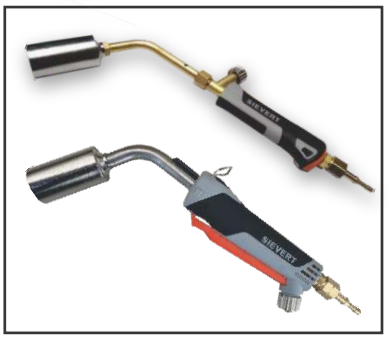
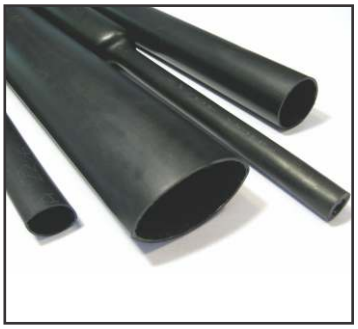
CiP

Cable Installation Products





Product Catalogue 2022

ISO 9001
BUREAU VERITAS
Certification

UKAS MANAGEMENT SYSTEMS
008

Company Introduction

CiP/AIRSHRINK SA is a South African manufacturer of heatshrink tubing and components, originally established in 1986. In 2001 the company changed ownership and the new management realized that future growth lay in diversification into heatshrink and associated products. In recent years the company has made great strides in in-house development and has significantly expanded its manufacturing facility to include other products such as heatshrink, medium voltage joints, terminations, screened and un-screened separable connectors, bushing boots, mechanical torque shear lugs, connectors and other LV / MV accessories.

In order to meet our customer's requirements on specialized products the company expanded further by complimenting our already well established and comprehensive product portfolio by carefully selecting and setting up joint ventures with foreign manufacturers such as elcon megarad / AMPLETEK / MELEC that are experts in their respective fields. The company is situated in Johannesburg with customers in Southern Africa as well as abroad. Our commitment to innovation and customer service ensures fast turnaround times for both standard and non standard products. Understanding the needs and expectations of our business partners and building lasting relationships by constantly exceeding expectations remains our main objective.

CiP/AIRSHRINK products are widely accepted and approved. Current customers include all major municipalities, Eskom, contractors, mines, OEM manufacturers and industry.

Investment in new processes and equipment is part of the company's long term strategy to ensure that we stay abreast of global developments and meet the existing and future requirements of our customers. Excellent in-house technical know-how means that the company can offer engineering solutions for a variety of challenges.

CiP/AIRSHRINK is ISO 9001/2015 certified

CiP
Cable Installation Products

elcon megarad

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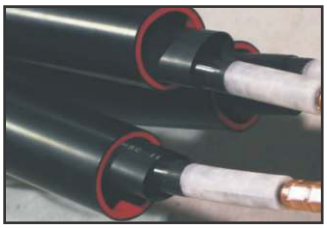
Product Profile





1. Medium Voltage Heatshrink, Components and Accessories

CiP and elcon megarad offer a range of joints, terminations and other products suitable for applications up to 36kV. These products have been designed and tested to meet the required standards and the relevant test reports are available. This range includes the following:

- MV (medium voltage) joint and termination kits
- MV components including anti-track and busbar tubing
- Busbar insulation tape
- Self amalgamating tape
- Screened separable connectors (11kV - 36kV)
- Torque shear lugs and connectors
- Overhead line insulation sleeving
- Flexible un-screened silicone bushing boots
- Un-screened separable connectors for Type C, 630A bushings
- Un-screened anti-tracking heat shrinkable right angle / straight bushing boots

2. Heatshrink

Standard heatshrink is a cross-linked polyolefin product that can be supplied in either general purpose or flame retardant form. Heatshrink's high dielectric strength and excellent mechanical properties makes it suitable for a variety of applications, including:

- Insulation and colour coding of busbars, lugs etc.
- Cable and component identification
- Mechanical strain relief and protection

Specialized heatshrink and components range from heatshrink with a thicker wall, higher shrink ratios, adhesive lined, RoHS and REACH compliant, halogen free and product suitable for applications up to 36 kV. Other products include:

- Heatshrink with excellent resistance to diesel, chemicals and hydraulic fluids
- Medium / thick wall adhesive and non-adhesive lined for use in low voltage and medium voltage joints and terminations

3. Low Voltage Products

- LV terminations
- LV heatshrink, polyurethane resin and epoxy joints
- LV breakout boots
- LV heatshrink, all colours

4. Other Products

- Cable end caps (adhesive lined)
- Wrap around cable repair sleeves
- Hot melt tape
- Mastic tape / putty

5. Tools and Accessories

- Heat guns and burners
- Tool cases, kits and tools

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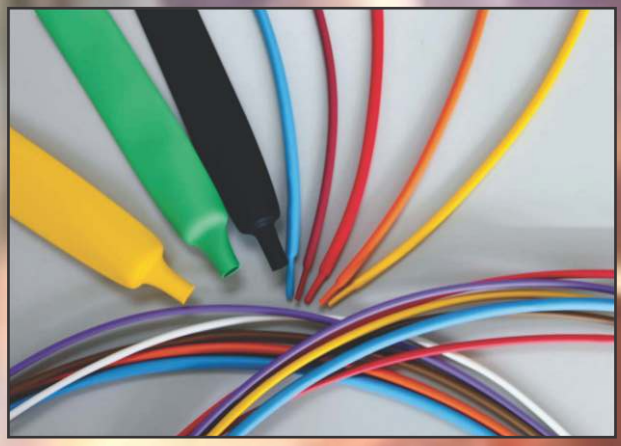
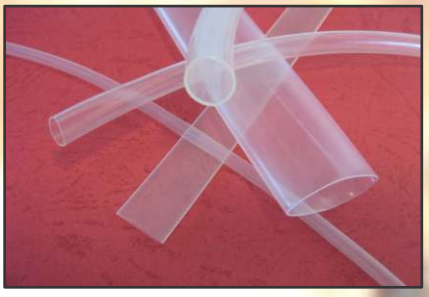
HEATSHRINK





CiP
Cable Installation Products

elcon megarad

Design Information

Busbar Sizing Guide

Busbar Sizes (mm)	Heatshrink Code (Low Voltage)	Heatshrink Layflat Size (mm)
12 X 1.5 / 12.5 X 3	ATW12.7	20
14 X 4	ATW19	30
15 X 3	ATW19	30
16 X 3	ATW19	30
16 X 4	ATW19	30
20 X 3 / 20 X 4 / 20 X 6	ATW19	30
25 X 3	ATW25.4	40
25 X 5 / 25 X 6 / 25 X 6.3	ATW25.4	40
30 X 3 / 30 X 6 / 30 X 6.3	ATW38.1	60
30 X 10 / 30 X 12 / 31.5 X 6.3	ATW38.1	60
40 X 4 / 40 X 6 / 40 X 6.3 / 40 X 10	ATW38.1	60
50 X 6 / 50 X 6.3	ATW38.1	60
50 X 10 / 50 X 12 / 50 X 16 / 60 X 3 / 60 X 6	ATW50.8	80
60 X 10 / 63 X 6 / 63 X 6.3	ATW50.8	80
80 X 6 / 80 X 8 / 80 X 10 / 80 X 12	ATW76	120
100 X 6 / 100 X 10 / 100 X 12 / 100 X 16	ATW76	120
120 X 10 / 120 X 16.5	ATW100	160

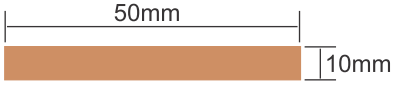
Calculations

Busbars

How to calculate / determine the correct size Heatshrink for your busbar dimensions.

1. Add all four sides.
2. Divide by 3.1415 (π).
3. This result gives the actual OD (outer diameter) of your busbar and thus the min ID (inner diameter) that your Heatshrink needs to shrink down to.
4. Add 10% to this result to allow sufficient clearance. This will ensure that your Heatshrink slips over easily.

Example



Busbar Size: 50 x 10
= (50+50+10+10) / 3.1415
= 120 / 3.1415
= 38.198
Add 10%
= 42.02mm →

This is the most suitable diameter (ID) for your application. Now choose the Heatshrink size that suits this busbar size. (50.8)

Cable Sizing Guide

Cable Size (mm²)	Approx. Core OD (mm) Including Insulation (LV)	Heatshrink Size (ID)	Heatshrink Layflat Size (mm)
630	42.8	50.8	80
500	36.5	50.8	80
300	30.0	38.1	60
240	27.0	38.1	60
185	23.5	25.4	40
150	22.0	25.4	40
120	18.5	25.4	40
95	16.5	19	30
70	14.5	19	30
50	12.6	19	30
35	10.8	12.7	20
25	9.0	12.7	20
16	6.9	9.5	15
10	6.0	9.5	15
6	5.1	6.4	10
4	4.5	6.4	10
2.5	3.7	4.8	7.5
1.5	3.2	4.8	7.5
1	2.6	4.8	5
0.5	2.1	2.4	3.8

- Insulation thickness depends on cable rating. The above referes to 600 - 1000V PVC insulated cable
- The information detailed above is intended as a guide only
- Cable dimensions depend on the rating and therefore accurate measurement of outside diameter is recommended before order is placed. This will ensure that correct size is supplied

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Design Information

General Tips on Selecting, Applying and Shrinking Heatshrink

1. Selection:

- Confirm the OD (Outside Diameter) of the cable/ object you need to cover.
- Decide on the wall thickness you require. Based on the thickness you may need to choose one size up or select a heatshrink with a higher shrink ratio. Standard thin wall heatshrink has a 2:1 ratio which means it will shrink to half its supplied size. ***(Example: 25.4 will shrink to 12.7)***.
- Take note that all heatshrink sizes are given as the ID (Inside Diameter) and not in mm² or layflat (see pages 4,6,7). Should you not have the ID refer to pages 4,7 and see the calculation necessary to determine the ID.
- When choosing the heatshrink always allow for at least a 20% shrink and a maximum of 80% as this will ensure the product performs according to the specifications stated.
- Will the heatshrink be placed onto the cable before or after a lug or ferrule has been crimped into place? If afterwards confirm that the heatshrink size is suitable to fit over the lug/ferrule and if it will still recover to the OD of the cable. If not, a heatshrink with a higher shrink ratio must be selected.
- Other considerations include:
  - Do you need a moisture seal/watertight connection, this will require an adhesive lined heatshrink (see pages 9, 10, 11, 12).
  - Will it be exposed to cleaning fluids, fuel, oils or more aggresive chemicals? This may require diesel resistant , Kynar, Viton or Teflon heatshrink.
  - What will the minimum or maximum operating temperature be? Typically diesel resistant, Kynar and Teflon material offer higher operating temperatures, up to 330°C.
  - Are you covering identification labels that must be clearly visible after shrink and must it be moisture free? Various grades of clear heatshrink exist, including adhesive lined.
  - Do you need any specific specifications, approvals and accreditations? This may include Military, Halogen Free, RoHS, Flame Retardant, REACH, UL, IEC, UV stability etc.
  - What will the operating voltage be?
  - Do you require high abrasion properties?
  - Standard or specialised colours. (Standard - Black, Clear, White, Red, Blue, Yellow, Green/Yellow).

2. Application and Shrinking:

- Always keep the work area and cables/application as clean as possible.
- When cutting the heatshrink to the required size bear the following in mind.
  - Always cut with a sharp knife/guillotine. Make sure that there are no jagged edges as this will lead to the heatshrink splitting/tearing during application of heat (see page 6). Should you need to trim the heatshrink to size after shrunk, allow sufficient time for the product to cool down first.
  - In order to allow for continuation of insulation determine a suitable overlap.
  - Allow for the longitudinal shrinkage by cutting slightly longer. This could be as much as 5% (see page 6).
- Slide the heatshrink sleeve into place by positioning it centrally over the ferrules/object.
- Before shrinking:
  - Carefully read the installation instructions first as improvements and ammendments may have been introduced.
  - Confirm that all other heatshrink or components have been placed over the cable and that all ferrules/lugs are crimped/connected.
  - Remove all sharp edges that may cause the heatshrink to split.
  - Ensure that the surface has been abraded (if required) and that it is clean and de-greased.
  - If an adjustable heat gun is used, confirm the suitable setting/temperature. Incorrect temperature may lead to uneven shrinkage/wall thickness, incorrect insulation properties, damage to heatshrink and undesired air entrapment.

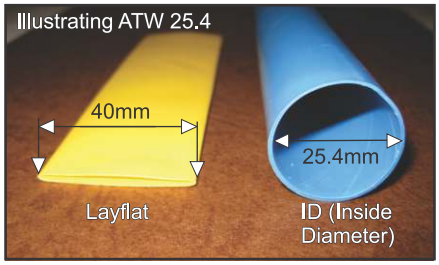
Design Information

General Tips Continued:

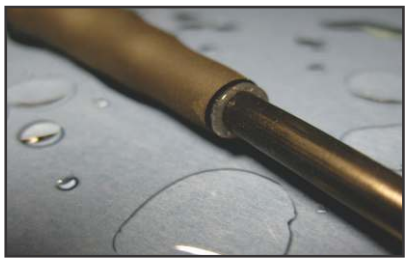
2. Application and Shrinking continued:

- Commence shrinking by starting from the middle working towards the outer ends applying heat circumferentially outwards until the internal sealant (adhesive) has melted, sleeves have a uniform wall thickness and are fully recovered (see below).
- When shrinking long lengths of heatshrink tubing (on cables for example), commence shrinking at one end and gradually move towards the other end.
- When shrinking thicker wall heatshrink (shrinks at higher temperatures) you may also use a propane gas torch (see below). When doing this keep the following in mind:
  - Ensure that this is done in a well ventilated area.
  - Use a "clean burning torch" e.g. a propane gas torch which does not leave any conductive contamination deposits.
  - Adjust the torch to a soft blue flame with an orange/yellow tip. A "pencil-like" blue flame should be avoided (see below).
  - As this heatshrink has a very thick wall the torch/flame has to be moved continuously to ensure proper shrinkage and avoid damage due to overheating in one place.
- Keep the following in mind during the shrinking process:
  - Keep the heat aimed in the shrink direction to pre-heat the material (see below).
  - Always apply the heat circumferentially around and outwards on all tubes, this ensures correct heat application which results in the correct material wall thickness.
  - Shrink the tubing and moulded parts as recommended and indicated in the instructions & manufacturer's guidelines.
- Once shrunk, all of the tubing should be smooth and free of any wrinkles. Signs of wrinkles indicate incorrect heating and possible air entrapment. With regards to Medium Voltage (MV) applications this may lead to failure over time.
- Allow the heatshrink to cool before applying any mechanical strain or trimming/cutting it to size.

Inside Diameter vs. Layflat



Adhesive Lined



Longitudinal Shrinkage

Hand Held Heat Gun

Split When Nicked

Gas Torch Orange/ Yellow Tip

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Design Information

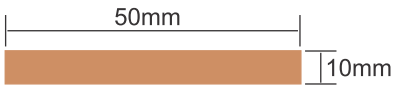
1. Busbar

How to calculate / determine the correct size Heatshrink for your busbar dimensions.

1. Add all four sides.
2. Divide by 3.1415 (π).
3. This result gives the actual OD (outer diameter) of your busbar and thus the min ID (inner diameter) that your Heatshrink needs to shrink down to.
4. Add 10% to this result to allow sufficient clearance. This will ensure that your Heatshrink slips over easily.

Example:

Busbar Size: 50 x 10
= (50+50+10+10) / 3.1415
= 120 / 3.1415
= 38.198
Add 10%
= 42.02mm → This is the most suitable diameter (ID) for your application. Now choose the Heatshrink size that suits this busbar size. (50.8)



2. Layflat to Diameter

Heatshrink sizes are given as the internal diameter (ID) as supplied and **NOT** the layflat (LF) size. If you are not sure of the correct ID you can calculate as follow:

Example:

Heatshrink size: 25.4mm
ID = (LF x 2) / 3.1415 (π)
= (40 x 2) / 3.1415
= 80 / 3.1415
ID = 25.46mm →

3. Circumference to Layflat

To calculate the Layflat if you have the diameter (D) it can be done as follow:

Example:

Heatshrink Size: 25.4mm
Circumference (C) is the same as 2 x Layflat (LF)
C = 3.1415 x ID
2LF = 3.1415 x ID
2LF = 3.1415 x 25.4
2LF = 79.79
$LF = \frac{79.79}{2}$
LF = 39.9mm →

4. Imperial to Metric

Inch	1/32"	3/64"	1/16"	5/64"	3/32"	1/8"	3/16"	1/4"	3/8"	1/2"	5/8"	3/4"	1"	1 1/4"	1 1/2"	2"	3"	4"
mm	**0.8**	**1.2**	**1.6**	**2**	**2.4**	**3.2**	**4.8**	**6.4**	**9.5**	**12.7**	**15.9**	**19.1**	**25.4**	**31.8**	**38.1**	**50.8**	**76.2**	**101.6**

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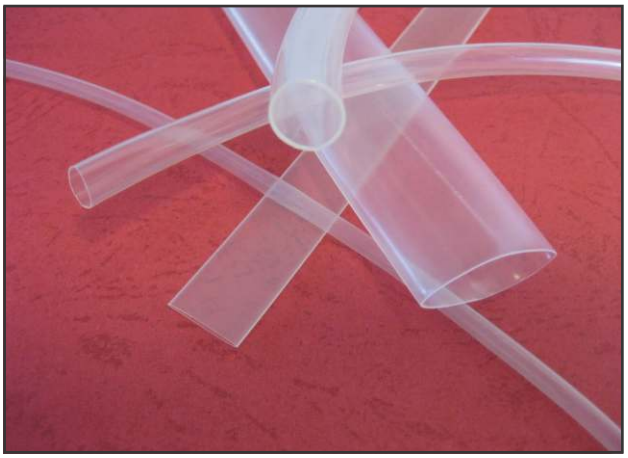
Thin Wall Clear

ATW...CL



Description

ATW...CL is a non flame retardant clear tubing which has excellent oil resistance and clarity. ATW...CL is RoHS compliant and halogen free.

Features

- Shrink Ratio 2 : 1
- Operating temperature -55°C to 125°C
- High chemical resistance
- Good abrasion resistance
- Excellent oil resistance
- Minimum shrink temperature 115°C

Applications

- Oil barrier in paper cable joints
- Abrasion and oil resistant covering for heatshrink and write and wrap labels
- Clear retainer for shock absorbers on safety harnesses
- Strain relief for electrical and electronic connections where visibility of connection is required

Technical Data

Properties	Test Methods	Typical Values
Tensile (MPa)	UL 224	> 15
Elongation (%)	UL 224	> 300
Heat Ageing : Tensile (MPa) : Elongation (%)	UL 224 (158°C x 168hrs)	> 12 > 250
Heat Shock (250ºC x 4hrs)	UL 224	Pass
Low temperature Flexibility	ASTM D 2671 (4hrs @ -35°C)	No Cracks / Pass
Fluid Resistance * (MPa)	ASTM D 2671	Tensile > 10
Dielectric Strength (kV/mm)	ASTM D 2671	> 20
Volume Resistivity (Ω/cm)	ASTM D 257	10^{14}

*Fluid Resistance: Tests conducted using brake fluid and unleaded petrol

Dimensions

Product	Inside Diameter (mm)		Wall Thickness (mm)		Reel Length (m)
	Supplied	Recovered	Supplied	Recovered	
ATW1.2CL	1.2	0.6	0.18	0.36	200
ATW1.6CL	1.6	0.8	0.18	0.36	200
ATW2.4CL	2.4	1.2	0.18	0.36	200
ATW3.2CL	3.2	1.6	0.20	0.40	200
ATW4.8CL	4.8	2.4	0.23	0.46	100
ATW6.4CL	6.4	3.2	0.28	0.60	100
ATW9.5CL	9.5	4.8	0.30	0.60	100
ATW12.7CL	12.7	6.4	0.33	0.66	100
ATW16CL	16	8.0	0.38	0.76	100
ATW19CL	19	9.5	0.40	0.80	100
ATW25.4CL	25.4	12.7	0.45	0.90	50
ATW32CL	32	16	0.45	0.90	50
ATW38.1CL	38.1	19.1	0.50	1.0	50
ATW50.8CL	50.8	25.4	0.50	1.0	25
ATW76CL	76	38	0.65	1.30	25

Tolerances for recovered wall thickness from 1.6 to 16 mm + - 0.10 mm
19 to 50 mm + - 0.15 mm
50 to 100 mm + - 0.2 mm

Oil barrier sleeve - PILC cables

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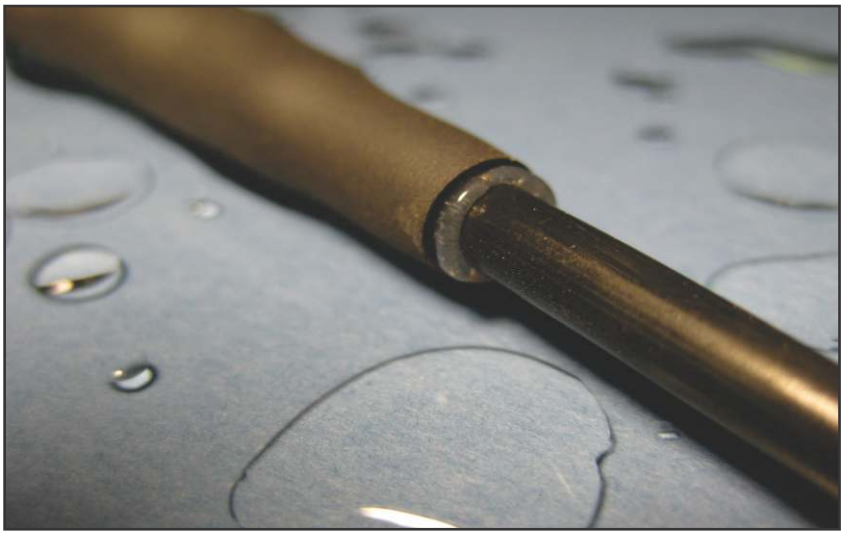
Thin Wall Adhesive Lined - (SAE-AMS-DTL-23053/4)

ADW3



Technical Data

Properties	Test Method	Typical Values
Cold Impact	ASTM D746-13 (-40°C)	No Cracking
Heat Shock	(250°C, 4hrs)	No Cracking / Dripping
Sealing Efficiency	(200°C, 3min) Reheat (150°C, 5min)	No opening on reheat
Tensile Strength (MPa)	ASTM D638-10	12.8
Elongation at Break (%)	ASTM D638-10	390
Dielectric Strength (kV/mm)	ASTM D2671-09	19.7
Volume Resistivity (Ω/cm)	ASTM D257-07	$2x10^{15}$
Flammability	ASTM D2671-09	Pass (Self extinguishing)
Corrosion	(121°C, 16hrs)	No Corrosion
Water Absorbtion (%)	ASTM D570-98 (23°C, 24hrs)	0.25
Heat Resistance	(175°C,168hrs)	No Cracks / Dripping / Flowing of outer walls
Longitudinal Shrinkage (%)	UL224	0 ± 5

Dimensions

Product	Inside Diameter (mm)		Wall Thickness Recovered (mm)	Reel Length (m)
	Supplied	Recovered		
ADW315	1.6	0.5	0.45	100
ADW331	3.2	1.0	0.90	100
ADW341	4.8	1.5	1.00	100
ADW362	6.4	2.0	1.25	100
ADW393	9.5	3.0	1.40	100
ADW3124	12.7	4.0	1.70	100
ADW3196	19.1	6.0	1.95	100
ADW3258	25.4	8.0	2.05	75
ADW33813	38.1	13.0	2.50	30
ADW35016	50.8	16	2.80	15

Description

ADW3 is manufactured by co-extrusion of polyolefin and hot-melt adhesive.
The product has been developed for applications that require a flame retardant highly flexible thin wall tubing with a higher shrink ratio and where a moisture seal is required.

Features

- Crosslinked polyolefin
- Shrink Ratio 3 : 1
- Adhesive lined
- Operating temperature -45 to 125°C
- Excellent flame retardant properties VW-1
- Standard colours - Black/Clear Special Colours on request
- Minimum shrink temperature, 70°C
- RoHS /REACH Complaint
- **Excellent oil & chemical resistance**
- **In compliance with SAE-AMS-DTL-23053/4**

Applications

- Environmental seal & insulation for electrical and electronic connections
- Bundling of wires and cables for flexible harnesses, including automotive and marine harnesses
- Quick recovery at low temperatures makes it ideal for use in the electronics & telecommunication applications
- Its 3 : 1 shrink ratio can easily cope with components of varying diameter, with no tendency to split

Clear

- Abrasion and oil resistant covering for identification labels/tags and write and wrap labels
- Strain relief and environmental seal for electrical and electronic connections where visibility of the connection is required
- Designed for applications where substrates need to remain visible and protected against the ingress of fluids

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Thin Wall Adhesive Lined

ADW4

Description

ADW4 is an adhesive lined flame retardant tubing. High shrink ratio combined with excellent sealing characteristics makes this product ideal for electrical and electronic connections where a moisture seal is required.

Features

- Shrink Ratio 4 : 1
- Operating temperature -55°C to 135°C
- Good flame retardant properties
- Good electrical and fungal resistant properties
- Colours - Black
- Minimum / fully recovered shrink temperature 90°C to 110°C

Applications

- Automotive wiring harnesses
- Low voltage joints
- Low voltage submersible connections
- Waterproof strain relief connections

Technical Data

Properties	Test Methods	Typical Values
Tensile (MPa)	UL 224	> 14
Elongation (%)	UL 224	> 400
Heat Ageing: Tensile (MPa) : Elongation (%)	UL 224 (175°C x 168hrs)	> 12 > 250
Heat Shock (25°C x 4hrs)	UL 224	Pass
Low temperature Flexibility	ASTM D 2671 (4hrs @ -55°C)	No Cracking
Copper Stability	ASTM D 2671 (175°C x 168hrs)	Pass
Flammability	VW-1	Pass *
Dielectric Strength (kV/mm)	ASTM D 2671	> 20
Volume Resistivity (Ω/cm)	ASTM D 257	10^{14}

Tests values are for outer crosslinked polyolefin layer

Dimensions

Product	Inside Diameter (mm)		Wall Thickness (mm)	
	Supplied	Recovered	Supplied	Recovered
ADW461	6.5	1.3	1.0	1.8
ADW491	8.9	1.6	1.0	2.5
ADW4122	11	2.4	1.1	2.1
ADW4164	16	4.0	1.2	3.0
ADW4194	19	4.0	1.2	3.0
ADW4256	25	6.0	1.2	3.2

Eccentricity < 30% as per UL 224

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Medium Wall

AMWA - Medium Wall Adhesive Lined
AMW - Medium Wall (Non-Adhesive Lined)

Technical Data

Properties	Test Methods	Typical Values
Tensile (MPa)	ASTM D2671	≥ 14
Elongation (%)	ASTM D2671	≥ 400
Heat Ageing: Tensile (MPa) : Elongation (%)	ASTM D2671 (150°C, 168hrs)	≥ 12 > 300
Water Absorption (%)	ISO 62 (23°C, 14days)	< 0.15
Eccentricity (%)	ASTM D2671	< 40
Copper Stability	ASTM D 2671	Pass
ESCR (environmental stress crack resistance)	ASTM D 1693 (50°C)	No Cracking
Dielectric Strength (kV/mm)	ASTM D 2671	≥ 18
Volume Resistivity (Ω/cm)	ASTM D 257 / IEC 93	10^{13}
Eccentricity (%)	ASTM D2671	< 40
Density (g/cm³)	ASTM D792	1.05
Longitudinal Shrink (%)	UL224	≤ 10
Adhesive Lining		
Water Absorption (%)	ISO 62	< 0.2
Softening Point (°C)	ASTM E28	85 ± 5
Peel Strength (N/cm)	DIN 30672	4
Resistance to Fungus and Decay	ISO 846	Pass

Dimensions

Product	Inside Diameter (mm)		Wall Thickness Recovered (mm)	Standard Length (mm)
	Supplied	Recovered		
AMWA12/3	12	3	1.8	1200
AMWA22/6	22	6	2.2	1200
AMWA28/6	28	6	2.5	1200
AMWA33/8	33	8	2.5	1200
AMWA40/12	40	12	2.5	1200
AMWA55/16	55	16	2.7	1200
AMWA63/19	63	19	2.8	1200
AMWA75/22	75	22	3.0	1200
AMWA85/25	85	25	3.0	1200
AMWA95/25	95	25	3.0	1200
AMWA105/30	105	30	3.3	1200
AMWA115/34	115	34	3.3	1200
AMWA130/36	130	36	3.5	1200
AMWA140/42	140	42	3.5	1200
AMWA160/50	160	50	3.5	1200
AMWA180/58	180	58	3.5	1200

NOTE: For non-adhesive lined replace AMWA with AMW (Suffix "A"-Adhesive lined)

Description

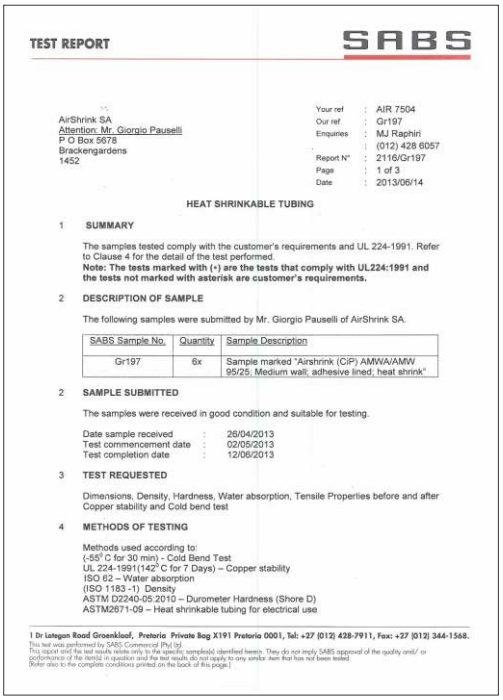
AMW / AMWA is a polyolefin medium wall tubing with outstanding insulation and environmental sealing properties. AMW & AMWA are UV resistant and have excellent mechanical properties.

Features

- Shrink Ratio 3 : 1
- Operating temperature -55°C to 110°C
- Excellent impact and abrasion resistance
- Excellent environmental and UV resistance
- High electrical insulation properties
- Colours - Black
- Minimum full recovery temperature 120°C

Applications

- Inner and outer sleeves for joints from 1 kV to 36 kV
- Strain relief/protection of connector components
- Water proofing of cable and wire harnesses
- Encapsulation and weatherproofing of irregular shapes
- Cable sheath repairs



TEST REPORT

SABS

AirShrink SA
Attention: Mr. Giorgio Pauselli
P.O.Box 5678
Brackengardens
1452

Your ref : AIR 7504
Our ref : Gr197
Enquiries : MJ Raphiri
: (012) 428 6057
Report N° : 2116/Gr197
Page : 1 of 3
Date : 2013/06/14

HEAT SHRINKABLE TUBING

1 SUMMARY

The samples tested comply with the customer's requirements and UL 224-1991. Refer to Clause 4 for the detail of the test performed.
Note: The tests marked with (+) are the tests that comply with UL224:1991 and the tests not marked with asterisk are customer's requirements.

2 DESCRIPTION OF SAMPLE

The following samples were submitted by Mr. Giorgio Pauselli of AirShrink SA.

SABS Sample No.	Quantity	Sample Description
Gr197	6x	Sample marked "Airshrink (CiP) AMWA/AMW 95/25, Medium wall, adhesive lined, heat shrink"

2 SAMPLE SUBMITTED

The samples were received in good condition and suitable for testing.

Date sample received : 26/04/2013
Test commencement date : 02/05/2013
Test completion date : 12/06/2013

3 TEST REQUESTED

Dimensions, Density, Hardness, Water absorption, Tensile Properties before and after Copper stability and Cold bend test

4 METHODS OF TESTING

Methods used according to:
(-55°C for 30 min) - Cold Bend Test
UL 224-1991(142° C for 7 Days) – Copper stability
ISO 62 – Water absorption
(ISO 1183 -1) Density
ASTM D2240-05:2010 – Durometer Hardness (Shore D)
ASTM2671-09 – Heat shrinkable tubing for electrical use

1 Dr Lategan Road Groenkloof, Pretoria Private Bag X191 Pretoria 0001, Tel: +27 (012) 428-7911, Fax: +27 (012) 344-1568.
This test was performed by SABS Commercial (Pty) ltd.
This report and the test results relate only to the specific sample(s) identified herein. They do not imply SABS approval of the quality and/ or performance of the item(s) in question and the test results do not apply to any similar item that has not been tested.
Refer also to the complete conditions printed on the back of this page.)

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CiP
Cable Installation Products (Pty) Ltd

Heavy / Thick Wall

AHWA - Thick Wall Adhesive Lined
AHW - Thick Wall (Non-Adhesive Lined)

Technical Data

Properties	Test Methods	Typical Values
Tensile (MPa)	ASTM D2671	≥ 14
Elongation (%)	ASTM D2671	≥ 400
Heat Ageing: Tensile (MPa) : Elongation (%)	ASTM D2671 (150°C, 168hrs)	≥ 12 > 300
Water Absorption (%)	ISO 62 (23°C, 14days)	< 0.15
Eccentricity (%)	UL 224	< 30
Copper Stability	ASTM D 2671	Pass
ESCR (environmental stress crack resistance)	ASTM D 1693 (50°C)	No Cracking
Dielectric Strength (kV/mm)	ASTM D 2671	≥ 18
Volume Resistivity (Ω/cm)	ASTM D 257 / IEC 93	10^{13}
Eccentricity (%)	ASTM D2671	< 40
Density (g/cm³)	ASTM D792	1.05
Longitudinal Shrink (%)	Ul224	≤ 10
Adhesive Lining		
Water Absorption (%)	ISO 62	< 0.2
Softening Point (OC)	ASTM E28	85 ± 5
Peel Strength (N/cm)	DIN 30672	4
Resistance to Fungus and Decay	ISO 846	Pass

Dimensions

Product	Inside Diameter (mm)		Wall Thickness Recovered (mm)	Standard Length (mm)
	Supplied	Recovered		
AHWA12/3	12	3	2.4	1200
AHWA22/6	22	6	2.7	1200
AHWA28/6	28	6	2.8	1200
AHWA33/8	33	8	3.2	1200
AHWA40/12	40	12	4.1	1200
AHWA55/16	55	16	4.1	1200
AHWA75/22	75	22	4.1	1200
AHWA95/25	95	25	4.3	1200
AHWA115/34	115	34	4.3	1200
AHWA140/42	140	42	4.3	1200
AHWA160/50	160	50	4.3	1200
AHWA180/58	180	58	4.3	1200

NOTE: For non-adhesive lined replace AHWA with AHW (Suffix "A"-Adhesive lined)

Description

AHW / AHWA is a thick wall polyolefin heatshrink tubing with excellent insulation, environmental and mechanical properties.

Features

- Wall thickness - 2.4mm to 4.5mm
- Shrink ratio 3 : 1
- Operating temperature -55°C to 110°C
- Excellent impact and abrasion resistance
- Excellent environmental and UV resistance
- High electrical insulation properties
- Colours - Black
- Minimum full recovery temperature 120°C

Applications

- Inner and outer sleeves for joints from 1 kV to 36 kV
- Installations where severe mechanical protection is required
- Borehole/submersible pump joints that may be exposed to high water pressure
- Encapsulating, water and weather proofing of cables and pipes

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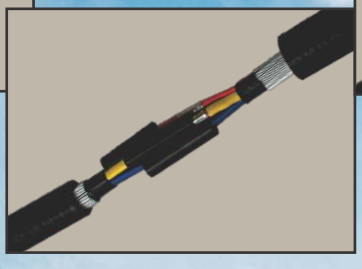
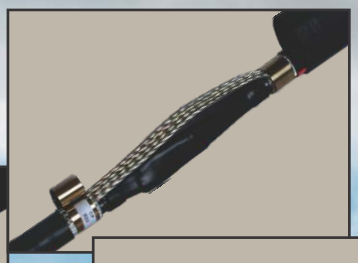
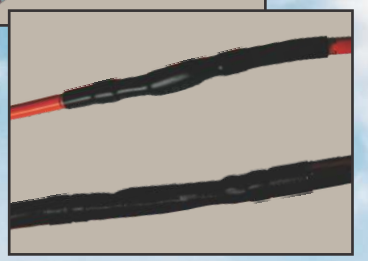
LOW VOLTAGE PRODUCTS







CiP
Cable Installation Products

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CABLE (mm²)	1.5	2.5	4	6	10	16	25	35	50	70	95	120	150	185	240	300
PVC 1 Core																
PVC CABLE SWA 600 / 1000V 1 CORE																
Cable OD																
Core Insulation Diameter	2.1	3.7	4.5	5.1	6	6.9	9	10.8	12.6	14.5	16.5	18.5	22	23.5	27	30
PVC 2 Core																
PVC CABLE SWA 600 / 1000V 2 CORE																
Cable OD	14	15	16.5	17.5	19.5	21.5	21.5	23	26.5							
Core Insulation Diameter	3.5	4	5	5.5	6	7	6.5	7.5	8.5							
PVC 3 Core																
PVC CABLE SWA 600 / 1000V 3 CORE																
Cable OD							28.5	30.5	33	36.5	41.5	44	47.5	53	58.5	63.5
Core Insulation Diameter							7.5	8.5	10	11.5	13	14.5	16	18	20.5	22.5
PVC 4 Core																
PVC CABLE SWA 600 / 1000V 4 CORE																
Cable OD	15	16	18	19.5	21.5	25	28.5	31	35	40	45	50	54	59.5	66.5	72.5
Core Insulation Diameter	3.5	4	5	5.5	6	7	8.5	9.5	11	12.5	14.5	16	17.5	20	22.5	25
XLPE 3 Core																
XLPE CABLE 600 / 1000V 3 CORE																
Cable OD							27	25.5	28	33.5	37	41	44	50	54.5	59.5
Core Insulation Diameter							7.5	8	9	11	12	13.5	15	17	19.5	21.5

Note 1: This is a guide only as dimensions may differ depending on the manufacturer specifications.
2: All dimensions in mm.

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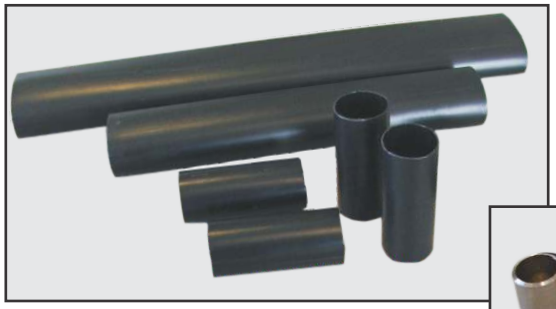
Low Voltage Joints

ALVJ



Optional

Technical Data

Properties	Test Methods	Typical Values
Tensile (MPa)	ASTM D 2671	> 14
Elongation (%)	ASTM D 2671	> 400
Heat Ageing : Tensile (MPa) : Elongation (%)	ASTM D 2671 (150°C x 168hrs)	> 10 > 300
Water Absorption (%)	ISO 62 (23°C, 14days)	< 0.15
Eccentricity (%)	ASTM D2671	< 40
Copper Stability	ASTM D 2671	Pass
ESCR (environmental stress crack resistance)	ASTM D 1693 (50°C)	No Cracking
Dielectric Strength (kV/mm)	ASTM D 2671	> 20
Volume Resistivity (Ω/cm)	ASTM D 257 / IEC93	10^{14}
Eccentricity (%)	ASTM D 2671	< 40
Density (g/cm³)	ASTM D 792	1.05
Longitudinal Shrink (%)	UL224	≤ 10
Adhesive Lining		
Water Absorbtion (%)	ISO 62	< 0.2
Softening Point (°C)	ASTM E28	85 ± 5
Peel Strength (N/cm)	DIN 30672	4
Resistance to Fungus and Decay	ISO 846	Pass

Dimensions

Product	2 to 4 core 600 / 1000 V cable	
	from (mm^2)	to (mm^2)
ALVJ1.5/4	1.5	4
ALVJ6/16	6	16
ALVJ16/25	16	25
ALVJ25/50	25	50
ALVJ50/95	50	95
ALVJ70/150	70	150
ALVJ120/185	120	185
ALVJ185/300	185	300

Eccentricity < 30 % as per UL 224

Description

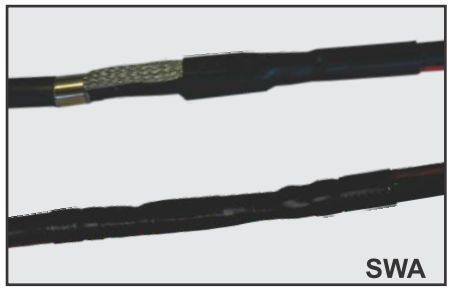
ALVJ – are low voltage heatshrink joints designed for both standard and submersible cables. The hot melt adhesive combined with the use of ABFM black mastic forms an excellent water seal. The outer sleeve is UV resistant and has excellent mechanical properties.

Features

- Shrink Ratio 3 : 1
- Operating temperature -55°C to 110°C
- Excellent impact and abrasion resistance
- Excellent environmental crack and UV resistance
- Hot melt ensures an excellent water seal
- High electrical insulation properties
- Colour - Black
- Minimum shrink temperature 120°C
- **ALVSJ - Submersible**
- **ALVJB - Budget (no roll springs and braid)**

Applications

- Voltage Range - 600 / 1000V
- Easy and quick installation
- Normal and submersible joints
- Suitable for 2 to 4 core PVC SWA cables



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Low Voltage Joints

CLVJ...ES

Technical Data

Properties	Test Methods	Typical Values
Tensile (MPa)	ASTM D 2671	> 14
Elongation (%)	ASTM D 2671	> 400
Heat Ageing : Tensile (MPa) : Elongation (%)	ASTM D 2671 (150°C x 168hrs)	> 10 > 300
Water Absorption (%)	ISO 62 (23°C, 14days)	< 0.15
Eccentricity (%)	ASTM D2671	< 40
Copper Stability	ASTM D 2671	Pass
ESCR (environmental stress crack resistance)	ASTM D 1693 (50°C)	No Cracking
Dielectric Strength (kV/mm)	ASTM D 2671	> 20
Volume Resistivity (Ω/cm)	ASTM D 257 / IEC93	10^{14}
Eccentricity (%)	ASTM D 2671	< 40
Density (g/cm³)	ASTM D 792	1.05
Longitudinal Shrink (%)	UL224	≤ 10
Adhesive Lining		
Water Absorbtion (%)	ISO 62	< 0.2
Softening Point (°C)	ASTM E28	85 ± 5
Peel Strength (N/cm)	DIN 30672	4
Resistance to Fungus and Decay	ISO 846	Pass

BS EN50393:2015 Test sequence for joints for solid extruded dielectric insulated cables and for transition joints between solid extruded dielectric insulated cables and impregnated paper insulated cables.

TEST	SUB-CLAUSE	Samples Types of Joints II A1/B1	REQUIREMENTS
AC voltage withstand (in air)	8.3	X	No Failure
Insulated resistance (in air)	8.4	X	Insulated resistance ≥50MΩ
Impact at ambient temperature	8.5	X	No Failure
Insulated resistance (immersed)	8.4	X	Insulated resistance ≥50MΩ
Heating cycle in air	8.6	X	63 Cycles
Heating cycle in water [b]	8.6	X	9 Cycles
Insulated resistance [b] (immersed)	8.4	X	Insulated resistance ≥50MΩ
Heating cycle in water	8.6	X	63 Cycles
AC voltage withstand (immersed)	8.3	X	No Failure
Insulated resistance (immersed)	8.4	X	Insulated resistance ≥50MΩ
Examination	8.8	X	To be recorded
Thermal short circuit (Earth fault) test		X	10kA for 1 second - No Failure

Dimensions

2 to 4 core 600/1000 V cable		
Product	**from (mm^2)**	**to (mm^2)**
CLVJ1.5/2.5ES	1.5	2.5
CLVJ4/10ES	4	10
CLVJ16/25ES*	16	25
CLVJ35/50ES*	35	50
CLVJ70/95ES*	70	95
CLVJ120/150ES*	120	150
CLVJ185/240ES*	185	240
CLVJ300ES*	300	300

Eccentricity < 30 % as per UL 224

Description

CLVJ – are low voltage heatshrinkable cable joints designed to join 2 - 4 core, 1kV PVC and XLPE cables. Core separators are included to further improve the high electrical insulation properties. Each kit includes black filler mastic (ABFM) & this combined with the hot melt adhesive lining in the medium wall tube (AMWA) ensures an excellent water/moisture seal.

Features

- Shrink Ratio 3 : 1
- Operating temperature -55°C to 110°C
- Excellent impact and abrasion resistance
- Excellent environmental crack and UV resistance
- High electrical insulation properties
- Colour - Black
- Minimum full recovery temperature 120°C
- Suitable for 2 - 4 core, 1,5 - 300mm² cables
- Voltage rating - 1000V
- Type tested and in compliance with BS EN50393 and NRS074-2
- Suitable for demanding environments
- Excellent water/moisture blocking properties
- Quick and easy to install
- System can be energized immediately after installation
- **In compliance with Eskom specifications**
- Mechanical torque shear connectors / ferrules included*

Kit Content

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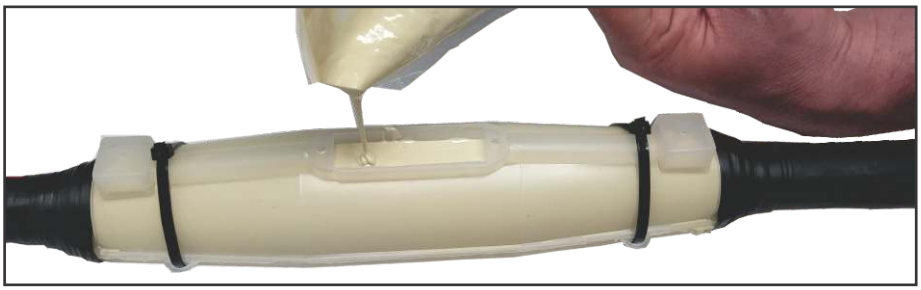
LV Polyurethane Resin Straight Through Joints

ARJP



Description

ARJP - are low voltage resin joint / splicing kits designed to join 2 - 4 core, 1kV PVC and XLPE cables. The two component, PU (polyurethane) resin compound completely solidifies and has excellent insulation and water blocking properties.

Features

- **Amber Polyurethane Resin**
- **Suitable for 2 - 4 Core, 1,5 - 300mm² cables.**
- Voltage Rating - 1000V
- Type tested and in compliance with BS EN50393 and NRS074-2
- Two year shelf life
- Suitable for demanding environments
- Quick setting properties in humid and cold conditions
- High quality shatterproof Polypropylene and Polycarbonate shells
- Excellent insulation properties
- Excellent water blocking properties
- Low viscosity allows for good penetration
- Easily separable twinpack mixing pouch ensures easy mix
- Exothermic Temperature -54°C
- Easy clip leak proof transparent shells

Technical Data

BS EN50393:2015 Test sequence for joints for solid extruded dielectric insulated cables and for transition joints between solid extruded dielectric insulated cables and impregnated paper insulated cables.

TEST	SUB-CLAUSE	Samples Type of Joints II A1/B1	REQUIREMENTS
AC voltage withstand (in air)	8.3	X	No failure
Insulated resistance (in air) (MΩ)	8.4	X	Insulated resistance ≥ 50
Impact at ambient temperature	8.5	X	No failure
Insulated resistance (immersed) (MΩ)	8.4	X	Insulated resistance ≥ 50
Heating cycle in air	8.6	X	63 Cycles
Heating cycle in water [b]	8.6	X	9 Cycles
Insulation resistance [b] (immersed) (MΩ)	8.4	X	Insulated resistance ≥ 50
Heating cycle in water	8.6	X	63 Cycles
AC voltage withstand (immersed)	8.3	X	No Failure
Insulation resistance (immersed) (MΩ)	8.4	X	Insulated resistance ≥ 50
Examination	8.8	X	To be recorded
Thermal short circuit (Earth fault) test (kA)		X	10 for 1 second - No Failure

KIT Content

Dimensions

Product	Min. Cable OD (mm)	Max. Cable OD (mm)	Mould Length (mm)	Cable Size (mm^2)
ARJEP0	6	20	185	1.5 - 4
ARJP1	9	30	240	4 - 10
ARJP2	17	34	270	10 - 16
ARJP2.5	22	42	310	16 - 35
ARJP3	28	52	395	35 - 50
ARJP3.5	32	56	430	50 - 95
ARJP4	38	65	560	70 - 150
ARJP5	48	80	660	150 -240

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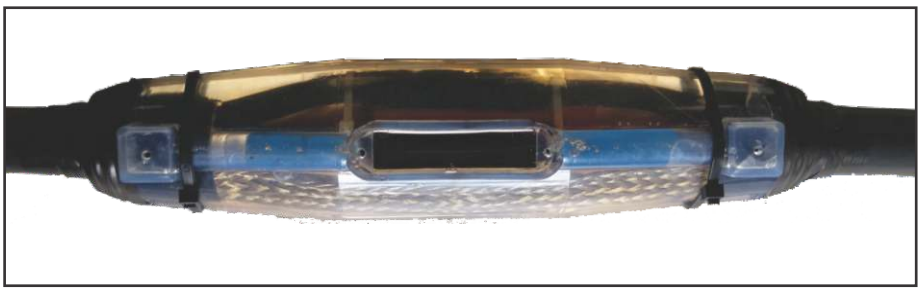
LV Cast Epoxy Clear Resin Straight Through Joints

CRJ...ES



Description

CRJ...ES - are low voltage resin joint / splicing kits designed to join 2 - 4 core, 1kV PVC and XLPE cables. The two component, flame retardant clear epoxy resin compound remains flexible and has excellent insulation and water blocking properties.

Features

- **Clear Epoxy Resin**
- **Suitable for 2 - 4 Core, 1,5 - 300mm² cables**
- Voltage Rating - 1000V
- Type tested and in compliance with BS EN50393 and NRS074-2
- Two year shelf life
- Suitable for demanding environments
- Quick setting properties in humid and cold conditions
- High quality shatterproof Polypropy-lene and Polycarbonate shells
- Excellent insulation properties
- Excellent water blocking properties
- Flame retardant (V0 Rated)
- Low viscosity allows for good penetration
- Easily separable twinpack mixing pouch ensures easy mix
- Odour free
- Easy clip leak proof transparent shells

Technical Data

BS EN50393:2015 Test sequence for joints for solid extruded dielectric insulated cables and for transition joints between solid extruded dielectric insulated cables and impregnated paper insulated cables.

TEST	SUB-CLAUSE	Samples Type of Joints II A1/B1	REQUIREMENTS
AC voltage withstand (in air)	8.3	X	No failure
Insulated resistance (in air) (MΩ)	8.4	X	Insulated resistance ≥ 50
Impact at ambient temperature	8.5	X	No failure
Insulated resistance (immersed) (MΩ)	8.4	X	Insulated resistance ≥ 50
Heating cycle in air	8.6	X	63 Cycles
Heating cycle in water [b]	8.6	X	9 Cycles
Insulation resistance [b] (immersed) (MΩ)	8.4	X	Insulated resistance ≥ 50
Heating cycle in water	8.6	X	63 Cycles
AC voltage withstand (immersed)	8.3	X	No Failure
Insulation resistance (immersed) (MΩ)	8.4	X	Insulated resistance ≥ 50
Examination	8.8	X	To be recorded
Thermal short circuit (Earth fault) test (kA)		X	10 for 1 second - No Failure

Application

- **In compliance with Eskom specifications** and kits include:
  - Shell (2 halves) and lid
  - Clear epoxy resin
  - Self amalgamating EPR tape
  - PVC insulation tape
  - Disposable gloves
  - Suitable tinned copper braid
  - Roll springs
  - Cable ties
  - Core separator
  - Torque shear mechanical connectors*

Dimensions

Product	Min. Cable OD (mm)	Max. Cable OD (mm)	Mould Length (mm)	Cable Size (mm²)
CRJ0ES	6	20	185	1.5 - 2.5
CRJ2ES	17	34	270	4 - 10
CRJ3ES*	28	52	400	16 - 25
CRJ3.5ES*	32	56	430	35 - 50
CRJ4ES*	38	65	560	70 - 95
CRJ5ES*	48	80	660	120 - 150
CRJ6ES*	48	80	660	185 - 240

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LV Flexible Polyurethane Resin Through Joints

CRJF

Description

CRJF - are low voltage resin joint / splicing kits designed to join 1 - 6 core, 1.1kV flexible rubber or trailing cables. The two component, PU (polyurethane) resin compound completely solidifies and has excellent insulation and water blocking properties.

Features

- **Black, Flexible Polyurethane Resin**
- **Suitable for 1 - 6 Core, 1,5 - 120mm² cables.**
- Voltage Rating - 1100V
- Excellent flame retardancy
- Two year shelf life
- Suitable for demanding environments
- Flexible compound allowing the joint to bend with the cable
- Outstanding abrasion resistance and toughness
- Excellent insulation properties
- Excellent water blocking properties
- Low viscosity allows for good penetration
- Easily separable twinpack mixing pouch ensures easy mixing
- Exothermic Temperature -54°C
- Easy clip leak proof transparent shells

Technical Data

BS EN50393:2015 Test sequence for joints for solid extruded dielectric insulated cables and for transition joints between solid extruded dielectric insulated cables and impregnated paper insulated cables.

TEST	SUB-CLAUSE	Samples Type of Joints II A1/B1	REQUIREMENTS
AC voltage withstand (in air)	8.3	X	No failure
Insulated resistance (in air) (MΩ)	8.4	X	Insulated resistance ≥ 50
Impact at ambient temperature	8.5	X	No failure
Insulated resistance (immersed) (MΩ)	8.4	X	Insulated resistance ≥ 50
Heating cycle in air	8.6	X	63 Cycles
Heating cycle in water [b]	8.6	X	9 Cycles
Insulation resistance [b] (immersed) (MΩ)	8.4	X	Insulated resistance ≥ 50
Heating cycle in water	8.6	X	63 Cycles
AC voltage withstand (immersed)	8.3	X	No Failure
Insulation resistance (immersed) (MΩ)	8.4	X	Insulated resistance ≥ 50
Examination	8.8	X	To be recorded
Thermal short circuit (Earth fault) test (kA)		X	10 for 1 second - No Failure

KIT Content

Dimensions

Kit Description	Min. Cable O.D. (mm)	Max. Cable O.D. (mm)	Mould Length (mm)	Cable Conductor Size (mm²)
CRJF1	5	20	185	1.5 - 4
CRJF2	15	30	290	4 - 6
CRJF3	20	45	395	10 - 35
CRJF4	30	65	505	50 - 95
CRJF5	35	70	605	120

Cable sizes indicated are based on Type 61A and B 640 / 1100V cables. Ensure that the correct joint is utilized for the required cable specification which is being installed.

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Low Voltage Terminations

ALVT...ES

AMWA Optional

Description

CiP offers a range of low voltage outdoor heatshrink terminations designed to withstand arduous UV and environmental conditions. Depending on your requirements, kits can be tailored to include high strength UV resistant medium wall tubing (AMWA), standard coloured thin wall heatshrink tubing (ATW) and UV stable coloured thin wall heatshrink tubing (ATW...UV). All kits include black filler mastic (ABFM) and water blocked main tinned copper earth braid thus ensuring an excellent water seal.

Features

- Type tested and in compliance with BS EN50393 and NRS074-2
- Operating temperature -55°C to 110°C
- Excellent environmental & UV resistance
- Suitable for demanding environments
- Excellent electrical insulation properties
- Excellent water blocking properties
- Quick and easy installation
- System can be energized immediately after installation
- **In compliance with Eskom specifications**

KIT Content

Technical Data

BS EN50393:2015 Table 5 Test sequence for outdoor terminations on solid extruded dielectric insulated cables.

TEST	SUB-CLAUSE	Samples Types of Termination I D1	Samples Types of Termination II D1	REQUIREMENTS
Impulse voltage withstand at ambient temperature	8.2	-	X	No Failure or flashover
AC voltage withstand (in air)	8.3	X	X	No Failure
Insulated resistance (in air) (MΩ)	8.4	X	X	Insulated resistance ≥ 50
Heating cycle in air	8.6	X	X	63 Cycles
Heating cycle in water (Crutch immersed)	8.6	X	X	63 Cycles
AC voltage withstand (Crutch immersed)	8.3	X	X	No Failure
Insulated resistance (Crutch immersed) (MΩ)	8.4	X	X	Insulated resistance ≥ 50
Examination	8.8	X	X	To be recorded

Optional

Dimensions

2 to 4 core 600 / 1000V cable		
Product	**from (mm^2)**	**to (mm^2)**
ALVT4/35ES	4	35
ALVT25/70ES	25	70
ALVT70/95ES	70	95
ALVT50/150ES	50	150
ALVT120/150ES	120	150
ALVT95/185ES	95	185
ALVT120/240ES	120	240
ALVT185/240ES	185	240

Eccentricity < 30 % as per UL 224

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Low Voltage Cable Breakout Boots

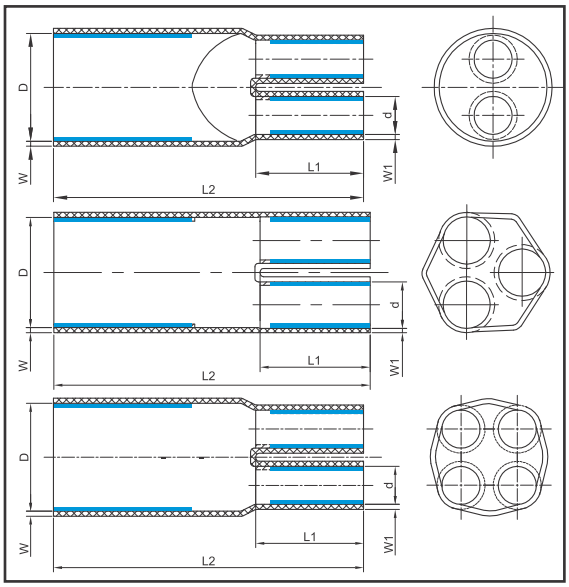
ALB

Description

ALB Cable breakout boots (inner coated with hot melt adhesive) are manufactured from crosslinked polyolefin & have been designed to offer excellent sealing & insulating properties when used on a cable crutch.

Features

- Excellent UV & environmental resistance
- Adhesive lining offers reliable sealing properties
- Excellent electrical & mechanical properties
- Excellent abrasion & corrosion resistance
- Abrasion resistance
- Available in 2, 3, 4 & 6 cores



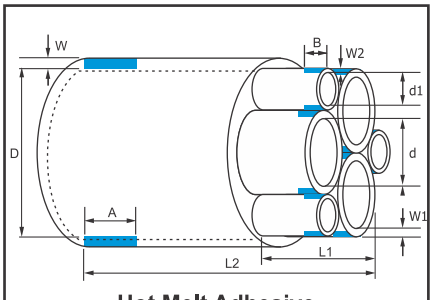
Technical Data

Properties	Test Methods	Typical Values
Tensile Strength (MPa)	ASTM D 2671	≥ 13
Tensile Strength (after thermal aging MPa)	ASTM D 2671 / 120°C, 168hrs	≥ 10
Ultimate Elongation (%)	ASTM D 2671	≥ 300
Ultimate Elongation (after thermal aging %)	ASTM D 2671 / 120°C, 168hrs	≥ 250
Dielectric Strength (kV/mm)	IEC 60243	≥ 15 ≥ 20 (6Core)
Volume Resistivity (Ω/cm)	IEC 60093	10^{14}
Water absorption (%)	ISO 62	≤ 1%
Operating Temperature (°C)		-40 - 100
Minimum Shrink Temp. (°C)		110
Min. Full Shrink Temp. (°C)		130

Dimensions

Size (mm)	D (Body)		d - Large Finger		d1 - Small Finger		Length ±10%		Recovered Wall ±20%			
	Supplied	Recovered	Supplied	Recovered	Supplied	Recovered	L2-Total	L1-Finger	W (Body)	W1 (Large Finger)	W2 (Small Finger)	Cable Size (mm²)
2 Cores												
ALB22/8 - 2	22	8	9	3.5			55	18	2.2	1.8		2.5-6
ALB34/12 - 2	34	12	14	4.5			90	30	2.2	2.0		4-35
ALB45/15 - 2	45	15	18	6			110	30	2.2	2.0		16-50
3 Cores												
ALB38/15 - 3	38	15	14	4.5			90	22	2.2	2.0		25-50
ALB60/25 - 3	60	25	25	8			150	45	3.0	2.5		50-150
ALB80/38 - 3	80	38	35	14			170	45	3.5	3.0		95-300
4 Cores												
ALB4015 - 4	40	15	14	4			95	20	2.0	2.0		2.5-35
ALB55/22 - 4	55	22	20	6			135	35	3.0	2.5		10-95
ALB75/27- 4	75	27	28	9			160	40	3.0	2.5		35-185
ALB90/37 - 4	90	37	32	11			170	50	3.5	2.5		50-300
ALB100/45 - 4	100	45	38	14			170	50	4.0	3.0		120-300
6 Cores												
ALB86/40 - 6	83	41	31	12	20	8	215	60	3.3	2.9	2.6	
ALB130/55 - 6	130	55	53	17	30	12	220	70	3.6	3.1	2.6	

NOTE: All dimensions in mm



Hot Melt Adhesive
A-50mm / B-25mm

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Lugs and Connectors - LV Torque Shear

ATSL...LV and ATSC...LV

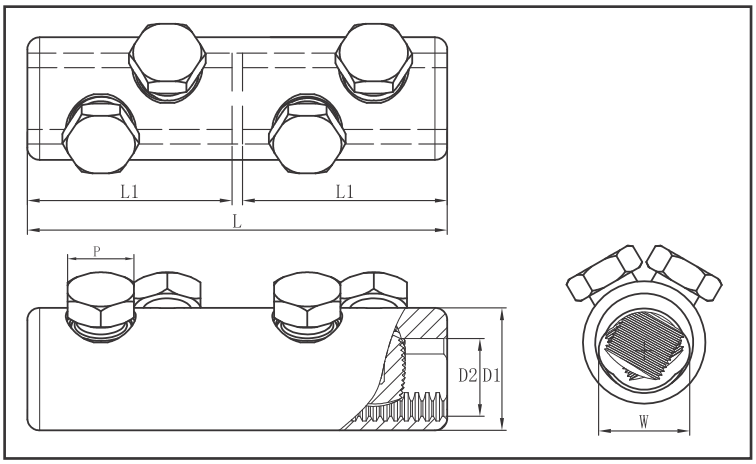
Description

ATSL...LV and **ATSC...LV** are mechanical torque shear lugs and connectors designed for use in low voltage applications. The product consist of an aluminium electro tin plated body with aluminium shear bolts and the range covers conductor sizes 6 mm² to 240 mm². The lugs are suitable for indoor and outdoor applications. All palm holes are suitable to accommodate M12 bolts.

Features

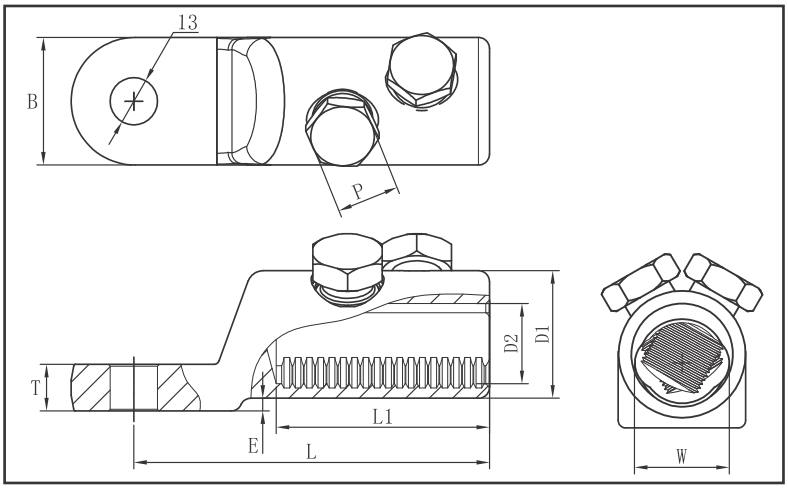
- Suitable for Al (Aluminium) and Copper cables
- Torque controlled shear off bolts guarantee excellent electrical connection
- Suitable for a wide range of applications and accommodate most types of conductors, shapes and materials
- Installation requires no expensive crimp tools, standard socket or wrench is suitable (hex bolts)
- Solid palm (no inspection hole) eliminates ingress of moisture
- Grooved inner barrel contact surface compliments shear bolt action to ensure good electrical connection
- Once bolt has been sheared it cannot be removed
- **Complies to IEC 61238-1 class A & B, BS EN 50483-6 : 2009**
- Solid centre on connectors ensure water block
- Incorporates Anti-Oxidizing paste for Al conductors
- Range taking allows for reduction in inventory levels

Dimensions



Connectors

Product	Conductor Size (mm²)	No. of Bolts	Dimensions (mm)					
			L	L1	D1	D2	W	P
ATSC1.5/16B2LV	1.5 - 16	2	30.5	14	12	6	-	8
ATSC6/25/B2LV	6 - 25	2	40	16	16	9	-	8
ATSC6/50B2LV	6 - 50	2	37.5	16	18	10	12	10
ATSC16/95B2LV	16 - 95	2	55	24	25	14	16	13
ATSC25/150B2LV	25 - 150	2	70	30	28	17	21	17
ATSC50/240B4LV	50 - 250	4	120	56	35	22	26	19



Lugs

Product	Conductor Size (mm²)	No. of Bolts	Dimensions (mm)								
			L1	L	D1	D2	T	P	B	E	W
ATSL6/25/12/1LV	6 - 25	1	19	41	16	9	6	8	24	2	-
ATSL6/50/12/B1LV	6 - 50	1	24	50	18	10	6	10	24	2	12
ATSL16/95/12/B1LV	16 - 95	1	25	52	25	14	8	13	25	2	16
ATSL50/240/12/B2LV	50 - 240	2	56	97	35	22	13	19	35	3	26

ATST1

MELEC

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MEDIUM VOLTAGE PRODUCTS

CiP
Cable Installation Products

elcon megarad

CABLE (mm²)	16	25	35	50	70	95	120	150	185	240	300	400	500	630	800	1000
XLPE 3 Core																
XLPE, 3800 / 6600V, 3 CORE, SWA																
Cable OD		44.5	47	51	55	55.5	62.5	66	71	77	83.5					
Core Insulation Diameter		13	14	15.5	17	19	20.5	22	23.5	26	28.5					
XLPE, 6350 / 11000V, 3 CORE, (No Armour)																
Cable OD		41.5	44	47	50.5	54	57.3	61	63.7	70	74.5					
Core Insulation Diameter		14.5	16	17	18.5	20.5	22	23.5	25	27.5	30					
XLPE, 6350 / 11000V, 3 CORE, SWA																
Cable OD	45.3	49.3	52.1	55.1	58.5	62.8	67.1	71.2	75.5	81.3	85.4	96.1				
Core Insulation Diameter	13.5	14.7	15.9	17.1	18.6	20.4	22.1	23.3	25.1	27.5	29.1	33.8				
XLPE, 12700 / 22000V, 3 CORE, SWA																
Cable OD			62	65	70	75	78	81	86	92	98					
Core Insulation Diameter			20	21	23	24.5	26	27.5	29.5	32	34					
XLPE, 19000 / 33000V, 3 CORE, SWA																
Cable OD				79	83	88	91	94	99	105	110					
Core Insulation Diameter				26.5	28	30	31	32.5	34.5	37	39.5					
XLPE 1 Core																
XLPE, 3800 / 6600V, 1 CORE, SWA																
Cable OD				28	29.5	31.5	33	34.5	37	39.5	42.5	47.5	53.5	57	61	66
Core Insulation Diameter				15.5	17	19	20.5	22	23.5	25.5	28.5	33	37.5	40.5	44.5	49
XLPE, 6350 / 11000V, 1 CORE, SWA																
Cable OD				30	31.5	33.5	35	37.5	39	41.5	44	48.5	54	57.5	61.5	66.5
Core Insulation Diameter				17.5	19	21	22	23.5	25	27.5	30	34	38	41	44.5	49.5
XLPE, 12700 / 22000V, 1 CORE, SWA																
Cable OD				34.5	37	39	40.5	42	43.5	46	50	54	58.5	62	66	71
Core Insulation Diameter				21.5	23.5	25	26.5	28	29.5	32	34	38	42	45.5	49	53.5
XLPE, 19000 / 33000V, 1 CORE, SWA																
Cable OD				40	42	44	46	48	50	53	55	60	64	68	74	79
Core Insulation Diameter				26.5	28	30	31	32.5	34.5	37	39.5	43.5	47	51	55.5	59.5
PILC 3 Core																
PILC, 3800 / 6600V, 3 CORE, SWA																
Cable OD	35.5	38	41	44	43.5	47.5	50.5	53.5	57.5	63	67.5					
Core Insulation Diameter	9.7	10.6	11.7	12.8	12.8	14.3	15.5	16.7	18.2	20.2	22.1					
PILC, 6350 / 11000V, 3 CORE, SWA																
Cable OD		43	45.5	48.5	48.5	52	55	58.5	62	66.5	72					
Core Insulation Diameter		12.4	13.5	14.6	14.6	16	17.2	18.4	19.9	21.9	23.9					
PILC, 12700 / 22000V, 3 CORE, SWA																
Cable OD				64.5	68.5	73	70.5	73.5	77.5	82.5	87					
Core Insulation Diameter				20.8	22.5	24.3	23.5	24.7	26.2	28.2	30.1					
PILC, 19000 / 33000V, 3 CORE, SWA																
Cable OD						79	82.5	86.5	91	96.5	103					
Core Insulation Diameter						26.8	28.2	29.7	31.5	33.8	36.2					
PILC 1 Core																
PILC, 3800 / 6600V, 1 CORE																
Cable OD								35	37	39.5	42	47	51	54		
Core Insulation Diameter								20.9	22.8	25	27.5	30.2	33.6	37		
PILC, 6350 / 11000V, 1 CORE																
Cable OD								38.5	41	43.5	47.5	51	54.5	58	62.5	69.5
Core Insulation Diameter								22.7	24.5	26.8	29.2	31.9	35.4	38.3	42.2	46.9
PILC, 12700 / 22000V, 1 CORE																
Cable OD								44.5	48	50.5	53.5	56.5	60	65.5	70	75.5
Core Insulation Diameter								27.7	29.5	31.8	34.2	36.9	40.4	43.3	47.2	52
PILC, 19000 / 33000V, 1 CORE																
Cable OD								48.5	50.5	53	55.5	58.5	62.5	68	72.5	77.5
Core Insulation Diameter								29.7	31.5	33.8	36.2	38.9	42.4	45.3	49.2	54

Note 1: This is a guide only as dimensions may differ depending on the manufacturer specifications.
2: All dimensions in mm.

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TIPS AND INSTRUCTIONS

- ☑ This product should be installed by competent personnel familiar with electrical equipment and safe operating practices.
- ☑ Parts contained in the kits should be visually inspected for possible damage and installed in accordance with the installation instructions. These instructions are not intended as a substitute for adequate training and experience in good safety practices.
- ☑ **Read all instructions carefully before commencing.**
- ☑ Always keep the work area and cables as clean as possible.
- ☑ Use a “clean burning” torch, e.g. a propane gas torch which does not leave any conductive contaminant deposits.
- ☑ Adjust the torch to a soft blue flame with an orange/yellow tip. A “pencil-like” blue flame should be avoided.
- ☑ Keep the torch aimed in the shrink direction to pre-heat the material.
- ☑ Always apply the heat circumferentially around and outwards on all tubes, this ensures correct heat application which results in the correct material wall thickness.
- ☑ As the heatshrink has a very thick wall the torch/flame has to be moved continuously to ensure proper shrinkage and avoid damage due to overheating in one place.
- ☑ Shrink the tubing and moulded parts as recommended and indicated in the instructions.
- ☑ If the tubing needs to be cut, always wait until the tubing has cooled down and then cut with a sharp knife ensuring that there are no jagged edges on the tube.
- ☑ Once shrunk, all of the tubing should be smooth and free of any wrinkles. Signs of wrinkles indicates incorrect heating and possibly air entrapment.

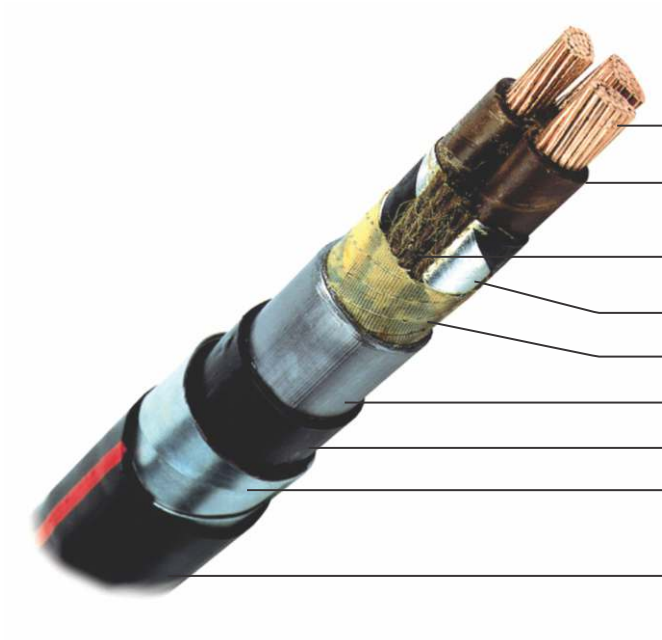
CABLE PREPARATION TIPS

- ☑ Cable ends should have been sealed (end capped) and checked for moisture before proceeding.
- ☑ Always keep the cable outer sheath clean and free from dust and mud.
- ☑ Take extreme care not to nick or cut the XLPE core insulation when removing the copper tape screen and semi-conductive layer.
- ☑ Do not nick or cut the paper core insulation when removing the belt papers on PILC cable.
- ☑ Ring cuts must be smooth and jagged free. A round file should be used.
- ☑ Tiny nicks in the XLPE insulation and persistent carbon particles can be removed by lightly abrading with non-conductive silver oxide abrasive paper. Always abrade circumferentially around the core insulation.
- ☑ Only use th pre-soaked cleaning cloth/wipes supplied.
- ☑ When cleaning the XLPE insulation take extreme care not to wipe the semi-conductive layer as this will contaminate the XLPE surface.
- ☑ Clean and de-grease all surfaces that will come into contact with mastic and tubing.
- ☑ Take extreme care not to nick or cut the cable insulation when removing the lead sheath and metalised screen paper of a PILC cable.
- ☑ Always leave a slight “bell” at the ring cut-off on the lead sheath of a PILC cable.
- ☑ Take care not to over bend any of the cable cores to avoid the paper screen or paper insulation cracks.
- ☑ Always clean and abrade the surfaces of the lead sheath, to remove the oxidised layer, prior to installing any earthing to the lead sheath.

Medium Voltage Cables

XLPE Insulated Cable

PILC Screened Cable



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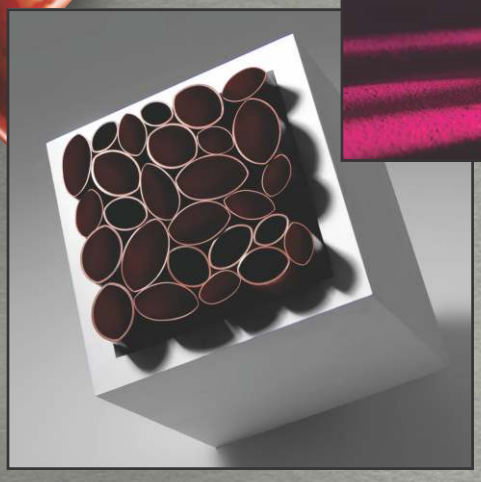

CiP

Cable Installation Products

Medium Voltage Cable Joints (6.6 - 36kV) 1 & 3 Core

CJ


11kV, 3Core, XLPE


11kV, 3Core, PILC

Description

CiP /elcon megarad offer a range of heatshrink cable joints designed for use on **6.6 - 36kV, 1 and 3 core** PILC and XLPE cables. All kits meet the requirements of SANS 1332, IEC 60055-1 and SANS 60502-4.
All kits comprise of state of the art high quality components, each clearly marked in relation to a well illustrated instruction manual and BOM (Bill of Material). This allows for easy cross referencing during installation.

Features

- **Eskom compliant kits available**
- Superior resistance to UV and weathering
- Covers a wide range of sizes
- Unlimited shelf life
- Excellent sealing properties
- Enhanced electrical, environmental and mechanical performance
- Well illustrated instruction manual (colour)
- All kits suitable for armoured and un-armoured cables

Other Accessories

- Torque shear connectors - See page 45
- Cable stripping tool (Semicon/XLPE cable)

ASSWS76

Technical Data

Test requirements for Impregnated cable (PILC) in accordance with Cenelec HD 629.2 S2: 2006 or IEC 60055-1: 2005

Seq.	Test	Rated Voltage 12kV / 24kV / 36kV	Requirements
1	DC Voltage Dry	15min at $6U_o$	No Breakdown or Flashover
2	AC Voltage Dry	5min at $4.5U_o$	No Breakdown or Flashover
3	Impact Test at Ambient Temperature	Insulation Resistance	Conductor to screen 10MΩ -Screen to water 50MΩ minimum.
4	Impulse Voltage at elevated temperature	10 impulses of each polarity	No Breakdown or Flashover
5	Electrical heat cycling in air	63 cycles at $1.5U_o$	No Breakdown or Flashover
6	Electrical heat cycling in water	63 cycles at $1.5U_o$	No Breakdown or Flashover
7	AC Voltage Dry	4hrs at $3U_o$	No Breakdown or Flashover
8	Thermal short circuit (screen)	2 short circuits at Isc	No visible deterioration
9	Thermal short circuit (Conductor)	2 short circuits at Isc	No visible deterioration
10	Impulse Voltage at ambient temperature	10 impulses of each polarity	No Breakdown or Flashover
11	AC Voltage Dry	15min at $2,5U_o$	No Breakdown or Flashover
12	Humidity	300hrs at $1.25U_o$	No Breakdown or Flashover
13	Salt Fog	1000hrs at $1.25U_o$	No Breakdown or Flashover
14	Examination	For Visual Information Only	a. no cracking b. no moisture path c. no corrosion, erosion or tracking d. no leakage of insulation material

Test requirements for Cross Linked Polyethylene cable (XLPE) in accordance with IEC 60502-4: 2010 or SANS 60502-4: 2013

Seq.	Test	Rated Voltage 12kV / 24kV / 36kV	Requirements
1	AC Voltage Withstand	5min at $4.5U_o$	No Breakdown or Flashover
2	DC Voltage Withstand	15min at $4U_o$	No Breakdown or Flashover
3	Partial Discharge	10pC max at $1.73U_o$	No Breakdown or Flashover
4	Impact Test at Ambient Temperature	Insulation Resistance	Conductor to screen 10MΩ -Screen to water 50MΩ minimum.
5	Impulse Voltage at ambient temperature	10 impulses of each polarity	No Breakdown or Flashover
6	Heat cycles in air	30 cycles at $2.5U_o$	No Breakdown or Flashover
7	Heat cycles in water	30 cycles at $2.5U_o$	No Breakdown or Flashover
8	Partial Discharge at ambient Temperature	10pC max at $1.73U_o$	No Breakdown or Flashover
9	Thermal short circuit (screen)	2 short circuits at Isc	No visible deterioration
10	Thermal short circuit (Conductor)	2 short circuits at Isc	No visible deterioration
11	Impulse Voltage at ambient temperature	10 impulses of each polarity	No Breakdown or Flashover
12	AC Voltage Withstand - Dry	15min at $2.5U_o$	No Breakdown or Flashover
13	Humidity	300hrs at $1.25U_o$	No Breakdown or Flashover
14	Salt Fog	1000hrs at $1.25U_o$	No Breakdown or Flashover
15	Examination	For Visual Information Only	a. no cracking b. no moisture path c. no corrosion, erosion or tracking d. no leakage of insulation material

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CiP Cable Installation Products (Pty) Ltd

Medium Voltage Cable Terminations (6.6 - 36kV) 1 & 3 Core

CT

Technical Data

Test requirements for Impregnated cable (PILC) in accordance with Cenelec HD 629.2 S2: 2006 or IEC 60055-1: 2005

Seq.	Test	Rated Voltage 12kV / 24kV / 36kV	Requirements
1	DC Voltage Dry	15min at $6U_o$	No Breakdown or Flashover
2	AC Voltage Dry	5min at $4.5U_o$	No Breakdown or Flashover
3	Impact Test at Ambient Temperature	Insulation Resistance	Conductor to screen 10MΩ -Screen to water 50MΩ minimum.
4	Impulse Voltage at elevated temperature	10 impulses of each polarity	No Breakdown or Flashover
5	Electrical heat cycling in air	63 cycles at $1.5U_o$	No Breakdown or Flashover
6	Electrical heat cycling in water	63 cycles at $1.5U_o$	No Breakdown or Flashover
7	AC Voltage Dry	4hrs at $3U_o$	No Breakdown or Flashover
8	Thermal short circuit (screen)	2 short circuits at Isc	No visible deterioration
9	Thermal short circuit (Conductor)	2 short circuits at Isc	No visible deterioration
10	Impulse Voltage at ambient temperature	10 impulses of each polarity	No Breakdown or Flashover
11	AC Voltage Dry	15min at $2{,}5U_o$	No Breakdown or Flashover
12	Humidity	300hrs at $1.25U_o$	No Breakdown or Flashover
13	Salt Fog	1000hrs at $1.25U_o$	No Breakdown or Flashover
14	Examination	For Visual Information Only	a. no cracking b. no moisture path c. no corrosion, erosion or tracking d. no leakage of insulation material

Test requirements for Cross Linked Polyethylene cable (XLPE) in accordance with IEC 60502-4: 2010 or SANS 60502-4: 2013

Seq.	Test	Rated Voltage 12kV / 24kV / 36kV	Requirements
1	AC Voltage Withstand	5min at $4.5U_o$	No Breakdown or Flashover
2	DC Voltage Withstand	15min at $4U_o$	No Breakdown or Flashover
3	Partial Discharge	10pC max at $1.73U_o$	No Breakdown or Flashover
4	Impact Test at Ambient Temperature	Insulation Resistance	Conductor to screen 10MΩ -Screen to water 50MΩ minimum.
5	Impulse Voltage at ambient temperature	10 impulses of each polarity	No Breakdown or Flashover
6	Heat cycles in air	30 cycles at $2.5U_o$	No Breakdown or Flashover
7	Heat cycles in water	30 cycles at $2.5U_o$	No Breakdown or Flashover
8	Partial Discharge at ambient Temperature	10pC max at $1.73U_o$	No Breakdown or Flashover
9	Thermal short circuit (screen)	2 short circuits at Isc	No visible deterioration
10	Thermal short circuit (Conductor)	2 short circuits at Isc	No visible deterioration
11	Impulse Voltage at ambient temperature	10 impulses of each polarity	No Breakdown or Flashover
12	AC Voltage Withstand - Dry	15min at $2.5U_o$	No Breakdown or Flashover
13	Humidity	300hrs at $1.25U_o$	No Breakdown or Flashover
14	Salt Fog	1000hrs at $1.25U_o$	No Breakdown or Flashover
15	Examination	For Visual Information Only	a. no cracking b. no moisture path c. no corrosion, erosion or tracking d. no leakage of insulation material

Description

CiP / elcon megarad offer a range of indoor and outdoor heatshrink cable terminations designed for use on **6.6 - 36kV, 1 and 3 core** PILC and XLPE cables. All kits meet the requirements of SANS 1332, IEC 60055-1 and SANS 60502-4.
All kits comprise state of the art high quality components, each clearly marked in relation to a well illustrated instruction manual and BOM (Bill of Material). This allows for easy cross referencing during installation.

Features

- **Eskom compliant kits available**
- **KIPTS Tested**
- Superior resistance to UV and weathering
- Covers a wide range of sizes
- Unlimited shelf life
- Excellent sealing properties
- Enhanced electrical, environmental and mechanical performance
- Well illustrated instruction manual (colour)
- All kits suitable for armoured and un-armoured cables

Other Accessories

- Torque shear lugs - See page 44
- Polypropylene clamps
  - CLAMP/50-75NW
  - CLAMP/75-100SNW

- Cable stripping tool (Semicon/XLPE cable)

ASSWS76

elcon megarad

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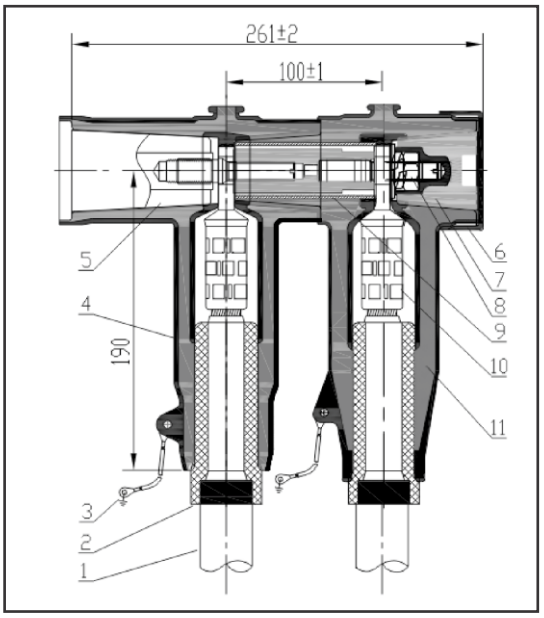
CiP
Cable Installation Products (Pty) Ltd

Screened Front and Rear Separable Connectors

11 / 24 / 36kV, 630A, Type C Interface, 35 - 500mm²

AQT3-24 / 630K Front Connector
AHT3-24 / 630K Rear Connector



Dimensions in mm

1. Cable
2. Stress reducing cable adaptor
3. Earth wire
4. Front T connector EPDM body
5. 24kV / 630A, type C bushing
6. Conductive screen cover
7. Insulating plug
8. Bolt
9. Copper linking rod
10. Cable lug / connector
11. Rear EPDM connector body
12. Position device

Kit Content *(Front Connector)*

Item	Description	Qty
1.	Front Connector Body	3
2.	Insulating Plug	3
3.	Cable Adaptor	3
4.	Screen Cover	3
5.	Bolt	3
6.	Earthing Wire	3
7.	Semi-conductive Tape	1
8.	Abrasive Paper	1
9.	Lubricant	1
10.	Tube Spanner/Fixing Tool	1
11.	Dielectric Tissue	9
	Cable Stripping Ruler	1
	Installation Sheet	1
	Certificate of Conformity	1
	Packing list	1
	Factory test record	1

Description

Screened front T and rear connectors are suitable for use on cable branch boxes, ring main units (switchgear), transformers, motors and cable to cable connections.

Features

- Every connector is suitably tested and QC passed prior to dispatch (AC withstand and partial discharge)
- EPDM for increased safety
- Cable adaptor manufactured of stress reducing material to balance the electric field at the cable crossing
- Meet the requirements of standard IEC 60502. KEMA Report No. 70951914-TDT09-72776A
- **All 3 core installations require a suitable Tri-Furcating kit**
- T-body allows for a cost effective upgrade if required, fit rear connector only

Other Accessories

- Torque Shear lugs (centre) - see page 45
- Cable tripping tool (Semicon/XLPE cable)

- Test Probe

- Insulating plug including test point

- Insulation Cap

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Screened Front and Rear Separable Connectors

Kit Content (Rear Connector)

Item	Description	Qty
1.	Rear Connector Body	3
2.	Cable Adaptor	3
3.	Linking Rod	3
4.	Bolt	3
5.	Earthing Wire	3
6.	Semi-conductive Tape	1
7.	Abrasive Paper	1
8.	Dielectric Tissue	9
9.	Lubricant	1
10.	Cable Stripping Ruler	1
	Installation Sheet	1
	Certificate of Conformity	1
	Packing list	1
	Factory test record	1

Order Information

Separable Connector		Voltage
Type	Product Code	
T-Front	AQT3-24/630K-Z	24kV
Rear	AHT3-24/630K-Z	24kV
T-Front	AQT3-36/630K-Z	36kV
Rear	AHT3-36/630K-Z	36kV

Substitute “Z” above with the number as indicated in the cable adaptor selection chart below.
This represents the most suitable cable size and dimensions.

“Z”	Cable Size (mm²)	Cable Adaptor	
		Range (mm)	ID (mm)
24kV			
35/50	35 - 50	16 - 20	14.5
70/120	70 - 120	21 - 25	19
150/240	150 - 240	26 - 31	23
300/400	300 - 400	32 - 38	28
36kV			
35/70	35 - 70	24 - 28	20
95/150	95 - 150	28 - 33	25
185/240	185 - 240	33 - 38	30
300/400	300 - 400	39 - 43	35
500	500	44 - 50	40

Screened Front and Rear Separable Connectors

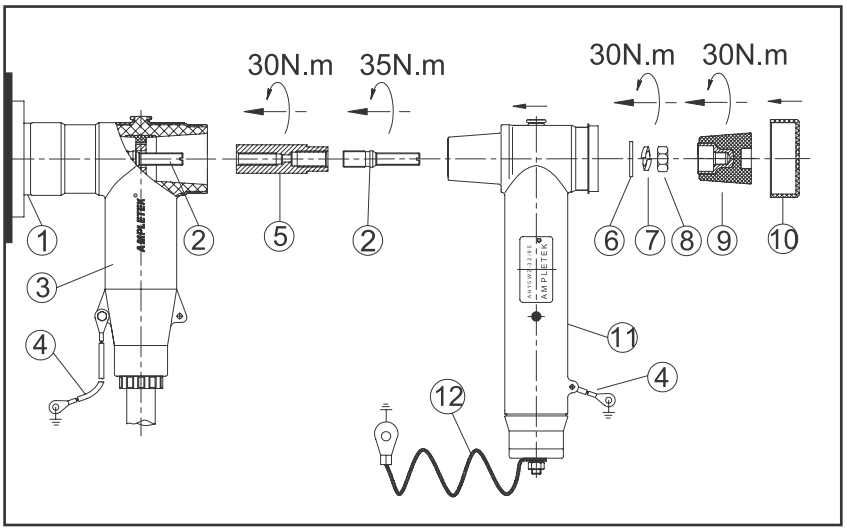
AHY10WZ - *Rear Separable Connector Body C/W Surge Arrester*

Kit Content (Rear Connector C/W Surge Arrestor)

Item	Description	Qty.
1	Rear Connector Body C/W Surge Arrester	3
2	Linking Rod	3
3	Bolt	3
4	Lubricant	1
5	Dielectric Tissue	4
	Installation Instructions	1
	Certificate of Conformity	1
	Packing List	1
	Factory Test Record	1

Order Information and Technical Data

Description	24kV (5kA) AHY5WZ-34/90-24	24kV (10kA) AHY10WZ-34/85-24	36kV AHY5WZ-51/134-36
System Nominal Voltage (kV rms)	20	20	40.5
Rated Voltage (kV)	34	34	51
Continuous Operation Voltage (kV)	27.2	27.2	40.8
Lightning Impulse Current Residual Voltage (kV)	≤ 90	≤ 85	≤ 134
At D.C 1mA Voltage U1mA (kV)	≥ 48	≥ 48	≥ 73
Leaking Current at D.C. 0.75 U1mA (μA)	≤ 50	≤ 50	≤ 50
2ms Rectangular Current Withstand (A)	150	400	400
A.C. Withstand Voltage Test for EPDM Housing (5min) (kV)	54	54	81



1. Bushing
2. Bolt
3. Front T-Connector Body
4. Earth Wire
5. Copper Linking Rod
6. Flat Ring Washer
7. Spring Washer
8. Nut
9. Insulation Plug
10. Conductive Screen Cover
11. Rear Connector Body
12. Tinned Soft Wire

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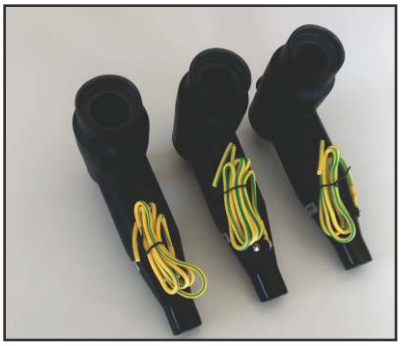
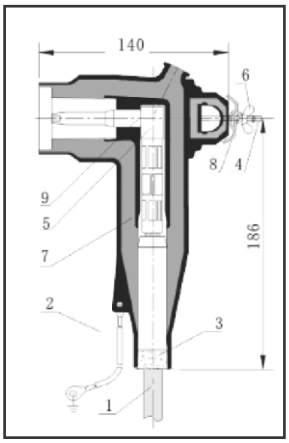
Screened Front Connectors

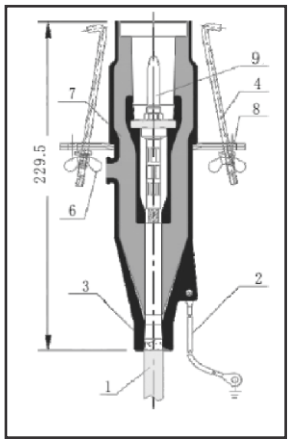
24kV, 250A, Type A Interface
35 - 120mm²



AZT-24/250
Elbow Connector

AZC-24/250
Straight Connector





1. Cable
2. Earth wire
3. Semi-conductive layer
4. Bolt
5. Elbow connecting lug
6. Wing nut
7. Elbow / straight connector body
8. Compression plate
9. Pin lug

Dimensions in mm

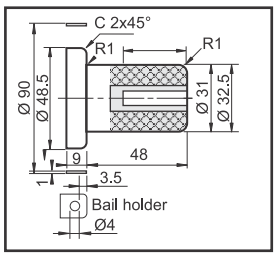
Description

Straight and elbow screened connectors are produced from EPDM and are suitable for use on ring main units and transformers.

Features

- Every connector is suitably tested and QC passed prior to dispatch (AC withstand and partial discharge)
- EPDM for increased safety
- Cable adaptor manufactured of stress reducing material to balance the electric field at the cable crossing
- Meet the requirements of standard IEC 60502.4 and Cenelec, EN50180
- No special tools required
- Compact design
- Fully insulated, submersible and screened

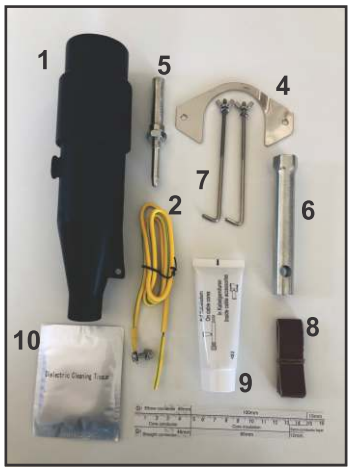
Bushing



- Standard bushing EN50181 200 series 250A
- Contact type: plug-in ϕ7.9mm
- Interface type: A

Kit Content

Item	Description	Qty
1.	Connector body	3
2.	Earthing wire	3
3.	Elbow connecting lug	3
4.	Compression plate	3
5.	Pin lug	3
6.	Fixing tool	1
7.	Bolt & wing nut	6
8.	Abrasive paper	1
9.	Lubricant	1
10.	Dielectric tissue	6
	Installation instruction	1
	Certificate of conformity	1
	Packing list	1
	Factory test record	1



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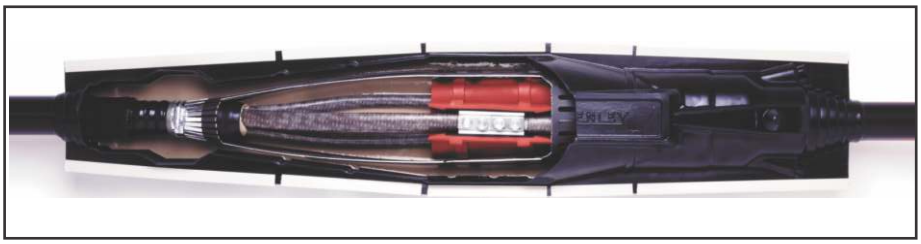
Medium Voltage MIRP Moulded Insulation Resin Protected Cable Joints (15kV)



Description

The unique patented MIRP joint has been developed taking all WT Henley's experience, gained over years in harsh weather and environmental conditions into account. Its ease of installation makes it one of the most reliable MV cable joint systems available today. All kits comprise of tried and tested high quality components, each clearly marked in relation to a well illustrated installation manual which allows for ease of installation.

Technical Data

Test requirements for accessories rated 3.6 / 6 up to 20.8 / 36kV - HD629.2S2

Test	Requirements
DC Voltage dry (15min, $6U_o$)	No breakdown or Flashover
AC Voltage dry (5min, $4.5U_o$)	No breakdown or Flashover
Impulse voltage at elevated temperature (10 +VE & 10 -VE) - 95kV	No breakdown or Flashover
Heating cycle voltage in air (63 cycles, $1.5U_o$)	No breakdown or Flashover
Heating cycle voltage in water (63 cycles, $1.5U_o$)	No breakdown or Flashover
AC Voltage dry (4hrs, $3U_o$)	No breakdown or Flashover
Impulse voltage at ambient temperature	No breakdown or Flashover
AC voltage dry (15min, $2.5U_o$)	No breakdown or Flashover

Features

- Type tested to HD629.2S2 and IEC61442
- Suitable for PILC, XLPE and transition joints
- MIRP1, 35 - 185mm²
- MIRP2, 240 - 300mm²
- Modular Joint systems
- Solder-less earthing
- Connectors included
- Resin protection
- Proven reliability
- Quick installation
- Easy-fit insulation
- Dehydrated silica sand / PU (polyurethane) resin mix posessess high impact strength and improves insulation properties and keeps water out

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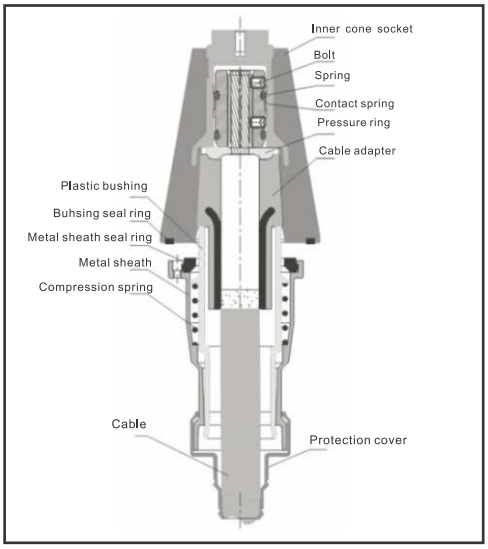
Inner Cone Plug-in Terminations (42kV)

ACBN

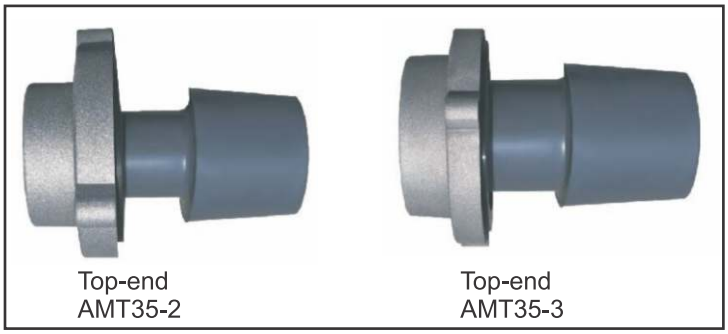


Description

In line with global developments and improved designs on gas insulated switchgear and transformers ***CiP - AMPLETEK*** offers a range of inner cone plug in terminations that meet the requirements to provide the appropriate connection system for bushings as per the EN50181 standard.
Suitable kits are available for size 2 (800A) and size 3 (1250A) with a system voltage up to 42kV.

Features

- Screened inline connection for gas insulated switchgear and transformers up to 42kV
- Metal-enclosed and suitable for outdoor use
- Special designs for wind power stations and offshore applications with bronze protection cover
- Optional voltage detection point
- Termination suitable for interfaces in accordance with EN50180 and EN50181 for inner cone connections
- Contact parts are designed for stranded circular copper or aluminium conductors in accordance to IEC-60228



Top-end
AMT35-2

Top-end
AMT35-3

Technical Data

Testing methods in accordance with GB/T12706.4-2008

Item	Size 2	Size 3	Requirements
U0 / u (kV)	19 / 33	20.8 / 36	
Um (kV)	38	42	
AC withstand voltage 5min (kV)	70	117	No breakdown or Flashover
PD at ambient temperature (kV)	⩽10pC	⩽10pC	max. 10pC at $2U_o$
Impulse voltage at ambient temperature (kV)	170	200	10 impulses of each polarity, No breakdown
Thermal short circuit (conductor) (kA)	23 / 2sec	23 / 2sec	2 short circuits to raise conductor, No breakdown
Dynamic short circuit (conductor) (kA) 10ms	83	83	No breakdown

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Cable Installation Products (Pty) Ltd

Inner Cone Plug-in Terminations (42kV)

Dimensions

Product	Size	Nominal current (A)	System voltage (kV)	Cross section (mm²)	Dia over conductor (mm)	Dia over insulation (mm)
ACBN-12-2	2	630	12	70 - 500	9.8 - 26.7	20 - 36.9
ACBN-24-2	2	630	24	35 - 500	7.0 - 26.7	19.6 - 36.1
ACBN-36-2	2	630	36	50 - 300	8.3 - 20.5	26.3 - 38.5
ACBN-35-2	2	630	35	50 - 185	8.3 - 16	31.9 - 39.6
ACBN-12-3	3	1250	12	300 - 630	20.5 - 30	30.7 - 40.2
ACBN-24-3	3	1250	24	185 - 630	16 - 30	28.6 - 42.6
ACBN-36-3	3	1250	36	50 - 300	8.3 - 20.5	26.3 - 38.5
ACBN-35-3	3	1250	35	50 - 185	8.3 - 16	31.9 - 39.6

Kit Content

Item	Description	Qty
1.	Cable Adaptor	1
2.	Contact Ring	1
3.	Pressure Ring	1
4.	Metal Sheath	1
5.	Hex Bolt (M12 x 16mm)	3
6.	Hex Bolt (M8 x 50mm)	3
7.	Protection Cover	1
8.	Tinned Copper Braid	1
9.	Constant Force Spring	1
10.	PVC Insulation Tape	1
11.	Installation Tape	1
12.	Phase Tape	1
13.	Abrasive Paper	1
14.	Lubricant	1
15.	Dielectric Tissue	3
16.	Gloves	2
	Installation Instructions	1
	Certificate of Conformity	1
	Packing List	1
	Factory Test Report	1

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CiP
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Anti-Track Tubing

AAT

Description

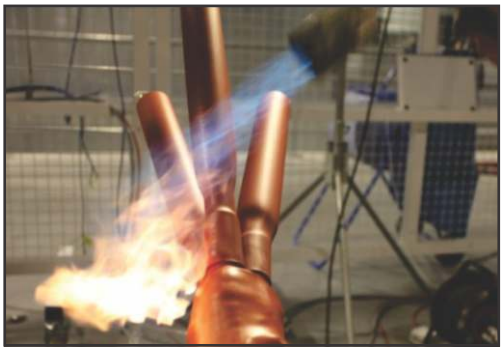
AAT is specially designed to provide high creep resistance and non-tracking properties for indoor and outdoor terminations.

Features

- Shrink Ratio 3 : 1
- Halogen Free
- High creep resistance and anti-tracking properties
- Colour – Red
- Minimum shrink temperature 110°C
- UV Resistant

Applications

- Indoor and Outdoor terminations up to 36 kV
- Indoor and Outdoor Medium voltage switchgear
- Medium Voltage Busbar Insulation

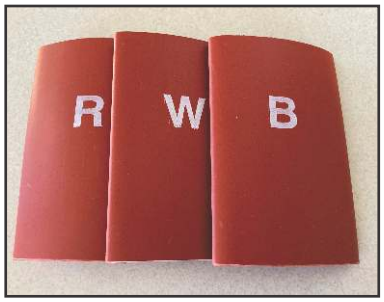


Technical Data

Properties	Test Methods	Typical Values
Tensile (MPa)	ASTM D 2671	> 11
Elongation (%)	ASTM D 2671	> 400
Heat Aging Tensile Strength (MPa)	ASTM D 2671 (120°C x 168hrs)	> 10
Heat Aging Ultimate Elongation %	ASTM D 2671 (120°C x 168hrs)	> 250
Dielectric Constant	IEC 250	≤ 3.0 (max)
Tracking Resistance	ASTM D 2303	3.75kV, 1hr (Pass)
Dielectric Strength (kV/mm)	IEC 250	> 15
Copper corrosion	ASTM D 2671 (120°C x 168hrs)	No Corrosion
Cold Bend	ASTM D 2671 (-40°C x 4hrs)	No Cracking
Water Absorption (%)	ISO62 / 23°C, 14days	< 0.15

Dimensions

Product	Inside Diameter (mm)		Wall Thickness Recovered (mm)	Reel Length (m)	Suitable for cable sizes (11kV, XLPE) mm²
	Supplied	Recovered			
AAT30/10	30	10	2.8	25	16 - 50
AAT38/12	38	12	2.8	25	70 - 150
AAT49/16	49	16	2.9	25	185 - 300
AAT55/18	55	18	2.9	25	185 - 300
AAT65/21	65	21	3.0	25	185 - 400
AAT76/26	76	26	3.0	15	400 - 1000
AAT85/30	85	30	3.5	15	
AAT100/40	100	40	4.0	15	



Phase Indicator Markers

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Heat Shrinkable Busbar Insulation Tubing

ABTM - 11 to 25kV
ABTH - 36kV

Technical Data

Properties	Test Method	Typical Values
Tensile (MPa)	ASTM D 2671	≥ 8
Elongation (%)	ASTM D 2671	≥ 400
Longitudinal Shrinkage (%)	ASTM D 2671	± 10
Heat aging: Tensile (MPa) : Elongation (%)	ASTM D2671 (150°C, 168hrs)	≥ 6.4 ≥ 200
Low Temperature Properties	ASTM D 2671 (-40°C, 4hrs)	No Cracking
Water Absorption (%)	ASTM D570A	≤ 0.5
Copper corrosion	UL 224	No Corrosion
Flammability (Oxygen Index)	ASTM D2863	≥ 28
Dielectric Strenght (kV/mm)	ASTM D149	≥ 20
Hardness (Shore A)	ASTM D2240	⩽ 88
Volume Resistivity (Ω/cm)	IEC 60093	≥ 4.3 x 10^{14}
Heat Shock	ASTM D 2671 (200°C, 4hrs)	No cracking, flowing, dripping
Corrosion Resistance	IEC60684	No Corrosion
Vertical Flame	UL94	V1 (3mm)

Dimensions

Product	Inside Diameter (mm)		Wall Thickness (mm)	Reel Length
	Supplied	Recovered	Recovered	(m)
Medium Wall (25kV)				
ABTM15/6	15	6	1.9	25
ABTM30/12	30	12	2.2	25
ABTM40/16	40	16	2.35	25
ABTM50/20	50	20	2.35	25
ABTM65/26	65	26	2.35	25
ABTM75/30	75	30	2.35	25
ABTM100/40	100	40	2.35	25
ABTM120/50	120	50	2.8	25
Thick Wall (36kV)				
ABTH30/12	30	12	4	15
ABTH40/16	40	16	4	15
ABTH65/26	65	26	4	15
ABTH75/30	75	30	4	15
ABTH100/40	100	40	4	15
ABTH120/48	120	48	4	15
ABTH150/60	150	60	4	15

Description

ABTM / ABTH is produced from specially formulated radiation cross-linked halogen free compounds and provides a high resistance to tracking and arcing. This enhances the insulation properties of busbars in switchgear and substations.

Features

- Operating Temperature -40°C to 125°C
- Flexible to ensure ease of installation
- Shrink Ratio 2.5 : 1
- Excellent tracking resistance & insulation
- Halogen free
- Superior resistance to UV and weather conditions
- Colours - Red
- Minimum fully recovered shrink Temperature, 125°C
- Suitable for corrosive environments

Applications

- Suitable for applications in LV and MV (36kV) switchgear and electrical equipment

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Heat Shrinkable Busbar Insulation Tape

ABIT

Technical Data

Properties	Test Method	Typical Values
Tensile (MPa)	ASTM D 2671	⩾ 11.8
Elongation (%)	ASTM D 2671	⩾ 550
Heat Ageing: Tensile (MPa) : Elongation (%)	120°C, 168hrs	> 10 > 450
Dielectric Strenght (kV/mm)	IEC243	⩾ 20
Water Absorption (%)	ISO 62 / 23°C, 14days	< 0.5
Copper Corrosion	ASTM D 2671 (120°C, 168hrs)	No corrosion
Flammability	ASTM D 2671	Self-extinquishing in 60sec
Dielectric Constant	IEC 250	⩽ 3.5
Volume Resistance (Ω/cm)	IEC 93	> 10^{13}

Dimensions

Product	Width of Tape (mm)	Wall Thickness (mm)	Reel Length
	Supplied	Recovered	(m)
ABIT-1	25	1	10
ABIT-2	50	1	10

Description

ABIT is manufactured from radiation cross-linked polyolifin and consists of a dual layer structure, insulation material and hot melt adhesive. This design enables the tape to provide effective electrical insulation and shock protection for busbars up to 36kV.

Features

- Shrink Ratio 30%
- Operating temperature -55°C to 105°C
- Colours - Red
- Minimum fully recovered shrink temperature, 100°C
- Very flexible for ease of installation
- Excellent tracking resistance & insulation properties
- Superior resistance to UV and weathering

Applications

- Busbar insulation for LV and MV applications

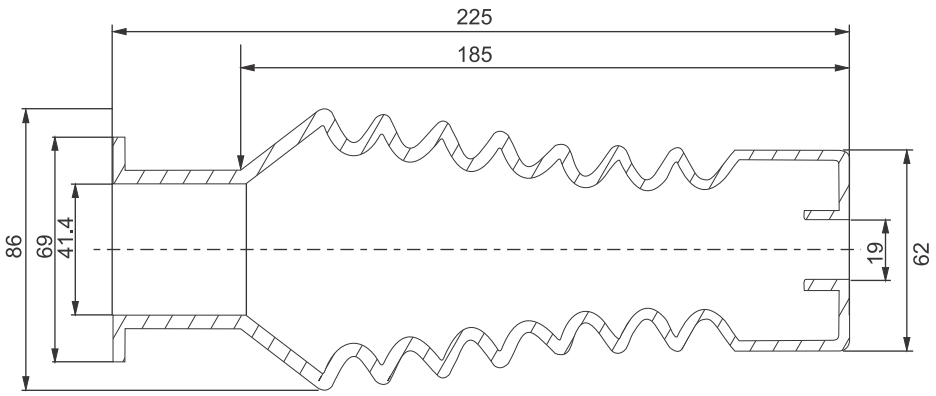
Flexible Un-screened Silicone Bushing Boot

CSB1

Technical Data

Properties	Test Methods	Typical Values
Breakdown Strength (kV/mm)	IEC 243	⩾ 20
Broken Extension Rate (%)	ASTM D 2671	⩾ 300
Tensile Strength (MPa)	ASTM D 2671	⩾ 6
Volume Conduct Rate (Ω/m)	IEC 93	⩾ 10^{14}
Maximum System Voltage (kV)		17.5

Dimensions



Dimensions in mm

Description

These are pre-molded un-screened silicone insulating bushing boots to be used on switchgear and transformer connections up to 17.5kV. Its main function is to protect, insulate and seal, thus improving the Phase-to-Phase and Phase-to-Ground insulation. It further protects against flashover where air clearances are insufficient.

Features

- Suitable for straight and right angle applications
- Simple and easy to install
- Excellent insulation properties
- Provides superior moisture block in high humidity areas
- Outstanding resistance to weathering and tracking (excellent erosion resistance)
- Extended shelf life
- Type tested and meets IEC60502-4 and GB12706.4-2008 standards
- Easy to remove and re-install
- No specialised tools required
- Immediate energising after installation

Options

- Reducing studs (16/12mm) - **CRSM16/12**

- Anti-track tubing shim sleeves - **AAT**

- Reducing collar - **CSBRC**

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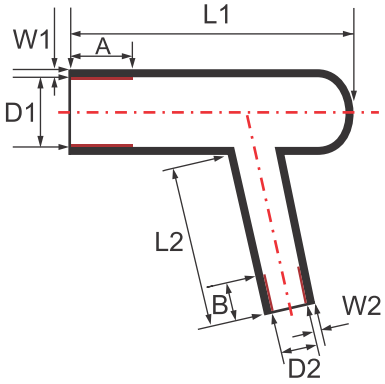
Anti-Tracking Right Angle and Straight Boots (Heat shrinkable)

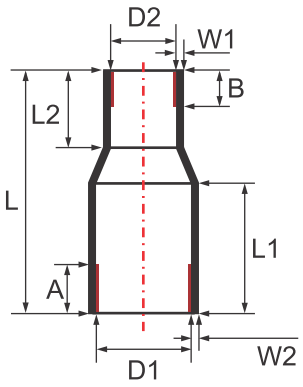
AHMR & AHMS

Technical Data

Properties	Test Methods	Typical Values
Tensile Strength (MPa)	ASTM D 2671	⩾ 12
Tensile Strength after Thermal Aging (Mpa)	ASTM D 2671 / 120°C, 168hrs	⩾ 8.5
Ultimate Elongation (%)	ASTM D 2671	⩾ 300
Ultimate Elongation after Thermal Aging (%)	ASTM D 2671 / 120°C, 168hrs	⩾ 200
Dielectric Strength (kV/mm)	IEC 243	⩾ 15
Volume Resistance (Ω/m)	IEC93	⩾ 10^{14}
Tracking Resistance	ASTM D 2303 / 3.75kV, 1hr	Pass
Water Absorption (%)	ISO 62	⩽ 1
Flammabillity (oxygen index)	ISO 4589	⩾ 25
Copper Corrosion	ASTM D 2671 / 120°C, 168hrs	No Corrosion
Cold Bend	ASTM D 2671 / -40°C, 4hrs	No Cracking

Dimensions





Anti-track red mastic
A-50mm / B-25mm

Product		As supplied (mm)		After recovery (mm)						
		D1 (Min.)	D2 (Min.)	D1 (Max.)	D2 (Max.)	L1 (Nom.)	L2 (±10%)	L (±10%)	W1 (±10%)	W2 (±10%)
Right Angle	AHMR80/36	80	35	36	18	170	125		4.2	3.5
	AHMR80/50	80	50	36	18	170	125		3.8	3.5
	AHMR95/70	95	70	38	28	160	140		4.2	4.8
Straight	AHMS80/34	80	34	35	20	145	30	220	3.2	3.2
	AHMS80/58	80	58	35	20	145	30	220	3.2	3.2

NOTE: D1 and D2 are inner diameter

Description

AHMR right angled and **AHMS** straight anti-tracking heat shrinkable bushing boots are used for insulating bushings on switchgear and transformers. Its function is to protect, insulate and seal. It further protects against flash over where air clearances are insufficient.

Features

- Suitable for use with any heatshrink termination
- UV resistant
- Excellent resistance to harsh weather and environmental conditions
- Red mastic inner lining offers reliable protection against moisture ingress
- Minimum recovery temperature 110°C
- Excellent erosion & tracking resistance
- Excellent electrical and mechanical properties

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Flexible Un-screened Separable Connector (12kV)

AUSCC12/630

Description

These are insulated T-shaped (right angled) pre-molded un-screened separable connectors (silicone) suitable for use on 12kV Type “C” 630A bushings. It has a very compact profile making it suitable for use in compact gas-insulated secondary switchgear where the spacing between bushings is significantly reduced. The pre-molded shape ensures optimal/full contact over the entire Type “C” bushing profile thus improving its ability to eliminate unwanted leakage currents.

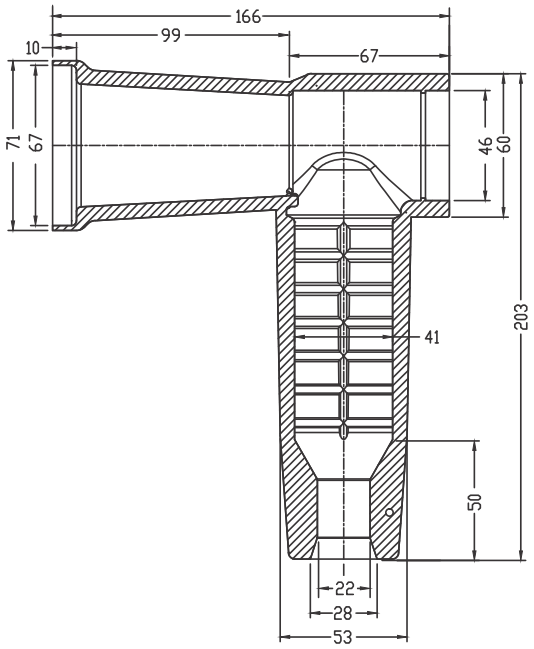
Features

- Excellent moisture sealing properties
- Quick and easy to install
- Suitable for cables 35 - 300 mm²
- Easy to remove and re-install
- No specialized tools required
- Compact profile provides for greater air clearances (P - P & P - E)
- Type tested to meet the requirements of IEC60502-4 and NRS1332
- Non tracking elastomeric housing offers excellent erosion resistance, dielectric properties and environmental resistance
- No slip/slide off the Type “C” bushings once installed
- Suitable to be used with all indoor terminations
- Accommodates bulky torque shear lugs

Technical Data

Properties	Test Methods	Typical Values
Breakdown Strength (kV/mm)	IEC 243	⩾ 20
Broken Extension Rate (%)	ASTM D 2671	⩾ 300
Tensile Strength (MPa)	ASTM D 2671	⩾ 6
Volume Conduct Rate (Ω/m)	IEC 93	⩾ 10^{14}
Maximum System Voltage (kV)		17.5

Dimensions



Dimensions in mm

Applications (12kV only)

- Compact SF6 gas-insulated secondary switchgear (RMU’s and Type B mini-substations)
- Metal box filled with air
- Distribution tranformers
- CT - VT metering units

Options

- Reducing studs (16 / 12mm) - **CRSM16/12**

- Anti-track tubing shim sleeves - **AAT**

- Set Screws

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Flexible Un-screened Separable Connector (24kV)

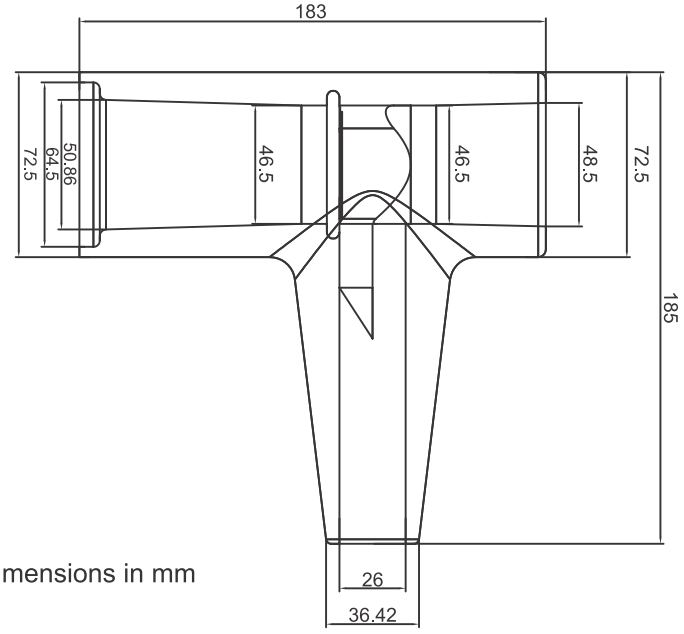
AUSCC24/630

Technical Data

Table 9 - Test sequences and requirements for un-screened separable connectors (excluding shrouded terminations)

Seq.	Tests [a]	Rated Voltage 12kV / 24kV	Requirements
1	AC and DC voltage	AC for 5min at 4,5U_o and d.c. for 15min at 4U_o	No Breakdown or Flashover
2	Partial discharge [b]	10pC max. at 1,73U_o	No Breakdown or Flashover
3	Impulse at θ_t [c]	10 impulses of each polarity	No Breakdown or Flashover
4	Heating cycles in air	30 cycles [d] at θ_t [c] and 2,5U_o	No Breakdown or Flashover
5	Heating cycles under water	30 cycles [d] at θ_t [c] and 2,5U_o	No Breakdown or Flashover
6	Disconnect/connect [i]	Five complete operations.	No Visible Damage
7	Partial discharge [b] at θ_t [c, e] and ambient temperature	10pC max. at 1,73U_o	No Breakdown or Flashover
8	Impulse	10 impulses of each polarity	No Breakdown or Flashover
9	AC voltage	15min at 2,5U_o	No Breakdown or Flashover
10	Humidity[j]	300hrs at 1,25U_o, see Table 13	No Breakdown or Flashover
11	Examination	For information only [k]	No Visible Damage

Dimensions



Dimensions in mm

Description

These are insulated T-shaped (right angled) pre-molded un-screened separable connectors (silicone) suitable for use up to 24kV Type “C” 630A bushings. It has a very compact profile making it suitable for use in compact gas-insulated switchgear where the spacing between bushings is significantly reduced. The pre-molded shape ensures optimal/full contact over the entire Type “C” bushing profile thus improving its ability to eliminate unwanted leakage currents.

Features

- Suitable to be used with any **CiP** / elcon megarad termination on PILC or XLPE cables
- Suitable for cables 35 - 300 mm²
- Easy to install, insulation plug screws directly onto reducing stud already in place
- Excellent moisture sealing properties
- Easy to remove and re-install
- No specialized tools required
- Compact profile provides for greater air clearances (P - P & P - E)
- Non tracking elastomeric housing offers excellent erosion resistance, dielectric properties and environmental resistance
- Accommodates bulky torque shear lugs

Supplied complete with

- Reducing studs (16 / 12mm)
  - CRSM16/12

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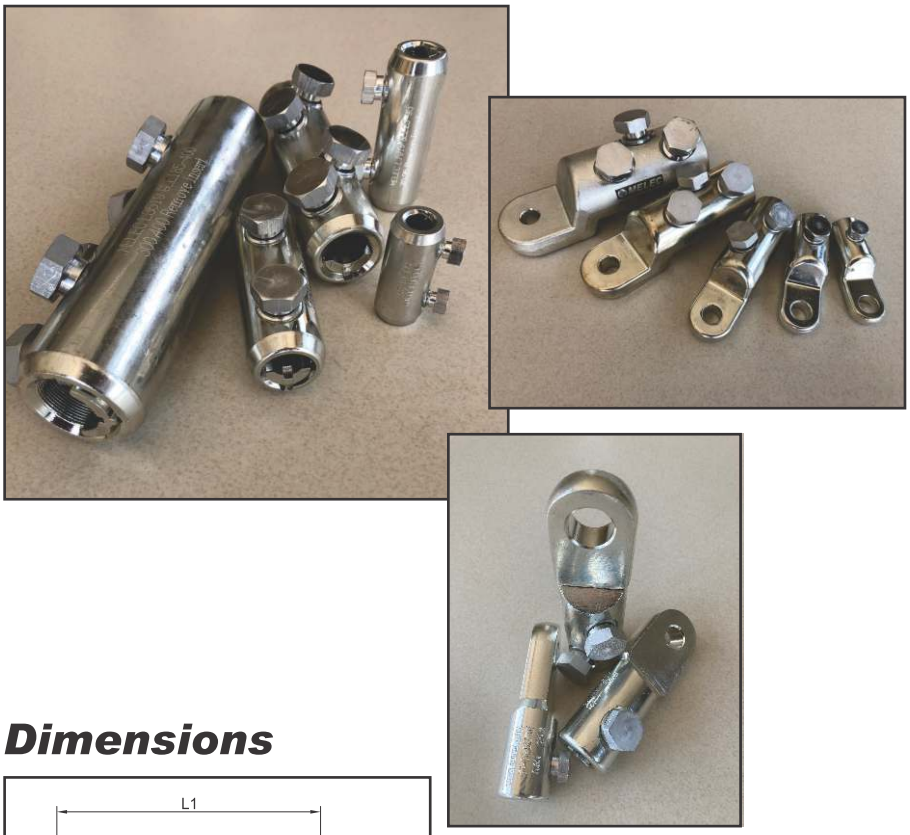
Lugs and Connectors - Torque Shear

ATSL and ATSC



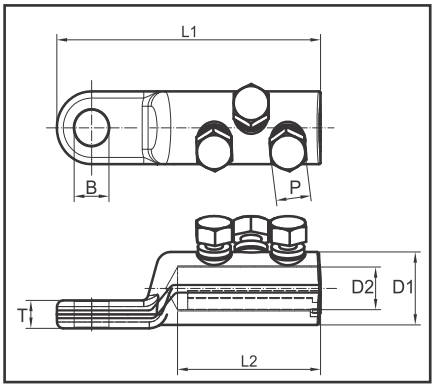
Description

ATSL and **ATSC** are mechanical torque shear lugs and connectors designed for use in low and medium voltage applications. The product consist of an aluminium electro tin plated body with aluminium shear bolts and the range covers conductor sizes 16mm² to 1000mm². The lugs are suitable for indoor and outdoor applications and are available with different palm hole sizes to accommodate M12 and M16 bolts.

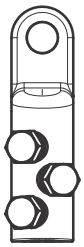
Features

- Suitable for Al (Aluminium) and Copper cables
- Torque controlled shear off bolts guarantee excellent electrical connection
- Suitable for a wide range of applications and accommodate most types of conductors, shapes and materials
- Installation requires no expensive crimp tools, standard socket or wrench is suitable (hex bolts)
- Solid palm (no inspection hole) eliminates ingress of moisture
- Grooved inner barrel contact surface compliments shear bolt action to ensure good electrical connection
- Once bolt has been sheared it cannot be removed
- **Complies to IEC 61238-1 class A & B, BS EN 50483-6 : 2009**
- Solid centre on connectors ensure water block
- Incorporates Anti-Oxidizing paste for Al conductors
- Range taking allows for reduction in inventory levels

Dimensions



Lugs

Product		Conductor Size (mm²)	No. of Bolts	Dimensions (mm)						
				L1	L2	D1	D2	T	P	B
	ATSL25/95/12B1	25 - 95	1	64.6	32.5	24	13.3	9	13	13
	ATSL25/95/16B1	25 - 95	1	64.6	32.5	24	13.3	9	13	17
	ATSL35/150/12B1	35 -150	1	72.6	38.5	28	16	10	17	13
	ATSL35/150/16B1	35 -150	1	72.6	38.5	28	16	10	17	17
	ATSL70/240/12B2	70 - 240	2	97.7	61.5	33	20	13	17	13
	ATSL70/240/16B2	70 - 240	2	97.7	61.5	33	20	13	17	17
	ATSL120/300/12B2	120 - 300	2	106.7	67.5	38	24	14	22	13
	ATSL120/300/16B2	120 - 300	2	106.7	67.5	38	24	16	22	17
	ATSL185/400/12B2	185 - 400	3	120	78	42	26	16	22	13
	ATSL185/400/16B2	185 - 400	3	120	78	42	26	16	22	17
	ATSL300/630/12B3	300 - 630	3	140	90	52	33	20	24	13
	ATSL300/630/16B3	300 - 630	3	140	90	52	33	20	24	17
	ATSL800/1000/12B4	800 - 1000	4	192	107	65	41	16.9	22	13
	ATSL800/1000/16B4	800 - 1000	4	192	107	65	41	16.9	22	17

ATST1

MELEC

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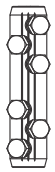
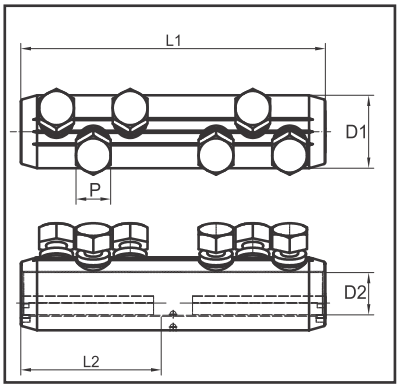
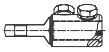
Lugs and Connectors - Torque Shear

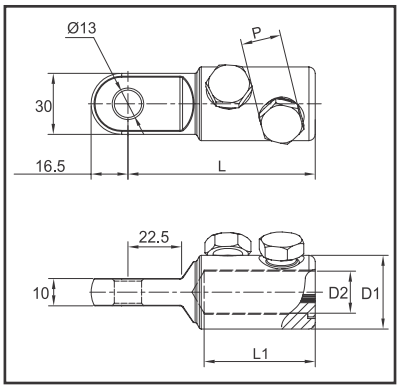
Connectors

Product		Conductor Size (mm²)	No. of Bolts	Dimensions (mm)						
				L1	L2	D1	D2	T	P	B
	ATSC10/35B2	10 - 35	2	45	21	19	8.3		9	
	ATSC25/95B2	25 - 95	2	70	33.5	24	13.3		13	
	ATSC35/150B2	35 - 150	2	80	38.5	28	16		17	
	ATSC70/240B4	70 - 240	4	125	61	33	20		19	
	ATSC120/300B4	120 - 300	4	140	68	38	24		22	
	ATSC185/400B6	185 - 400	6	170	83	42	26		22	
	ATSC300/630B6	300 - 630	6	200	97	52	33		24	
	ATSC800/1000B8	800 -1000	8	220	105	65	41		22	



Centre Lugs

Product		Conductor Size (mm²)	No. of Bolts	Dimensions (mm)				
				L1	L	D1	D2	P
	ATSLC25/95B1	25 - 95	1	33.8	69	24	13.3	13
	ATSLC35/150B1	35 - 150	1	45	83	29	15.8	17
	ATSLC70/240B2	70 - 240	2	52	84	33	20	19
	ATSLC300/400B3	300 - 400	3	56	98.5	39.5	26	22



Lugs

Product	Al Circular	Al Sector	Strip Length	Retain Insert	Remove Insert	Head Size (P)
	mm²	mm²	mm			mm
ATSL25/95	25 - 95	25 - 70	35	25 - 50	70 - 95	13
ATSL35/150	35 - 150	35 - 120	41	35 - 70	95 - 150	17
ATSL70/240	70 - 240	70 - 185	64	70 - 120	150 - 240	19
ATSL120/300	120 - 300	120 - 240	71	120 - 185	240 - 300	22
ATSL185/400	185 - 400	185 - 300	81	185 - 240	300 - 400	22
ATSL300/630	300 - 630	300 - 500	92	300 - 400	500 - 630	24
ATSL800/1000	800 - 1000	800	108			22

Connectors

Product	Al Circular	Al Sector	Strip Length	Retain Insert	Remove Insert	Head Size (P)
	mm²	mm²	mm			mm
ATSC10/35B2	10 - 35	10 - 25	23	— —	— —	9
ATSC25/95B2	25 - 95	25 - 70	35	25 - 50	70 - 95	13
ATSC35/150B2	35 - 150	35 - 120	40	35 - 70	95 - 150	17
ATSC35/150B4	35 - 150	35 - 120	53	35 - 70	95 - 150	17
ATSC70/240B4	70 - 240	70 - 185	63	70 - 120	150 - 240	19
ATSC120/300B4	120 - 300	120 - 240	70	120 - 185	240 - 300	22
ATSC185/400B6	185 - 400	185 - 300	85	185 - 240	300 - 400	22
ATSC300/630B6	300 - 630	300 - 500	99	300 - 400	500 - 630	24
ATSC800/1000B8	800 - 1000	800	108			22

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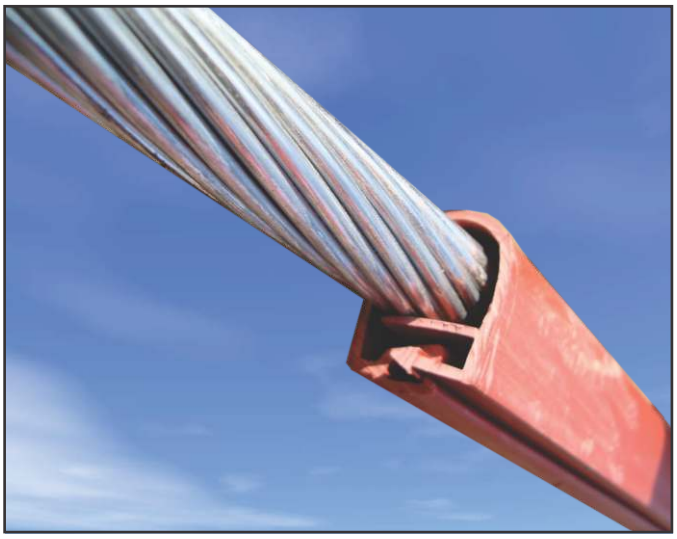
Overhead Line Insulation Sleeve

AOPS



Description

AOPS has been designed to provide reliable insulation and protection on bare overhead line systems preventing electrical outages caused by accidental contact from trees, animals and other objects. Outages may also occur in windy conditions between power lines and when these lines are close to steel structures.

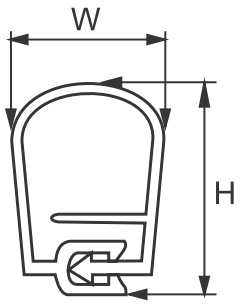
Features

- Suitable for voltage up to 35kV
- Prevent tapping by hooking and other means
- Excellent UV and abrasion resistance properties resulting in outstanding resistance to weathering (harsh environments)
- Excellent erosion and tracking properties
- Quick and easy installation
- Red mastic sealant available for improved performance
- Colours - red / yellow / green / black
- Range taking

Technical Data

Properties	Test Methods	Typical Values
Tensile strength (MPa)	GB/T 1040-92	⩾ 10
Elongation at break (%)	GB/T 1040-92	⩾ 500
Dielectric strength (kV/mm)	GB/T 1408-89	⩾ 20
Volume resistance (Ω/cm)	GB/T 1410-2006	⩾ 1×10^{13}
Dielectric constant	GB/T 1409-2006	⩽ 3.0
Flammability (O_i)	GB/T 2406-1993	⩾ 27
Microtherm flexility (-40℃, 4hrs)	ASTM D 2671	No Cracking
Water absorption (%)	GB/T 1034-98	⩽ 0.5

Dimensions



AOPST1 - Application Tool

Product	Sleeve Size (Ø)	Voltage Rating (kV)	Conductor Size (mm²)	Max Conductor OD (mm)	Standard Length (m)	Width (W) mm	Height (H) mm
AOPS14/35	14	35	⩽ 70	12	20	23.8	34
AOPS18/35	18	35	95	18	20	28	37.5
AOPS20/35	20	35	120 - 150	22	20	30	40
AOPS28/35	28	35	185 - 240	30	20	35	48
AOPS38/35	38	35	⩾ 300	38	20	43	53

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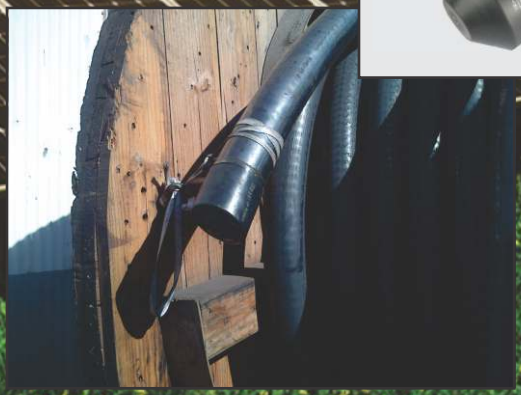
OTHER PRODUCTS



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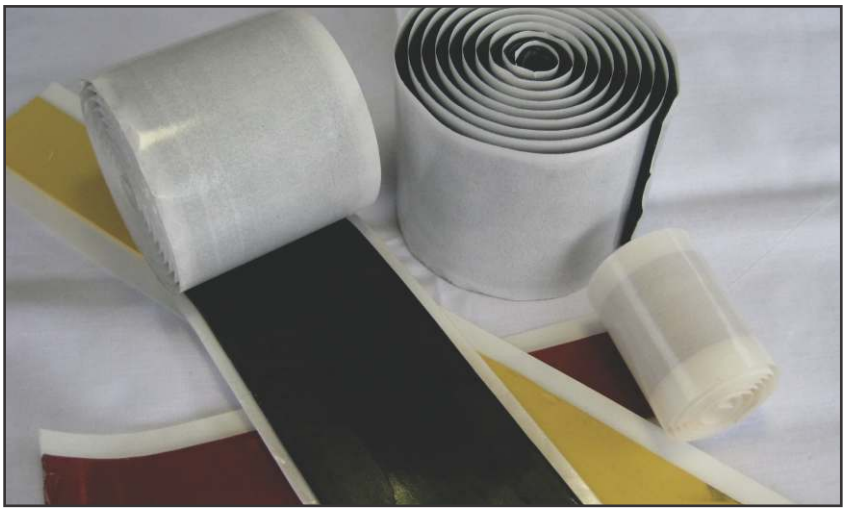
Mastic Tape



Description

AYSM
Yellow stress relief void filling mastic is used on connectors and at screen cuts when doing medium voltage (MV) joints and termination installations.
Features include excellent adhesive and sealing capabilities, weather resistance, anti-aging, mildew, chemical resistance and excellent dielectric properties.

ARAM
Red anti-track mastic is used in MV termination installations to ensure a watertight seal on breakout boots, anti-track tubing and on lugs.
Features include excellent adhesive and sealing capabilities, weather resistance, anti-aging, mildew, chemical resistance and excellent dielectric properties.

ABFM & AGFM
Grey & black butyl self amalgamating sealing mastic is suitable for LV and MV applications. It is used for sealing and waterproofing of electrical installations such as joints and terminations, as well as in telecom installations.
Features include excellent adhesive, sealing, electrical, anti-aging properties and UV resistance.

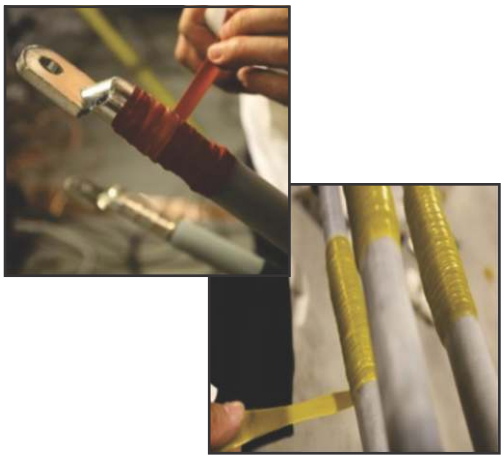
Technical Data

Properties	Test Methods	Typical Values		
		AYSM	ARAM	ABFM / AGFM
Density (g/m³)	ASTM D792	1.3	1.2	1.3
Tensile Strength (MPa)	ASTM D638	0.1	0.1	0.1
Ultimate elongation (%)	ASTM D638	> 1000	> 1000	> 1000
Dielectric Strength (kV/mm)	IEC 250	≥ 15	≥ 10	≥ 15
Dielectric Constant	IEC 250	10 - 15	3	2 - 3
Volume Resistance (Ω/cm)	ASTM D527	10^{9} - 10^{12}	10^{13}	10^{13}
50Hz Loss Factor(tqo)		0.035	0.035	0.035
Service Temp. (max) (°C)		-20 to 90	-20 to 90	-40 to 90
Adhesive & self-amalgamation		Good	Good	Good

Dimensions

Product	Description	Size (mm)
AYSM-150	Yellow Stress Relief	1.5 x 25 x 150
AYSM-500	Yellow Stress Relief	1.5 x 25 x 500
ARAM-500	Red Anti-Track	1.5 x 25 x 500
ABFM-1200	Black Sealing / Filler	2.5 x 35 x 1200
AGFM-1500	Grey Sealing / Filler	2.5 x 35 x 1500

(Thickness x Width x Length)



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Rubber Based Mastic Putty / Tape

ABFMR

Description

ABFMR self amalgamating void filling and insulation putty tape is suitable for use in various low voltage & medium voltage applications. To apply, stretch and wrap (or mould) around the application, 50% overlap is recommended for best results. The product is suitable for sealing and water proofing of electrical installations such as joints and terminations, telecom installations and to allow for a smoother finish when applied to an irregular shape.

Features

- Excellent self amalgamating and sealing properties
- Easy filling of irregular shapes
- Suitable for use up to 600V
- Soft and pliable
- Non corrosive with good ageing properties
- 5 Year shelf life

Applications

- Moisture block in LV heatshrink joints
- Preventing moisture from entering MV joints and terminations

Technical Data

Properties	Test Methods	Typical Values
Tensile Strength (MPa)	ASTM D1000	0.1
Ultimate elongation (%)	ASTM D1000	≥ 1000
Dielectric Strength (kV/mm)	ASTM D1000	≥ 20
Dielectric Constant	IEC 250	2 - 3
Insulation Resistance (mΩ)	ASTM D1000	1 x 10^6
Operataing Temp. (°C)		-40 to 90
Copper Corrosion		None

Dimensions

Product	Description	Size (mm)
ABFMR-1500	Black Void Filling Insulation Putty	3.2 x 38 x 1500

(Thickness x Width x Length)

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Heat Shrinkable Cable End Caps

AEC

Description

AEC are adhesive lined cross-linked polyolefin end caps. The hot melt adhesive retains flexibility after recovery and ensures a watertight seal when applied to either power or telecom cable ends.

Features

- Shrink Ratio 2 : 1
- Operating temperature -55°C to 110°C
- UV stable
- Adhesive lined for excellent moisture seal
- Colour - Black
- Shrink temperature 120°C

Applications

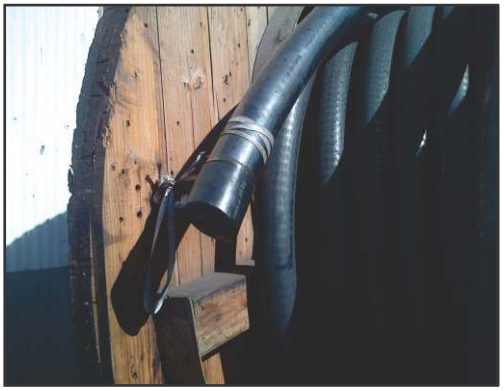
- Sealing ends of power and telecom cables
- Capping of hydraulic and pneumatic tubes to prevent ingress of both dust and moisture

Technical Data

Properties	Test Methods	Typical Values
Operating Temperature (°C)	IEC 216	-55 to 110
Tensile (MPa)	ASTM D 638	> 14
Elongation (%)	ASTM D 638	> 400
Aged Elongation (%)	150°C x 168hrs	> 300
Volume Resistance (Ω/cm)	IEC 93	10^{14}
Dielectric Strength (kV/mm)	IEC 243	> 15

Dimensions

Product	Inside Diameter (mm)		Wall Thickness Recovered (mm)	Cable Diameter (mm)
	Supplied	Recovered		
AEC14/5	14	5	2.0	5 - 12
AEC25/8	25	8	2.3	10 - 20
AEC40/15	40	15	3.0	18 - 32
AEC55/26	55	26	3.3	28 - 48
AEC75/36	75	36	3.5	45 - 70
AEC100/40	100	40	4.0	55 - 90
AEC120/60	120	60	4.0	65 - 110
AEC145/60	145	60	4.0	65 - 138



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Wrap Around - Cable Repair Sleeve

ACRS

Description

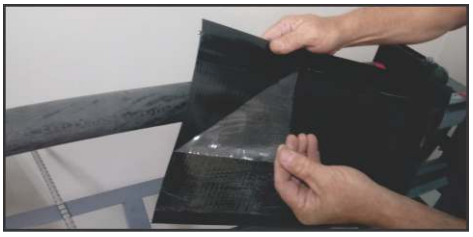
ACRS is a wrap-around sleeve which provides a fast and convenient way to repair both power and telecom cables. The hot melt adhesive lining ensures a water proof seal.

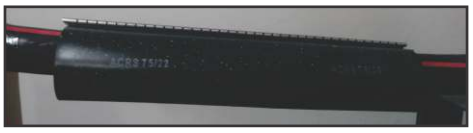
Features

- Shrink Ratio 3 : 1
- Thermochromic heat activated paint
- Operating temperature -35°C to 105°C
- Excellent impact and abrasion resistance
- Excellent environmental cracking and UV resistance
- Colour - Black
- Minimum shrink temperature 120°C

Applications

- Permanent sheath repairs on both power and telecom cables
- Temporary repairs to low pressure gas lines
- Temporary repairs to low pressure water and sewerage pipes





Technical Data

Properties	Test Methods	Typical Values
Tensile (MPa)	UL 224	> 14
Elongation (%)	UL 224	> 300
Heat Ageing: Tensile (MPa) : Elongation (%)	UL 224 (135°C x 168hrs)	> 10 > 150
Water Absorption (%)	ISO 62	< 0.15
Eccentricity (%)	UL 224	< 30
Mould Resistance	ASTM D638 G21	No Growth
ESCR	ASTM D 1693 (50°C)	No Cracking
Dielectric Strength (kV/mm)	ASTM D 2671	> 20
Volume Resistivity (Ω/cm)	ASTM D 257	10^{14}

Dimensions

Product	Inside Diameter (mm)		Wall Thickness Recovered (mm)	Standard Length (mm)
	Supplied	Recovered		
ACRS50/15	50	15	3.0	1000
ACRS75/22	75	22	3.2	1000
ACRS105/30	105	30	3.5	1000
ACRS146/38	146	38	3.5	1000
ACRS188/55	188	55	3.5	1000

Eccentricity < 30 % as per UL 224
Tolerances on size id's and wall thickness allow 15 % on above values

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Self-Amalgamating Tape

ASM18

Technical Data

Properties	Typical Values
Electrical resistivity (Ω/cm)	10^{14}
Dielectric power factor (%)	0.3
Dielectric strength (kV)	25
Tensile Strength (kg/mm)	0.2
Elongation at break (%)	600
Thickness (mm)	0.75
Width (mm)	18
Length (Roll) (m)	10

Description

ASM18 Self-amalgamating EPR rubber tape is non sticky but bonds to itself within hours. This forms a homogeneous moulding which is water-proof and electrically insulating. To apply remove the separator film, gently stretch and wrap with a 50% overlap.

Features

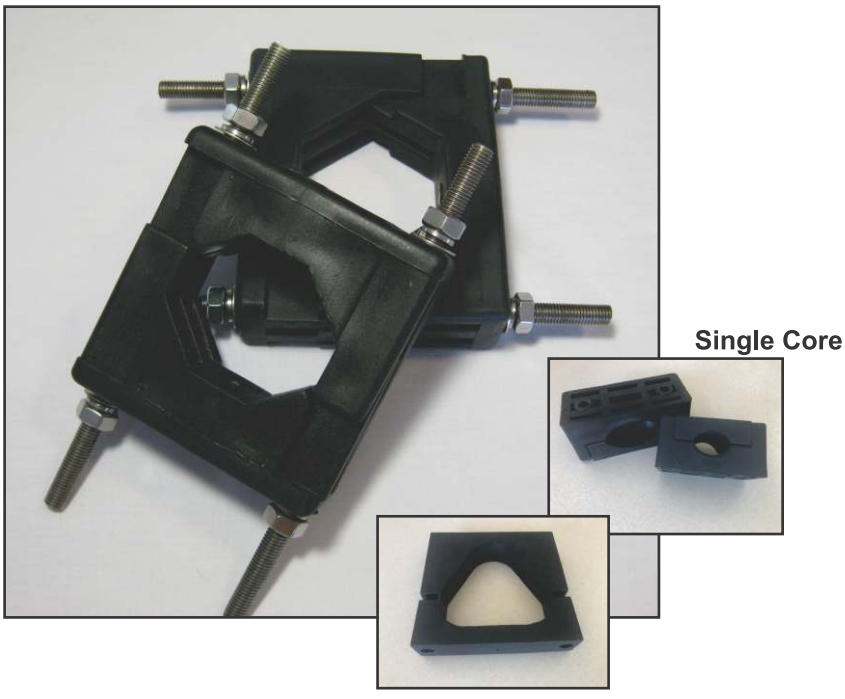
- Sealing, insulating & waterproofing
- Water, ozone & corona resistant
- Suitable for use in HV & MV applications
- High dielectric strength
- Forms stable, long lasting joint
- Excellent UV resistance
- For in & outdoor applications

Applications

- Waterproofing of power cable joints
- Corrosion protection if wrapped onto metal pipes
- Temporary repairs to waterhose and pipe leaks
- Soft non-slip handgrip in sports racquets and bicycles

Cable Clamps

CLAMP



Single Core

Tre-foil

Description

CiP cable clamps are used to fix / clamp and support LV, MV and HV power cable systems. They are installed at regular intervals to secure electrical installations and provides effective protection / support especially during short circuit conditions. They further provide restraint and prevent excessive cable movement that could lead to equipment damage.

Features

- Clamp material - polypropylene
- Threaded rod, nuts and washers available in mild or stainless steel
- Excellent resistance to harsh weather and environmental conditions
- UV resistant
- Excellent oxidation and corrosion properties
- Flame retardant, UV94V0 rated
- Sizes available 50 / 75 and 75 / 100
- Customized single core and tre-foil clamps available

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TOOLS & ACCESSORIES

CiP
Cable Installation Products

elcon megarad

Electrical Heat Gun

AFME

Description

AFME670K is a powerful electronically controlled hot air gun with temperature and airflow control for continuous use. The unit is a professional high-spec tool for virtually any hot air application.

Features

- Airflow rate adjustable in three stages
- Electronic temperature control
- 2000W
- Hand held and self resting on soft stand
- Continuously adjustable temperature from 50°C to 600°C
- Dual protection cut-off system to prolong tool life
- Durable for continuous operation
- 4m Rubber cord
- Cool air stage for rapid cooling on nozzle change
- 3 Year guarantee

Applications

- Shrinking heatshrink sleeves
- Welding plastics
- Soldering of plumbing joints
- Stripping of paint
- Removing stickers
- Bending plastic pipes
- Loosening of tight nuts and bolts

Technical Data

Properties	Typical Values
Dimensions (l x w x h) mm	250 x 83 x 210
Output (W)	2000
Voltage	230 - 240V, 50 - 60Hz
Airflow (l/min)	300 / 550
Temperature (°C)	50 - 450 / 70 - 600
Weight (g)	940

SIEVERT Gas Burner

AGB

AGB38

AGB38PRO

Recommended flame
Orange/yellow tip

AGB38PRO

- With automatic Piezo Ignition
- No gas emission unless burner fitted
- Bayonet fitting for burners
- Combined suspension hook and foot stand

Description

The **AGB SIEVERT** gas burner's advanced and safe design makes it one of the craftman's most important tools when efficiency and professional work-manship are the most important requirements. Its soft yellow and blue soot-free windproof flame makes it ideal for all heat shrinking applications. Design allows fresh air to be sucked in and keeps the burner head cold to minimise the risk of burning the heatshrink material.

Features

- Design ensures a very exact and quick flame setting
- Spring design knob gives a precise and stable setting
- Metal parts made of high quality brass
- Double moulded soft grip for highest comfort and usability
- **Swivel hose fitting avoids hose drag**
- Working pressure - 2bar
- Burner diameter - 38mm
- Gas consumption - 1200g/hr at 2 bar

Tools and Tool Kits

JTK-26 Piece Jointers Tool Kit

Item	Description
1	Toolbag Large Double, 430x330x160mm
2	Hacksaw,Heavy Duty, 300mm
3	Screwdriver Set, 7 piece
4	Pliers, Flat Nose, 140mm
5	Pliers Long Nose, Heavy Duty, 160mm
6	Side Cutter, 160mm
7	Pliers, Groove Joint, 180mm
8	Pliers, Groove Joint, 250mm
9	Pliers, Flat Nose, 150mm
10	File, Round, 200mm
11	File, Flat, 150mm
12	Hammer, Ballpein, 300g
13	Tape Measure, 3m
14	Brush File, 230mm
15	Insulated Cable Stripping Knife, 180mm
16	Insulated, Cable Stripping Knife, Hooked, 180mm
17	Scoring Tool, Fixed Blade, 0.4mm
18	Nipper, End Cut, 160mm
19	Tin Snip, 265mm
20	Torque Shear Tool

Tools and Tool Kits

ACSK1 - Insulated Cable Stripping Knife

Total Length:	180mm
Blade Length:	50mm
Weight:	112g

Features

- Blade - Stainless steel
- Ergonomic dual moulded handle, non-slip
- Fixed, sturdy straight blade
- Protective blade cover, for safety
- Tested to DIN EN60900, 1000V

ACSK2 - Insulated Cable Stripping Knife, Hooked

Total Length:	180mm
Blade Length:	40mm
Weight:	118g

Features

- Blade - tough, drop forged, heat treated chrome vanadium steel
- Ergonomic dual moulded handle, non-slip
- Protective blade cover, for safety
- Tested to DIN EN60900, 1000V

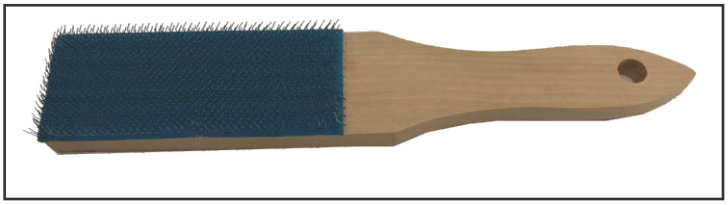
AST0.4 - Fixed Blade Semicon Scoring Tool

Total Length:	123mm
Blade Length:	0.4mm Fixed
Weight:	48g

Features

- Fixed blade ensures correct cutting debth
- Blade - Tungsten
- Protective blade cover for safety

ABF1 - Brush File



Total Length:	229mm
Brush Width:	40mm
Weight:	60g

Features

- For use on PILC cables to clean the lead sheath
- Brush strands from stainless steel to ensure proper cleaning

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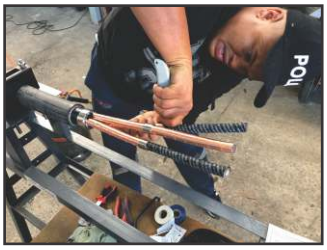
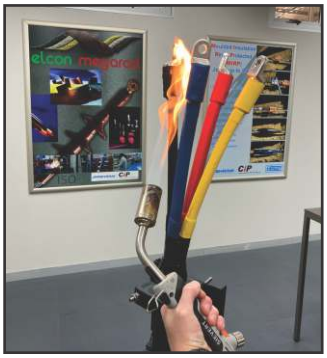
Practical and Theoretical Training





Basic Outline

CiP offers a range of training modules tailored to the requirements of our customers. These include courses designed for the novice, intermediate and the professional jointer with a wealth of experience. Training offered can be as basic as just a practical demonstration, hands on principal or for individuals that require training to be done under the accreditation of EWSETA.

- Training on jointing and termination of Low and Medium Voltage cables are aligned to the requirements of SANS 10198
    - Part 9 - Cables up to 3.3kV
    - Part 10 - Paper insulated cables not exceeding 33kV (PILC)
    - Part 11 - Screened polymeric insulated cables not exceeding 33kV (XLPE)
- Practical and theoretical training available as per SAQA unit standards ID 259187 and 259189
- Training can be arranged at ***CiP***'s training centre in Klipriver Business Park or at the customer's premises
- Course duration depends on the requirements of the customer and is generally between 2 to 5 days
- Our training is presented by well experienced and qualified jointers and engineers with many years of experience in this field. During the course they will share the "tricks of the trade" which they acquired
- Trainees receive individual attention and are assessed by registered assessors
- Where required, assessments are moderated by registered and accredited moderators
- Certificates issued will either be a certificate of attendance or a certificate of competence based on the course selected
- All material used meet the requirements of SANS 1332

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