SYRIAN ARAB REPUBLIC
MINISTRY OF ELECTRICITY
PUBLIC ESTABLISHMENT FOR DISTRIBUTION
The ELECTRICITY
(PETDE)
TENDER DOCUMENTS for
PREMOULDED CABLE TERMINATIONS ELBOW

SUITABLE FOR 12/20 kV SINGLE CORE,
XLPE INSULATED CABLE WITH ROUND STRANDED
ALUMINIUM CONDUCTOR WITH CROSS SECTION
1X120 mm^2 +1 X 185 mm2

Prepared by:

Eng. Subhi Salem

Mr. Hasan Alksh

Mr. Ahmed Naeel AL akhras

Eng. Rateb Fares

Eng. Mohamed Rajeh

Eng. Mysa Akkash

Approved by

GENERAL DIRECTOR of PETDE

Engineer Khaled Abu DI

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ITEM

SCOPE :

This specification covers the requirements of components, product design, performance and quality assurance of premoulded **cable terminations elbow,** suitable for 12/20KV, SINGLE CORE XLPE INSULATED POWER CABLE WITH ALUMINIUM CONDUCTORS 1X120 mm2 + 185mm2
These termination elbows are ready for installation with 1 x 120 mm² + 185mm2cables used in Ring Main Units (RMU).and to connect polymeric insulated cable to equipment (transformers, switchgear, ...).
The Manufacturer should have (a minimum of 5 years) long experience in the usage of their products in similar system and climatic environmental conditions as given in the relevant clauses and have quality assurance certificate such as (ISO accreditation).
Application
Separable elbow connector designed to connect polymeric insulated cable to equipment (transformers, switchgear, ...).

GENERAL INFORMATION AND REQUIREMENTS

1 INTRODUCTION

This description determines the requirements of the PETDE for design, material, testing and supply of premoulded **cable elbow** for 12/20 kV single core, XLPE insulated power cable with Aluminum round stranded conductors for underground laying in the distribution system of the PETDE under the service conditions of Syria.

For preparing tenders in good and complete form, Tenderers are requested to examine carefully the tender documents in order to ascertain the matters on which they will be deemed to have satisfied themselves and the risks and obligations which they are to undertake.

The form of the tender and all accompanying documents shall be completely filled in and signed by Tenderer and manufacturer and must not be altered or mutilated. The Tenderer shall fill technical specification list (Guarantee schedule) and give clear technical information and dimensions in detail.

The Tenderer shall give answers to all questionnaires mentioned in the tender book.
All the needed data should be fulfilled and the pages signed by the tenderer and manufacturer, in order to be considered as guarantee schedules.
Test samples (ready for testing) should be sent with the offer and will be considered as essential part of it.
If any Tenderer is in any doubt as to the true meaning of any part of the tender documents or wishes to make inquiries regarding the documents, he should make all such inquiries addressed as follows:

LETTERS:
Syrian Arab Republic
Public Establishment for Transmission and Distribution of Electricity
Fax: + 963 11 2144435
Fax: + 963 11 2144436

2 DEFINITIONS

PETDE : Shall mean Public Establishment for Transmission and Distribution of Electricity

PURCHASER : " " " " " " "

TENDERER :Shall mean supplier, manufacturer,.....

SUCCESSFUL OFFERER: Shall mean the manufacturer, supplier,... whose offer has been accepted by the Purchaser.

OFFER : Shall mean all documents submitted by the Supplier, bidder, manufacturer.

I E C : International Electrotechnical Commission

3 SYSTEM DETAILS AND SERVICE CONDITIONS

The performance of the cable terminations elbow shall be guaranteed for the following operating, installation and environmental conditions of Syria.

3.1 20 kV Distribution System

- 20 kV ± 20%
-Three phases, three wires
-Earthed through an earthing transformer 20/0,4kV (Zn yn11)
-Vector group of distribution transformer 20 kV/0,4 kV :Dyn 11
-Rated voltages Uo/U : 12 kV/20 kV
-Maximum service voltage : 24 kV
- Rated frequency : 50 Hz
- Impulse withstand voltage level : 125 kV at 1.2/50 us
-Symmetrical system rated short-circuit level is 500 MVA
-Earth fault current is limited to 500 A at 20 kV side

3.2 Installation Conditions

The cable terminations elbow shall be used with cable for underground laying.

3.3Environmental Conditions

-Max. ambient temperature : 50 °C
-Min. ambient temperature : - 10 °C
-Maximum relative humidity 80% at 30 °C

4 STANDARDS AND NORMS

The offered products shall be designed, manufactured and tested inconformity with the latest applicable IEC, CENELEC, HD, VDE, IEEE standards.

5 RATINGS AND PERFORMANCE/GENERAL

5.1 Rating, performance and testing of the cable terminations elbow shall meet the requirements described in the relevant clauses.

5.2 The specified ratings and the minimum guaranteed performance shall be for the distribution system and service conditions described in clause 3.

5.3 All the materials used in the construction of the cable terminations elbow shall be capable of withstanding mechanical, electrical and thermal stresses developed during the normal working (permanent or temporary loading), short circuit and emergency overloading under the service conditions described in clause 3.

6 CONSTRUCTION DETAILS

The cable terminations elbow are intended to be used with underground cables.

It shall be 12/20 KV power cable, single core, XLPE insulated and class 2 concentric round stranded Aluminum conductor with cross section 1x120mm2.

It must comply with CENELEC HD 629.1, CENELEC EN 50180, IEC 60137, IEC60502-4…, VDE IEEE and this technical specification.

The material of cable terminations elbow should be High-quality silicone rubber or EPDM (Ethylene Propylene Diene Monomer) for insulation. another material is not accepted.

Method of installation: push on.

Any improvement or technological progress of the required cable should be presented with necessary technical and economical information by the tenderer.

7 ACCESSORIES

Every cable terminations elbow should have all necessary accessories for installation and their components.

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8 DIAGRAMS AND DRAWINGS

The following diagrams and drawings shall be submitted with the tender as a part of the tender documents:

- Complete sets of detailed dimension drawings and catalogues of the offered products.
- Other necessary drawings**.**
- Installation instruction and documents.
- List of accessories for installation
- Every cable terminations elbow Box should be including instruction sheet.

9 QUALITY ASSURANCE

The tenderer shall submit quality assurance(ISO-Certificate) for manufacturer

10 LANGUAGE OF THE OFFER AND CORRESPONDENCES

The offer and its enclosed documents and references shall be submitted in English. The correspondence, if abroad, shall be in English.

11 TENDERER'S BACKGROUND

Tenderers are requested to state in their offers their experience in design, manufacture and erection of the products they have proposed, namely:

- annual capacity of production;
- material and product test facilities;
- list of main clients (companies, establishments, etc., over the last two years with addresses and fax.
- any other details may be useful.

12 DOCUMENTS OF TECHNICAL OFFER

A complete technical offer shall include of the following documents in English:

1 -Tender schedule of guarantee duly completed and signed by the offerer and the manufacturer.

2 -Type test report for offered cable, accessories.

3-Quality assurance certificate by an independent authority.

4-Dimensioned drawings and details of the offered product and used materials.

5-Reference list:

- Manufacturer experiences in design, manufacture and erection of the offered product.
- Annual capacity production.
- Main clients and offered cable/accessories used over the last two years (companies, establishments, etc., with addresses, and fax numbers).
- Any other details may be useful.

13 -Test samples of the offered product:

The offerer must submit **Two samples for each size** with his offer to be installed and tested in the ring main units, switchgear used in Syria. otherwise the offer will be rejected.

The bidder will bear the costs of all tests (routine and type tests).

14-TESTING AND INSPECTION

14.1 -The offered products shall be tested in accordance with the standards and specifications mentioned in this book. The tests mentioned in the different sections of this book are given as minimum and are not restrictive.

14.2 -The tests shall be performed to prove ratings and performance under Syrian service conditions mentioned in clause 3.

14.3 -The type test reports and certificates shall be enclosed with the tender.

14.4 - The Contractor shall provide PETDE schedule of proposed tests to be carried out together with PETDE representatives which may witness the tests.

The Contractor shall make as many tests as, in the opinion of PETDE can be made together. He shall provide to the representative of the PETDE all the testing facilities at the work.

14.5 - The acceptance of the Contractor's tender including his design drawings and specifications shall not bind PETDE to accept any of the contract works or material until they shall have passed the tests prescribed and have been approved by PETDE in writing.

14.6 -Test certificates shall include in addition to test results:

(a) The order number of the PETDE.
(b) The manufacturer’s number.
(c) The date of testing.
(d) The signature of the test engineer.

14.7- The acceptance test on random samples of the delivered material shall be carried out in Syria. The acceptance tests consist of:

- Power frequency withstand voltages
- Impulse withstand voltage
- Partial discharge test
- DC withstand voltage
- AC withstand voltage test

15 PARTICIPATION IN TESTING

The PETDE will delegate two representatives (Engineers) to the manufacturer country, to participate in the testing, the contractor will bear the costs of attendance of such tests. The costs borne by the contractor will include the costs of return air fares from Damascus to the manufacturer's country and all accommodation and subsistence expenses for 7 days for each delivery.

16 PACKING AND SHIPMENT:

1 - The type of packing should be suitable for export and provide complete protection for marine or truck or rail transportation and for loading, for example (boxes, cases, etc..) should be robust enough and have suitable dimensions and weights.

2 - Tenderer will take care on his own account that the commodity will be packed carefully in order to avoid damage of delivered materials and to be acceptable to the insurance company.

3 - The strength and quality of the packing materials should correspond to the weight of the packed materials.

4 - Appropriate measures according to each commodity type shall be taken to prevent vibration, sliding or movement inside boxes or cases.

5 - Boxes which should be handled with care according to the contents must be marked accordingly and clearly.

6 - Sufficient steel bands for boxes shall be in accordance with their weight and dimensions. Sensitive instruments and similar materials must be packed carefully to prevent exposure of elements to rain, sun, dust, etc... with the appropriate packing of nylon bags oiled paper and foam materials.

7 - Each case must contain equipment of the same kind and their accessories.

8 - Each case must include the packing list fixed on the case and protected in addition to the list inside the case.

17 MARKING AND IDENTIFICATION

1 - The PETDE stresses great importance to distinct and durable identification. The marking on the outer covering shall be indelible and distinct and shall clearly show:
12/20 KV, SIZE, YEAR OF MANUFACTURE and the name of the MANUFACTURER / TRADE MARK.

2 - It is important to mark each case or box clearly by the following:
- contract number;
- PETDE, the purchaser;
- delivery number, shipment number;
- manufacturing date;
- name of manufacturer;
- kind of materials;
- quantities contained;
- main technical specification;
- cross section;
- gross weight, net weight;
- item number.

The marking must be clear and written on two sides of the box with inerasable materials.

18 PROVISIONAL ACCEPTANCE, REJECTION AND REPLACEMENT

The provisional acceptance will be in the Syrian warehouses after holding the following:
- Verifying the compliance of the materials specification delivered with the standards (stipulated in the technical specification in the contract).
- Succeeding the acceptance tests according to sub-clause 15.3 of IEC and sub-clause 14.10 of this description, and succeeding the test after installation.

19 GUARANTEE

The manufacturer shall guarantee the cable terminations elbow boxes against all defects arising out of faulty design or workmanship, or defective material for a period as mentioned in juridical book.

TABLE 1

GENERAL SPECIFICATIONS AND GUARANTEE SCHEDULE
FOR **CABLE TERMINATIONS ELBOW**
FOR 12/20KV, SINGLE CORE XLPE INSULATED POWER CABLE
WITH ALUMINIUM CONDUCTORS **1X120 mm2**

No.	Description	Unit	PETDE Requirements	Offered Data
1	Name of manufacturer			
2	Country of origin			
3	Termination elbow type		T-shaped separable connector for outer cone system terminals type C	
4	Termination elbow designation (symbol)			
5	Standards		CENELEC HD 629.1, CENELEC EN 50180, IEC 60137, IEC60502-4…	
6	Climatic design	Cº	- 10 Cº, + 50 Cº	
7	**Termination elbow suitable to be used with the following cable :**			
	-standards		IEC60502	
	- size of conductor	mm^2	**1x120 AL**	
	Class and form of conductor		Class 2 round stranded	
	Material of cable conductor		Aluminum	
	- rated voltage	kV	12/20	
	- conductor diameter	mm	12.5- 13.5	
	- conductor screen thickness	mm	0.4 min	
	-Average thickness of XLPE insulation	mm	5.5	
	- insulation screen thickness	mm	0.4 min	
	Diameter over XLPE Insulation	mm	24- 26	
	Metallic screen Cu wires Cu tape	 mm^2 mm^2	 16 2.5	
	- thickness of outer sheath	mm	1.7-2. 6	
	- Outside diameter of cable	mm	32 -36	
8	Rated voltage	kV	12/20	
9	Max. service voltage	kV	24	
10	Rated frequency	Hz	50	
11	AC voltage dry withstand	KV	42 KV/5 min	
12	Partial discharge at elevated and ambient temperature	PC	≤ 10 PC at 1.73 U◦ (20,8 kV)	
13	Impulse voltage at elevated and ambient temperature	KV	125	
14	Thermal short circuit (screen)	KA	1.96	
15	Thermal short circuit (conductor)	KA	11.25	
16	Dynamic short circuit	KA	25	

17	**Technical Specifications for Elbow Connectors: for 120 mm²**			
18	Rated Voltage:	KV	12/20 kV (Um = 24 kV)	
19	Rated Current:	A	≥ 630 A	
20	Thermal Short-Circuit (1s)	KA	≥ 16 KA/I sec	
21	Dynamic Short-Circuit (peak)	KA	≥ 40 kA	
22	**Type**:		T-shaped separable connector ELBOW	
23	Applicable Standards:		IEC 60502-4, IEEE 386	
24	Installation		On RMU with Type C bushing interface	
25	Protection Class		IP68 after installation	
26	Insulation Material:		High-quality silicone rubber or EPDM	
27	External Housing:		Semiconductive layer + insulation + weather-resistant outer sheath	
28	Stress control system		Stress Control Cone -IEEE 386/ Acc to /IEC 60502-4	
29	Internal Conductor / Lug Material		Aluminum tin-plated Lug 120mm2 Type screw cable lug for CU and AL	
30	Connection Method			
31	Fixing Bolts		Stainless steel bolts resistant to corrosion.	
32	Grounding System		Flexible copper grounding wire with suitable connectors. ≥16mm2 cu	
33	AC Withstand Voltage	KV	50 kV for 5 minutes	
34	Lightning Impulse Withstand Voltage - BIL	KV	125	
35	Partial Discharge	PC	≤ 10	
36	Operating Temperature Range		-10°C to +50°C	
37	Application		Connection to RMUs with type C cable bushings, 630A	
38	Service Life under standard environmental conditions		≥ 30 years	
39	The connector includes a test point covered by a cap for voltage detection and fault testing		YES	
40	The cable can be tested without removing the connector using VLF or DC Hipot equipment		YES	
40	Copy of test reports by independent laboratory		Should be submitted	
41	Included Accessories**:**		Detailed installation guide	
42	Earthing continuity of termination: -cross section of Cu wires	mm^2	16	
43	Combustibility- burnable		YES	
44	Insulation resistance	M Ω	≥2000	
45	Elbow connector with test point		YES	
46	Submit dimensioned drawing and detailed information and documentation about termination layers, materials and		Should be submitted	

	their electrical and non electrical properties			
47	Method of installation			
48	Shelf life of termination elbow	Year	≥5	
49	List of kit contents with description		Should be enclosed	
50	Installation instruction		Should be submitted	
51	Manufacturer experience	Year	≥5	
52	The name of manufacturer ,voltage and the range should be printed on the termination body		should be printed	
53	Quality assurance certificate e.g. (ISO accreditation)		Should be submitted	
54	Total weight of termination elbow	Kg		
55	Time of execution of termination	min/man		
56	Include the offered tools for execution and submit of the termination elbow Detailed description of tools (with drawings)		Should be submitted	
57	Submit sample(s) for local Testing		**Should be submitted two samples**	

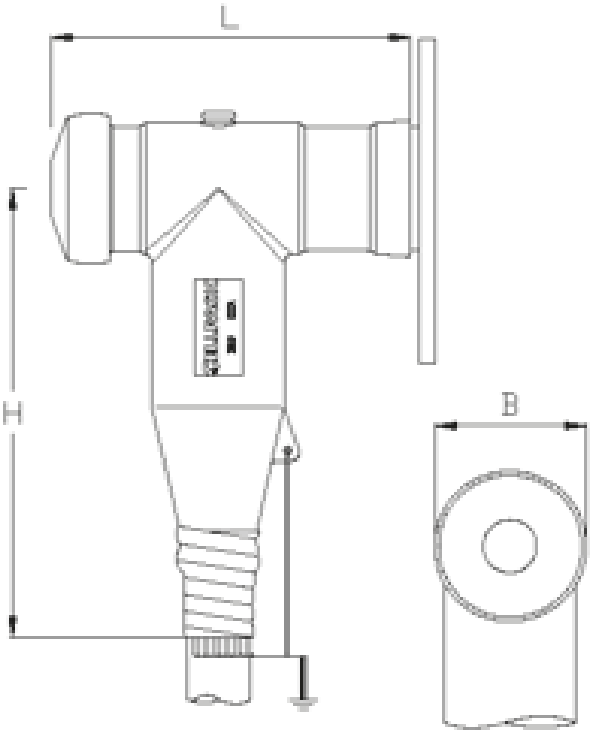
TABLE 2

GENERAL SPECIFICATIONS AND GUARANTEE SCHEDULE
FOR **CABLE TERMINATIONS ELBOW**
FOR 12/20KV, SINGLE CORE XLPE INSULATED POWER CABLE
WITH ALUMINIUM CONDUCTORS **1X185 mm2**

No.	Description	Unit	PETDE Requirements	Offered Data
1	Name of manufacturer			
2	Country of origin			
3	Termination elbow type		T-shaped separable connector for outer cone system terminals type C	
4	Termination elbow designation (symbol)			
5	Standards		CENELEC HD 629.1, CENELEC EN 50180, IEC 60137, IEC60502-4…	
6	Climatic design	Cº	- 10 Cº, + 50 Cº	
7	**Termination elbow suitable to be used with the following cable :**			
	-standards		IEC60502	
	- size of conductor	mm^2	**1x185 AL**	
	Class and form of conductor		Class 2 round stranded	
	Material of cable conductor		Aluminum	
	- rated voltage	kV	12/20	
	- conductor diameter	mm	15.5 - 16.8	
	- conductor screen thickness	mm	0.4 min	
	-Average thickness of XLPE insulation	mm	5.5	
	- insulation screen thickness	mm	0.4 min	
	Diameter over XLPE Insulation	mm	26 – 29	
	Metallic screen Cu wires Cu tape	 mm^2 mm^2	 25 2.5	
	- thickness of outer sheath	mm	1.7-2. 6	
	- Outside diameter of cable	mm	35 – 39	
8	Rated voltage	kV	12/20	
9	Max. service voltage	kV	24	
10	Rated frequency	Hz	50	
11	AC voltage dry withstand	KV	42 KV/5 min	
12	Partial discharge at elevated and ambient temperature	PC	≤ 10 PC at 1.73 U◦ (20,8 kV)	
13	Impulse voltage at elevated and ambient temperature	KV	125	
14	Thermal short circuit (screen)	KA	3	
15	Thermal short circuit (conductor)	KA	16/1sec	
16	Dynamic short circuit	KA	40	

17	**Technical Specifications for Elbow Connectors: for 185 mm²**			
18	Rated Voltage:	KV	12/20 kV (Um = 24 kV)	
19	Rated Current:	A	≥ 630 A	
20	Thermal Short-Circuit (1s)	KA	≥ 20 kA	
21	Dynamic Short-Circuit (peak)	KA	≥ 40 kA	
22	**Type**:		T-shaped separable connector ELBOW	
23	Applicable Standards:		IEC 60502-4, IEEE 386	
24	Installation		On RMU with Type C bushing interface	
25	Protection Class		IP68 after installation	
26	Insulation Material:		High-quality silicone rubber or EPDM	
27	External Housing:		Semiconductive layer + insulation + weather-resistant outer sheath	
28	Stress control system		Stress Control Cone -IEEE 386/ Acc to /IEC 60502-4	
29	Internal Conductor / Lug Material		Aluminum tin-plated Lug 185mm2 Type screw cable lug for CU and AL	
30	Connection Method			
31	Fixing Bolts		Stainless steel bolts resistant to corrosion.	
32	Grounding System		Flexible copper grounding wire with suitable connectors. ≥25mm2 cu	
33	AC Withstand Voltage	KV	50 kV for 5 minutes	
34	Lightning Impulse Withstand Voltage - BIL	KV	125	
35	Partial Discharge	PC	≤ 10	
36	Operating Temperature Range		-10°C to +50°C	
37	Application		Connection to RMUs with type C cable bushings, 630A	
38	Service Life under standard environmental conditions		≥ 30 years	
39	The connector includes a test point covered by a cap for voltage detection and fault testing		YES	
40	The cable can be tested without removing the connector using VLF or DC Hipot equipment		YES	
40	Copy of test reports by independent laboratory		Should be submitted	
41	Included Accessories**:**		Detailed installation guide	
42	Earthing continuity of termination: -cross section of Cu wires	mm^2	25	
43	Combustibility- burnable		YES	
44	Insulation resistance	M Ω	≥2000	
45	Elbow connector with test point		YES	
46	Submit dimensioned drawing and detailed information and documentation		Should be submitted	

	about termination layers, materials and their electrical and non electrical properties			
47	Method of installation			
48	Shelf life of termination elbow	Year	≥5	
49	List of kit contents with description		Should be enclosed	
50	Installation instruction		Should be submitted	
51	Manufacturer experience	Year	≥5	
52	The name of manufacturer ,voltage and the range should be printed on the termination body		should be printed	
53	Quality assurance certificate e.g. (ISO accreditation)		Should be submitted	
54	Total weight of termination elbow	Kg		
55	Time of execution of termination	min/man		
56	Include the offered tools for execution and submit of the termination elbow Detailed description of tools (with drawings)		Should be submitted	
57	Submit sample(s) for local Testing		**Should be submitted two samples**	



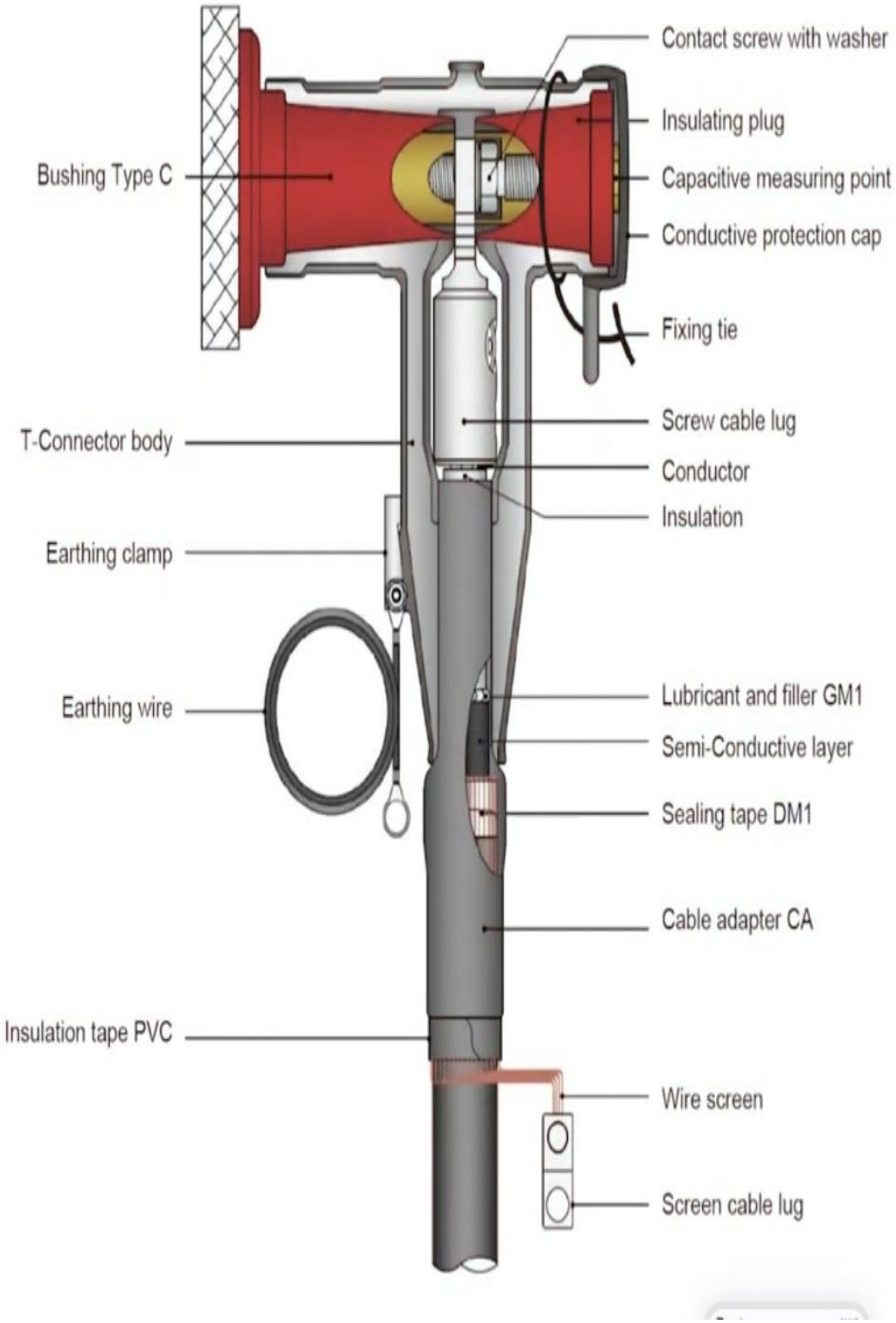

Contact screw with washer
Insulating plug
Bushing Type C
Capacitive measuring point
Conductive protection cap
Fixing tie
Screw cable lug
T-Connector body
Conductor
Insulation
Earthing clamp
Earthing wire
Lubricant and filler GM1
Semi-Conductive layer
Sealing tape DM1
Cable adapter CA
Insulation tape PVC
Wire screen
Screen cable lug

TABLE 3

LIST OF REQUIRED QUANTITIES

ITEM No.	DESCRIPTION	QUANTITY	PRICE ($)			
			FOB		CFR	
		Pieces	Unit	Total	Unit	Total
1	**120 mm2 termination elbow box**	**15000**				
2	**185 mm2 termination elbow box**	**15000**				
3	Living expenses of two representatives (engineers) to the manufacturer's country to participate in the testing for seven work days for each delivery	**2**				
	TOTAL PRICE					