

**SYRIAN ARAB REPUBLIC
MINISTRY OF ENERGY
PUBLIC ESTABLISHMENT FOR
TRANSMISSION AND DISTRIBUTION OF ELECTRICITY**

(PETDE)

**SPECIFICATIONS FOR PREMOULDED CABLE JOINTS
SUITABLE FOR 12/20 kV SINGLE CORE,
XLPE INSULATED CABLE WITH ROUND STRANDED
ALUMINIUM CONDUCTOR WITH CROSS SECTIONS
ALUMINIUM 1X120 mm² and 1X185 mm²**

Prepared by:

Eng. Subhi Salem

Mr. Hasan Alksh

Mr. Ahmed Naeel AL akhras

Eng. Rateb Fares

Eng. Mohamed Rajeh

Eng. Maysa Akkash

**Approved by
GENERAL DIRECTOR of PETDE
Engineer Khaled Abu DI**

INDEX**ITEM**

- SCOPE
- 1- INTRODUCTION
- 2- DEFINITIONS
- 3- SYSTEM DETAILS AND SERVICE CONDITIONS
- 4- STANDARDS AND NORMS
- 5- RATING AND PERFORMANCE
- 6- CONSTRUCTION DETAILS
- 7- ACCESSORIES
- 8- DIAGRAMS AND DRAWINGS
- 9- QUALITY ASSURANCE
- 10- LANGUAGE OF THE OFFER AND CORRESPONDENCES
- 11- TENDERER'S BACKGROUND
- 12- DOCUMENTS OF TECHNICAL OFFER
- 13- TEST SAMPLES
- 14- TESTING AND INSPECTION
- 15- PARTICIPATION IN TESTING
- 16- PACKING AND SHIPMENT
- 17- MARKING AND IDENTIFICATION
- 18- FINAL ACCEPTANCE, REJECTION AND REPLACEMENT
- 19- GUARANTEE

TABLE 1: GENERAL SPECIFICATIONS AND GUARANTEE SCHEDULE FOR
PREMOULDED CABLE JOINTS ALUMINIUM 1x120 mm²

TABLE 2: GENERAL SPECIFICATIONS AND GUARANTEE SCHEDULE FOR
PREMOULDED CABLE JOINTS ALUMINIUM 1x185 mm²

TABLE 3: LIST OF REQUIRED QUANTITIES

SCOPE:

This specification covers the requirements of components, product design, performance and quality assurance of **PREMOULDED CABLE JOINTS**, suitable for 12/20 single core, XLPE insulated cable with round stranded conductor. These **CABLE JOINTS**, are ready for installation with a range for 1x120 mm² + 1x185 mm².

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).

GENERAL INFORMATION AND REQUIREMENTS**1 INTRODUCTION**

This description determines the requirements of the PETDE for design, material, testing and supply of Premoulded cable joints box 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

2 DEFINITIONS

PETDE	: Shall mean Public Establishment for TRANSMISSION 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.
IEC	: International Electrotechnical Commission

3 SYSTEM DETAILS AND SERVICE CONDITIONS

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

3.1 20 kV Distribution System

- 20 kV \pm 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 U_o/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 joint boxes shall be used with cable for underground laying.

3.3 Environmental 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 in conformity with the latest applicable IEC, CENELEC, HD, VDE, IEEE standards.

5 RATINGS AND PERFORMANCE/GENERAL

- 5.1 Rating, performance and testing of the cable joints 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 joints 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 joints 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 sections $1 \times 120 \text{ mm}^2$, + $1 \times 185 \text{ mm}^2$. It must comply with IEC, CENELEC, HD 628, HD 629, VDE, IEEE and this technical specification.

The material of cable joints should be silicone rubber or EPDM rubber; another material is not accepted.

Method of installation: push on.

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

7 ACCESSORIES

Every joint for each size should have all necessary accessories for installation and their components are at least according to the following tables:

-For 120mm²- 12/20 KV XLPE Cable Joint Boxes (Single Core)

No.	Description
1	Joint body
2	Copper braided tape
3	Heat shrinking hose
4	Semi- conductive tape
5	Silicone grease
6	Ferrule
7	Gloves
8	Cleaning tissues
9	Installation paste
10	PVC tapes
11	Installation instructions
12	Emery paper or cloth
13	Compression sleeve for conductor connection AL 120 mm²
14	Compression sleeve for copper screen connection 16 mm²
15	Box ruler
16	Any other necessary accessories for installation

-For 185mm²- 12/20 KV XLPE Cable Joint Boxes (Single Core)

No.	Description
1	Joint body
2	Copper braided tape
3	Heat shrinking hose
4	Semi- conductive tape
5	Silicone grease
6	Ferrule
7	Gloves
8	Cleaning tissues
9	Installation paste
10	PVC tapes
11	Installation instructions
12	Emery paper or cloth
13	Compression sleeve for conductor connection AL 185 mm²
14	Compression sleeve for copper screen connection 25 mm²
15	Box ruler
16	Any other necessary accessories for installation

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 joint 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 three copies 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 otherwise the offer will be rejected.

The expenses of all tests (routine and type tests) shall be borne by the offerer.

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

15 PARTICIPATIONS 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. of this description, and succeeding the test after installation.

19 GUARANTEES

The manufacturer shall guarantee the cable joint boxes against all defects arising out of faulty design or workmanship, or defective material for a period as mentioned in GUARANTEE SCHEDULE.

TABLE 1

GENERAL SPECIFICATIONS AND GUARANTEE SCHEDULE
FOR **PREMOULDED CABLE JOINTS** (CONNECTING BOXES)
FOR 12/20KV, SINGLE CORE XLPE INSULATED POWER CABLE
WITH ALUMINIUM CONDUCTORS **120 mm²**

No.	Description	Unit	PETDE Requirements	Offered Data
1	Name of manufacturer			
2	Country of origin			
3	Joint type			
4	Joint designation (symbol)			
5	Standards		CENELEC HD 629 HD 628,E61442 , VDE, IEEE, IEC 60502	
6	Climatic design	C°	- 10 C°, + 50 C°	
7	Joint suitable to be used with the following cable :			
	-standards		IEC60502	
	- size of conductor	mm ²	1 x120	
	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	24- 26	
	Metallic screen			
	Cu wires	mm ²	16	
	Cu tape	mm ²	2.5	
	- thickness of outer sheath	mm	1.7-2. 6	
	- Outside diameter of cable	mm	32- 35	
8	Rated voltage	kV	12/20	
9	Max. service voltage	kV	24	
10	Rated frequency	Hz	50	
11	DC voltage dry withstand	KV	48 KV/15 min	
12	AC voltage dry withstand	KV	42 KV/5 min	
13	Partial discharge at ambient temperature test	PC	≤10 PC	
14	Impulse voltage 1.2/50 µs at ambient temperature	KV	125 KV	
15	heating cycle voltage in air		20 times	
16	heating cycle voltage in water		20 times	

No.	Description	Unit	PETDE Requirements	Offered Data
17	Partial discharge at elevated and ambient temperature	PC	≤ 10	
18	Impulse voltage at elevated temperature test	KV	125	
19	Thermal short circuit (screen)	KA	≥ 1.96	
20	Thermal short circuit (conductor)	KA	≥ 11.25	
21	Dynamic short circuit	KA	≥ 25	
22	Impulse voltage at ambient temperature	KV	125	
23	AC voltage dry withstand	KV	42 KV/5 min	
24	Copies of test reports by independent laboratory		Should be submitted	
25	Submit sample(s) for local Testing		The offerer must submit two samples	
26	Building-up of joint			
	Conductor connector (pipe connector) suitable for cable and copper screen -cross section - dimensions	mm ² mm	(1x 120) AL And 16mm ² CU Acc to IEC	
	-Material used for:		Silicon Rubber or EPDM rubber	
	Stress control system		One housing Stress cone	
	Insulating part		Silicon Rubber or EPDM	
	Outer screening		Silicon Rubber or EPDM	
	Metallic screen of joint : (Earthing continuity) -cross section of Cu wires -material	mm ²	≥ 16 copper	
	outer protection of joint body (outer cover)		Suitable adhesive heat shrinkable tube (one piece)	
27	Properties of joint			
	Combustibility- burnable		Non-combustible	
	Insulation resistance	M Ω	≥ 2000	
	Resistivity to mineral oil, acids, solvents		yes	
28	Dimensions of joint before & after installation for 1x120	mm		
	Submit dimension drawing		Should be submitted	
	Inner diameter of joint body	mm	it must mention by bidder	
	-diameter over joint body	mm	it must mention by bidder	
	-overall length	mm	it must mention by bidder	
	accepted diameter over XLPE insulation range for cable 1x120		range for cable 1x120mm ²	
29	Submit dimensioned drawing and detailed information and documentation about joint box layers, materials and their electrical and non electrical properties		Should be submitted	

30	Method of installation:		Push-on	
No.	Description	Unit	PETDE Requirements	Offered Data
31	List of kit contents with description		Should be enclosed	
32	Installation instruction		Should be enclosed	
33	Manufacturer experience	Year	≥ 5 years	
34	The name of manufacturer, voltage and the range should be printed on the joint box body		should be printed on the joint box body	
35	Quality assurance certificate e.g. (ISO accreditation)		Should be submitted	
36	Reference list		Should be submitted	
37	Expected life time under normal operation	Year	≥ 25 years	
38	Total weight of one joint box 1x120mm ²	Kg	it must mention by bidder	
39	Time of execution of one joint if required	min/man	it must mention by bidder	
40	Include the offer tools for execution of the joint box and submit detailed description of tools (with drawings)		Should be submitted	
41	warranty period	Year	≥ 1 year	
42	shelf life of joint	year	≥ 3 years	

TABLE 2

GENERAL SPECIFICATIONS AND GUARANTEE SCHEDULE
FOR **JOINT BOXES** (CONNECTING BOXES)
FOR 12/20KV, SINGLE CORE XLPE INSULATED POWER CABLE
WITH ALUMINIUM CONDUCTOR 1X185 mm²

No.	Description	Unit	PETDE Requirements	Offered Data
1	Name of manufacturer			
2	Country of origin			
3	Joint type			
4	Joint designation (symbol)			
5	Standards		CENELEC HD 629 HD 628, E61442 , VDE, IEEE, IEC 60502	
6	Climatic design	C°	- 10 C°, + 50 C°	
7	Joint suitable to be used with the following cable :			
	-standards		IEC60502	
	- size of conductor	mm ²	1x185	
	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	mm ²	25	
	Cu tape	mm ²	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	DC voltage dry withstand		48 KV/15 min	
12	AC voltage dry withstand		42 KV/5 min	
13	Partial discharge at ambient temperature test		≤10 PC	
14	Impulse voltage 1.2/50 μs at ambient temperature		125 KV	
15	heating cycle voltage in air		20 times	
16	heating cycle voltage in water		20 times	
17	Partial discharge at elevated and ambient temperature		≤10 PC	

18	Impulse voltage at elevated temperature test		125	
19	Thermal short circuit (screen)		≥ 3	
20	Thermal short circuit (conductor)		≥ 16	
21	Dynamic short circuit		≥ 40	
22	Impulse voltage at ambient temperature		125	
23	AC voltage dry withstand		42 KV/5 min	
24	Copies of test reports by independent laboratory		Should be submitted	
25	Submit sample(s) for local Testing		The offerer must submit two samples	
26	Building-up of joint		One housing	
	Conductor connector suitable for cables -cross section- dimensions	mm ²	(1x185) AL-lug Acc to IEC	
	-Material used for:		silicone rubber or EPDM rubber	
	Stress control system		One housing Stress cone	
	Insulating part		silicone rubber or EPDM	
	Outer screening		silicone rubber or EPDM	
	Metallic screen of joint : (Earthing continuity) -cross section of Cu wires -material	mm ²	25 cu -lug copper	
	outer protection of joint body (outer cover)		Suitable adhesive heat shrinkable tube (one piece)	
27	Properties of joint			
	Combustibility- burnable		Non-combustible	
	Insulation resistance	M Ω	≥ 2000	
	Resistivity to mineral oil, acids, solvents		yes	
28	Dimensions of joint before & after installation			
	Submit dimension drawing		Should be submitted	
	Inner diameter of joint body		it must mention by bidder	
	-diameter over joint body		it must mention by bidder	
	-overall length		it must mention by bidder	
	- accepted diameter over XLPE insulation		range for cable 1x185mm ²	

29	Submit dimensioned drawing and detailed information and documentation about joint box layers, materials and their electrical and non electrical properties		Should be submitted	
30	Method of installation:		Push-on	
31	shelf life of joint	year		
32	List of kit contents with description		Should be enclosed	
33	Installation instruction		Should be enclosed	
34	Manufacturer experience	Year	≥5 years	
35	The name of manufacturer ,voltage , the range ,year of manufacture and type should be printed on the joint body		should be printed	
36	Quality assurance certificate e.g. (ISO accreditation)		Should be submitted	
37	Reference list		Should be submitted	
38	Expected life time under normal operation	Year	≥25 years	
39	Total weight of one joint box	kg	it must mention by bidder	
40	Time of execution of one joint if required	min/man	it must mention by bidder	
41	Include the offer tools for execution of the joint box and Submit detailed description of tools (with drawings) (all necessary accessories for installation)		Should be submitted	
42	warranty period	Year	≥ 1 year	
43	shelf life of joint	year	≥3 years	

