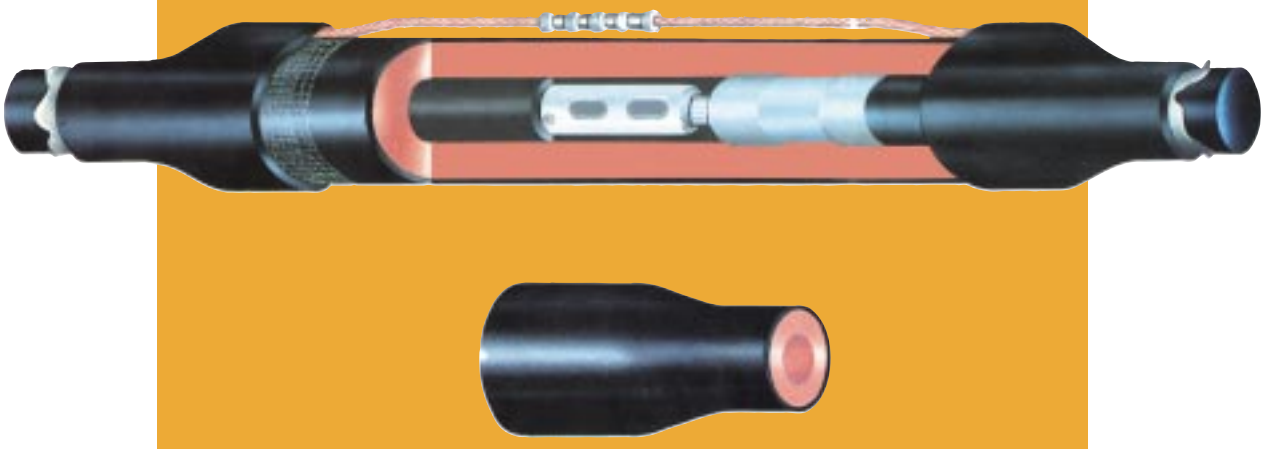
HEAT-SHRINKABLE JOINTS MVK
&
DUAL WALL TUBINGS HVDW

FOR POWER CABLES UP TO 36 kV



CANUSA

CANUSA

HEAT-SHRINKABLE JOINTS FOR SCREENED PLASTIC, EPR RUBBER OR PAPER INSULATED "NON-DRAINING" CABLES UP TO 36 kV

GENERAL

Cable joints, based on heat-shrinkable materials are a reliable, fast and simple method of jointing screened plastic, EPR rubber or paper insulated "NON-DRAINING" cables. Other methods (resin, prefabricated accessories and self-amalgamating tapes), are more difficult to install especially in poor weather conditions. A heat shrink joint covers the life time of the cable (for European conditions, average life time of a cable is 35 years).

RELIABILITY IN INSTALLATION

A dual-wall heat-shrinkable tube is used in joint installation It consists of a semi-conducting layer of cross-linked polyolefin and an insulating layer of EPR rubber. The cross-linking process of the polyolefin layer results in an elastic "memory", activated simply by heating, so that the material shrinks to a pre-determined diameter. The quality and reliability of the joint is pre-engineered and easy to install. When recovered, this composite tubing exerts elastic force between cable, stress grading layer and joint insulating body, capable of withstanding normal, overload and short circuit current.

ELECTRICAL FIELD CONTROL

In order to decrease the electrical field in the area of interruption of the semi-conducting layer as well as conductor ferrules, stress-grading material with non-linear volt-ampere characteristic is used. Electrical field control in the joint is improved by pressure from the inner EPR rubber to the stress grading material, so it reduces the possibility of partial discharge.

ADVANTAGES

- Fast, reliable and cost effective installation
- Quick installation
- No requirement for skilled jointers and special tools, application can also be extended to paper insulated cables ("NON-DRAINING")
- Capability of jointing cables made of various types of insulation, metal and conductor cross-sections
- Small number of heat-shrinkable tubes cover a wide range of cable cross-sections
- Factory tested quality and reliability.

CANUSA

NEW PRODUCT

DUAL WALL HEAT-SHRINKABLE TUBES FOR MEDIUM VOLTAGE UP TO 36 kV (HVDW)

1. DESCRIPTION AND USES

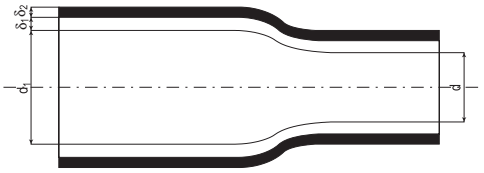
A two-layer coextruded tube with a black outside semi-conducting layer and a brick inside insulating layer used for jointing MV cables up to 36 kV.

2. TECHNICAL DATA

Outside semi-conducting layer		
PHYSICAL PROPERTY	**VALUES (min/max)**	**SPECIFICATION**
Density	1160 kg/m^3	IEC 684-2-4
Tensile Strength	15/20.5 N/mm^2	IEC 684-2-19
Ultimate Elongation	100/250 %	IEC 684-2-19
ELECTRICAL PROPERTY		
Resistivity	50/100 Ω cm	

Dual wall heat-shrinkable tube	
PROPERTIES	**VALUES (min/max)**
Temperature at continuous duty	90/105°C
Shrinkage Temperature	>125°C
Shrinkage at full recovery	120/125 %

Inside insulating layer		
PHYSICAL PROPERTY	**VALUES (MIN/MAX)**	**SPECIFICATION**
Density	1200/1300 kg/m^3	IEC 684-2-4
Tensile Strength	5/6.5 N/mm^2	IEC 684-2-19
Ultimate Elongation	250/660 %	IEC 684-2-19
ELECTRICAL PROPERTY		
Dielectric Strength	21/26 kV/mm	IEC 684-2
Volume Resistivity	1x1015/7x1015 Ω cm	IEC 684-2



TYPE OF TUBES	Recovered dimensions			Expanded d_1 (mm)	Length (m)
	Insulation EPDM δ_1 (mm)	Semi-cond. PE δ_2 (mm)	Internal diameter d (mm)		
HVDW 36/16	5.5	3.0	16.0	36.0	acc. buyer requirements
HVDW 36/16S	8.5	4.0	16.0	36.0	
HVDW 45/20	8.5	4.0	20.0	45.0	
HVDW 56/25	12.0	4.0	25.0	56.0	

CANUSA

HEAT-SHRINKABLE JOINT MVK FOR SCREENED PLASTIC AND EPR RUBBER CABLES UP TO 36 kV

SPECIFICATION

- Dual-wall XLPE/EPR heat-shrinkable tube
- Outer protective heat-shrinkable tube with inner adhesive layer - stress grading material
- Compression type ferrules
- Semi-conducting self-amalgamating tape or semi-conducting tube - braided copper tape
- Rubber sealing tape - trichlorethylene
- Cleaning cloth

SINGLE CORE CABLES				THREE CORE CABLES		
U (kV)	Mark	CrossSection (mm^2)	L (mm)	Mark	CrossSection (mm^2)	L (mm)
12	MVK 10/1-70 MVK 10/1-150 MVK 10/1-300	25-70 95-150 185-300	700	MVK 10/3-70 MVK 10/3-150 MVK 10/3-300	25-70 95-150 185-300	1200
24	MVK 20/1-70 MVK 20/1-150 MVK 20/1-300	25-70 95-150 185-300	750	MVK 20/3-70 MVK 20/3-150 MVK 20/3-300	25-70 95-150 165-300	1300
36	MVK 35/1-70 MVK 35/1-150 MVK 35/1-300	25-70 95-150 185-300	800	MVK 35/3-70 MVK 35/3-150 MVK 35/3-300	25-70 95-150 185-300	1500

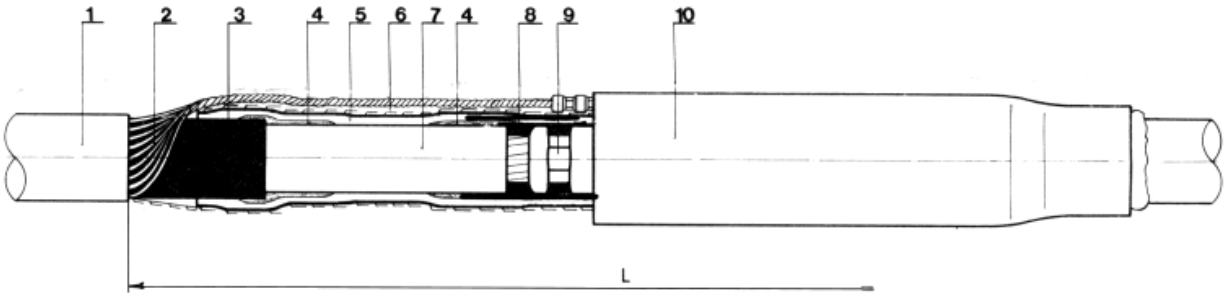
APPLICATION

Heat-shrinkable joints MVK are used for fast and reliable jointing of XLPE, PVC or EPR rubber single core or three core, screened, armoured or unarmoured cables in a wide range of cross-sections. After installation, cable and joint may be put into service immediately. This cable joint uses a heat-shrinkable tube with adhesive, for outer corrosion protection from cable sheath to cable sheath.

CANUSA

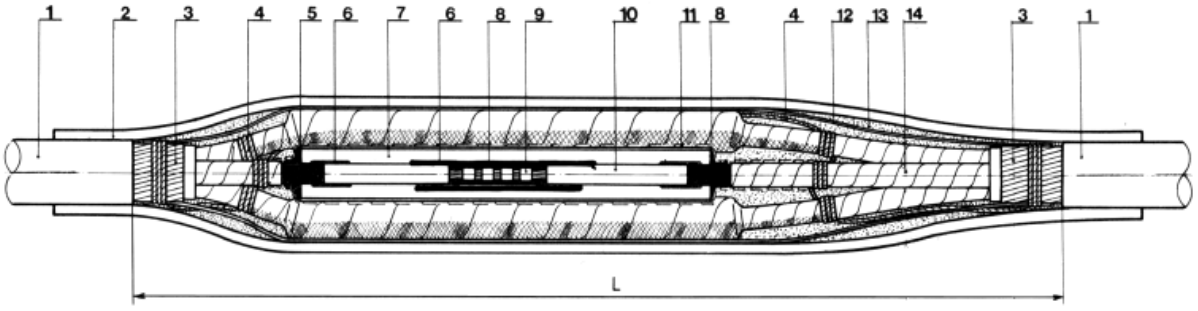
CABLE JOINT MVK

1. Cable outer sheath
2. Copper wire screen
3. Cable semi-conducting layer
4. Stress grading material
5. Dual-wall XLPE/EPR heat-shrinkable tube
6. Braided copper tape
7. Cable insulation
8. Semi-conducting self-amalgamating tape or semi-conducting tube
9. Compression type ferrules
10. Outer protective heat-shrinkable tube



CABLE JOINT MVK FOR THREE CORE CABLES

1. Cable outer sheath
2. Outer protective heat-shrinkable tube
3. Cable armour
4. Copper flexible conductor
5. Cable semi-conducting layer
6. Stress grading material
7. Dual wall XLPE/EPR heat-shrinkable tube
8. Semi-conducting self-amalgamating tape or semi-conducting tube
9. Compression type ferrule
10. Cable insulation
11. Braided copper tape
12. Canister
13. Rubber sealing tape
14. Copper tape screen



CANUSA

HEAT-SHRINKABLE JOINT MVK-PI FOR PAPER INSULATED "NON-DRAINING" CABLES UP TO 36 kV

SPECIFICATION

- Dual-wall XLPE/EPR heat-shrinkable tube
- Outer protective heat-shrinkable tube with inner adhesive layer - stress grading pad
- Compression type ferrules
- Semi-conducting self-amalgamating tape or semi-conducting tube
- silicone rubber tape or kynar tube
- Braided copper tape
- PVC thermoplastic tape
- Rubber sealing tape
- Material for soldering

Materials necessary for jointing of three core cables are as follows:

- Canister
- 3-way semi-conducting heat-shrinkable break out
- Copper flexible conductor

SINGLE CORE CABLES				THREE CORE CABLES		
U (kV)	Mark	CrossSection (mm^2)	L (mm)	Mark	CrossSection (mm^2)	L (mm)
12	MVK-PI 10/1-70	25-70	900	MVK-PI 10/3-70	25-70	1400
	MVK-PI 10/1-150	95-150		MVK-PI 10/3-150	95-150	
	MVK-PI 10/1-300	185-300		MVK-PI 10/3-300	185-300	
24	MVK-PI 20/1-70	25-70	950	MVK-PI 20/3-70	25-70	1500
	MVK-PI 20/1-150	95-150		MVK-PI 20/3-150	95-150	
	MVK-PI 20/1-300	185-300		MVK-PI 20/3-300	165-300	
36	MVK-PI 35/1-70	25-70	1000	MVK-PI 35/3-70	25-70	1600
	MVK-PI 35/1-150	95-150		MVK-PI 35/3-150	95-150	
	MVK-PI 35/1-300	185-300		MVK-PI 35/3-300	185-300	

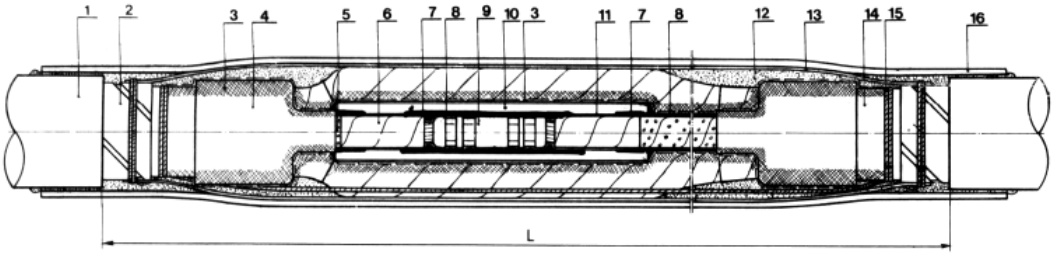
APPLICATION

Heat-shrinkable joints MVK-PI are used for fast and reliable jointing of single core or three core, paper insulated "NON-DRAINING", screened cables in a wide range of cross-sections. Application of the oil resistant separator
(silicone tape or Kynar tube) enables use of this joint for paper insulated cables. The separator is applied directly on the paper insulation. After installation the cable with the joints may be put into service immediately. This cable joint uses a heat-shrinkable tube with adhesive, for outer corrosion protection from cable sheath to cable sheath.

CANUSA

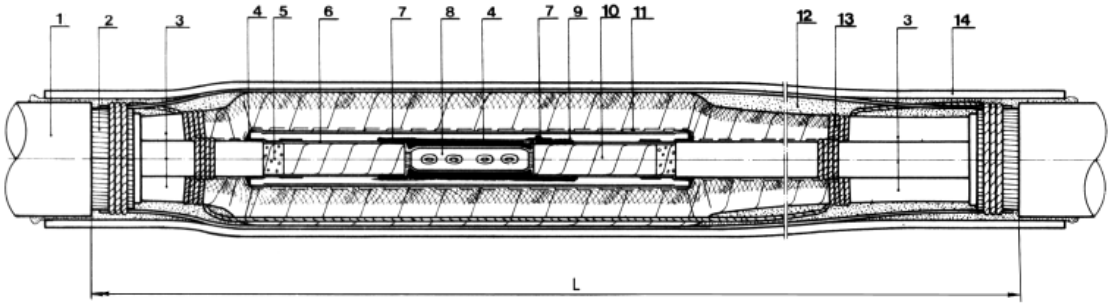
CABLE JOINT MVK-PI FOR THREE CORE, LEAD SHEATHED CABLES

1. Cable outer sheath
2. Cable armour
3. Braided copper tape
4. Semi-conducting
3-way heat-shrinkable breakout
5. Metal screen paper
6. Cable insulation
7. Stress grading material
8. Semi-conducting self-amalgamating tape or semi-conducting tube
9. Compression type ferrule
10. Dual-wall XLPE/EPR heat- shrinkable tube
11. Silicone rubber tape / kynar tube
12. Rubber sealing tape
13. Canister
14. Lead sheath
15. Copper flexible conductor
16. Outer protective heat-shrinkable tube



CABLE JOINT MVK-PI FOR THREE CORE, SEPARATE LEAD SHEATHED CABLES

1. Cable outer sheath
2. Cable armour
3. Lead sheath
4. Semi-conducting self-amalgamating tape or semi-conducting tube
5. Metal screen paper
6. Silicone rubber tape / kynar tube
7. Stress grading material
8. Compression type ferrule
9. Dual-wall XLPE/EPR heat-shrinkable tube
10. Cable insulation
11. Braided copper tape
12. Rubber sealing tape
13. Copper flexible conductor
14. Outer protective heat-shrinkable tube



CANUSA

TRANSITION JOINT MVK-XPI FOR JOINTING THE SCREENED PLASTIC AND EPR RUBBER INSULATED CABLES WITH PAPER INSULATED "NON-DRAINING" CABLES UP TO 36 kV

SPECIFICATION

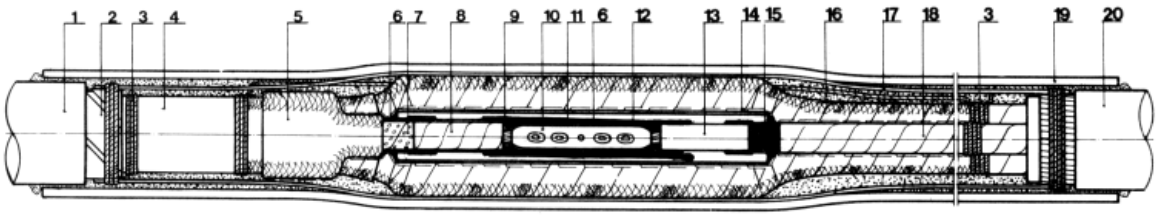
- Dual-wall XLPE/EPR heat-shrinkable tube
- Outer protective heat-shrinkable tube with inner adhesive layer
- stress grading material
- Compression type ferrules
- Semi-conducting self-amalgamating tape or semi-conducting tube
- Silicone rubber tape
- Braided copper tape
- PVC thermoplastic tape - rubber sealing tape
- Material for soldering

Materials necessary for jointing of three core cables are as follows:

- Canister
- 3-way semi-conducting heat-shrinkable break out.
- Copper flexible conductor

TRANSITION JOINT MVK-XPI

1. Outer sheath of paper cable
2. Cable armour
3. Copper flexible conductor
4. Lead sheath
5. Semi-conducting 3 way heat-shrinkable break out
6. Semi-conducting self-amalgamating tape or semi-conducting tube
7. Metal screen paper
8. Paper insulation
9. Stress grading material
10. Compression type ferrule
11. Silicone rubber tape
12. Dual-wall XLPE/EPR heat-shrinkable tube
13. Plastic insulation
14. Braided copper tape
15. Semi-conducting layer of plastic cable
16. Rubber sealing tape
17. Canister
18. Copper tape screen of plastic cable
19. Outer protective heat-shrinkable tube
20. Outer sheath of plastic cable



APPLICATION

Transition joint MVK-XPI is used for jointing screened plastic and EPR rubber insulated cables with paper insulated "NON-DRAINING" cables. Besides jointing, three core cables, three single core cables with different dielectric can be jointed. Using the separator (silicone tape/ kynar tube), paper cables convert to cable with extruded dielectrics.

CANUSA

ELECTRICAL RATINGS

TEST SEQUENCE	TEST VOLTAGE HIGHEST VOLTAGE FOR CABLE Um (kV)			RESULTS
	12	24	36	
A.C. Voltage Withstand 1 min.	35	55	75	passed
Partial Discharge	12	24	36	≤ 10pC
Impulse Voltage Withstand - 10 positive and 10 negative, 1,2/50 µs, between conductor and grounded screen	75	125	170	passed
Load Cycling - 3 cycles, 5 h heating, 3h cooling - Conductor temperature: XLPE cables 95°C paper insulated cables	15 75°C	30 70°C	45 65°C	passed
Partial Discharge	12	24	36	≤ 10 pC
Load Cycling - as above, but 60 cycles	15	30	45	passed
Thermal Short Circuit 1s - Conductor temperature: XLPE cables 250°C paper insulated cables	 165°C	 155°C	 140°C	passed
Load Cycling - as above, but 63 cycles with joint in the water	15	30	45	passed
Impulse Voltage Withstand - as above	75	125	170	passed
D.C. Voltage Withstand 30 min.	48	96	144	passed
A.C. Voltage Withstand up to breakdown				

CANUSA SYSTEMS LIMITED
Bergstrand House
Broadley Industrial Park
Roborough, Plymouth, U.K. PL6 7EZ
Tel: 44-1752-209880
Fax: 44-1752-209850
Web site: www.canusa-emi.com