxes.
- The wide application range covers cable cross-sections from 35 to 400 mm².
- Conductor connection with mechanical or DIN lugs.
- Easily accessible rear plug with capacitive test point.
- Few accessories required for system test and earth connection.
- Complete kit including lugs for easier installation and storage

Selection Table

Screened separable coupling connection system 36 kV and 42 kV with mechanical lugs and shear bolts

Catalogue Reference	Cross Section	Dia. Core Insulation
	(mm²)	(mm)
RSTI-CC-6851	35 - 95	22.4 - 35.5
RSTI-CC-6852	95 - 120	22.4 - 35.5
RSTI-CC-6853	150 - 240	28.9 - 42.0
RSTI-CC-6855	300	28.9 - 42.0
RSTI-CC-6856	240 - 400	28.9 - 42.0

Screened separable coupling connection system 36 kV and 42 kV with DIN compression lugs

Catalogue Reference AL	Catalogue Reference CU	Cross Section	Dia. Core Insulation
		(mm²)	(mm)
RSTI-CC-6811	RSTI-CC-6821	50	22.4 - 35.5
RSTI-CC-6812	RSTI-CC-6822	70	22.4 - 35.5
RSTI-CC-6813	RSTI-CC-6823	95	22.4 - 35.5
RSTI-CC-6814	RSTI-CC-6824	120	22.4 - 35.5
RSTI-CC-6815	RSTI-CC-6825	150	28.9 - 42.0
RSTI-CC-6816	RSTI-CC-6826	185	28.9 - 42.0
RSTI-CC-6817	RSTI-CC-6827	240	28.9 - 42.0
RSTI-CC-6818	RSTI-CC-6828	300	28.9 - 42.0

Screened Separable Connection System 1250 amp - 42kV

RSTI-39/59/69

Raychem RSTI screened separable connectors are designed to connect single and three core polymeric cables to medium-voltage gas insulated switchgear and other equipment using CENELEC bushings Type C_1=630 A and C_2=1250 A, specified up to 42 kV.

Made of a highly modified silicone rubber and protected by a thin walled outer conductive screen connected to earth, Raychem RSTI connectors are equally suited for indoor and outdoor application.

Supporting a wide application range, the design incorporates one body and three stress cone adapters to cover all cross-sections from 400 to 800 mm² and all voltage classes from 12 to 42 kV. The overall and cut back dimensions are designed to take up minimum space in the terminal box.

Raychem RSTI connectors are equipped with a capacitive test point for determining whether the circuit is energised. A conductive cap protects this test point.

Selection Table

Screened separable connection system 12 kV with mechanical lugs

Catalogue Reference	Cross Section (mm²)	Dia. Core Insulation (mm)
RSTI-3951	400	28.9 - 36.4
RSTI-3952	500	28.9 - 36.4
RSTI-3953	630	34.0 - 45.4
RSTI-3954	800	34.0 - 45.4

Screened separable connection system 24 kV with mechanical lugs

Catalogue Reference	Cross Section (mm²)	Dia. Core Insulation (mm)
RSTI-5951	400	34.0 - 45.4
RSTI-5952	500	34.0 - 45.4
RSTI-5953	630	39.1 - 59.0
RSTI-5954	800	39.1 - 59.0

Screened separable connection system 36 & 42 kV with mechanical lugs

Catalogue Reference	Cross Section (mm²)	Dia. Core Insulation (mm)
RSTI-6951	400	34.0 - 45.4
RSTI-6952	500 - 630	39.1 - 59.0
RSTI-6953	800	39.1 - 59.0

Screened Separable Coupling Connection System for Large Cross Sections 1250 amp - 42kV

RSTI-CC-39/59/69

Features

- The screened coupling connector is designed to mate with the rear end of the base screened connector system RSTI designed for 42 kV.
- The insulation of the coupling connector is made of a highly modified silicone rubber characterised by high tracking resistance, elongation at break and non-flammability.
- A thin walled screen is permanently bonded onto the insulation and protects the connection system against accidental contact.
- The screened coupling connector need not be removed for oversheath testing.
- The combination of screened connector and coupling connector exceeds CENELEC HD 629.1 S1 requirements, which include BS, VDE and other international specifications.
- Design of combination fits 630 A and 1250 A bushings (Interface "C1" and "C2") as specified by EN 50180 and EN 50181.
- The compact design supports the use of double "T" connections inside standard terminal boxes.
- The wide application range covers cable cross-sections from 400 to 800 mm^2.
- Conductor connection with mechanical lugs.
- Easily accessible rear plug with capacitive test point.
- Few accessories required for system test and earth connection.
- Complete kit including lugs for easier installation and storage.

Selection Table

Screened separable connection system 12 kV with mechanical lugs

Catalogue Reference	Cross Section	Dia. Core Insulation
	(mm^2)	(mm)
RSTI-CC-3951	400	28.9 - 36.4
RSTI-CC-3952	500	28.9 - 36.4
RSTI-CC-3953	630	34.0 - 45.4
RSTI-CC-3954	800	34.0 - 45.4

Screened separable connection system 24 kV with mechanical lugs

Catalogue Reference	Cross Section	Dia. Core Insulation
	(mm^2)	(mm)
RSTI-CC-5951	400	34.0 - 45.4
RSTI-CC-5952	500	34.0 - 45.4
RSTI-CC-5953	630	39.1 - 59
RSTI-CC-5954	800	39.1 - 59

Screened separable connection system 36 & 42 kV with mechanical lugs

Catalogue Reference	Cross Section	Dia. Core Insulation
	(mm^2)	(mm)
RSTI-CC-6951	400	34.0 - 45.4
RSTI-CC-6952	500 - 630	39.1 - 59
RSTI-CC-6953	800	39.1 - 59

Screened Separable Surge Arrester - 5kA

RSTI-SA-05

The screened gapless surge arrester is a "T"-shaped product. It is designed for direct connection onto outer cone bushings in accordance to EN50180 or EN50181 with interface type "C" or for parallel connection mating to the rear entry of the base screened connector system RSTI-58 designed for system voltage up to 24 kV.

The insulation of the screened surge arrester is made of a highly modified silicone rubber characterised by high tracking resistance, elongation at break and non-flammability.

A thin walled screen is permanently bonded onto the insulation and protects the connection system against unintentional contact.

The active part is a metal oxide arrester which meets the requirements of IEC-60099-4 for separable and dead front arresters.

The combination of screened connector and surge arrester exceeds CENELEC HD 629.1 S1 requirements, which includes BS, VDE and other international specifications.

Easily accessible rear plug with capacitive test point.

Few accessories required for system test and earth connection.

Complete kit including screened surge arrester, threaded pin and earth lead for three phases facilitates installation and storage.

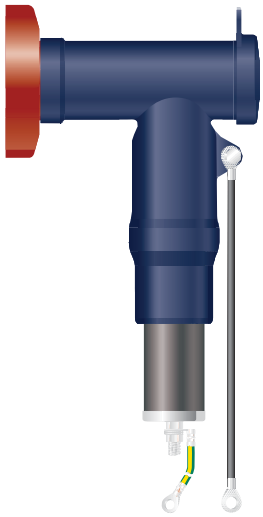
Standalone Arrestor

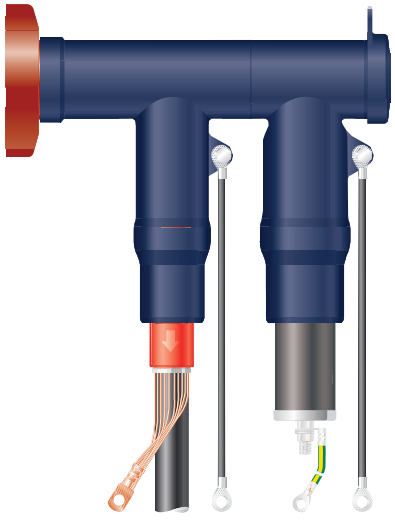
Catalogue Reference	Voltage Class (kV)	Length (mm)
RSTI-58SA1205	12	285
RSTI-58SA2405	24	400

Piggy Back Arrestor*

Catalogue Reference	Voltage Class (kV)	Length (mm)
RSTI-CC-58SA1205	12	285
RSTI-CC-58SA2405	24	400

*Can be used with RSTI-58 Elbows





Screened Separable Surge Arrester - 10kA

RSTI-SA-10

The screened gapless surge arrester is a "T"-shaped product. It is designed for direct connection onto outer cone bushings in accordance to EN50180 or EN50181 with interface type "C" or for parallel connection mating to the rear entry of the base screened connector system RSTI designed for system voltage up to 41 kV.

The insulation of the screened surge arrester is made of a highly modified silicone rubber characterised by high tracking resistance, elongation at break and non-flammability.

A thin walled screen is permanently bonded onto the insulation and protects the connection system against unintentional contact.

The active part is a metal oxide arrester which meets the requirements of IEC-60099-4 for separable and dead-front arresters.

The combination of screened connector and surge arrester exceeds CENELEC HD 629.1 S2 requirements, which includes BS, VDE and other international specifications.

Easily accessible rear plug with capacitive test point.

Few accessories required for system test and earth connection.

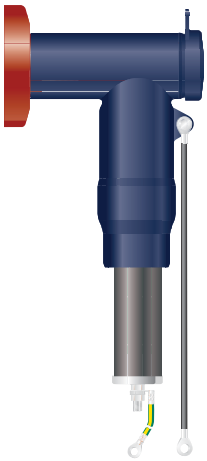
Complete kit including screened surge arrester, threaded pin and earth lead for three phases facilitates installation and storage.

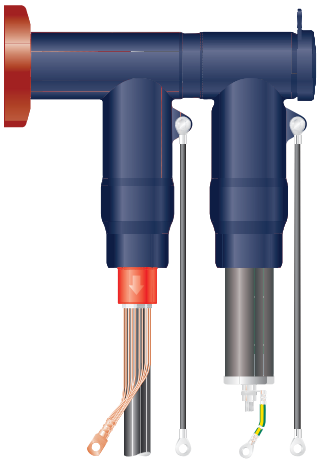
Standalone Arrestor

Catalogue Reference	Voltage Class (kV)	Length (mm)
RSTI-68SA1210	12	285
RSTI-68SA2410	24	400
RSTI-68SA3310	33	520

Piggy Back Arrestor

Catalogue Reference	Voltage Class (kV)	Notes
RSTI-CC-68SA1210	12	1, 2, 3
RSTI-CC-68SA2410	24	1, 2, 4
RSTI-CC-68SA3310	33	5





Notes

1) Can be used as a piggy back on RSTI-58 type elbows
2) Can be used as a piggy back on RSTI-CC-58 type elbows
3) Can be used as a piggy back on RSTI-39 type elbows with the addition of support pin RSTI-SA-PIN
4) Can be used as a piggy back on RSTI-59 type elbows with the addition of support pin RSTI-SA-PIN
5) Can be used as a piggy back on RSTI-69 type elbows with the addition of support pin RSTI-SA-PIN

Section 9: Tools and Equipment

Accessories for the Installation of Heat Shrinkable and Cold Applied Products

FH-1630 Torch Assembly

The FH 1630 torch assembly for rapid installation of heat shrinkable materials offers maximum burning efficiency and the best available balance of surface preheat.
All system components are fully compatible.

FH-1630-S-HNZ Torch handle

Torch handle with holder and shutoff valve for use on all FH 1630-S nozzles, -PIE regulators and hoses.

Nozzle connection thread: R3/8'', right
Hose connection thread: R3/8'', left

FH-1630-S-HSZ Torch handle

Torch handle with holder and shutoff valve and pilot/full flame lever for all FH 1630-S nozzles, -PIE regulators and hoses.

Nozzle connection thread: R3/8'', right
Hose connection thread: R3/8'', left

Nozzles for FH-1630-S handles

	Nozzle Ø (mm)	Gas Consumption Max (kg/h)
FH 1630-S-BN28	28	0.46
FH 1630-S-BN38	38	0.90
FH 1630-S-BN50	50	2.00
FH 1630-S-PN17 (for plumbing)	17	0.24

FH-1630-S-MC10 Torch box with content

Torch box of red enamelled galvanised steel, three nozzles BN28, BN38, and PN17, one torch handle HSZ, one constant pressure regulator R1, one automatic cut-off valve CV, one 5 m high pressure hose SW5.
Weight: 4.8 kg
Size: 450 x 210 x 74 mm

FH-1630-S-BH20
Compact gas bottle

This highly portable lightweight gas bottle is supplied complete with a robust carrying hook and a stand for the work bench or desk top. The bottle and stand are finished in red enamel and the unfilled bottle weighs only 1.45 kg.
Capacity: 0.425 kg

FH-1630-PIE
Torch handle

Torch handle with Piezo automatic ignition. Gas flow with pressed trigger only.

Nozzle connection: bayonet socking
Hose connection thread R3/8'', left

Nozzles for FH-1630-PIE handle

	Nozzle Ø (mm)	Gas Consumption Max (kg/h)
FH 1630-PIE-BN28	28	0.46
FH 1630-PIE-BN38	38	0.90
FH 1630-PIE-BN50	50	2.00
FH 1630-PIE-PN18 (for plumbing)	18	0.24

Constant pressure regulator for all FH-1630 hoses

Applicable on propane gas tanks with a capacity of 5 kg to 11 kg.
Gas flow: max 6 kg/h
Constant pressure: 2 bar
The constant pressure regulator screw connections are compatible with all FH-1630 high pressure hoses.

	Hose Connection Thread	Gas Bottle Connection Thread
FH 1630-PIE-R1	R3/8'' LH	W21.8 x 1/14'' LH DIN/Combi
FH 1630-PIE-R2	R3/8'' LH	W20 x 1/14'' LH POL
FH 1630-PIE-R3	R3/8'' LH	W20 x 1/14'' LH SHELL

High pressure hoses for all FH-1630 handles

Fitted with screw connections for all FH-1630 constant pressure regulators and torch handles.

Internal diameter: 4 mm
Connection threads: R3/8'' LH
Colour: orange

FH-1630-PIE-SW4 4 m length
FH-1630-PIE-SW5 5 m length
FH-1630-PIE-SW10 10 m length

FH-1630-PIE-CV
Automatic cut-off valve

The automatic cut-off valve is fitted between the hose and the constant pressure regulator and cuts off the gas supply in the event of damage to the hose or torch handle.

Connection threads: R3/8'' LH

FH-1630-PIE-LGS
Safety valve

The safety valve is a combination of FH-1630-PIE-R1 and FH-1630-CV, including an automatic gas leakage device.

Max. hose length: 10 m

Torch holder

The snap-fitting torch holder enables the torch to be put aside in a convenient clean and safe position during installation work in the field.
Galvanised steel.

	Nominal diameter of fixing ring (mm)
FH-1630-TH229	229
FH-1630-TH300	300

IT-1000-001
Tool Kit for cable installation

A compact and comprehensive kit for the installation of cable accessories, joints, terminations, etc.

IT-1000-002
Cable Vice

The IT-1000-002 cable vice for fast and easy installation of joints and the repair of cables. An adaptor is included which enables the cable vice to be used for the installation of terminations. Suitable for field installation and for workshop use. When fixed to a work bench, the upper part with the clamps can be used without the legs. Cable vice for the installation of joints and the repair of cables.

Overall Diameter of Cable	Length	Width of Legs	Height of Upper Part	Height (Total)	Weight
(mm)	(mm)	(mm)	(mm)	(mm)	(kg)
15 – 100	700 – 1210	800	450 - 580	1010 - 1140	11.5

IT-1000-019
Installation Tool for Mechanical Connectors

This tool avoids the cable cores being over bend during installation of mechanical connectors.
Application diameter range: 15 – 60 mm
Length of handle: 205 mm

IT-1000-031
Screen Removal Tool

For bonded screens on sector shaped conductors packed in a belt pouch.
Spare blade included

IT-1000-030-2
Screen Removal Tool

TE's Screen Removal Tool IT-1000-030-2 for bonded screens on round conductors of MV Cables, incl. 1 spare blade, silicone grease and allen key delivered in a robust polypropylene box. Suitable for one and three core cables.
Features:

- Application range over insulation 10 – 50 mm
- Min. screen cutback 10 mm
- Variable cutting thickness

IT-1000-030-2-Blade
Spare Blade

for Screen Removal Tool IT-1000-030-2

IT-1000-030-2-Grease
Silicone Grease

for Screen Removal Tool IT-1000-030-2

Cable Sheath Joggling Tool

SIML-0-0711744-1
PG2 Cable Diameter: 21 – 35 mm
SIML-0-0711745-1
PG3 Cable Diameter: 26 – 52 mm
SIML-0-0711746-1
PG4 Cable Diameter: 47 – 75 mm

IT-1000-004 Ligarex Pliers

Ligarex Pliers are used to fasten stainless steel Ligarex collar.

Ligarex Collar Description	Length (mm)
EXRM-0302-250	250
EXRM-0302-500	500
EXRM-0302-800	800

AD-1522-1 Crimp Tool

The AD-1522 crimp tool crimps all DuraSeal crimp and PolyCrimp products.

IT-1000-010 Diameter Tape

Total length: 2 m

EXRM-1004 Insulation Removal Tool

For the removal of paper insulation.
Application Diameter Range:
13 – 55 mm
Length: 190 mm

EXRM-0607
Cable Knife

Total length: 175 mm

EXRM-1228
Hexagon Insert Socket

Extra long hexagon insert socket wrench, used for the installation of RICS-adaptors.
Insert socket size: 19 mm

EXRM-1455-600-1000
Heat Protection Cover

Dimensions:
Length 1000 x Width 600 mm
Material:
Kevlar needle felt

EXRM-0764
Insulation stripping string

Insulation stripping string for plastic insulated cables.
Length: 2 m

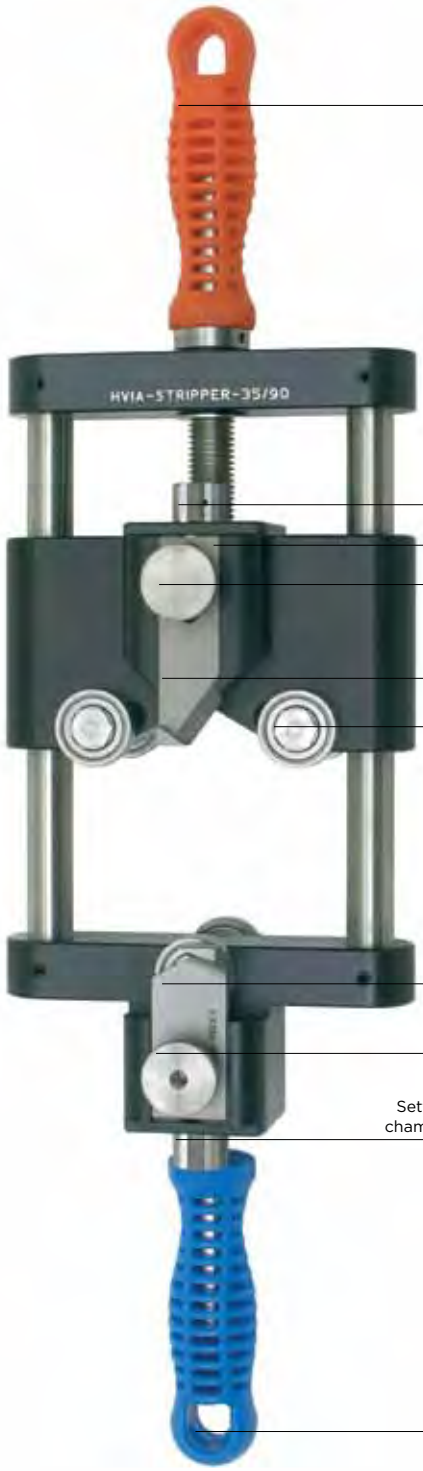
EPPA-004
Cleaning Tissue

A special type of cellulose paper multiple felded and impregnated with isopropyl alcohol. Cleaning tissues can be used to clean and degrease the surface of metal, plastic, rubber, etc. components before the installation of heat-shrinkable products. Supplied in individual sachets.

Size: 140 x 200 mm, folded to 60 x 80 mm

Stripping Tool from 35 - 90mm
HVIA-STRIPPER-35/90

HVIA



Handle to adjust spindle to cable diameter

Setting screw to adjust cutting depth of blade for removing primary insulation

Locating hole for blade

Locking screw for cable insulation blade

Blade EXRM-0982-1-22.5 for removing primary insulation

Adjustable rollers (2 positions)

Blade EXRM-0982-R-20 for removing bonded cable screen

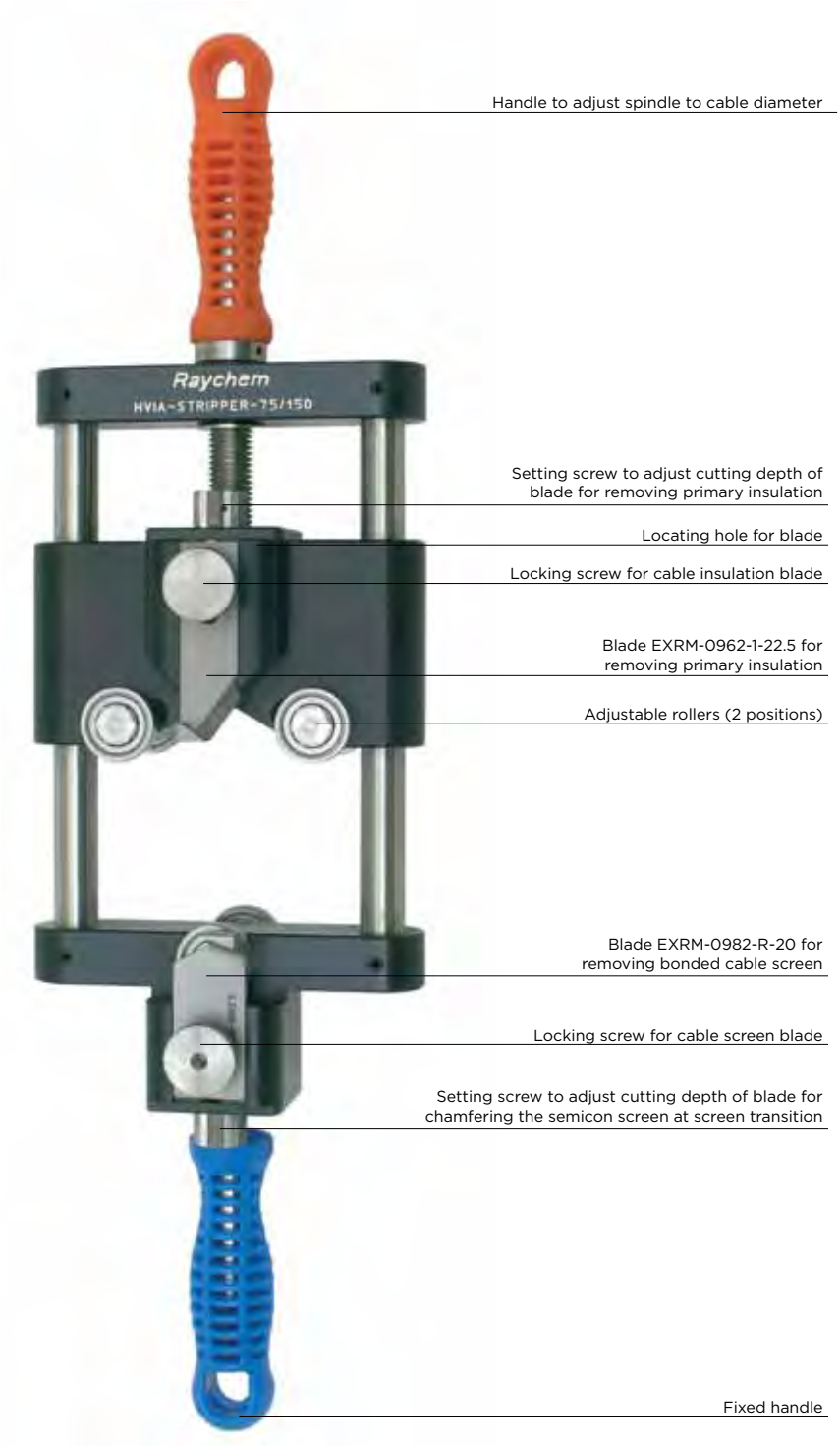
Locking screw for cable screen blade

Setting screw to adjust cutting depth of blade for chamfering the semicon screen at screen transition

Fixed handle

Stripping Tool from 75 - 150mm
HVIA-STRIPPER-75/150

HVIA



Handle to adjust spindle to cable diameter

Setting screw to adjust cutting depth of blade for removing primary insulation

Locating hole for blade

Locking screw for cable insulation blade

Blade EXRM-0962-1-22.5 for removing primary insulation

Adjustable rollers (2 positions)

Blade EXRM-0982-R-20 for removing bonded cable screen

Locking screw for cable screen blade

Setting screw to adjust cutting depth of blade for chamfering the semicon screen at screen transition

Fixed handle

Cordless Impact Wrench

Features

Catalogue Reference	IT-1000-033-AU
Voltage	14.4V
No-Load Speed	Tools and Equipment
Nominal Tightening Torque	200Nm
Rechargeable battery	3.0Ah; Li-ion (8 cells)
Charging Time	90min
Weight	1.5kg
Vibration emission value ah	1.5m/s²

Packaging:

- 1 Tool
- 2 Batteries
- 1 Charger
- Sockets
- User manual

Notes

Index

Notes

About TE Connectivity

TE Connectivity is a global, $12.1 billion company that designs and manufactures over 500,000 products that connect and protect the flow of power and data inside the products that touch every aspect of our lives. Our nearly 100,000 employees partner with customers in virtually every industry – from consumer electronics, energy and healthcare, to automotive, aerospace and communication networks – enabling smarter, faster, better technologies to connect products to possibilities.

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*as defined www.te.com/leadfree

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TE connectivity ENERGY