

## Annex. II

### المواصفات الفنية للأعمال المطلوبة لمشروع تأهيل شبكة الكهرباء في مدينة القامشلي و ريفها

#	اسم المادة	النوع والمواصفات الفنية	العدد
1	تقديم ونقل وتركيب محولة 200 KVA في الموقع المخصص مع لوازم التركيب والتشغيل	وجود شهادة اختبار أصلية ومرصص	8
2	تقديم ونقل وتركيب محولة 100 KVA في الموقع المخصص مع لوازم التركيب والتأريض والتشغيل	وجود شهادة اختبار أصلية ومرصص	10
3	تقديم ونقل وتركيب محولة 50 KVA في الموقع المخصص مع لوازم التركيب والتشغيل	وجود شهادة اختبار أصلية ومرصص	20
4	تقديم وتركيب قاطع A 400 ضمن لوحة المنخفض المخصصة	نوع ABB أو ميرلان أو ما يعادلها	8
5	تقديم وتركيب قاطع A 160 ضمن لوحة المنخفض المخصصة	نوع ABB أو ميرلان جيرن أو ما يعادلها	10
6	تقديم وتركيب قاطع A 80 ضمن لوحة المنخفض المخصصة	نوع ABB أو ميرلان جيرن أو ما يعادلها	20
7	تقديم ونقل وتركيب لوحة بدون قاطع على برج المحولة المخصص مع جميع لوازم التركيب والتأريض والتشغيل	بارات نحاس مجهزة بثلاثة مخارج مع المنصهرات	31
8	تقديم وتركيب عازل منخفض على التسليحة في موقع العمل	كركر و خشابي	1,378
9	تقديم تسليحات من الحديد وتركيبها على الأعمدة في موقع العمل مع البراغي وكل لوازم التثبيت (رباعي 50% + 30%)	رباعي 50% وثلاثي 30% وثنائي 20%	404
10	تقديم مرس ألمنيوم / KG وتركيبه على التسليحات والأعمدة المخصصة في موقع العمل	25 % ذو مقطع 120 + 20 % ذو مقطع 95 + 20 مقطع 70 + 20 % ذو مقطع 50 + 5 % ذو مقطع 35	9,700

500		تقديم وتركيب قفيس 14 مم في نقاط الوصل والشد ورؤوس الكابلات	11
500		تقديم وتركيب قفيس 16 مم في نقاط الوصل والشد ورؤوس الكابلات	12
150	براغي عدد 4 نحاس صافي	تقديم وتركيب كوس برغي 300 مم نحاس على اقطاب المحولات ورؤوس الكابلات	13
300	براغي عدد 4 نحاس صافي	تقديم وتركيب كوس برغي 185-120 مم نحاس على اقطاب المحولات ورؤوس الكابلات	14
15		تقديم شريط لحام 3 كغ علبة	15
1	1- استطاعة لا تقل عن KVA10-ثلاثي الاطوار 2- مجموعة كاملة من محرك + مولدة + ترانس لحام(ضمن صندوق مغلق وكاتم للصوت) 3- مأخذ AC (380+220) 4- طول شريط الترانس لا يقل عن 20 م	مجموعة لحام (مولدة+ملحمة)	16
4	ألمنيوم مقسى قابل للطي ( سحب ( طول 12 م و 8 م	سلام ألمنيوم	17
200		كفوف عازلة (امينط)	18
50	نوع يونيور حصرا	بنسة عازلة	19
10	عليه المنشأ محفور او نافر	مقص أمراس ألمنيوم	20

## توضيحات:

### اولاً : القواطع من العيارات ( 400-160-80 ) أمبير ثلاثية الاطوار:

من نوع ( ABB أو ميرلان جيرن أو ما يعادلها ) , بتيار قصر KA 26 عند جهد اسمي 400 فولط, وعلى ان يكون القاطع جديد ووعير مقلد ومن النوع الثابت وليس المعياري .

### ثانياً : اللوحات ومكوناتها :

- من الصاج المدهون جيداً وبسماكة لا تقل عن 1.5 ملم وبالأبعاد التالية ( عرض 100 سم - ارتفاع 120 سم - عمق 45 سم )
- بارات التوصيل من النحاس الصافي والأبعاد التالية :
  - ✓ من أجل المحولة 200 ك ف أ فيجب ان تكون البارات بعرض 4سم وسماكته 7 ملم
  - ✓ من أجل المحولة 100 ك ف أ فيجب ان تكون البارات بعرض 3سم وسماكته 7 ملم
  - ✓ من أجل المحولة 50 ك ف أ فيجب ان تكون البارات بعرض 3سم وسماكته 5 ملم
- فقل خارجي
- فتحات سفلية عدد 4/ للكابل الرئيسي والمخارج
- حاملات حديدية للقاطع وقواعد المنصهرات .
- قواعد المنصهرات من البورسلان الجيد تتحمل جهد اسمي لا يقل عن (600 الى 1000) فولط .
- اما المنصهرات فتركب باللوحات تبعاً لاستطاعة المحولة
  - ✓ من أجل المحولة 200 ك ف أ تركب منصهرات لا تزيد عن 315 أمبير
  - ✓ من أجل المحولة 100 ك ف أ تركب منصهرات لا تزيد عن 160 أمبير
  - ✓ من أجل المحولة 50 ك ف أ تركب منصهرات لا تزيد عن 80 أمبير
- يكتب عبارة ( خطر الموت ) على اللوحة بشكل واضح وباللون الاحمر على باب اللوحة .

### ثالثاً : فرق الاعداد :

عدد المحولات اللازم للمشروع هو 38/ محولة وبالأستطاعات المختلفة وعدد القواطع اللازمة هو 38/ قاطع اما عدد اللوحات اللازم هو 31/ لوحة , حيث أنه توجد بعض اللوحات المركبة لا زالت بحالة جيدة و قابلة للاستخدام .

### رابعاً : فيما يخص التوضيحات بالبندين 8 و 9:

التسليحات هي عبارة عن القاعدة الحديدية التي تركب اعلى الاعمدة ويركب عليها عوازل من البورسلان لعزل الامراس عن القواعد الحديدية ( التسليحات ) .  
ففي البند رقم 8/ يقوم المقاول بشراء العوازل ( كركر او خشابي ) ويقوم بتركيبها على القواعد الحديدية (التسليحات) وتثبيت هذه العوازل عبر ميل حديدي .  
اما البند رقم 9/ يقوم المقاول بتصنيع التسليحات وما عليها من عوازل اعلى الاعمدة وفي موقع العمل ويثبت التسليحة بالاطواق الحديدية والبراغي المناسبة .

### **Technical Specifications**

<b>QTY</b>	<b>Type and Technical Specifications</b>	<b>Material Number</b>	<b>#</b>
8	Original factory certificate sent with the shipment.	Providing, transferring, and installing a transformer 200 KVA in the assigned location along with the requirements of installation and operation.	1
10	Original factory certificate sent with the shipment.	Providing, transferring, and installing a transformer 100 KVA in the assigned location along with the requirements of installation, earthing, and operation.	2
20	Original factory certificate sent with the shipment.	Providing, transferring, and installing a transformer 50 KVA in the assigned location along with the requirements of installation and operation.	3
8	Type ABB or Merlin Gerin or equivalent	Providing and installing 400A circuit breakers within the assigned low voltage panel.	4
10	Type ABB or Merlin Gerin or equivalent	Providing and installing 160A circuit breakers within the assigned low voltage panel.	5
20	Type ABB or Merlin Gerin or equivalent	Providing and installing 80A circuit breakers within the assigned low voltage panel.	6
31	Copper bars provided with three outlets with the fuses.	Providing, transferring and installing a panel without circuit breakers on the assigned tower of the transformer along with all requirements of installation, earthing, and operation.	7
1,378	Wooden type	Providing and installing low voltage insulator on the reinforcement in the work site.	8
404	Quadruple 50%, triple 30%, and double 20%	Providing iron reinforcement and installation on the columns in the work site with the screws and all requirements of fixation (quadruple 50% + triple 30% + double 20%)	9

9,700	25 % ذو مقطع +120 20 % ذو مقطع +95 20 % ذو مقطع +70 20 % ذو مقطع +50 5 % ذو مقطع 35	Providing aluminum cordage/kg and installation on the assigned reinforcements and columns in the work site.	10
500		Providing and installing Case 14mm in the connection and tension points, and the cable heads.	11
500		Providing and installing Case 14mm in the connection and tension points, and the cable heads.	12
150	Bolts QTY 4, pure copper	Providing and installing copper beveled screws 300mm on the terminals of the transformers and the cable heads	13
300	Bolts QTY 4, pure copper	Providing and installing copper beveled screws 120-185 mm on the terminals of the transformers and the cable heads	14
15		Providing welding strip 3kg, a box	15
1	1- Capacity no less than 10 KVA- three phase 2- full set: engine + generator + welding transformer (within a closed box as well as a silencer) 3- outlet AC (380+220) 4- Transformer cord is no less than 20m long	Welding set (generator + welding device)	16
4	Hardened aluminum, foldable, (slide-up) 12m and 8m long	Aluminum ladders	17
200		Asbestos gloves	18
50	Unior type, exclusively	Insulated plier	19
10	With the origin engraved or embossed.	Aluminum cordage shears	20

#### Important Note:

The Receiving Committee has the right to reject any material and therefore a complete rejection of the total or part of the offer in case the provided material is irregular, given that there are materials in the market holding the name of well-known products but they are professionally counterfeited.

## **Clarifications:**

### **First: Circuit breakers are of three phase (80-160-400) amp**

ABB or Merlin Gerin brand or their equivalent, short current 26 KA at a nominal voltage 400volt, provided that the new circuit breaker is new and not imitated, and of the fixed type not the modular one.

### **Second: Panels and Contents:**

- Of properly painted sheet iron, of thickness no less than 1.5mm, and of the following dimensions (100cm wide – 120cm high – 45cm deep)
- Connection bars are of pure copper and of the following dimensions:
  - ✓ For 200KVA transformers, the bars should be of 4cm width and 7mm thickness
  - ✓ For 100KVA transformers, the bars should be of 3cm width and 7mm thickness
  - ✓ For 50 KVA transformers, the bars should be of 3cm width and 5mm thickness
- External lock
- Lower openings QTY /4/ for the main cable and the outlets.
- Iron holders for the circuit breakers and the bases of the fuses.
- Bases of the fuses are made of good quality ceramic that bears nominal voltage of (600 to 1000 volt)
- Fuses are to be installed in the panels according to the capacity of the transformer.
  - ✓ For 200 KVA transformers, fuses that do not exceed 315amp are to be installed.
  - ✓ For 100 KVA transformers, fuses that do not exceed 160amp are to be installed.
  - ✓ For 50 KVA transformers, fuses that do not exceed 80amp are to be installed.
- (Danger of Death) phrase is to be explicitly written on the panel, with red color, on the door of the panel.

### **Third: Number Differences:**

The required number of transformers for the project is /38/ transformers, of various capacities, and the required number of circuit breakers is /38/ breaker, whereas the number of required panels is /31/ panel, given that some installed panels are still of good condition and serviceable.

### **Fourth: Concerning the clarifications in the items 8 and 9:**

Reinforcements are a means of iron basis that are installed atop the columns, with ceramic insulators to be mounted on, to insulate the cordage from the iron bases (reinforcements) In item /8/, the vendor has to buy the insulators (Wooden type) and has to install them on the iron basis (reinforcements), and these insulators are to be fixed by iron lining. Whereas in item /9/, the vendor has to manufacture the reinforcements with the insulators atop the columns and in the work site, and the reinforcements are to be fixed by appropriate iron collars and screws.

## **20/0.4 KV DISTRIBUTION TRANSFORMER**

### **OPEN TERMINAL BUSHINGS AND HERMETICALLY SEALED FULLY FILLED WITH OIL**

**200 K.V.A**

**100 K.V.A**

**50 K.V.A**

The equipment offered shall comply with the requirements of the IEC standards applicable at the time of contract placement and the technical requirements of this specification.

The tenderer is required to state in his offer the manufacturer's experience in the design and manufacturing the equipment they have proposed. In particular, the tenderer shall state:

- Manufacturer's annual production capacity for the last two years.
- Manufacturer's client reference list over the last two years.

The manufacturer is required to assure his offered transformers are according to international quality standard ISO 9001-2008 (ISO 9001-2008 certificate should be submitted).

The transformers should be hermetically sealed fully filled with oil.

3-phase distribution transformers having a voltage ratio of 20/0.4 kV. The transformers are to be used in Syrian Electrical Network, constructed in compliance with relevant IEC standards to an accredited quality control system and shall be suitable for use at the specified ambient conditions.

The transformer design shall comply with the requirements of the latest current edition of relevant IEC standards and with the specific technical requirements of this specification.

In particular, the following IEC standards shall apply:

IEC 76:	Power transformers
IEC 137:	Insulated bushings for alternating voltages above 1000 V
IEC 296:	Specification for unused mineral insulating oils for transformers and switch-gear
IEC 354:	Loading guide for oil-immersed power transformers

## **System Details and Service Conditions (General Data)**

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

### 20 kV Distribution System

- 20 kV  $\pm$  5%
- Three phases, three wires
- Earthed through an earthing transformer 20/0,4kV (Zn Yn11)
- Vector group of distribution transformer 20 kV/0,4 kV DYN11
- Maximum service voltage: 24 kV
- Rated frequency: 50 Hz
- Impulse withstand voltage level: 125 kV at 1.2/50  $\mu$ s
- Short circuit apparent power of the system 500 MVA

### Environmental Conditions

- |   |   |               |
|---|---|---------------|
| - | Altitude above sea level:   | 1000 m        |
| - | Max. ambient temperature:   | 50 °C         |
| - | Min. ambient temperature:   | - 10 °C       |
| - | Average annual temperature:   | 35 °C         |
| - | Maximal temperature variation in one day:                             | 20 °C         |
| - | Average max. relative humidity:                                       | 80% at 30 deg |
| - | (Relative humidity - in some sites of Syria - up to 100% is possible) |               |

The offered products should be suitable for use under semi - arid conditions as well as for use on coastal area.

## **Technical Requirements**

### **Rating**

Ratings shall be based on permissible winding temperature rises (as measured by resistance) and top-oil temperature rises (as measured by thermometer) with maximum ambient air temperature, as specified in 'General Data'.



The transformer shall have overload capabilities in accordance with IEC 354 (item 2-3).

All associated components of the transformer, including bushing and tap switches shall have overload capabilities not lower than of the transformer with which they are associated.

The transformer shall be capable of providing full rated power at all tap positions.

### **Short circuit capability**

Transformers together with all equipment and accessories shall be designed and constructed withstanding the thermal and dynamic effect of external short circuit under the condition specified in item 2.3 without damage

### **Tank**

The transformers must be equipped with flexible (variable volume) folded corrugation tank that is needed to accommodate the expansion and contraction of oil due to varying service condition.

The number, depth and length of corrugations are chosen to give safe dissipation of the internal heat generated during operation of transformer.

The tank cover is bolted and sealed to it.

There is one thermometer pocket on the tank cover for thermometer, also there are two lifting lugs on the cover for lifting and carrying the transformer.

The tank cover is equipped with a filling pipe which is high enough to ensure a safe oil filling

level in the insulated elements lead-through bushings at all times.

In the lower side there is a device for draining and down sampling of the transformer oil.

The earthing screws M12 are provided for earthing the transformer, one is fitted at the bottom on the high voltage side of the tank and the other on the tank cover adjacent to low voltage neutral bushing.

The tank must have fixing at the bottom to prevent any movement of the active part during transportation.

Two base frames that carrying the bidirectional wheels and have four puling lugs are welded to tank bottom.

After tank parts have been assembled by welding process, it is checked for leakage with control liquid and ultraviolet radiation. The tank with its sealed cover is capable to withstand over-pressure of 0.3 Bar

**Cleaning and Painting:**

All metal parts such as cover, tank, core clamping, etc. shot blasted first to eliminate all signs of rust, welding spatters, grease, oil and mil scale and to achieve a good abraded surface for the paint to hold for long period of time.

Painting of transformer can be done with flooding or electrostatic process. In the process three coats of paint are applied, one under coat, one intermediate and one top coat, each coat has a minimum 40µm thickness. In the electrostatic process one coat of paint with a minimum thickness of 80µm is applied. The transformers are delivered in the final color shade RAL 6003 Olive green or RAL 7023 Concrete gray.

painting by hand and natural drying is not accepted.

The offeror should submit the method of painting in details.

**Windings**

The LV Windings shall be made of either foil or rectangular copper conductor with paper insulation. In the foil windings, there are diamond pattern papers as interlayer insulator, which have epoxy adhesive and cures during oven process to form a high strength winding against short circuit.

The HV Windings shall be made of enameled round copper conductors and wound in layers, the extension of tap changer steps are determined accurately by using full automatic winding machine.

The insulation of windings shall be designed to give full protection against dielectric voltage stresses.

Insulation material meet the requirements of class A insulating's material withstanding maximum continuous operating temperature of 105 degrees of centigrade without loss of life.

The windings shall be one piece for each phase and made of electrolytic copper and shall comply in all respects with the relevant IEC standards.

The windings shall be designed such as they may be replaced with the minimum of difficulty.

The tenderer shall submit a detailed description of the windings and the insulation proposed.

**Neutral earthing**

The neutral point of the transformer L.V windings shall be brought out to a separate fully insulated bushing and shall be suitable for solid connection to the earth stud.

## **Core**

The core shall be of beltless type equipped with Three limbs and two yokes, manufactured of high grade, grain oriented, silicon steel laminations with 0.3 or 0.27 mm thickness and low hysteresis losses.

Both sides of laminations have an insulation coating which provide the required interlamination resistance for decreasing eddy current losses.

For precisely cutting and stacking full automatic machine shall be used.

The core shall be designed to facilitate removal and replacement of the windings.

The core stack shall be internally earthed.

## **Insulating Oil**

**Insulating oil shall be in conformity with IEC60296-2003.**

**The use of PCBs as the dielectric medium is strictly prohibited.**

## **Cooling**

The transformer cooling system shall be ONAN.

## **Bushings**

The bushings shall be designed in such a way as to allow easy dismantling.

3 HV porcelain bushings and 4 LV (same rated current) porcelain bushings will be fitted on the cover.

The bushings shall be designed to withstand the different thermal, electrical and mechanical stresses as well as all forces that may be produced by the short circuit currents.

## **Tap Changer**

The transformer shall be equipped with an externally operated off-load tap changer on the high voltage side. The tapping range shall be  $\pm 5\%$  in five equal steps. The tap changer shall be manually operated and lockable and shall be mounted such that operation is in a horizontal plane. The tap position number shall be durable and clearly visible.

## **Transformer Accessories**

The transformer shall be equipped with at least the following:

- 1- oil level reduction
- 2- pressure relief valve
- 3- thermostat with contacts (alarm and tripe)  
multi-functions device for items (1, 2, 3) is accepted
- 4- Rating plate
- 5- Thermometer pocket
- 6- Oil drain plug at bottom
- 7- Two earthing terminal
- 8- Oil Filling pipe
- 9- Four bidirectional wheels
- 10- four puling lugs are welded to tank bottom
- 11- Lifting eyes suitable for lifting by crane hook and ropes
- 12- Arcing horns on H.V. bushing (protection gap)
- 13- Off-load tape changer

**Rating Plate**

The transformer shall be provided with a rating plate of weatherproof and corrosion resistant material which shall be fitted in a position clearly visible to the operator.

The plate shall be indelibly marked in English. It shall include all information required by IEC 76-1.

## **SCHEDULE A**

### **MANUFACTURER AND PLACE OF MANUFACTURE**

**(Information to be provided with the Tender**

**Signed and approved by the manufacturer and the offeror)**

<b>Item</b>	<b>Manufacturer</b>	<b>Place of Manufacture</b>
Transformer bushings -LV -HV		
Windings Insulation paper - LV - HV		
Magnetic core steel		
Transformer oil		
Winding copper -LV -HV		
Off -load Tap changer		
a- Pressure relief valve b- oil level reduction c- Thermometer with two contacts - Or Multi-Functions Protection device for above items (a, b, c).		

**SCHEDULE B****TECHNICAL GUARANTEES AND PARTICULARS****(Information to be provided with the Tender****Signed and approved by the manufacturer and the offeror)**

<b>Item No</b>	<b>Description</b>	<b>Units</b>	<b>Requirements</b>	<b>Offered Data</b>
<b>1</b>	Name of manufacturer			
<b>2</b>	Country of origin			
<b>3</b>	Voltage ratio	kV	20/0.4	
<b>4</b>	Vector Group		Dyn11	
<b>5</b>	Method of cooling		ONAN	
<b>6</b>	Rated power when operated at the specified site conditions	kVA	200	
<b>7</b>	Maximum temperature rises above 50 °C ambient at rated power:			
7.1	Winding temperature rise	°C	≤ 55	
7.2	Top oil temperature rise	°C	≤ 50	
7.3	Hot spot temperature rise	°C		
<b>8</b>	<b>Losses:</b>			
8.1	No load losses at rated voltage	W	≤ 500	
8.2	Load losses at rated power At u.p.f. and 75 °C	W	≤ 2400	
8.3	Total losses at 75 °C	W	≤ 2900	
<b>9</b>	Impedance voltage (at 75°C, rated power and principle tapping)	%	4	
<b>10</b>	Power frequency withstand voltage:			
10.1	20 KV winding and bushing	kV	50	
10.2	LV winding and bushing	kV	3	
<b>11</b>	Impulse withstand voltage 1.2/50 μs:			

Item No	Description	Units	Requirements	Offered Data
11.1	20 KV winding and bushing	KV <sub>peak</sub>	125	
11.2	LV winding and bushing	KV <sub>peak</sub>	6	
<b>12</b>	Winding resistance at 75°C:			
12.1	20 KV winding (tolerance +5 %)	Ω/phase		
12.2	LV winding (tolerance +5 %)	Ω/phase		
<b>13</b>	Magnetizing current in % of rated current at rated voltage	%	≤ 2	
<b>14</b>	2 sec short circuit withstand current: -HV winding -LV winding	kA		
<b>15</b>	Maximum flux density at normal voltage and frequency.	Tesla	≤ 1.7	
<b>16</b>	Conductor cross-section:			
16.1	20 KV winding	mm <sup>2</sup>	≥ 1.4	
16.2	LV winding	mm <sup>2</sup>	≥ 116	
<b>17</b>	Type and class of insulation:		Class A	
<b>18</b>	Transformer oil:		Acc to IEC 60296-2003	
	- Viscosity at 40 °C - Viscosity at -30 °C - Flash point - Pour Point	mm <sup>2</sup> /S mm <sup>2</sup> /S °C °C	max 12 max 1800 min 140 max -30	
	-Appearance		Clear, free from sediment and suspended matter	
	-Acidity	mg/KOH/g	Max 0.01	
	-Density, at 20 °C	g/ml	Max 0.895	

Item No	Description	Units	Requirements	Offered Data
	-Water Content	mg/kg	Acc to IEC	
	-Sludge		Max 0.8%	
	-DDF at 90 ° C		≤ 0.005	
	- Breakdown voltage after laboratory treatment	KV	Min 70	
<b>19</b>	Physical parameters:			
19.1	Total weight (tolerance -5 %)	kg		
19.2	Active part weight (tolerance -3 %)			
19.3	Weight of magnetic core (tolerance - 3 %)	kg		
19.4	Weight of single 20 KV winding with insulating paper (tolerance -2 %)	kg		
	Weight of single 20 KV winding without insulating paper (tolerance - 2 %)	kg		
	Weight of single LV. Winding with insulating paper (tolerance -2 %)	kg		
19.5	Weight of single LV. Winding without insulating paper (tolerance -2 %)			
19.6	Weight of insulating Oil (tolerance -5 %)	kg		
19.7	Tank cover thickness	mm	≥ 4	
19.8	Tank bottom thickness	mm	≥ 4	
19.9	Side Thickness (at least two longitudinally tank sides must be corrugated)	mm	corrugated thickness ≥1.2 other sides ≥ 3	
<b>20</b>	Dimension:			
20.1	Overall length	mm		
20.2	Overall width	mm		



Item No	Description	Units	Requirements	Offered Data
20.3	Overall height	mm		
<b>21</b>	Transformer Bushings:			
21.1	Material		Porcelain	
21.3	Rated current (MV/LV)	A	$\geq 250/400$	
21.4	Cree-page distance (MV/LV)	mm	$\geq 500/75$	
<b>22</b>	Maximum noise level	dB		
23	Tapping:			
23.1	Tapping range		$\pm 2 \times 2.5 \%$	
23.2	Number of taps		5	
<b>24</b>	Clearances:			
24.1	Between the windings and the tank	mm	$\geq 30$	
24.2	Between phases	mm	$\geq 15$	
<b>25</b>	Painting:		Acc to paragraph 2.4.4	
25.1	Paint type: flooding and drying by oven or electrostatic		preferable electrostatic	
25.2	The Thickness	micron		
26	Bi-directional wheels		Acc to paragraph 2.4.3	

-The offeror must submit all the required data in detail (quantity and type).

-The offeror must submit all the necessary drawings for the transformers.

## **الشروط العامة:**

### **صفة المتعهد :**

يشترط في المتعهد أن يكون مهندساً من تنطبق عليهم أحكام القانون /17/ لعام 93 أو متعهداً يضم جهازه العامل مهندس كهرباء و مهندس مدني، مارس المهنة خمسة سنوات على الأقل وعلى أن يكون كلاً منهما قد قام بتنفيذ أعمال التعهدات بمسؤولية كاملة لا تقل عن خمس سنوات بكفاءة تامة وأن يضم جهازه العامل عناصر اختصاصية ومجموعة كافية من العدد النظامية للأعمال السابقة

### **مدة تنفيذ العقد :**

إن مدة التنفيذ/30/ يوماً بدءاً من اليوم التالي لتسليم الموقع .

## **General Conditions:**

### **The Contractor:**

The contractor shall be an engineer to whom the law /17/ of 1993 applies or a contractor under who's work group are an electrical and civil engineer and who have been doing similar work for at least the last 5 years. Both engineers have to demonstrate that they have executed all their works during their last five years in full competence and to demonstrate that they were using sufficient numbers of qualified and specialized labor and that they were using specialized tools and machinery for all the works done.

### **Contract execution period:**

The contract execution period is /30/ days starting from the next day of signing the contract. (Contract signature date).