

**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 1 of 27

**12-SDMS-01 REV.06**

**12-SDMS-01  
REV.06**

**SPECIFICATION FOR CABLE JOINTS, TERMINATIONS,  
AND ACCESSORIES UP TO 36KV**

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**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 2 of 27

**12-SDMS-01 REV.06**

**12-SDMS-01  
REV.06**

**SPECIFICATION FOR CABLE JOINTS, TERMINATIONS,  
AND ACCESSORIES UP TO 36KV**

**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 3 of 27

**12-SDMS-01 REV.06**

**Revision History**

#	Date	Revision No.	Revised By	Major Revision Description
1	04/08/2019	5	ERT	Apply new template; re-structure the clauses.
2	01/02/2024	6	SPEC.COMM.	Remove the MV.long joint, Purify & re-structure the clauses.
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# SPECIFICATION FOR CABLE JOINTS, TERMINATIONS, AND ACCESSORIES UP TO 36KV

Issue Date: 02/2024

Page: 4 of 27

12-SDMS-01 REV.06

## Table of Contents

1	Scope.....	7
2	Cross References to Other SEC Standards .....	7
3	Applicable Codes and Standards .....	7
4	Material, Design and Construction Requirements .....	8
4.1	General .....	8
4.2	Requirements for Low-Voltage Cable Accessories .....	9
4.2.1	General.....	9
4.2.2	LV Joints.....	10
4.2.3	LV Termination .....	11
4.3	Requirements for Medium-Voltage Cable Accessories Rated up to 36kV.....	12
4.3.1	General.....	12
4.3.2	MV Joints.....	13
4.3.3	MV Terminations.....	14
4.3.4	MV Separable Elbow-Type Connector (T-Body).....	16
4.3.5	MV Inside Cone Plug-in Terminations.....	17
4.3.6	MV Joints with Injected Cast-Resin Outer Jacket .....	17
4.3.7	Transition Joints.....	18
4.3.8	Other Accessories .....	18
5	Testing and Inspection .....	19
5.1	Type Test.....	19
5.1.1	Low-Voltage Cable Accessories.....	19
5.1.2	Medium-Voltage Cable Accessories.....	19
5.2	Routine Test .....	20
5.3	Sample Inspection .....	20
6	Marking, Packing and Shipping.....	20
6.1	Marking .....	20
6.2	Packing .....	21

**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 5 of 27

**12-SDMS-01 REV.06**

6.3	Shipping .....	22
7	Guarantee .....	22
8	Submittals .....	22
8.1	Submittal Required with Tender/Inquiry .....	22
8.2	Submittal Required Following Award of Contract .....	23
9	Technical Data Schedules .....	26



**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 6 of 27

**12-SDMS-01 REV.06**

**List of Figures (Illustrations):**

Figure 1: Traceability ID Marker..... 12

**List of Tables:**

Table 1: Reference SEC specifications..... 7

Table 2: List of applicable standards..... 8

Table 3: Technical parameters for MV inside cone plug-in terminations ..... 18

# SPECIFICATION FOR CABLE JOINTS, TERMINATIONS, AND ACCESSORIES UP TO 36KV

Issue Date: 02/2024

Page: 7 of 27

12-SDMS-01 REV.06

## 1 Scope

This specification defines the minimum technical requirements for design, engineering, manufacturing, testing, inspection and performance of all kinds of cable accessories for low and medium voltage, intended to be used in the distribution network of Saudi Electricity Company (SEC) in Saudi Arabia.

## 2 Cross References to Other SEC Standards

This specification shall always be read in conjunction with SEC General Specification No. 01-SDMS-01 (latest revision) titled “General Requirements for all Equipment/Materials”, which shall be considered as an integral part of this specification. It shall also be read in conjunction with SEC purchase order and/or contract schedules, and scope of work/technical specifications for projects, as applicable.

The latest revisions of the following specifications shall be applicable for the equipment/material covered in this specification:

Standard #	Title
11-SDMS-01	Specification for Low-Voltage Power and Control Cables
11-SDMS-03	Specification for XLPE Insulated Power Cables for Rated Voltages from 15kV up to 36kV (Um)
11-SDMS-04	Specification for Aluminum Unarmored XLPE/LLDPE Insulated Power Cables for Rated Voltages from 15kV up to 36kV
12-SDMS-02	Specification for Lugs and Connectors for Low-Voltage and Medium-Voltage Distribution System

*Table 1: Reference SEC specifications*

Reference for cables, sleeve and lug connectors not covered by above specifications shall be as per tender enquiry.

## 3 Applicable Codes and Standards

The latest revision of the following codes and standards shall be applicable for the equipment/materials covered in this specification. In case of any deviation, the vendor/manufacture may propose equipment/materials conforming to alternate codes or standards. However, the provisions of SEC standards shall supersede the provisions of these alternate standards in case of any difference.

# SPECIFICATION FOR CABLE JOINTS, TERMINATIONS, AND ACCESSORIES UP TO 36KV

Issue Date: 02/2024

Page: 8 of 27

12-SDMS-01 REV.06

Standard #	Title
HD 629-1-S3	Test requirements for accessories for use on power cables of rated voltage from 3,6/6(7,2) kV up to 20,8/36(42) kV - Part 1: Accessories for cables with extruded insulation
EN 50180	Bushings above 1 kV up to 52 kV and from 250 A to 3,15 kA for liquid filled transformers
EN 50181	Plug-in type bushings above 1 kV up to 52 kV and from 250 A to 2,50 kA for equipment other than liquid filled transformers
EN 50393	Test methods and requirements for accessories for use on distribution cables of rated voltage 0,6/1,0 (1,2) kV
IEC 60060	High-voltage test techniques
IEC 60230	Impulse tests on cables and their accessories
IEC 60455-3-8	Resin Based Reactive Compounds Used for Electrical Insulation – Part 3: Specifications for Individual Materials - Sheet 8: Resins for Cable Accessories
IEC 60502-2	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) – Part 2: Cables for rated voltages from 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)
IEC 60502-4	Power cables with extruded insulation and their accessories for rated voltages from 1 kV (Um = 1,2 kV) up to 30 kV (Um = 36 kV) – Part 4: Test requirements on accessories for cables with rated voltages from 6 kV (Um = 7,2 kV) up to 30 kV (Um = 36 kV)
IEC 60507	Artificial pollution tests on high-voltage insulators to be used on a.c. systems
IEC 60682-2	Flexible Insulating Sleeves – Part 2: Methods of Test
IEC 60815-3	Selection and dimensioning of high-voltage insulators intended for use in polluted conditions
IEC 61442	Test methods for accessories for power cables with rated voltage from 6 kV (Um = 7.2 kV) up to 30 kV (Um 36 kV)
IEC 61238-1	Compression and mechanical connectors for power cables for rated voltages up to 30 kV (Um = 36 kV) - Part 1: Test methods and requirements, (Class A)
IEC 62677-2	Heat Shrinkable Low and Medium Voltage Moulded Shapes – Part 2: Methods of Test
IEEE 404	IEEE Standard for Extruded and Laminated Dielectric Shielded Cable Joints Rated 2.5kV to 500kV
IEEE 1816	IEEE Guide for Preparation of Extruded Dielectric, Shielded Cables Rated 2.5kV through 46kV and the Installation of Mating Accessories
IEEE 386	Separable insulated connector system for power distribution systems above 600 Volts.

Table 2: List of applicable standards

## 4 Material, Design and Construction Requirements

### 4.1 General

- 4.1.1 All cable joints, terminations, accessories and all of its associated components shall meet or exceed the requirements of this specification in all respects, and shall be manufactured and tested in conformance with relevant international standards.



## **SPECIFICATION FOR CABLE JOINTS, TERMINATIONS, AND ACCESSORIES UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 9 of 27

**12-SDMS-01 REV.06**

- 4.1.2 Manufacturer's drawings shall show the outline and dimensions of the joints, terminations, and accessories. Any variation in the dimensions due to manufacturing tolerances shall be indicated. In addition, a vivid illustration in cut-away view showing the outline of the fully assembled cable joints and terminations indicating clearly all the components applied thereto shall be provided.
- 4.1.3 All joints, terminations, and accessories shall be designed to fit the cables per latest revisions of SEC specifications 11-SDMS-01, 11-SDMS-03, 11-SDMS-04.
- 4.1.4 All terminal lugs and/or sleeve connectors provided with each kit shall conform with the latest revision of 12-SDMS-02. It shall be supplied from SEC approved manufacturers or, per SEC approval, from other suppliers provided it is explicitly identified in the submitted type test reports of the joints/terminations. The connectors shall be type tested as Class-A in conformance to IEC 61238-1,
- 4.1.5 Heat-shrinkable tubes shall be made out of cross-linked polyolefin. The longitudinal shrinkage must not exceed +5% / -10% of the original length. The recovery thickness must not be less than the part of the cable being restored.
- 4.1.6 The sealing overlapping distance, except on the breakout overlap, shall be not less than 100mm, so the moisture can't penetrate on any side of the cable joint, making it completely sealed from cable jacket to cable jacket.
- 4.1.7 All outer sleeves shall be identified by the name of the manufacturer with embossed lot number for traceability purposes.
- 4.1.8 All heat-shrinkable sleeves and moulded shapes (breakout, boots, and cable end caps) with sealing mastic coatings or hot-melt adhesives shall have means to prevent the coated surfaces from adhering to each other.
- 4.1.9 Each cable joints and termination kits, and accessories with more than one component shall be supplied in one box and ready to be installed in the field.

## **4.2 Requirements for Low-Voltage Cable Accessories**

### **4.2.1 General**

- Technology for low-voltage joints, terminations, and accessories is heat-shrink.

## SPECIFICATION FOR CABLE JOINTS, TERMINATIONS, AND ACCESSORIES UP TO 36KV

Issue Date: 02/2024

Page: 10 of 27

12-SDMS-01 REV.06

- The connection of sector-shaped conductors must be possible without a rounding tool for mechanical connectors. In the case of crimp-type connectors, pre-rounding is mandatory.
- Unless specified, low-voltage power cables are conforming to the technical requirements of IEC 60502-1.

### 4.2.2 LV Joints

Low-voltage joints depending on the type of cable and/or manufacturers recommendation shall include but not limited to the following major components:

4.2.2.1 A set of sleeve connectors complying with the latest revision of SEC specification 12-SDMS-02.

4.2.2.2 A set of core insulation (insulation over the sleeve connectors), it shall be halogen-free heat shrinkable thick wall tube made of cross-linked polyolefin, shrink ratio of 3:1, inner surface is coated by hot-melt adhesive with softening temperature of not less than 90°C. It shall be resistant to chemical agents, thermally stable and conforming with the test methods per IEC 60684-2.

Recovered wall thickness shall be not less than the cable core insulation.

4.2.2.3 Outer tube/s (jacket for the joint), it shall be halogen-free heat shrinkable thick wall tube made of cross-linked polyolefin, shrink ratio of 3:1, inner surface is coated by hot-melt adhesive with softening temperature of not less than 90°C. It shall be resistant to chemical agents, thermally stable and conforming with the test methods per IEC 60684-2.

Recovered wall thickness shall be not less than the cable outer jacket.

4.2.2.4 Traceability (ID) marker (size: 150mm width x 100mm height), ultra-resistant chemical grade label, BS 5609 Part-2 certified, it shall be durable color white polyethylene (PE) film, laser-print with extra-strong permanent adhesive. It shall be waterproof, resistant to chemicals, abrasion, UV and saltwater, and is unaffected by temperature variations from -40°C to +150°C.

A flexible transparent heat-shrinkable thin wall tube made of cross-linked polyolefin, shrink ratio of 2:1 shall be used to protect the traceability (ID) marker. It shall be resistant to chemical agents, thermally stable and conforming with the test methods per IEC 60684-2. Recovered length shall be not less than 200mm.

**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

Issue Date: 02/2024

Page: 11 of 27

12-SDMS-01 REV.06

Technician's Name: .....  
Technician's ID Number: .....  
Employer: .....  
Date of Work Completion: .....  
SEC Supervisor's Name: .....  
SEC Supervisor's ID Number: .....  
SEC Item No.: ..... PO No.: .....  
Manufacturer: .....

Figure 1: Traceability ID Marker, size: 150mm x 100mm

4.2.2.5 Accessories like:

- aloxite emery cloth strip 25mm x 400mm (150 grit or as per manufacturer recommendations)
- cleaning tissues drenched with industrial grade isopropyl cleaner (sealed in foiled packets to prevent drying)
- mastics, if applicable

**4.2.3 LV Termination**

Low-voltage terminations depending on the type of cable and/or manufacturers recommendation shall include but not limited to the following major components:

4.2.3.1 A set of terminal lugs complying with the latest revision of SEC specification 12-SDMS-02.

4.2.3.2 A 4-way breakout boot stabilized against UV rays suitable for indoor and outdoor applications, and is made of halogen-free cross-linked polyolefin with test standard compliance according to IEC 62677-2. The inner surfaces in all of its openings are coated by hot-melt adhesive with softening temperature of not less than 90°C to ensure 100% watertight seal. It shall be resistant to chemical agents and thermally stable.

Recovered wall thickness shall be not less than the cable outer jacket.



**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 12 of 27

**12-SDMS-01 REV.06**

- 4.2.3.3 A set of weather-resistant insulating tubes, it shall be halogen-free heat shrinkable medium wall tube made of cross-linked polyolefin, shrink ratio of 3:1. It shall be resistant to chemical agents, stabilized against UV rays (Color Black), thermally stable and conforming with the test methods per IEC 60684-2.
- 4.2.3.4 A set of terminal lug sealing/insulating tubes, it shall be halogen-free heat shrinkable medium wall tube made of cross-linked polyolefin, shrink ratio of 3:1, the inner surface is coated by hot-melt adhesive with softening temperature of not less than 90°C. It shall be resistant to chemical agents, stabilized against UV rays, thermally stable and conforming with the test methods per IEC 60684-2.
- 4.2.3.5 Traceability (ID) marker and flexible transparent heat shrinkable tube as per Clause 4.2.2.4.
- 4.2.3.6 Accessories like:
- aloxite emery cloth strip 25mm x 400mm (150 grit or as per manufacturer recommendations)
  - cleaning tissues drenched with industrial grade isopropyl cleaner (sealed in foiled packets to prevent drying)
  - heat-shrinkable phase identification sleeves (Red, Yellow, Blue, Black)
  - mastics, if applicable

## **4.3 Requirements for Medium-Voltage Cable Accessories Rated up to 36kV**

### **4.3.1 General**

- Technology for medium-voltage joints and terminations are either premolded or cold-shrink.
- Unless specified, medium-voltage power cables are conforming with the technical requirements of IEC 60502-2.
- Use of black-colored PVC insulating tapes as temporary fixings for installation is strictly prohibited.
- The supplier shall ensure that the preparation techniques of the medium-voltage joints and termination kits are adhering to accepted best industry practices, and international guidelines, e.g. IEEE 1816.



**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 13 of 27

**12-SDMS-01 REV.06**

### **4.3.2 MV Joints**

MV joints depending on the type of cable and/or manufacturers recommendation shall include but not limited to the following major components:

4.3.2.1 A set of sleeve connectors complying with the latest revision of SEC specification 12-SDMS-02..

4.3.2.2 A set of premolded joint body with integral faraday-cage (stress control grader over the sleeve connectors) and/or stress-cone (XLPE-insulation shield cutback voltage stress control).

Stress grading on the XLPE-insulation shield cutback shall be achieved either or both by:

1. Geometric, adding extra insulation in the insulating layer of the premolded joint body, or
2. Use of refractive/capacitively graded stress cones that is either integral to the premolded joint body or supplied as separate components.

The molded layers of the premolded joint body shall be made of high-performance silicones and/or EPDM rubber.

4.3.2.3 Metallic-shielding kit, restoration of the metallic shielding over the premolded joint body is achieved either by:

1. Using wrinkle-free, highly flexible, tin-coated copper braided tapes (60mm width x 0.5mm thick) of sufficient length to ensure full-wrapping with 50% overlap, or
2. Using tin-coated copper socks to cover each jointed conductor/core. Fixing each end of the socks shall be made by using stainless steel, fatigue-proof, constant-force pressure springs.

4.3.2.4 Armor transition using flat-rolled, tinned copper braid 35mm<sup>2</sup> shall be bonded over the armor of each cable. Bonding shall be made using stainless steel, fatigue-proof constant-force pressure springs.

4.3.2.5 Outer jacketing, is either by using heat-shrinkable tubes or injected cast-resin compound, as requested in the tender documents.

**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 14 of 27

**12-SDMS-01 REV.06**

1. Heat-shrinkable outer jackets, it shall be halogen-free heat shrinkable thick wall tubes made of cross-linked polyolefin, shrink ratio of 3:1, inner surface is coated by hot-melt adhesive with softening temperature of not less than 90°C. It shall be resistant to chemical agents, thermally stable and conforming with the test methods per IEC 60684-2.

Recovered wall thickness shall be not less than the cable outer jacket.

2. Injected cast-resin outer jackets, is a two-component polyurethane cast-resin, resistant to alkaline earth elements, stabilized against UV rays with pot life conforming with the test method per IEC 60455-3-8.

Necessary cast forming kit like nylon mesh, pressure tapes, nozzles, etc. shall be provided.

Special requirements for MV joints with injected cast-resin outer jacket are specified in Clause 4.3.6.

- 4.3.2.6 Traceability (ID) markers and flexible transparent heat shrinkable tube as per Clause 4.2.2.4.

- 4.3.2.7 Accessories like:

- aloxite emery cloth strips 25mm x 400mm (150 grit or as per manufacturer recommendations)
- cleaning tissues drenched with industrial grade isopropyl cleaner (sealed in foiled packets to prevent drying)
- gloves
- mastics (various types), as per manufacturer recommendations
- tapes (various types), as per manufacturer recommendations
- silicone grease
- applicators that would aid installation of relevant component/s
- galvanized wrap-around armoring kit

### **4.3.3 MV Terminations**

MV terminations depending on the type of cable and/or manufacturers recommendation shall include but not limited to the following major components:

- 4.3.3.1 A set of terminal lugs complying with the latest revision of SEC specification 12-SDMS-02, (terminal lug palm hole shall be M16 for indoor-type terminations and M12 for outdoor-type terminations).

**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 15 of 27

**12-SDMS-01 REV.06**

4.3.3.2 A trifurcating boot (3-way breakout) stabilized against UV rays suitable for indoor and outdoor applications, and is made of halogen-free cross-linked polyolefin with test standard compliance according to IEC 62677-2. The inner surfaces in all of its openings are coated by hot-melt adhesive with softening temperature of not less than 90°C to ensure 100% watertight seal. It shall be resistant to chemical agents and thermally stable.

4.3.3.3 A set of anti-tracking tubes, it shall be halogen-free heat shrinkable medium wall tube made of cross-linked polyolefin, shrink ratio of 3:1. It shall be resistant to chemical agents, stabilized against UV rays (Color Red Brown), thermally stable and conforming with the test methods per IEC 60684-2.

Minimum length should be 800mm.

4.3.3.4 A set of single-piece premolded termination body with integral stress-cone (XLPE-insulation shield cutback voltage stress grader).

The molded layers of the premolded termination body shall be made of high-performance silicones.

Modular type termination body is not acceptable.

4.3.3.5 Traceability (ID) markers and flexible transparent heat shrinkable tube as per Clause 4.2.2.4.

4.3.3.6 Accessories like:

- earthing kit, to effectively earth the metallic shield and/or armor of the cable.
- aloxite emery cloth strips 25mm x 400mm (150 grit or as per manufacturer recommendations)
- cleaning tissues drenched with industrial grade isopropyl cleaner (sealed in foiled packets to prevent drying)
- gloves
- mastics (various types), as per manufacturer recommendations
- tapes (various types), as per manufacturer recommendations
- silicone grease
- applicators that would aid installation of relevant component/s

4.3.3.7 Indoor and Outdoor Applications:



**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 16 of 27

**12-SDMS-01 REV.06**

1. For indoor-type terminations, a set of halogen-free molded heat shrinkable boots (straight) stabilized against UV rays suitable for indoor and outdoor applications, and is made of halogen-free cross-linked polyolefin with test standard compliance according to IEC 62677-2. The inner surfaces in all of its openings are coated by hot-melt adhesive with softening temperature of not less than 90°C to ensure 100% watertight seal. It shall be resistant to chemical agents and thermally stable.
2. For outdoor-type terminations the following components shall be provided:
  - a set of terminal lug sealing tubes made of high-performance silicones shall be provided. Lug sealing can also be achieved via the termination body with extended top section designed to encapsulate the barrel of the terminal lug.
  - a set of polymer insulators with M12 size threaded studs for termination complying with the technical requirements of the latest revision of SEC specification 15-SDMS-02.
  - A hot-dipped galvanized steel insulator-support bracket.

**4.3.4 MV Separable Elbow-Type Connector (T-Body)**

MV Separable Elbow-Type Connector (T-Body) terminations are depending on the type of cable and/or manufacturers recommendation shall include but not limited to the following:

- 4.3.4.1 A set of terminal lugs complying with the latest revision of SEC specification 12-SDMS-02
- 4.3.4.2 Require no special tools for installation and no components that need any heat for shrinking except for break outs and tail.
- 4.3.4.3 Pre-molded elbow connectors shall be bolted type and meet all the requirements of IEEE-386.
- 4.3.4.2 MV separable elbow-type connector, shall have T-shaped body. It is used to terminate medium-voltage power cables on the primary side of the pad-mounted transformers including unit substations and RMUs with Type-C bushings conforming to EN 50180 and EN 50181, respectively.



## SPECIFICATION FOR CABLE JOINTS, TERMINATIONS, AND ACCESSORIES UP TO 36KV

Issue Date: 02/2024

Page: 17 of 27

12-SDMS-01 REV.06

4.3.4.3 The separable elbow-type connector shall be fully screened it shall be either manufactured from EPDM or high-performance silicone or a combination of both. The minimum thickness of the molded outer shield is 3.0mm with a resistance of maximum 5k $\Omega$ . Installation should not require any special tools, and no component that need any heat for shrinking except the breakout and anti-tracking tubes.

4.3.4.4 coupling connector can be used for special use of the RMU items for double cable connection.

### 4.3.5 MV Inside Cone Plug-in Terminations

MV inside cone plug-in termination is used to terminate medium-voltage power cables on primary substation SF<sub>6</sub> insulated switchgears with inside cone bushings conforming to EN 50181. The premolded stress cone shall include geometric field control elements. The outer layer of the premolded plug-in termination body shall be fully screened and earthed.

Weather-resistant insulating tubes shall be halogen-free heat shrinkable medium wall tube made of cross-linked polyolefin, shrink ratio of 3:1. It shall be resistant to chemical agents, stabilized against UV rays (Color Black), thermally stable and conforming with the test methods per IEC 60684-2. The minimum length from the breakout to the connector shall be 5.0m.

Interface Type	Current Rating	Conductor Material / Size	Voltage
Size 2	800	Copper: 240mm <sup>2</sup>	36kV
Size 2	800	Aluminum: 400mm <sup>2</sup>	36kV
Size 3	1250	Copper: 240mm <sup>2</sup> , 500mm <sup>2</sup>	36kV
Size 3	1250	Aluminum: 400mm <sup>2</sup>	36kV

Table 3: Technical parameters for MV Inside Cone Plug-in Terminations

### 4.3.6 MV Joints with Injected Cast-Resin Outer Jacket

4.3.6.1 The joint body is either premolded or cold-shrink.

4.3.6.2 The connectors shall be either compression or mechanical (shear-bolt) type, longitudinally sealed (water-blocking) with very smooth surface. complying with the latest revision of SEC specification 12-SDMS-02.

**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 18 of 27

**12-SDMS-01 REV.06**

4.3.6.3 The outer jacketing shall be electrical grade two-component polyurethane cast-resin, resistant to alkaline earth elements, stabilized against UV rays with pot life conforming with the test method per IEC 60455-3-8. It shall be provided in two-chamber bags/cartridges: one for the resin and the other for the hardener. Mixing shall be done such that the compound is not exposed or in direct contact with the atmosphere. The mixture shall then be force injected on the formed cast over the joint body either manually or by pumping gun through nozzles (injection valves) to ensure no-mess, even spread, maximum penetration, and no air pockets (bubbles) formed.

4.3.6.4 Cast forming accessories like; nylon meshes, pressure tapes and nozzles (injection valves), etc. shall be provided with the kit.

4.3.6.5 Cast forming may also be done using a prefabricated coffin-box.

4.3.6.6 Injection of the resin by gravity using funnel or similar method is not acceptable.

#### **4.3.7 Transition Joints**

4.3.7.1 Transition joints shall be suitable to splice cables of different types, sizes, and materials (copper or aluminum) with same voltage level.

4.3.7.2 Connectors shall be tin-coated complying with the requirements of the latest revision of SEC specification 12-SDMS-02.

#### **4.3.8 Other Accessories**

##### **4.3.8.1 Repair Sleeves**

Repair sleeves are intended to be used on damaged cable jackets. It shall be wrap-around type, halogen-free heat shrinkable sleeve, made of cross-linked polyolefin. It shall be resistant to chemical agents, stabilized against UV rays (Black), thermally stable and conforming with the test methods per IEC 60684-2. Inner surface in contact with the cable jacket shall be lined with hot-melt adhesive with softening temperature of not less than 90°C to ensure 100% watertight seal.

**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 19 of 27

**12-SDMS-01 REV.06**

Repair sleeves shall be supplied in 1.5m length complete with stainless steel channels and clips.

**4.3.8.2 Cable End Caps**

Cable end caps shall be halogen-free heat shrinkable molded shape made of cross-linked polyolefin. It shall be resistant to chemical agents, stabilized against UV rays (Black), thermally stable and conforming with the test methods per IEC 60684-2. Inner surface in contact with the cable jacket shall be lined with hot-melt adhesive with softening temperature of not less than 90°C with additional sealing mastic to ensure 100% watertight and pressure-tight seal.

## **5 Testing and Inspection**

Joints and termination kits shall be tested in conformance with applicable international standards.

Each accessory or component supplied with each joints or termination kits shall be tested in conformance with relevant standard, as applicable. Qualifying test reports or certificates proving that the raw materials and/or final products (component) conforms with relevant standard specifications shall be submitted.

### **5.1 Type Test**

Type test shall be performed in SEC approved laboratory. Type test certificates shall explicitly identify the range of item tested and included in the type test.

SEC reserves the right to request the supplier/manufacturer to repeat the type test every five years, or at any time should there be incidents of premature failures.

SEC reserves the right to witness the type test.

#### **5.1.1 Low-Voltage Cable Accessories**

Low-voltage joints, terminations, and accessories shall be type tested in conformance with EN 50393.

#### **5.1.2 Medium-Voltage Cable Accessories**

Medium-voltage joints, terminations, and accessories shall be type tested in conformance with CENELEC HD 629-1-S3 or IEC 61442.



## **SPECIFICATION FOR CABLE JOINTS, TERMINATIONS, AND ACCESSORIES UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 20 of 27

**12-SDMS-01 REV.06**

### **5.2 Routine Test**

All types of heat shrinkable sleeves shall be tested in conformance with the applicable clauses of IEC 60684-2.

All types of heat shrinkable molded shapes like; breakout boots, right-angle and straight boots, and cable end caps shall be tested in conformance with the applicable clauses of IEC 62677-2.

Each and every premolded joints and termination body shall be pretested by the manufacturer in conformance with the production test requirements per IEEE 404. Test shall include; partial discharge voltage level, and AC withstand or full-wave impulse withstand voltage. Test reports shall be submitted for every batch to be delivered prior to issuance of release for delivery to SEC warehouses.

### **5.3 Sample Inspection**

Either during or after the evaluation of technical documents in the tendering stage, it is mandatory to submit a sample for each item (joint/termination kit or accessories per SEC item code) to be evaluated by SEC Technical Department for suitability and completeness prior to issuance of approval for mass production. Sample shall include; components list (kit contents), instruction manual, production test reports of premolded joints/termination bodies, and/or qualifying test reports of components, as applicable.

## **6 Marking, Packing and Shipping**

Packing and shipping requirements shall be generally be as per latest revision of SEC specification 01-SDMS-01 or as per purchase order requirements.

All components shall be capable of being stored without deterioration within the temperature range of -10°C to +55°C. Components or materials, if subjected to shelf-life limitation, shall have the final date of use prominently and permanently shown on all packages.

Additional marking, packing and shipping requirements shall be coordinated with the SEC Warehousing Department.

### **6.1 Marking**

Each component of the kits shall be clearly marked or labeled with the manufacturer's name and part code. And these markings and/or labels shall be used in harmony with all pertinent documentations like; components list (kit contents), instruction manuals, drawing, test reports, etc.).



**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 21 of 27

**12-SDMS-01 REV.06**

Each mastic strip/roll shall be clearly and permanently identified according to its use (void-filling, insulating, conducting, stress-grading, sealing, etc.).

Electrical relevant components must be marked with the following information:

- Manufacturer's name
- Production indicator for traceability
- In case of joints; the cross-section, diameter or application range

Each carton of joints and termination kits and accessories shall be marked with the following information:

- Manufacturer's name
- Manufacturer's Type No. / Catalogue No.
- Purchase Order No. and Tender No.
- Cable Size and material
- Nominal Voltage
- Date of Manufacture
- Date of Expiry
- SEC Item Code
- Gross Weight in kg

## **6.2 Packing**

Each component of same material shall be packed in polybag to protect it from dirt, dust and moisture. It shall then be packed in bigger polybag together with the other set of components should they belong to a sub-kit depending in application and installation.

All types of mastics shall be packed in polybags, except stress control mastics which are packed in aluminum foiled packaging to prevent moisture absorption.

Packing shall be designed to protect the kits or accessories against ingress of dust, moisture, and mechanical damage.

The kits shall not be packed in perishable material.

Each kit shall be packed separately in card board box with complete components as per approved sample in Clause 5.3 together with components list (kit contents) and instruction manual.

**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 22 of 27

**12-SDMS-01 REV.06**

Maximum of 10 boxes shall be packed properly in palletized non-returnable wooden boxes or as per SEC Warehousing Department requirements.

### **6.3 Shipping**

The joints and termination kits, and accessories shall be delivered ready for service and should conform as per approved samples.

## **7 Guarantee**

- 7.1 The supplier shall guarantee the joints/termination kits and all associated components against all kinds of defects arising out of faulty design or manufacturing defects/inconsistencies or sub-standard materials for a period of five years from the date of delivery.
- 7.2 The supplier shall guarantee the completeness of the joints, terminations and accessories according to SEC requirements and applications.
- 7.3 The supplier shall guarantee that each component provided in the kit conforms to standard specifications and test requirements, and are sourced from manufacturers with established quality management system having the ability to trace non-conforming product/s in every step of the process. Technical specifications and qualification test report and certificates shall be made readily available for submittal, if requested.
- 7.4 The supplier shall guarantee the uniformity of the products delivered with the approved samples including all the associated components. SEC should be advised of any changes in the design, material, test compliance, origin and 3rd party supplier of each individual component of the kits. Any deviation from the approved sample without permission from SEC Technical Department is strictly prohibited.

## **8 Submittals**

### **8.1 Submittal Required with Tender/Inquiry**

Each offered item of the bidder may be rejected due to incomplete or non-submittal of the requirement stipulated in this clause.

The following documents, both as printout and e-copy in USB thumb drive, shall be submitted on the technical offer in the tender:

**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 23 of 27

**12-SDMS-01 REV.06**

- 8.1.1 Summary of offered items in tabulated format showing the following information (e-copy shall be submitted in Microsoft Excel \*.xlsx format):
1. SEC Item Code
  2. Manufacturer
  3. Origin
  4. Catalogue Number / Part or Kit Model
  5. Quantity Offered
- 8.1.2 Clause-by-clause compliance with the applicable clauses of this specification.
- 8.1.3 Completely filled technical data schedules of each item offered, with all pages signed and stamped by both vendor and manufacturer.
- 8.1.4 Complete components list for each item offered showing the following information (e-copy shall be submitted in Microsoft Excel in \*.xlsx format):
1. Component name and description
  2. Drawings showing the detailed dimensions and allowable manufacturing/production tolerances, as applicable
  3. Clear pictures of each component
  4. Origin, manufacturer, and product/part code of the components
  5. Alternative 3<sup>rd</sup> party supplier of each of the components, if any
- 8.1.5 Product catalogues including of those components sourced from 3<sup>rd</sup> party suppliers (e-copy shall be submitted in True PDF format not scan-copy).
- 8.1.6 Type test report and certificates of joints and terminations kits and/or connectors issued from SEC approved laboratories (e-copy to be submitted in True PDF format not scan-copy).
- 8.1.7 Qualifying test reports and certificates of relevant components proving conformance with standard specifications (e-copy shall be submitted in True PDF format not scan-copy), as applicable.
- 8.1.8 Colored installation manual showing step-by-step cable preparation, and application and/or installation of each and every component in the kit (e-copy shall be submitted in True PDF format not scan-copy).
- 8.1.9 Vivid illustration of the completely assembled kit in cut-away view (sectional view) showing each and every component in the kit (e-copy shall be submitted in True PDF format not scan-copy), as applicable.

**8.2 Submittal Required Following Award of Contract**

- 8.2.1 Samples in compliance with Clause 5.3 of this specification shall be submitted.



**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 24 of 27

**12-SDMS-01 REV.06**

- 8.2.2 Production and shipment schedules.
- 8.2.3 Production test schedules.
- 8.2.4 Special test or type test schedules, if applicable.

### **8.3 Submittal Required with Tender/Inquiry**

Each offered item of the bidder may be rejected due to incomplete or non-submittal of the requirement stipulated in this clause.

The following documents, both as printout and e-copy in USB thumb drive, shall be submitted on the technical offer in the tender:

- 8.3.1 Summary of offered items in tabulated format showing the following information (e-copy shall be submitted in Microsoft Excel \*.xlsx format):
  - 1. SEC Item Code
  - 2. Manufacturer
  - 3. Origin
  - 4. Catalogue Number / Part or Kit Model
  - 5. Quantity Offered
- 8.3.2 Clause-by-clause compliance with the applicable clauses of this specification.
- 8.3.3 Completely filled technical data schedules of each item offered, with all pages signed and stamped by both vendor and manufacturer.
- 8.3.4 Complete components list for each item offered showing the following information (e-copy shall be submitted in Microsoft Excel in \*.xlsx format):
  - 1. Component name and description
  - 2. Drawings showing the detailed dimensions and allowable manufacturing/production tolerances, as applicable
  - 3. Clear pictures of each component
  - 4. Origin, manufacturer, and product/part code of the components
  - 5. Alternative 3<sup>rd</sup> party supplier of each of the components, if any
- 8.3.5 Product catalogues including of those components sourced from 3<sup>rd</sup> party suppliers (e-copy shall be submitted in True PDF format not scan-copy).
- 8.3.6 Type test report and certificates of joints and terminations kits and/or connectors issued from SEC approved laboratories (e-copy to be submitted in True PDF format not scan-copy).



**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 25 of 27

**12-SDMS-01 REV.06**

- 8.3.7 Qualifying test reports and certificates of relevant components proving conformance with standard specifications (e-copy shall be submitted in True PDF format not scan-copy), as applicable.
- 8.3.8 Colored installation manual showing step-by-step cable preparation, and application and/or installation of each and every component in the kit (e-copy shall be submitted in True PDF format not scan-copy).
- 8.3.9 Vivid illustration of the completely assembled kit in cut-away view (sectional view) showing each and every component in the kit (e-copy shall be submitted in True PDF format not scan-copy), as applicable.

**8.4 Submittal Required Following Award of Contract**

- 8.4.1 Samples in compliance with Clause 5.3 of this specification shall be submitted.
- 8.4.2 Production and shipment schedules.
- 8.4.3 Production test schedules.
- 8.4.4 Special test or type test schedules, if applicable.

**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

Issue Date: 02/2024

Page: 26 of 27

12-SDMS-01 REV.06

## 9 Technical Data Schedules

SEC Tender No: \_\_\_\_\_

SEC Item No. \_\_\_\_\_

No	Description	SEC Specified Values	Vendor Proposed Values**
1	Joint / Termination / Accessories	*	
2	Type (Heat Shrink, Cold Shrink, Pre-molded, Separable Elbow Connector, Inner Cone Plug-in)		
3	Outdoor/Indoor (termination only)	*	
4	Termination length: Low voltage Medium voltage	* * *	
5	Conductor material, size, and number of cable cores	*	
6	Voltage designation (kV)	*	
7	Manufacturer catalog name	*	
8	Class of termination as per applicable standard	Yes	
9	Creepage distance (mm, for outdoor termination only)	*	
10	Product offered is type tested	Yes	
11	SEC approved laboratory	*	
12	Date of product type test	*	
13	Submittals required as part of tender/inquiry included	Yes	
14	Weight of each joint/termination/accessories (kg)	-	
15	Name of the manufacturer	*	
15	Country of origin	*	

**Note:** Components list (kit contents) conforming to the requirements of Clause 8.1.4 of this specification shall be attached herewith.

**SPECIFICATION FOR CABLE JOINTS,  
TERMINATIONS, AND ACCESSORIES  
UP TO 36KV**

**Issue Date:** 02/2024

**Page:** 27 of 27

**12-SDMS-01 REV.06**

**Joints / Terminations / Accessories**

**SEC Inquiry No:**

**Item No:**

- Additional Technical Information or Features Specified by SEC
- Additional Supplementary Data or Features Proposed by Bidder/Vendor/Supplier.
- Other Particulars to be filled-up by the Bidder/Vendor/Supplier.
- List of Deviations and Clauses to which exception is taken by the Bidder/Vendor/Supplier. (Use separate sheet, if necessary).

Description	Manufacturer of Material/Equipment	Vendor/Supplier
Name of Company		
Location and Office Address		
Name and Signature of Authorized Representative with Date		
Official Seal / Stamp		