



شركة توزيع الكهرباء المساهمة العامة
Electricity Distribution Company



Ref : _____

الرقم : 3245/4/23/9

Date : _____

التاريخ : 2023/02/23

السادة _____ المحترمين

الموضوع: تمديد موعد إغلاق العطاء رقم (2023/4) بتوريد محولات توزيع

إشارة الى الموضوع اعلاه ، يرجى العلم بأنه تقرر تمديد موعد إغلاق العطاء (2023/4) والمتعلق بتوريد محولات توزيع، والذي يصادف موعد إغلاقه يوم الثلاثاء الموافق 2023/2/28 إلى يوم الأربعاء الموافق 2023/3/15.

واقبلوا الإحترام ،،،

نائب المدير العام للشؤون الفنية

م. سامي الزواتين

FQp18-02,Rev.c



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Jordan



THE HASHEMITE KINGDOM OF JORDAN
ELECTRICITY DISTRIBUTION COMPANY (EDCO)

Tender No. (4/2023)

تمديد

توريد محولات توزيع

Tenderer:

- Name: _____
- Address: _____
- Telephone/ Cellular: _____
- Fax: _____
- Website: _____
- E-Mail: _____
- Contact Person: _____

Director General

Electricity Distribution Company (EDCO)

P.O. BOX: 830878.

Amman - 11183 - Jordan.

The Hashemite Kingdom of Jordan.

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INVITATION TO TENDER

(4/2023)

تمديد

Dear Sir,

You are kindly requested to tender for the supply of the below mentioned materials as per the quantities and technical specifications enclosed herewith, by filling in the schedules, signing the form of tender, and forwarding the complete tender documents to the attention of **EDCO-Director General** addressed as seen on the cover page, to be **received not later than 2: 00 pm (local time) (15/ 3 /2023).**

All bids must be accompanied with a bid bond of a value not less than **5%** of the highest alternative tender price, otherwise your tender will not be considered. The bid bond shall be enclosed in the same envelope of the tender and must be delivered to the above office **not later than 2:00 pm (local time) (15/3 /2023).**

- **The winning bidders/bidder shall bear the announcement costs in the local newspapers, no matter how often the announcement has been posted.**

GENERAL CONDITIONS

- The below are general conditions of contract for the supply and delivery of plant and materials based on United Nations economic commission for Europe publication ref.: me/ 188 Geneva. March, 1953 And/or according to FIDIC 1999 if there is a constructions works.

1. Preamble

1.1. These General Conditions shall apply, save as varied by express agreement accepted in writing by both parties.

1.2. Definition of Terms:

The "**Purchaser**" shall mean "**ELECTRICITY DISTRIBUTION COMPANY.**" Hereinafter called "**EDCO**", and shall include **EDCOS** legal personal representatives and duly appointed engineers. The "**Engineer**" shall mean ". **ELECTRICITY DISTRIBUTION COMPANY** " or persons for the time being or from time to time duly appointed in writing by the purchaser to act as Engineer for the purpose of the contract.

The words "approved" and "approval" where used in these conditions or in the specification shall mean "**approved by**" and "**approval of**" the purchaser respectively. The "Vendor" shall mean the "Contractor" who's tender has been accepted by the purchaser and shall include the **Vendor's.** (Contractor's) legal personal representatives, successors and permitted assigns, "**F.O.B. Price**" shall mean the cost of the equipment delivered free on board the ship or truck or aircraft, all port charges and handling charges (also heavy lift if applicable) included .

The contractor must insure the material against all risks from the time it leaves the works until it is placed F.O.B "**CFR price**" shall mean F.O.B. price plus freight including unloading at the port of destination. All Marine Insurance will be affected by the purchaser.

NOTE:-The contractor must provide full details of the material to be shipped in good time for **EDCO** to arrange for Marine Insurance before the material is actually shipped.

2. Formation of Contract

- 2.1. The contract shall be deemed to have been entered into when the purchaser has sent an acceptance in writing before the time set in the tender for acceptance or any such later date extended by the tenderer at the request of the purchaser.
- 2.2. Notwithstanding that the contract and correspondence in connection with the contract shall be in the English language, the contract shall be and be deemed to be a Jordan contract and shall accordingly be governed by and construed according to the laws for the time being in force in the Hashemite Kingdom of Jordan.
- 2.3. **Power to Vary The Work:** no alternations, amendments, omissions, additions, suspensions, or variations of the work, (hereinafter referred to as "variations") under the contract as shown by the contract drawings or the specification shall be made by the contractor except as directed in writing by the purchaser, but the purchaser shall have full power, subject to the provision hereinafter contained, from time to time during the execution of the contract by notice in writing to instruct the contractor to make such variation without prejudice to the contract and the contractor shall carry out such variations, and be bound by the same conditions, as far as applicable, as though they said variations occurred in the specification. If any suggested variations would, in the opinion of the contractor, if carried out, prevent him from fulfilling any of his obligations or guarantees under the contract, he shall notify the purchaser thereof in writing, and the purchaser shall decide forthwith whether or not the same shall be carried out, and if the purchaser confirms his instructions, the contractor's obligations and guarantee shall be modified to such an extent as may be justified. The difference in cost, if any, occasioned by any such variations, shall be added to or deducted from the contract price as the case may require. The amount of such difference, if any, shall be ascertained and determined in accordance with the rates specified in the schedule of prices so far as the same may be applicable, and where the rates are not contained in the said Schedule, or are not applicable they shall be settled by the purchaser and the contractor jointly.

But the purchaser shall not become liable for the payment of any charge in respect of any such variations, unless the instruction for the performance of the same shall have been given in writing by him. In the event of the purchaser requiring any variation, such reasonable a proper notice shall be given to the contractor as will enable him to make his arrangements accordingly, and in cases where goods or materials are already prepared, or any designs, drawings, or patterns made or work done that requires to be altered a reasonable sum in respect thereof shall be allowed by the purchaser. Provided that no such variations shall, except with consent in writing of the contractor, be such as will involve an increase or decrease of the total price payable under the contract by more than 25 percent thereof. The power given to the purchaser to make any alteration, amendment, omission, addition or variation to, from or in any part of the works shall include power to vary from time to time the date for the completion of the works or any part thereof, **also the purchaser shall have the absolute right to increase the quantities in such manner that the increment does not exceed the amount of 25% of the total price payable under the contract, however; the same prices awarded and any other relevant conditions shall remain the same for this purpose. This right is valid during the delivery period of the ordered material, implementation of works, or (90) days from the date of the letter of award, which is come later.**

- 2.4. **Precedence:** In the event of any discrepancy or contradiction between the provisions of the conditions of contract and of the specification, the conditions of contract shall take precedence. Furthermore in case of discrepancy between unit and total prices then unit price will be considered.
- 2.5. **Prices:** the tender calls for firm prices, unless; otherwise mentioned in the special requirements schedule.

3. **Drawings and Descriptive Documents**

- 3.1. The weights, dimensions, capacities, prices, performance rating and other data included in catalogues, prospectuses, circulars, advertisement, illustrated matter and price lists constitute an approximate guide. These data shall not be binding save to the extent that they are by reference expressly included in the contract.

- 3.2. Any drawings or technical documents intended for use in the construction of the material or of part thereof and submitted to the purchaser prior or subsequent to the formation of the contract remain the exclusive property of the Vendor. They may not, without the Vendor's consent, be utilized by the purchaser or copied, reproduced, transmitted or communicated to a third party. Provided, however, that the said plans and documents shall be the property of the purchaser.
- a. If it is expressly so agreed, or
 - b. If they are referable to a separate preliminary development contract on which no actual construction was to be performed and in which the property of the Vendor in the said plans and documents was not reserved.
- 3.3. Any drawings or technical documents intended for use in the construction of the material or of part thereof and submitted to the Vendor by the Purchaser prior or subsequent to the formation of the contract remain the exclusive property of the Purchaser. They may not, without his consent be utilized by the Vendor or copied, reproduced, transmitted or communicated to a third party.
- 3.4. The Vendor shall, if required by the purchaser, furnish free of charge to the purchaser at the commencement of the Guarantee Period, as defined in clause 9, information and drawings other than manufacturing drawings of the material in sufficient detail to enable the purchaser to carry out the erection, commissioning, operation and maintenance (including running repairs) of all parts of the material. Such information and drawings shall be the property of the purchaser and the restrictions on their use set out in paragraph 2 hereof shall not apply thereto. Provided that if the Vendor so stipulates, they shall remain confidential.

4. Packing of the materials and shipping marks

- 4.1. All materials, equipment and goods shall be very well packed, in seaworthy containers and/or wooden cases, etc. These should protect the material during shipping, handling, unloading for a reasonable period of storage at Aqaba and latter storage at EDCO stores.
- 4.2. Packing for indoor materials should be done in such manner as to adequately ensure no ingress of moisture, during the shipping and storage periods.

- 4.3. Packing of fragile equipment (e.g. including instruments and porcelain) should be done in a way which ensures a reasonable resistance to impact breakage during transport.
- 4.4. Packing shall in general be adequate and in compliance with the best international practice.
- 4.5. A descriptive and fully itemized list shall be prepared for the contents of each packing case. A copy of this list shall be placed in a waterproof envelope under a metal or other suitable plate and securely fastened to the outside of one end of the case. And its position adequately indicated by stenciling on the case. Where appropriate drawing showing the erection marking of the items concerned shall be placed inside the case.
- 4.6. **EDCO** will supply the successful tenderer with a drawing of its shipping mark for utilization.
- 4.7. All packing cases, crates, barrels and drums shall remain the property of the purchaser.

5. **Inspection and Tests**

All inspections and tests of the Plant and materials shall be performed to the extent and in the manner as stipulated in the Standards specified. Type test certificates shall be submitted for all important items supplied. They shall contain all major technical particulars which are mentioned in the Technical Data Sheets.

Routine test certificates showing the results of all tests performed on the individual Plant and materials shall be furnished to the Purchaser before dispatch of such equipment. The Purchaser reserves the right to have certain tests performed in the presence of his representative or an independent testing authority. A suitable program for such inspections and tests shall be agreed upon and adequate notice (at least 21 days) shall be given when the Plant and/or materials are ready for inspection or test and every facility shall provide by the Contractor to enable the Purchaser to carry out the necessary inspections and tests. The performance of any such inspections and tests in the presence of the Purchaser and/or an

independent testing authority does not relieve the Contractor from his Contractual obligations.

5.1 General Inspection Requirement

The whole of the material by the contract will be subject to inspection and testing by the engineer during manufacture and on completion. The approval of the engineer or the passing of any such inspection or test will not, however; prejudice the right of the purchaser to reject the material if it fails to comply with the specification when erected or to give complete satisfaction in service. The costs of all tests and inspection shall be borne by the contractor and shall be deemed to be included in the contract price. Before any material is packed or dispatched from the main or sub-contractor's works, all tests called for are to have been successfully carried out in presence of the engineer. Adequate notice shall be given when the material is ready for inspection or test and every facility shall be provided by the contractor and his inspection and his sub-contractors to enable the Engineer to carry out the necessary inspections and tests.

Triplicate copies of all principal test records and test certificates shall be supplied to the Engineer for all tests carried out in accordance with the provisions of the contract.

5.1.1 If expressly agreed in the contract, the purchaser shall be entitled to have the quality of the materials used and the parts of the instruments, both during manufacture and when completed, inspected and checked by his authorized representatives.

Such inspection and checking shall be carried out at the place of manufacture during normal working hours after agreement with the Vendor as to date and time.

5.1.2 If as a result of such inspection and checking the purchaser shall be of the opinion that any materials or parts are defective or not in accordance with the contract, he shall state in writing his objections and the reasons therefore.

5.1.3 Sub-Contractors: Within two months of acceptance of the tenders the contractor shall forward to the engineer a list of all sub-orders

placed or intended. The contractor shall submit three copies of all sub-orders or selected by the engineer for progress or inspection. One copy of all drawings referred to in the sub-order is to be submitted unless otherwise agreed by the engineer. The drawings and sub-orders submitted to the engineer will cover all major components which are subject to electrical and mechanical pressure or stress when the material is in operation and also auxiliaries and stores which will be dispatched to site direct from the sub-contractor's work. For the purpose of this clause inter-works orders are to be treated as sub-order. Sub-orders are to include a statement advising the sub-contractor that the items being order will be subject to inspection and test by the Engineer. It is important that all copies of such orders are clearly marked with the main contractor's name and the following reference:

ELECTRICITY DISTRIBUTION COMPANY. CONTRACT No. (4/2023)

Sub-Contractors are to comply with all the applicable requirements of this specification. Orders issued by the sub-contractor are also to include the main contractor's reference on their sub-order in addition to the above-mentioned heading.

5.2 **TESTS:**

All tests should meet the requirements of latest international standard mentioned in the contract or any relevant standard

- 5.2.1 Acceptance tests will be carried out and, unless otherwise agreed, will be made at the Vendor's works and during normal working hours. If the technical requirements of the tests are not specified in the contract, the tests will be carried out in accordance with the general practice obtaining in the appropriate branch of the industry in the country where the material is manufactured.
- 5.2.2 The Vendor shall give to the purchaser sufficient notice of the tests to permit the purchaser's representatives to attend. If the purchaser is not represented at the tests, the tests report shall be communicated by the Vendor to the purchaser and shall be accepted as accurate by the purchaser.
- 5.2.3 If on any test (other than a test site, where test on site are provided for in the contract) the material shall be found to be defective or not in accordance with the contract, the Vendor shall with all speed make good the defect or ensure that the plant complies with the contract. Thereafter, if the purchaser so requires, the test shall be repeated.
- 5.2.4 Unless otherwise agreed, the Vendor shall bear all the expenses of tests carried out in his works.
- 5.2.5 If the contract provides for tests on site, the terms and conditions governing such tests shall be such as may be specially agreed between the parties
- 5.2.6 **Material Tests:** The contractor shall provide test prices as required by the engineer to enable him to determine the quality of the material supplied free of charge and any cost of the tests shall be borne by the contractor. If any test pieces fails to comply with the requirements of the appropriate specifications for the material in question, the engineer may reject the whole of the material represented by that piece, the contractor's designers and Metallurgists will be consulted before any material is so rejected. In

the event of the engineer being furnished with the certified particulars of the tests which have been carried out for the contractor by the suppliers of the material, he may, at his own discretion, dispense with the previously mentioned tests entirely.

5.2.7 Tests at Manufacture's Works: Works tests shall include all routine, electrical, mechanical and hydraulic tests in accordance with the relevant IEC standard or other standard may be approved except where departures there from and modifications thereto are embodied in this specification. For material not covered by an IEC or British standard or specifically mentioned in this specification the tests shall be agreed with the Engineer. After satisfactory completion of the witnessed tests at the works, the material shall be submitted for the engineer's approval preparatory to shipping. No item of material is to be dispatched to site until the Engineer has given his approval in writing.

5.2.8 Test Certificates: Triplicate sets of all principal test records test certificates and performance curves shall be supplied for all tests carried out in accordance with the provisions of this contract. These test records, certificates and performance curves shall be supplied for all tests, whether or not they have been witnessed by the engineer. The information given in such test certificates and curves shall be sufficient to identify the material or equipment to which the certificates refers and should also bear the contract reference and heading as given in clause 7.2 of this section.

5.2.9 Rejection of the materials: If Any item of material or component which fails comply with the requirements of this specification in any respect whatsoever at any stage of manufacture, test, erection or on completion at site may be rejected by the engineer either in whole or in part as he considers necessary, and after adjustment or modification if so directed by the Engineer, the contractor shall submit the item for the item for the further inspection and / or test.

In the event defects of such a nature that the requirements of this specification cannot be fulfilled by adjustment or modification shall be replaced by the contractor, at his own expense, to the entire satisfaction of the engineer.

5.3 Maintenance:

The contractor must submitted maintenance bond equal to (5%) of the Order amount to guarantee the efficient and good working of the material supplied under the contract for a period of 12 months (Gregorian) from the date of delivery of the material to EDCO SORES in accordance with the General conditions of contract.

6. Passing of Risk

Save as provided in paragraph 7.6, the time at which the risk shall pass shall be fixed in accordance with the International Rules for the Interpretation of Trade Terms (Incoterms) of the International Chamber of Commerce in force at the date of the formation of the contract.

7. Delivery:

- 7.1. Unless otherwise agreed the delivery period shall run from the latest of the following dates:
 - a. The date of the formation of the contract as defined in clause 2.
 - b. The date on which the Vendor receives notice of the issue of a valid import license where such is necessary for the execution of the contract.
 - c. The date of the receipt by the Vendor of such payment in advance of manufacture as stipulated in the contract.
- 7.2. Should delay in delivery be caused by any of the circumstances mentioned in clause 10 or by an act or omission of the purchaser and whether such cause occur before or after the time or extended time for delivery, they shall be granted subject to the provisions of paragraph 5 hereof such extension of the delivery period as is reasonable having regard to all the circumstances of the case.
- 7.3. If a fixed time for delivery is provided for in the contract and the Vendor fails to deliver within such time or any extension thereof granted under paragraph 2 hereof, the purchaser shall be entitled, on giving to the Vendor within a reasonable time notice in writing, to

Claim a deduction of the price payable under the contract. Such deduction shall be calculated at the rate of one half of one percent (0.5%) of that part of the price payable under the contract which is properly attributable to such portion of the plant as cannot in consequence of the said failure be put to the use intended for each complete week of delay commencing on the due date of delivery, but shall not exceed a maximum percentage deduction of ten percent. Such deduction shall be allowed when a payment becomes due on or after delivery. Save as provided in paragraph 5 hereof, such deduction of price shall be to the exclusion of any other remedy of the purchaser in respect of the Vendor's failure to deliver as aforesaid.

- 7.4. If the time for delivery mentioned in the contract is an estimate only, either party may after the expiration of two thirds of such estimated time require the other party in writing to agree a fixed time. Where no time for delivery is mentioned in the contract, this course shall be open to either party after the expiration of six months from the formation of the contract. If in either case the parties fail to agree, either party may have recourse to arbitration, in accordance with the provisions of clause 13, to determine a reasonable time for delivery and the time so determined shall be deemed to be the fixed time for delivery provided for in the contract and paragraph 3 hereof shall apply accordingly.
- 7.5. If any portion of material in respect of which the purchaser has become entitled to the maximum deduction provided for by paragraph 3 hereof, or in respect of which he would have been so entitled had he given the notice referred to therein, remains undelivered, the purchaser may by notice in writing to the Vendor require him to deliver and by such last mentioned notice fix a final time for delivery which shall be reasonable taking into account such delay as has already occurred.
- 7.6. If for any reason whatever the Vendor fails within such time to do everything that he must do to effect delivery, the purchaser shall be entitled by notice in writing to the Vendor, and without requiring the consent of any court, to terminate the contract in respect of such portion of the material and thereupon to recover from the Vendor any amount not exceeding that part of the price payable under the Contract which is

properly attributable to such portion of the material as could not in consequence of the Vendor's failure be put to the use intended.

- 7.7. If the purchaser fails to accept delivery on due date, he shall nevertheless make any payment conditional on delivery as if the material had been delivered. The Vendor shall arrange for the storage of the material at the risk and cost of the purchaser. If required by the purchaser, the Vendor shall insure the material at the cost of the purchaser. Provided that if the delay in accepting delivery is due to one of the circumstances mentioned in clause 10 and the Vendor is in a position to store it in his premises without prejudice to his business, the cost of storing the material shall not be borne by the purchaser.
- 7.8. Unless the failure of the purchaser is due to any of the circumstances mentioned in clause 10, the Vendor may require the purchaser by notice in writing to accept delivery within reasonable time. If the purchaser fails for any reason whatever to do so within such time, the Vendor shall be entitled by notice in writing to the purchaser, and without requiring the consent of any court, to terminate the contract in respect of such portion of the material as is by reason of the failure of the purchaser aforesaid not delivered and thereupon to recover from the purchaser any loss, suffered by reason of such failure up to an amount not exceeding the value of the material, the delivery of which has not been accepted.
- 7.9. If the winner contractor in the tender, refrained for supply the material or execution of works which award for him or failed to execute the contract on the limited time, or failed to replace the rejected material or works in another applying materials on his account, the tenders committee which take its previous design to award the tender for this supplier has the right to Confiscation the bid bond or the performance bond or part of them as commensurate with the material & works value.
- 7.10. If refrained bidder to comply with his offer or did not complete the necessary contract and signing of the purchase order and did not submitted the performance bond within 15 days from the date of the order, the tender s committee has the right to confiscated the bid bond.

Force Majeure

- Notwithstanding the provisions of clauses 7, the supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, its delay in performance or other failure to perform its obligations under the contract is the result of an event of Force Majeure.
- For purposes of this clause, "Force Majeure" means an event beyond the control the supplier not involving the supplier's fault or negligence. Such events may include, but are not restricted to, acts to the purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.
- If a Force Majeure situation arises, the supplier shall promptly notify the purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the purchaser in writing, the supplier shall continue to perform its obligations under the contract as far as is reasonably practical, and shall all reasonable alternative means for performance not prevented by the Force Majeure event.

8. Payment:

8.1. **Terms of Payment:**

Subject to any deduction which the purchaser may be authorized to make under the contract or subject to any additions or deductions provided for under clause 2-3 above, The Company (EDCO) prefers to deal with the supplier on an **open account basis**, and the payment to be made as the following:

a. (10%) of the CFR contract value (as shown by the supplier's invoice/contractor invoice) on receipt of the following **legalized shipping** documents by EDCO:

- (Original Invoice + five copies)
- (Certificate of origin + five copies)
- (Bill of lading 3-negotiable + 5 non-negotiable)
- (Test certificate (where applicable) + 6 copies).
-

The original shipping documents must arrive to EDCO or to our bank before (5) days at least prior the materials arrival.

b. (80%) of the invoice value to be paid within 60 days of Receipt of EDCO's certificate of acceptance, Receipt of goods at EDCO stores.

c. (10%) of the contract value within 60 days from expiration of the guarantee period.

If the bidder insists on L/C (letter of credit) as a method of payment, all L/C charges will be on his own expense, in all respects all banking charges are at vendor account, the terms will be as follows:

a. The L/C will be confirmed and irrevocable but has to be **acceptance** L/C, and the supplier has to send the following **legalized shipping** documents:

- (Original Invoice + five copies),
- (Certificate of origin + five copies),
- (Bill of lading 3-negotiable + 5 non-negotiable),
- (Test certificate (where applicable) + 6 copies).
- (Release of shipment (where applicable) – fax copy is accepted).

b. Payment will be released after submitting EDCO's certificate of acceptance to the bank within (30) days after receipt of goods at EDCO's stores.

In the case of a Jordanian Supplier (materials are delivered from local companies), payment will be made through presentation of the invoice as following:

- a. (90%) of the contract value to be paid within 30 days from date of receipt and acceptance of the materials at our EDCO stores.
- b. (10%) of the contract value within 30 days from expiration of the guarantee period (one year from the date of receipt and acceptance of the materials at EDCO stores)

NOTE:

- In case the supplier has better terms of payment than those mentioned above the purchaser will discuss such terms.
- Any deviation on the payment methods mentioned above, will negatively affect the evaluation of tenderer's offer.
- In case the payment by acceptance L/C, The performance bond should be valid for a period expiring at least one year after receipt of the last consignment in EDCO stores.
- EDCO has the right to request an additional bank guarantee equal to (5%) five percent to cover the guarantee period.

Currency of Payment: The contract price will normally be paid in the currency or currencies in which the price has been stated. The purchaser, however, reserves the right to make payments in the currencies of the countries of origin of goods and services at the exchange rates applicable at the time of payment of the contract price.

Shipping documents shall comprise the following documents: -

- 1) **Invoices** – one original, five copies.
- 2) **Shipping specification (packing list)** – six copies.
- 3) **Certificate of origin** – one original, five copies.
- 4) **Bill of lading** – 3 three negotiable, five non-negotiable.
- 5) **Test certificates (where applicable)** – six copies.
- 6) **Release of shipment (where applicable)** – fax copy is accepted.
- 7) **EDCO's Certificate of Acceptance** - fax copy is accepted

- 8.2. Any advance payments made by the Purchaser are payments on account and do not constitute a deposit, the abandonment of which would entitle either party to terminate the Contract.
- 8.3. If delivery has been made before payment of the whole sum payable under the Contract, plant delivered shall, to the extent permitted by the law of the country where the plant is situated after delivery, remain the property of the Vendor until such payment has been effected. If such law does not permit the Vendor to retain the property in the plant, the Vendor shall be entitled to the benefit of such other rights in respect thereof as such law permits him to retain. The Purchaser shall give the Vendor every assistance in taking any measures required to protect the Vendor's right of property or such other rights as aforesaid.
- 8.4. A payment conditional on the fulfillment of an obligation by the Vendor shall not be due until such obligation has been fulfilled, unless the failure of the Vendor is due to an act or omission of the Purchaser.
- 8.5. If the Purchaser delays in making any payment, the Vendor may postpone the fulfillment of his own obligations until such payment is made, unless the failure of the Purchaser is due to an act or omission of the Vendor.
- 8.6. If delay by the Purchaser in making any payment is due to one of the circumstances mentioned in clause 10, the Vendor shall not be entitled to any interest on the sum due.
- 8.7. Save as aforesaid, if the Purchaser delays in making any payment, the Vendor shall on giving to the Purchaser within a reasonable time notice in writing be entitled, and without requiring the consent of any Court, to terminate the Contract and thereupon to recover from the Purchaser the amount of his loss up to the value of the plant, the payment for which has been unreasonably delayed.

9. **Guarantee:**

- 9.1. Subject as hereinafter set out; the Vendor undertakes to remedy any defect resulting from faulty design, materials or workmanship.
- 9.2. This liability is limited to defects which appear during the period (Hereinafter called the Guarantee Period) of **fifteen** months from date of dispatch ex-works or twelve months from the date of accepting the Materials at EDCO stores whichever shall be later.

Or in case of turn key projects eighteen months from the date of setting to work.

- 9.3. In fixing this period due account has been taken of the time normally required for transport as contemplated in the contract.
- 9.4. In respect of such parts (whether of the Vendor's own manufacture or not) of the material as are expressly mentioned in the contract, the Guarantee Period shall be such other period (if any) as is specified in respect of each of such parts.
- 9.5. The Guarantee period is based on the continuous use of the plant in services for 24 hours every day.
- 9.6. A fresh Guarantee Period equal to that stated in paragraph 2 hereof shall apply, under the same terms and conditions as those applicable to the original material, to parts supplied in replacement of defective parts or to parts renewed in pursuance of this clause. This provision shall not apply to the remaining parts of material, the Guarantee Period of which shall be extended only by a period equal to the period during which the material is out of action as result of a defect covered by this clause.
- 9.7. In order to be able to avail himself of his rights under this clause the purchaser shall notify the Vendor in writing without delay of any defects that have appeared and shall give him every opportunity of inspecting and remedying them.
- 9.8. On receipt of such notification the Vendor shall remedy the defect forthwith and at his own expense. Save where the nature of the defect is such that it is appropriate to effect repairs on site, the purchaser shall return to the Vendor any part in which a defect covered by this clause has appeared, for repair or replacement by the Vendor, and in such case the delivery to the purchaser of such part properly repaired or a part in replacement thereof shall be deemed to be a fulfillment by the Vendor of his obligations under this paragraph in respect of such defective part.
- 9.9. The Vendor shall bear all the costs and risks of the transport of defective parts or equipment's and their replacements.

- 9.10. Where, in pursuance of paragraph 9 hereof, repairs are required to be effected on site, the conditions covering the attendance of the Vendor's representatives on site shall be such as may be specially agreed between the parties.
- 9.11. Defective parts replaced according to this clause shall be placed at the disposal of the Vendor.
- 9.12. If the Vendor refuses to fulfill his obligations under this clause or fails to proceed with due diligence after being required so to do, the purchaser may proceed to do the necessary work at the Vendor's risk and expense, provided that he does so in a reasonable manner.
- 9.13. The Vendor's liability does not apply to defects arising out of materials provided, or out of a design stipulated, by the purchaser.
- 9.14. The Vendor's liability shall apply only to defect that appears under the conditions of operation provided for by the contract and under proper use. It does not cover defects due to causes arising after the risk in the material has passed in accordance with clause 6. In particular it does not cover defects arising from the purchaser's faulty maintenance or erection, or from alterations carried out without the Vendor's consent in writing, or from repairs carried out improperly by the purchaser, nor does it cover normal deterioration.
- 9.15. Save as in this clause expresses, the Vendor shall be under no liability in respect of defects after the risk in the material has passed in accordance with clause 6, even if such defects are due to causes existing before the risk so passed. It is expressly agreed that the purchaser shall have no claim in respect of personal injury or of damage to property not the subject matter of the contract or of loss of profit unless it is shown from the circumstances of the case that the Vendor has been guilty of gross misconduct.

9.16. All defective and/ or not complying materials shall be

Evacuated from

EDCO stores within a maximum of one month by the vender from the date of notifying him. All costs and expenses of transportation shall be borne by the vendor. Unless otherwise agreed.

Otherwise; EDCO has the right to deal with the defective materials in a proper way.

9.17. Gross misconduct "does not comprise any and every lack of proper care or skill, but means an act or omission on the part of the Vendor implying either a failure to pay due regard to serious consequences which a conscientious contractor would normally foresee as likely to ensue, or a deliberate disregard of any consequences of such act or omission.

10. Relief

10.1. The following shall be considered as cases of relief if they intervene after the formation of the contract and impede its performance: industrial disputes, and any other circumstances (e.g. fire, mobilization, requisition, embargo, currency restrictions, insurrection, shortage of transport, general shortage of materials and restrictions in the use of power) when such other circumstances are beyond the control of the parties.

10.2. The party wishing to claim relief by reason of any of the said circumstances shall notify the other party in writing without delay on the intervention and on the cessation thereof.

10.3. The effects of the said circumstances so far as they affect the timely performance of their obligation by the parties, are defined in clauses 7 and 8. Save as provided in paragraph 7.5, 7.7, and 8.7, if by reason of any of the said circumstances, the performance of the contract within a reasonable time becomes impossible, either party shall be entitled to terminate the contract by notice in writing to the other part without requiring the consent of any court.

10.4. If the contract is terminated in accordance with paragraph 3 hereof, the division of the expenses incurred in respect of the contract shall be determined by agreement between the parties.

10.5. In default of agreement it shall be determined by the arbitrator which

party has been prevented from performing his obligations and that party shall bear the whole of the said expenses.

Where the purchaser is required to bear the whole of the expenses and has before termination of the contract paid to the Vendor more than the amount of the Vendor's expenses, the purchaser shall be entitled to recover the excess. If the arbitrator determines that both parties have been prevented from performing their obligation, he shall apportion the said expenses between the parties in such manner as to him seems fair and reasonable, having regard to all the circumstances of the case.

- 10.6. For the purposes of this clause "expenses" means actual out of pocket expenses reasonably incurred, after both parties shall have mitigated their losses as far as possible. Provided that as respects material delivered to the purchaser the Vendor's expenses shall be deemed to be that part of the price payable under the contract which is properly attributable thereto.

11. Limitation of Damages:

- 11.1. Where either party is liable in damages to the other these shall not exceed the damage which the party in default could reasonably have foreseen at the time of the formation of the contract.
- 11.2. The party who sets up a breach of the contract shall be under a duty to take all necessary measures to mitigate the loss which has occurred provided that he can do so without unreasonable inconvenience or cost. Should he fail to do so, the party guilty of the breach may claim a reduction in the damages.

12. Rights at Termination:

Termination of the contract from whatever cause arising shall be without prejudice to the rights of the parties accrued under the contract up to the time of termination.

Arbitration and Law Applicable:

- 13.1. If Any dispute, question or controversy shall arise between the purchaser and the contractor concerning this contract the matter in dispute shall be referred to an arbitration committee composed of three (3) arbitrators

- 13.2.** One arbitrator shall be nominated by the purchaser and one by the contractor, and the third arbitrator shall be appointed by both parties.
- 13.3.** If either party fails to appoint his arbitrator within one month of the appointment of the arbitrator by the other party, or if the two parties fail to agree on the third arbitrator within two months of the date of the request to refer the dispute to arbitration, such arbitrator shall be appointed by the president of the highest court in Jordan at the request of either or both parties.
- 13.4.** The decision of the arbitrators shall be final and binding on both the purchaser and the contractor. Any such reference shall conform to the statutory enactment or regulation governing arbitration as may be in force in Jordan at the time. The assessment of costs incidental to the reference and award respectively shall be at the discretion of the arbitration committee.

TENDERING INSTRUCTIONS

1. The Tender shall be made in one copy of the accompanying form; however, all blanks and schedules shall be filled up in ink, and signed without alteration to the form of tender. If any such alteration were made, or if these Instructions were not fully complied with, the tender may be rejected. The tenderer; however, is at liberty to add any further details that he may deem desirable and, in the event of his so doing, shall print or type such details and annex the added matter to the tender submitted by him. Such additional details shall not be binding upon the purchaser unless they shall be subsequently incorporated in the contract.
2. One copy of the tender, and its accompanying documents, filled up as directed, together with the drawings, catalogs, and relevant documents called for, must be enclosed in a secure envelope endorsed **(Tender for Contract No. (4/2023))**.
3. All correspondences in connection with this tender and all matters accompanying the tender that are relevant to its examination shall be in English language and expressed in metric units.
4. The tender is to be held open for acceptance or rejection for a validity period of (90) days from the time fixed for opening the tenders.
5. Tenders received prior to the time fixed for opening of tenders will be securely kept, unopened. Tenders received after that time will be rejected. The purchaser bears no responsibility for premature opening of tenders not properly addressed or identified.
6. Tenders may be withdrawn by formal request received in writing from the tenderer prior to the time fixed for opening. If for any reason the tender should be withdrawn after the time fixed for opening and before expiry of the said validity period, the purchaser has the right to retain the full value of the tender bond.
7. The successful tenderer shall abide by the commercial and professional regulations as required by the Ministry of Industry & Trade, Engineering Association and other relevant Institutions in Jordan.

8. Tenderers attention is drawn to the action of customs officers in the discharge of their duties. Whereby air parcels are frequently opened In their own interests and in order to preserve the confidential nature of the tender price, tenderers are urged to pay attention to the:
 - a. To dispatch the completed tender document and any covering letter only by Air Mail which should be endorsed and labeled in the manner laid down in paragraph 10 of the Instructions to Tendering.
 - b. Technical literature and the like may reasonably be sent by Air Parcel or Air Freight but since this would then be separated from the actual Tender, each parcel should contain specific evidence identifying the Tender to which the contents refer.
 - c. The purchaser will not consider late or incompletely delivered tenders or literature supporting tenders due to the action of any customs officer.
9. In the event that the intending signatory does not manufacture one or more of the main sections of equipment and materials, then the tender submitted should give evidence to show that all the obligations imposed by the documents on the intending signatory have been fully understood and accepted, where applicable, by the manufacturer(s) to whom it would be intended to sub-contract one or more of the main sections of the equipment and materials.
10. For overseas transport of the contractor and his Sub-contractors, suppliers and manufactures must give priority to Jordan shipping national lines, and to Arab shipping companies and their subsidiaries for the shipping of goods, materials provided such companies ships call at the port of export. The contractor shall also give priority to the Royal Jordanian Airlines for air freight shipment and transport of personnel.
11. Tenderer must submit country of origin and name of manufacturer for the offered goods.
12. The foreign bidders who participate in this tender must submit their bids through a registered local agent or through their registered office in Jordan.
13. For all manufacturers from inside Jordan it is quite essential that they have JQM for their products and the purchaser will have the right to accept or reject their offer if they did not submitted the JQM certificate with their offer.

14. If samples were not re-claimed by the tenderer within one month from date of order all samples shall remain the property of the purchaser.
15. The purchaser will not be responsible for, nor to pay for, any expenses or losses which may be incurred by a tenderer in the preparation of his tender.
16. If the tenderer has any doubt about the meaning of any portion of the General Conditions, Specifications, Drawings, he shall clarify such doubts before submitting his tender, or in case of any further information can be obtained by an application in writing to the director general.
17. Tenderers are particularly directed that the amount entered on the form of tender shall be a fixed price for performing the contract strictly in accordance with the bound document, and shall be the sum total of all the amounts printed into and entered by the tenderer upon the schedule of prices.
18. Tender price shall include all incidental and contingent expenses.
19. The tender shall be accompanied by a tender bond in the form of a Bank Guarantee valid for at least 90 days from the time fixed for opening the tenders or certified check in favor of and payable to the purchaser for a sum of **5% Of Your Offer** _____ as a guarantee of good faith. This bond is to be issued by any approved bank in Jordan. The bond will be returned to the unsuccessful tenderer within (90) days from the time fixed for opening the tenders or at such earlier time as a tender shall have been accepted by the purchaser. In the case of the successful tenderer, the bond will, subject to the conditions of contract, be returned as soon as a formal contract agreement and a performance bond have been entered into.
20. The successful tenderer has to submit a performance bond equal to (10%) ten percent of the total amount of the order within (15) days from date of receipt of the order. Any delay will be subject to delay penalty.

If the successful tenderer fails for any reason to submit the required performance bond within (15) days, the purchaser will confiscate the bid bond and the awarding letter will be cancelled too.
21. The performance bond should be valid for a period; expiring at least one month after receipt of the last consignment in EDCO stores.

22. The tenderer shall state in his tender the name or names of the sureties, insurance company, or bank proposed for guaranteeing the performance of the contract.
23. Prices are highly recommended to be on the basis of C&F EDCO STORES. However CFR Aqaba port or Amman customs are also accepted. All prices offered shall be exempted from custom duties, sales taxes, import license fees and any other tariffs.
24. The tenderer may state the tender price in Jordanian Dinars. If however, a portion of the tenderer's expenditure under the contract is expected to be made in countries other than Jordan he may state a corresponding foreign currency portion of the tender price in the currencies of those other countries.
25. Stamp duty and award fees are payable on Jordanian contracts according to Jordanian laws and, after the placing of a contract, it is the contractor's responsibility to purchase legal stamps to the requisite amount depending on the contract value.
26. If after receipt of tenders, the purchaser finds any difference between prices shown on the form of tender in writing and in numerals, then the price shown in writing shall be considered correct by the purchaser and the tenderer. If any discrepancies are found between the total in the price schedule and the total obtained by adding the products of each quantity and its particular rate then, whether the price shown on the form of tender in numerals or in writing corresponds or not, the total obtained by adding the products of the quantities and their particular rates shall be considered by the purchaser and the tenderer as the tender price.
27. Tender evaluation will be consistent with the terms and conditions set forth in the tender document. In addition to the tender price adjusted to correct arithmetical errors, other relevant factors such as the time of completion of delivery or construction, operating costs where applicable, or the efficiency and compatibility of the equipment, the availability of service and spare parts, and reliability of construction methods proposed will be taken into consideration, to the extent and in the manner specified in the tender documents, in determining the evaluated tender most advantageous to the purchaser. For comparison of all tenders, the currency or currencies of the tender price for each tender will be valued in terms of Jordanian Dinars. The

rates of exchange to be used in such valuation will be the selling rates published by the CENTRAL BANK OF JORDAN and applicable to similar transactions, on the day tenders are opened unless there should be a change in the value of the currencies before the award is made. In the latter case, the exchange rates prevailing at the time of the decision to notify the award to the successful tenderer may be used.

28. The purchaser does not bind himself to accept the lowest offers of any tender, nor to assign any reason for the rejection of any tender, nor to purchase the whole of the equipment and materials specified. The purchaser has the right to purchase part of the tender, even if it is only one item from the schedule of rates and prices.
29. The tenderer shall submit with his tender in order of the relevant clauses, a statement of any departures from specifications, or he can fill in the related schedule attached herewith. Notwithstanding any description, drawings, or literature which may be submitted, all details other than those in the statement of departures shall be assumed to be in accordance with the specification.
30. Although IEC standards for workmanship, equipment and materials, have been selected in this specification as a basis of reference, standards and specifications of other countries and recommendations of other international standard organizations will be acceptable provided that they are substantially equivalent to the designated standards and provided

Further that the tenderer submits for approval detailed specification which he proposes to use.

31. References to brand names or catalog numbers, if any, in this specification have been made only for that equipment for which it has been determined that a degree of standardization is necessary to maintain certain essential features. In certain instances such references have also been made for purpose of convenience to specify the requirements. In either case offers of alternative goods which have similar characteristics and provide performance and quality at least equal to those specified are acceptable.
32. Where compliance with a specific standard specification is called for the standard specification used shall be that in force at the time of tender.
33. The Tenderer should submit a type test certificate from independent testing laboratory similar to the Tender materials as an evidence of his capability to

manufacture such materials also to submit a reference list showing his past supply and he should prove that he supplied similar materials to more than one firm and operated for more than 3 years without problems otherwise his offer will not be considered.

34. A nonrefundable fee of (550) JD will be charged for each set comprising one copy of the Tender Documents.

TENDER AGREEMENT SUMMARY

Tender No. (4/2023)

Dear Sir;

1. Having examined the conditions of Contract, specification and schedule for the above Works, the undersigned, offer to manufacture, supply, work, test, and deliver the said works described in the specification and schedules and in accordance with the said conditions of contract, for the sum of _____ or such other sum as may be ascertained in accordance with the said conditions.
2. We agree that this tender shall be held open for acceptance or rejection for the validity period of **(90) days** from the date fixed for opening tenders and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
3. Unless and until a formal agreement is prepared and executed, this tender, together with your written acceptance thereof, shall constitute a binding contract between us.
4. If our tender is accepted, we will deliver to **ELECTRICITY DISTRIBUTION COMPANY**. Within **(15) days** of being called upon to do so a performance bond by bank or insurance company (to be approved in either case by the purchaser) to be jointly and severally bound with us in a sum equal to **10%** of the value of the contract. The form of the performance bond will be as attached hereto. We propose the following Bank or insurance company as surety (or sureties) in this respect:-.....

5. We undertake if our tender is accepted and on receipt of your acceptance to commence and manufacture, works test, and complete for delivery **ex-works** the whole of the Works offered within (——) weeks calculated from the date of **Order Letter Awarding**, and to deliver on the dock at (—— port) - Jordan the whole of the works offered within a further (—— weeks, or to **EDCO stores** within a further (——) weeks.
6. We undertake to insure the materials against all risks from the time they leave the works until they are placed on board ship. We understand that marine insurance will be affected by **ELECTRICITY DISTRIBUTION COMPANY**. And we will provide details of the materials to be shipped in good time for **ELECTRICITY DISTRIBUTION COMPANY** to arrange for the said marine insurance.
7. A guarantee Period will apply to each section of the works of 15 months from the date of dispatch ex-works or 12 months from the date of setting to work whichever shall be later.
8. We understand that you are not bound to accept the lowest or any tender you may receive.

Dated this ——— day of / / 2023.

Signature———— in the capacity of————

Duly authorized to sign Tender for and on behalf of ———

ADDRESS ——— OCCUPATION ———

ELECTRICITY DISTRIBUTION COMPANY.

Form of Bid Bond

Tender No. (4/2023)

Dear Sir,

We are pleased to inform you that we guarantee
M/S _____for the amount
of _____in order to allow them to submit an offer
for the due performance of the undertaking and obligation as specified in their
Tender for Contract No. _____This Guarantee shall remain valid for a
period of **(90)** days from the time fixed for opening the Tenders by
ELECTRICITY DISTRIBUTION COMPANY.

This Guarantee shall be free from any interest and will be extended or paid in cash upon your first request in any or required, without the need for natural warning or judicial proceedings and without any rights to delay, oppose, or stop payment on our part, or on the part of the Tenderer or any of his representatives whomever.

This Guarantee shall be deemed valid until the submittal of a duly executed Performance Bond.

Signed _____ Bank (Surety)

ELECTRICITY DISTRIBUTION COMPANY.

Form of Performance Bond

Tender No. (4/2023)

Dear Sirs,

At the request of _____ bank (the Foreign Bank)
and on behalf of M/S _____
(Contractor's Name and Address), we _____ Bank (the
Local Bank) issue in your favor our irrevocable and unconditional Performance
Bond No. _____ in the amount of _____
_____(In _____ words), in this connection we
_____ Bank (the Local Bank) hereby consider
ourselves responsible forth unconditional payment to you or to your authorized
representatives of the above sum on your first written demand in whole or in
part notwithstanding any objections on the part of the above named contractor
and without any need for natural warning or judicial proceedings.

This Bond will expire on _____ and shall be renewed automatically for
a period of _____ months and for consecutive similar periods until it is
returned by you to us.

Signed _____ Bank (Surety)

ELECTRICITY DISTRIBUTION COMPANY.

Form of Maintenance Bond

Tender No. (4/2023)

**M/S. ELECTRICITY DISTRIBUTION CO. (EDCO)
Amman – Jordan**

At the request of _____ Bank (the foreign bank) and on behalf of M/S : _____ (The Contractor name and address), we _____ Bank (the local bank) issue in your favor our irrevocable and unconditional maintenance bond No.(_____) in the amount of _____ (In words) valid until _____ covering _____ PCT value of the _____ (Contract No. Name), in this connection we the _____ Bank (local bank), hereby consider ourselves responsible for the unconditional payment to you or your authorized representatives of the above sum on your first written demand in whole or in part notwithstanding any objections on the part of the above named Contractor and without any need for notarial warning or judicial proceedings.

This bond will expire on _____and shall be renewed automatically for a period of (_____) months and for consecutive similar periods until it is returned by you to us.

Signed _____ Bank (Surety)

TECHNICAL SPECIFICATIONS
AND SCHEDULES

1. General

The distribution transformers are intended for use in outdoor distribution substations in conjunction with 33kV or 11kV load break switches or cutout fuses and L.V distribution boards, to be supplied separately.

The distribution transformers shall be supplied as specified hereafter complete and ready for installation and service after completion of the incoming and outgoing connections.

All equipment shall be easily accessible for maintenance and inspection. Ease of erection shall be considered in the design. The design shall incorporate every reasonable precaution and provision for the safety of all those concerned in its operation and maintenance.

No welding, filling, or plugging of defective part will be permitted without the approval in writing of the EDCO.

Cast iron shall not be used for chambers of oil-filled apparatus or for any part of the equipment which is in tension or subject to impact stresses except where it can be shown that service experience has been satisfactory with the grade of cast iron and duty proposed.

All connection and contacts shall be of ample section and surface for carrying continuously the specified currents without undue heating and shall be secured by bolts or set screws of ample size, fitted with locking devices of approved type and material.

2 OIL IMMERSED TRANSFORMERS:

2.1 THREE PHASE OIL IMMERSED TRANSFORMERS:

Three-phase oil immersed transformers, self - cooled, outdoor ground mounted, or pole mounted with the following technical data:

-Rated power on continuous operation in KVA:	1500, 1000, 630, 400, 250, 100
-Rated highest primary side voltage	36, 12 KV
-No load voltage ratio	33/0.415, 11/0.415
-Rated primary side voltage	33kV or 11kV
-Off - load tap changer with taps for	± 5 %(5 steps 2.5% each)
-Rated low voltage	415 V
-Vector group	Dyn11

-With skids, provided that transformers with rated power 100, 250, and

400KVA must be U–Channel Type; suitable for pole mounted installation on Concrete H-Poles.

- With conservator tank or sealed
- With pressure relief device
- With complete oil filling
- With contact thermometer range 0 °C to 120 °C
- With oil level gauge (unbreakable)
- L.V. neutral point solidly earthed.
- Temperature rise of windings at continuous maximum rating (C.M.R.) 55 °C
- Temperature rise top oil at C.M.R. 50 °C
- With MV bushing equipped with clamps suitable for connection of Aluminum conductor of 50 mm² to 200 mm²
- With L.V bushings either outdoor or housed in a cable box -attached to the side of the transformer,- The Cable Box should be fitted in a style guarantees cables' easy access from the bottom side, as specified in schedules of requirement.** The LV bushings shall be equipped with suitable clamps for connection of single core Cu conductor PVC cables of the following sizes:
 - 5(1x300mm) per phase + 3(1x300mm) per neutral for 1500KVA
 - 3(1x300mm) per phase + 2(1x300mm) per neutral for 1000KVA
 - 3(1x185mm) per phase + 2(1x185mm) per neutral for 630 KVA
 - 2(1x185mm) per phase + 1x185 mm per neutral for 400 KVA
 - 1x185 mm per phase + 1x120 mm per neutral for 250 KVA
 - 1x120 mm per phase + 1x120 mm per neutral for 100 KVA

The size of the LV cable box should be sufficient to install a meter (dimensions are (40x25) cm in addition to the installation of ring current transformers inside, the supplier should have approval for the drawing of the transformer and LV cable box.

2.2 SINGLE PHASE OIL IMMERSED DUAL-SECONDARY TRANSFORMERS:

Single-phase oil immersed transformers, self - cooled, outdoor pole mounted with the following technical data: -

- Rated power on continuous operation in KVA: 25, 50
- No load voltage ratio 33/0.46(0.23+0.23), 11/0.46(0.23+0.23) KV
- secondary side with three terminals, one common and 230 V per each two others (dual-secondary).
- Rated highest primary side voltage 36, 12 KV
- Off - load tap changer with taps for $\pm 5 \%$ (5 steps 2.5% each)
- With outdoor bushings.
- With skids.
- Pole mounted brackets, where cylinder type transformer that is mounted on one pole

is preferred.

-With pressure relief device.

-With complete oil filling.

-With contact thermometer range (0-120) °C with maximum temperature pointer.

-With oil level gauge (unbreakable).

-With suitable lifting and pulling lugs.

-LV neutral point solidly earthed .

-Temperature rise of windings at C.M.R. 55 °C

-Temperature rise top oil at C.M.R. 50 °C

2.3 TANKS

Each transformer shall be enclosed in a suitable stiffened welded steel tank such that the transformer can be lifted and transported without permanent deformation or oil leakage. The construction shall employ weldable steel of an approved grade.

The transformer tank shall be vacuum-proof and suitable for outdoor installation.

The tank shall be equipped with standard accessories as follows: -

- Oil drain valve fitted at the lowest point of the tank at one of the narrow sides.
- Oil filter valve located near to the top of the tank.
- Oil sampling valve near to the bottom of tank.
- 2 earthing screws.
- Suitable no of lifting lugs for the cover plates of the active part.
- Suitable no of pulling lugs.
- 1 thermometer pockets.
- Rating plate and connection diagram.
- One dial thermometer for oil temperature indication with maximum temperature indicator.

The tank and cover shall be designed in such a manner as to leave no external pockets in which water can lodge, no internal pockets in which oil can remain when draining the tank or in which air can be trapped when filling the tank and to provide easy access to all external surfaces for painting.

Each tank cover shall be of adequate strength, shall not distort when lifted and shall be provided with suitable flanges having sufficient and properly spaced bolts.

The gasket of the cover plates shall be at least 2mm thick and shall be of two-fold construction and of such type that its further use shall be possible after the tank has been opened. A solid earth connection between cover and tank shall be ensured.

Hermetically sealed transformers with fins are accepted.

2.4 OIL CONSERVATOR TANKS AND BREATHERS

Conservator tanks shall be formed of substantial steel plates and arranged above the highest point of the oil circulating system. Connections into the main tank shall be at the highest point to prevent the trapping of air or gas under the main tank cover.

The oil conservator shall be detachable and arranged at the narrow side of the transformer tank. The capacity of each conservator tank shall be adequate for the expansion and contraction of oil in the whole system under the specified operation conditions. Conservator tanks shall be provided with cleaning door, filling cap, drain valve with captive cap. An oil level indicator consisting of unbreakable material shall be installed at one end of the oil conservator tank. A dehydrating breather with silica gel filling shall be fitted to the air inlet pipe.

2.5 JOINTS AND GASKETS

All joint faces shall be machined or ground and arranged to prevent the ingress of water or leakage of oil with a minimum of gasket surface exposed to the action of oil or air.

Oil resisting synthetic rubber gaskets are not permissible except where the synthetic rubber is used as a bonding medium for cork or similar material or where metal inserts are provided to limit compression.

2.6 PRESSURE RELIEF DEVICE

An approved pressure relief device of sufficient size for the rapid release of any pressure that may be generated in the tank and designed to operate at a static pressure lower than the hydraulic test pressure shall be provided.

If a diaphragm is used, it shall be of approved design and material and located above the maximum oil level.

A pressure-equalizing pipe shall be provided between the pressure relief device and the oil conservator.

2.7 MAGNETIC CIRCUITS

The design of the magnetic circuit shall be such as to avoid static discharge, development of short circuit paths internally or to the earthed clamping structure and the production of flux components normal to the plans or the laminations. Each lamination shall be insulated with a material stable under the action of pressure and hot oil.

The winding structure and major insulation shall be designed to permit an unobstructed flow of cooling oil through core cooling ducts to ensure efficient core cooling.

The magnetic circuit shall be insulated from all structural parts and shall be capable of withstanding a test voltage to core bolts and to the frame of 2KV r.m.s. for one minute.

Cores shall be constructed from cold rolled grain-oriented steel sheets. The flux density under the most onerous conditions in any part of the magnetic circuit shall not exceed 1.9 tesla.

The top main core clamping structure shall be connected to the tank body by a copper strap and the bottom main core clamping structure shall be earthed.

The magnetic circuit shall be earthed to the clamping structure at one point only beneath an inspection opening in the tank cover and which, by disconnection will enable the insulation between the core and clamping plates, etc. to be tested at voltages up to 2.5 kV for the purpose of checking deterioration during service.

The connection to the link shall be on the same side of the core as the main earth connection.

Magnetic circuits having an insulated sectional construction shall be provided with a separate link for each individual section. Where oil ducts or insulated barriers parallel to the plane of the laminations divide the magnetic circuit into two or more electrically separate parts, the ducts and insulating barriers which have a thickness greater than 0.25 mm are to be bridged with tinned copper strips so inserted as to maintain electrical continuity.

2.8 WINDINGS

The windings shall be completely short-circuiting proof.

The MV winding shall be subdivided into a suitable number of single coils and shall be composed of individual discs. Design of the windings must provide unrestricted cooling ducts ensuring free circulation of oil, proper heat dissipation and preventing accumulation of heat.

Tapped coils shall be placed at the center of the winding. The end windings shall be suitably insulated to withstand impulse voltages.

The winding and leads of all transformers shall be braced to withstand the shocks, which may occur through rough handling and vibration during transport, switching and other transient service conditions.

The windings shall be thoroughly dried out and vacuum impregnated, during which time they shall be shrunk under pressure to eliminate shrinkage in service.

Aluminum windings could be used instead of copper, where the transformers are to be guaranteed for a period of two years, with full technical data, experience, test reports of such transformers to be submitted separately. All values of copper (were applicable) to be substituted by Aluminum.

2.9 OFF-LOAD TAP CHANGERS

Off-load tap changers shall be short circuited proof. They shall be manually operated while the transformer is de-energized by means of a special spindle; while the same should be equipped with Five (5) Taps suitable for voltage changing from -5% to +5% of the rated voltage with a step of 2.5%.

The design shall ensure that the tap selectors on all three phases operate simultaneously. An external operating handle shall be located on the cover, register plates clearly indicating tapping in use must be fixed to the external operating handle and provision shall be made for securing the switches in any working position to prevent operation by unauthorized persons.

2.10. TERMINAL BUSHING

(I) General: -

The transformer shall be provided with outdoor type bushing insulators for phase and neutral terminals. The bushings shall have a minimum creepage distance of 1320 mm for 36 kV bushings and 440 mm for 12kV bushings, and to be provided with adjustable arcing horns. All bushings shall meet the requirements of IEC 60137 or equivalent standards.

- Porcelain: - All porcelain shall be sound, free from defects and thoroughly Vitrified. The glaze must not be depended upon for insulation. The glaze shall be smooth and hard and shall cover completely all exposed parts of the insulator. Outdoor insulators and fittings shall be unaffected by atmospheric conditions. All porcelain insulators shall be of the anti-fog type, designed to facilitate cleaning. Each porcelain bushing or insulator shall have a mark of manufacturer identification and the date of manufacturing.

The terminal bushings both for MV and LV shall be supplied with the necessary clamps to fit the aluminum conductor connection to the MV bushings and the single core PVC, CU cable to the LV bushings.

- Polymeric Rubber : For outdoor bushing weather-proof polymer-type with grey color single-piece housing and hydrophobic sheds that are designed to minimize trapping of contamination of dust, sands, moisture, etc. Housing is made of UV-resistant high-temperature vulcanized silicon rubber and shall be comply with the last edition of IEC62217

The bushing type will be specified according to EDCo requirements.

Some transformers shall be provided with cable boxes at both LV and MV sides.

2.11 OIL

The insulating oil shall be one of the following types:

1. Uninhabited mineral Oil-Naphthenic Oil Base comply with IEC 60296 for mineral oil. (Paraffinic Oil Base not accepted).
2. Synthetic Ester Oil comply with IEC 61099
3. Renewable Natural Vegetable Ester comply with IEC 62770

The fundamental requirements of the insulating oil are:

- The oil shall be PCB free and this shall be clarify in your offer and the routine test certificate of transformers
- The oil must be clean, free from impurities such as suspended or solid matters, detrimental chemical compounds and water.

For mineral oil:

- The oil must be chemically stable, i.e. its deterioration due to heating caused by oxygen at the service temperatures must be as low as possible.
- The oil shall be uninhibited oil.

The chemical composition and the physical characteristics of the Insulating oil shall be as follows:

Three copies of certified test reports of oil shall be submitted.

The oil shall be complied with the following characteristic.

Natural easter oil (IEC62770)	Mineral oil (IEC 60296)	Synthetic easter oil (IEC 61099)
renewable natural vegetable easter oil Base Type	Mineral Naphthanic Oil Base	Synthetic easter
Density at 20°C ≤ 1000 KG/M³	Density at 20°C ≤ 895 KG/M³	Density at 20°C ≤ 1000 KG/M ³
Viscosity at 40 C° ≤ 50	Viscosity at 40 C° ≤ 12	Viscosity at 40 Co, ≤35
Viscosity at 0C° ≤ 500	Viscosity at -30 C° ≤ 1800	Viscosity at 20 Co, ≤3000
Flash point ≥ 275 C°	Flash point ≥ 135 C°	Flash point ≥ 250 Co
Fire point ≥ 300 C°	Fire point ≥ 170 C°	Fire point ≥ 300 Co
Pour point ≤ -10	Pour point ≤ -40	Pour point ≤ -45
Acidity Value Mgkoh /G ≤ 0.06	Acidity Value Mgkoh /G ≤ 0.01	Acidity Value Mgkoh /G ≤ 0.03
Dielectric dissipation factor at 90 C° ≤ 0.05	Dielectric dissipation factor at 90 C° ≤ 0.005	Dielectric dissipation factor at 90 Co ≤ 0.03
Dielectric Breakdown voltage 2.5 mm gap ≥ 35 kv	Breakdown voltage ≥ 30 KV Before treatment & ≥ 70 KV after treatment	Breakdown voltage ≥ 45
Water content ≤ 200 mg/Kg	Water content ≤ 30 mg/Kg	Water content ≤ 200 mg/Kg

The oil shall be supplied only from one of the following manufacturer:

For mineral oil
✓ TOTAL(Multi-brands)
✓ Shell Global
✓ Nynas
✓ British petroleum(Multi-brands)
✓ Eargon
For synthetic or natural easters oil
✓ Midel oil
✓ Cargill

2.12 **SURFACE TREATMENT**

Transformer and all metal parts shall be protected by one primary and two finishing coats of appropriate paint prior to delivery.

The color of the outer surface of the package shall be of RAL 7038.

The interior of the tank and the oil conservator shall be painted with two coats of varnish.

2.13 **LOSSES AND EVALUATION OF LOSSES**

The tenderer shall state in the Schedule of Particulars and Guarantees the guaranteed values for component losses (i.e., no-load loss, load loss at C.M.R. of the total loss which shall be as low as is consistent with transport restrictions, reliability and economic use of materials.

Tenderers will be assessed on the basis of the capital cost plus Present Worth of guaranteed losses as follows:

$$C = C_o + 6325 Fe + 2040.66 Al$$

Where: C is the cost of assessment in JD's.

C_o is the tender price of transformer in JD's.

Fe; the no load loss expressed in kilowatts, as shown in the Schedule of Particulars.

Cu/Al ; the full load copper/aluminum loss expressed in kilowatts, as shown in the Schedule of Particulars.

The transformer will be accepted after passing FAT related tests successfully; and the FAT losses actual results are governing transformers acceptance as follows:

- a) FAT actual losses are above tender value of the losses, then the transformer is rejected
- b) FAT actual losses are equal or less than offered value, then the transformer is accepted.
- c) FAT actual losses are equal or less than tender value but above offered value then the transformer is accepted with the following penalty (*)
- ΔFe component losses penalty in JoD = $6325 \cdot \Delta Fe^3$
 - $\Delta Cu/Al$ component losses penalty in JoD = $2040.66 \cdot \Delta Cu^3$
 - ΔFe & $\Delta Cu / Al$ losses penalty are the summation of above two equations.

Where:

- ΔFe losses > 0, ΔCu losses > 0
- ΔFe losses: the difference between the actual no-load losses value and no-load losses offered value (KW)
- $\Delta Cu/Al$ losses: the difference between the actual load losses value and load losses offered value (KW)

(*): Transformer is accepted if and only if the component losses (Cu/AL, Fe) are less than or equal 15% of the guaranteed offered value **and** the total losses (Cu+Fe) are less than or equal 10%, according IEC 60076.

IMPORTANT ONTE: THE GUARANTEED TOTAL LOSSES SHALL NOT EXCEED THE FOLLOWING PERCENTAGES (MAX) OF ONAN RATING FOR BOTH 33&11KV TRANSFORMERS.(ACCORDING EDCO REQUIREMENTS)

Rating (KVA)	Percentage of losses%	The permitted total losses(W)
50	1.2	600
100	1.2	1200
250	1	2500
400	0.8	3200
630	0.7	4410
1000	0.8	8000
1500	0.7	10500

In the event of transformers yielding component and total losses, which are either equal

to or below the guaranteed values, the Tenderer will not be entailed to any premium in respect of reduction in losses below the guaranteed values.

2.14 INSPECTION AND TESTING

All transformers shall be subjected to inspection and testing in accordance with IEC 60076. The Purchaser may attend these tests.

Inspection and test Plan (ITP) should be submitted for EDCO review & final approval at proper notice not less than 21 days prior to execute the Factory acceptance Test (FAT).

Adequate notice shall be given when the transformers are ready for inspection or test and every facility shall be provided by the supplier to enable the Purchaser to carry out the necessary inspections and tests.

Before the transformers are packed or dispatched all tests called for shall have been successfully carried out.

No passing of plant or materials by the Engineers shall relieve the Contractor from his responsibility.

The contractor shall also be responsible for proper carrying out of all test of work and of plant and material carried out or supplied by a sub-contractor to the same extent as if the work, were carried out or supplied by the contractor himself.

If, due to the Contract works and/or component materials not complying with these specifications further tests are necessary, the Contractor shall pay all additional costs which may be incurred in re-testing.

The following tests shall be carried out: -

2.14.1 TRANSFORMERS

- **Routine Tests**

All transformers shall be subjected to the following Routine tests in accordance with IEC 60076:

- 1- Measurement of winding resistance.
- 2- Ratio, Polarity and phase relationships.
- 3- Impedance voltage.
- 4- Load loss
- 5- No load loss and no-load current.
- 6- Induced over voltage withstand
- 7- Separate source voltage withstand.
- 8- leak testing.
- 9- check of core and frame insulation.

B) Type Tests

The Tenderer should submit with his offer complete Type Test certificates and (9 asymmetrical shots and 3 seconds symmetrical) short circuit tests according to IEC standard from one of STL group laboratory for the Transformers as evidence of his capability to manufacture such materials.

Offered materials and equipment should be certified under STL umbrella and not before ten (10) years before the date of tender announcement.

Temperature-Rise Test: The test shall be in accordance with IEC 60076-2 and shall be carried out on one transformer of each rating. The transformer shall be selected randomly by EDCO.

Temperature-rise test shall be conducted on the tapping corresponding to the maximum losses.

Hot spot determination should be done on one transformer for the whole contract. The transformer shall be selected randomly by EDCO.

Dielectric Type Test:

These shall be made on one transformer of each rating. The transformer shall be selected randomly by EDCO, and shall include the following requirements:

The transformers shall have been subjected to the above routine tests prior to the impulse voltage tests and those transformers subjected to the temperature-rise test shall be impulse tested as soon as practicable thereafter.

The procedure shall be as required by IEC60076-3 the impulse test voltages being applied successively to each line terminal.

Negative polarity is to be used throughout the tests.

Oscillographic records of the applied voltage and neutral current and/or transferred voltage are to be taken and included in the records.

Films of the oscillographic records are to be made available to the engineer at the time of the tests for his examination.

Chopped impulse should be applied as per IEC 60076-3.

External flashover of the bushings during the chopped wave tests is not permitted

C) Special Tests

- 1. *The Tenderer should submit with his offer complete (9 asymmetrical shots and 3 seconds symmetrical) short circuit tests according to IEC standard from one of STL group laboratory for the Transformers as evidence of his capability to manufacture such materials.***

Offered materials and equipment should be certified under STL umbrella and valid up to ten (10) years before the date of tender announcement.

- 2. Dissipation factor and shall be according to IEEE.**
- 3. Insulation resistance.**
- 4. Capacitance.**
- 5. Zero phase sequence impedance measurement:**

This test shall be in accordance with IEC 60076 and tests numbered (2-5) above, shall be carried out on 10% of transformers quantity.

Note: For similar transformer type test certificate, the tenderer shall be filling compliance sheet to proof the similar design according to IEC.

EDCO will be accept only the similar design of transformer for the same level voltage.

2.14.2 VOLTAGE CONTROL EQUIPMENT

Routine Tests: Each finished tap changer is to be subjected to the mechanical and dielectric routine tests specified in IEC.60214.

2.14.3 MAGNETIC CIRCUIT

Routine Tests:

Each core completely assembled is to be tested for one minute at 2500 volt a.c. between core and bolts, side plates, structural steel work and core and coils stage. After the transformer is tanked and completely assembled, a further test is to be applied at 500 V d.c. between the core and the earthed structural steel work to prove that the core is earthed through the removable link, at one point only as required in this specification.

2.14.4 COMPLETE OUTDOORS BUSHING ASSEMBLIES WITH PORCELAIN INSULATORS.

Routine test to include:-

- A) Voltage test.**
- B) Power factor-voltage measurements.**

Type test to include:-

- A) Dry withstand and flashover voltage tests.
- B) Visible Corona test.
- C) Wet voltage withstand test.
- D) Wet flashover test.
- E) Impulse voltage test.
- F) Flashover under oil test.

2.14.5 **TANKS**

Routine Test

A) Oil Leakage:

All tanks, conservators and oil filled compartments which are subjected in service or during maintenance to oil pressure are to withstand without leakage, a hydraulic pressure test equal to 69 KN/m² or the normal pressure plus 34 KN/m² whichever is the greater, for 24 hr during which time no leakage or oil ingress into normally oil free space shall occur.

Type Tests

Unless type test certificates can be produced for tests carried out on similar equipment, the following tests are to be included for tanks, conservators and pressure relief devices.

A) Vacuum Test (where applicable):-

The equipment is to withstand a vacuum of 508 mm of Mercury when empty of oil. The permanent deflection of plates or stiffeners on removal of vacuum is not to exceed the following values.

<u>Length of Plate</u>	<u>Permanent Deflection</u>
Less than 1300 mm	3.17 mm
1300 to 2500 mm	9.5 mm
Greater than 2500 mm	12.7 mm

- Pressure Test:-

The equipment is to withstand a pressure corresponding to 69 KN/m² or the normal pressure plus 34 KN/m² whichever is the greater.

The permanent deflection of plates or stiffeners on removal to pressure is not to exceed the value stated in respect of the vacuum test in the preceding paragraph.

2.14.6 **OIL TEST**

Samples of oil from each compartment and each separate consignment shall be

tested and comply with the tests specified in the appropriate standard. In addition type tests should be submitted.

Bushing

The requirements of this section are applicable to ceramic, treated paper, condenser and other bushings for use indoors or outdoors and must be without fluid or filling.

Routine Tests

In accordance with the requirements of IEC 60137.

Sample Tests

In accordance with the requirements of IEC 60137.

Type Tests

In accordance with the requirements of IEC 60137.

- (a) Puncture Withstand Test – The bushing, immersed in the medium, or media as intended for service shall have a voltage an approximately one third of the test voltage applied to it. The voltage shall be increased to the test voltage as rapidly as is consistent with its value being indicated by the measuring means, provided that the time taken to increase the voltage to the final value is not less than 10 seconds. The final test voltage, which shall be (15%) greater than the specified power withstand voltage sustained only for time necessary to determine it. Puncture or flashover shall not during the test.

Bushing which have been subjected to this test shall not thereafter be used in the contract works without special approval.

Alternatively, on bushings intended for use with impulse tested apparatus, the test shall be performed by subjecting the bushing under the above conditions to five consecutive impulse voltage waves. The impulse waves shall be of the most onerous polarity and of a value (15%) in excess of that specified as the Rated Insulation Level. During this test puncture of the bushing or flashover of insulator shall not occur, but flashover of air ends is permissible.

• Porcelain Insulators

The requirements of this section are applicable to porcelain which are complete or form part of complete bushing assemblies.

Routine Tests

In accordance with the requirements of IEC 62155.

Type Tests

In accordance with the requirements of IEC 62155.

- **Silicon rubber**

Design test

In accordance with the requirements of IEC61109

Sample test

In accordance with the requirements of IEC61109

Routine Tests

In accordance with the requirements of IEC61109

Type Tests

In accordance with the requirements of IEC61109

In additional: the manufacturer has to submit a test certificate to indicate the performance of ageing test according to the last edition to IEC61109 and IEC62217 Also; documentations have to be provided to indicate that the test has been passed successfully. The test procedures must be performed by one of STL group laboratory as evidence of his capability to manufacture such materials.

Offered materials and equipment should be certified under STL umbrella and not before ten (10) years from the date of tender announcement.

Material

Sample Tests

Samples selected by the Engineer from metals used in the contract Works shall be tested to prove compliance with the Specification.

Galvanizing

Sample Tests

Representative samples, selected by the Engineer of all galvanized material shall be submitted to galvanizing test. Galvanized fittings associated with insulators and steel cores for aluminum conductor steel reinforced cables shall be tested in line with the relevant IEC Recommendation. All other fittings, fabrications, hardware and fixings shall be inspected and tested in accordance with ISO Recommendation R 1460 and R 1461.

Handling Devices and Lifting Tackle

Routine Tests

All handling devices and lifting tackle supplied for maintenance purposes under this contract shall unless they are built into and form part of the equipment, be tested, marked and certificates of test provided.

Lifting tackle built into and forming part of the equipment shall be operated with the maximum working load to the satisfaction of the Engineer.

3. PACKING

All transformers shall be packed and supported by all necessary packing aids and shipped by **top open containers**

Careful packaging of all equipment is of the utmost importance and will be subject to inspection control, when the following aspects will be examined:-

- Package design.
- Protection of material/equipment against damage by mechanical shock, moisture ingress and adverse atmospheric conditions.
- Material Quality.
- Case markings and coding.
- **Bushings shall be backed and fixed by wooden box for each insulator to prevent the bushing from damage during transportation.**

4. LIST OF EQUIPMENT

Distribution Transformer

The following details are given in accordance to IEC 60076-1 Annex A.

- (1) The Particular Specification associated with this schedule, IEC 60076-1.
- (2) Separate Winding Transformer, 50Hz, 33 and 11KV, with off circuit voltage control from +5% to – 5% of the rated voltage in steps of 2.5%, M.V. tapping. The tap changer shall be in the form of an off circuit tap selector switch or links.
- (3) System highest voltage: M.V.: 36KV or 12KV
L.V.: 440V.
- (4) System earthing: L.V. solidly earthed.
- (5) Insulation Level: 170(33), and 75(11) KV.

To complete each equipment detailed in this schedule there shall be provided the necessary bushing, all auxiliary equipment, including any steel work, panel wiring, fuses, interlocking devices, holding down bolts, screens, guards, labels and all necessary sundries whether specified in detail or otherwise.

In all cases the current rating referred to are the minimum continuous site ratings required for the equipment in its final on site location.

The following items shall be provided for each transformer in addition to specific details for each transformer:-

- (a) Terminal configuration according to drawing no.
- (b) Temperature indicator with maximum recording pointer.
- (c) Temperature control for fans.
- (d) Rating and diagram plates to IEC60076.
- (e) Earth terminal.
- (f) Lifting fittings for the whole transformer.
- (h) Jacking lugs.

6. DRAWINGS AND MAINTENANCE INSTRUCTIONS

Drawings for approval shall be submitted in duplicates as paper prints and, after having been approved, the contractor shall supply (six) further copies, one copy at least being a reproduction on a tracing cloth as specified in this specification

The following are the drawings, which shall be submitted by the Bidder:-

- a) General arrangement of transformers showing medium and low voltage sides
- b) End elevation of transformer
- c) Plan of tank and terminal gear
- d) General arrangement of tap equipment
- e) Detail drawing of MV and LV bushings

The following is a list of drawings to be submitted by the contractor for approval within one month from the Commencement Date or such other period as may be agreed with the Purchaser: -

- a) Drawings corresponding to all drawings submitted by the supplier with his Tender
- b) Outline, general arrangement, sectional and detail drawings of each transformer.
- c) Drawings showing the construction of the transformer tank, tank cover and terminal arrangements with details of all accessories.
- d) Diagram of connections of the transformer, showing the polarity of the windings.
- e) Details of cable boxes and fittings
- f) Instruments scales.
- g) All catalogs, manuals, etc of the transformers and its apparatus.

MAINTENANCE INSTRUCTIONS

Before the specified completion date of the Contract works, the Supplier shall submit maintenance instructions. Diagrams and record drawings for approval by the Engineers and shall supply six further copies of the final approved form.

5. PAINTING, GALVANIZING AND WELDING PROCEDURES:

The painting should be **electrostatic** painting.

The above-mentioned producers should be submitted with the offer.

SCHEDULES AND GUARANTEES

<u>SCHEDULE NO.</u>	<u>DESCRIPTION</u>
A	SCHEDULE OF REQUIREMENTS
B	PRICE SCHEDULE
C	GUARANTEED DELIVERY PERIODS SCHEDULE
D	MANUFACTURER AND PLACES OF MANUFACTURE, TESTING AND INSPECTION SCHEDULE
E	LIST OF TYPE TEST CERTIFICATES
F	LIST OF SERVICE EXPERIENCE
G	DEVIATIONS FROM SPECIFICATIONS SCHEDULE

SCHEDULE (A)
SCHEDULE OF REQUIREMENTS

ITEM NO.	DESCRIPTION	Unit Item	Bushing Type	Required Qty
1.	33/.46 kV, 25 KVA, SINGLE PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED	NO.	Porcelain	1
2.	33/0.415 kV , 25 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH A CABLE BOX ON THE LV SIDE.	NO.	Porcelain	1
3.	DITTO BUT 50 KVA.	NO.	Porcelain	13
4.	DITTO BUT 50 KVA.	NO.	Rubber	5
5.	DITTO BUT 100 KVA.	NO.	Porcelain	22
6.	DITTO BUT 100 KVA.	NO.	Rubber	8
7.	DITTO BUT 250 KVA.	NO.	Porcelain	52
8.	DITTO BUT 250 KVA.	NO.	Rubber	18
9.	DITTO BUT 400 KVA.	NO.	Porcelain	50
10.	DITTO BUT 400 KVA.	NO.	Rubber	15
11.	DITTO BUT 630 KVA CABLE BOX ON BOTH SIDES.	NO.	Porcelain	7
12.	DITTO BUT 630 KVA CABLE BOX ON BOTH SIDES.	NO.	Rubber	3
13.	DITTO BUT 1000 KVA CABLE BOX ON BOTH SIDES.	NO.	Porcelain	3
14.	DITTO BUT 1500 KVA CABLE BOX ON BOTH SIDES.	NO.	Porcelain	2
15.	33/0.415 kV , 630 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH BUSHINGS ON BOTH SIDES.	NO	Porcelain	11
16.	33/0.415 kV , 630 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH BUSHINGS ON BOTH SIDES.	NO	Rubber	6
17.	DITTO BUT 1000 KVA.	NO	Porcelain	7
18.	DITTO BUT 1000 KVA.	NO	Rubber	3

19.	DITTO BUT 1500 KVA.	NO	Porcelain	2
20.	11/0.415 kV , 400 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH A CABLE BOX ON THE LV SIDE.	NO	Porcelain	9
21.	11/0.415 kV , 400 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH A CABLE BOX ON THE LV SIDE.	NO	Porcelain	3

EDCO has the right to modify the above estimated quantities, by increasing the quantities of some items or decrease the quantities of some items.

VENDORS have the right to participate in partial offers.

PRICES:

References shown are those under Schedule of Requirements schedule A.

The total prices entered in the prices schedules whether or not they are fully described, shall include everything necessary to provide the equipment complete and in working order in accordance with the provisions of the contract. A price must be entered for each individual item.

VARIATION PRICE

	U.S. Dollar per Ton
Basic Prices for copper on which the quoted prices are based (BLME) for Al winding transformers	9200
Basic Prices for aluminum on which the quoted prices are based (BLME) for Al winding transformers	2600

Authorised source responsible for the publication of current market price is **London Metal Exchange (LME)**

LME PRICE ADJUSTMENT FORMULA:

$$P_{\text{new}} = P_o (1 + AF (CLME/BLME-1)) + \text{FRIGHT COST.}$$

Where:

- **P_o**: Quoted Price (FOB) per unit.
- **CLME**: Current Copper/Aluminum Price as Per London Metal Exchange Closing Price on the Fifth Working Day from the Date of Purchase Order (Cash Seller).
- **BLME**: The Copper /Aluminum Price Quoted In The Offer (Base LME), **where VENDORS have to obligate to the above specified BLME price in their offers**
- **AF**: Copper /Aluminum Factor (copper/Aluminum value percentage of transformer value).

IMPORTANT NOTES:

- (EDCO) HAS THE RIGHT TO ACCEPT PARTIAL OFFERS AND TO AWARD PART OF THE ITEMS OR QUANTITIES WITHOUT ANY LIMIT OR NOTICE.
- DELIVERY TIME IS IMPORTANT FACTOR IN THE EVALUATION AND PRIORITY WILL BE GIVEN TO SHORTER DELIVERY PERIOD OF LESS THAN (120) DAYS C&F AQABA PORT FROM THE DATE OF RECEIPT OF EDCO PURCHASING ORDER

SCHEDULE (B-1) (copper winding) OPTION 1
PRICES SCHEDULES

ITEM NO.	DESCRIPTION	BUSHING TYPE	Qty	Unit Price (US\$)		TOTAL PRICE C&F AQABA PORT-JORDAN (US\$)	C.F
				FOB	Freight COST		
1.	33/.46 kV, 25 KVA, SINGLE PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED	Porcelain	1				
2.	33/0.415 kV, 25 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH A CABLE BOX ON THE LV SIDE.	Porcelain	1				
3.	DITTO BUT 50 KVA.	Porcelain	13				
4.	DITTO BUT 50 KVA.	Rubber	5				
5.	DITTO BUT 100 KVA.	Porcelain	22				
6.	DITTO BUT 100 KVA.	Rubber	8				
7.	DITTO BUT 250 KVA.	Porcelain	52				
8.	DITTO BUT 250 KVA.	Rubber	18				
9.	DITTO BUT 400 KVA.	Porcelain	50				
10.	DITTO BUT 400 KVA.	Rubber	15				
11.	DITTO BUT 630 KVA	Porcelain	7				

	CABLE BOX ON BOTH SIDES.						
12.	DITTO BUT 630 KVA CABLE BOX ON BOTH SIDES.	Rubber	3				
13.	DITTO BUT 1000 KVA CABLE BOX ON BOTH SIDES.	Porcelain	3				
14.	DITTO BUT 1500 KVA CABLE BOX ON BOTH SIDES.	Porcelain	2				
15.	33/0.415 kV , 630 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH BUSHINGS ON BOTH SIDES.	Porcelain	11				
16.	33/0.415 kV , 630 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH BUSHINGS ON BOTH SIDES.	Rubber	6				
17.	DITTO BUT 1000 KVA.	Porcelain	7				
18.	DITTO BUT 1000 KVA.	Rubber	3				
19.	DITTO BUT 1500 KVA.	Porcelain	2				
20.	11/0.415 kV , 400 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH A CABLE BOX ON THE LV SIDE.	Porcelain	9				
21.	11/0.415 kV , 400 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH A CABLE BOX ON THE LV SIDE.	Porcelain	3				
TOTAL PRICE C&F AQABA PORT ITEMS (1-21) (must be appeared in tender summary)							
22.	cost for two EDCO engineer to witness FAT at the manufacture for						

	one week	
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SCHEDULE (B-2) (Aluminum winding) OPTION 2
PRICES SCHEDULES

ITEM NO.	DESCRIPTION	BUSHING TYPE	Qty	Unit Price (US\$)		TOTAL PRICE C&F AQABA PORT-JORDAN (US\$)	C.F
				FOB	Freight COST		
1.	33/.46 kV, 25 KVA, SINGLE PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED	Porcelain	1				
2.	33/0.415 kV , 25 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH A CABLE BOX ON THE LV SIDE.	Porcelain	1				
3.	DITTO BUT 50 KVA.	Porcelain	13				
4.	DITTO BUT 50 KVA.	Rubber	5				
5.	DITTO BUT 100 KVA.	Porcelain	22				
6.	DITTO BUT 100 KVA.	Rubber	8				
7.	DITTO BUT 250 KVA.	Porcelain	52				
8.	DITTO BUT 250 KVA.	Rubber	18				

9.	DITTO BUT 400 KVA.	Porcelain	50				
10.	DITTO BUT 400 KVA.	Rubber	15				
11.	DITTO BUT 630 KVA CABLE BOX ON BOTH SIDES.	Porcelain	7				
12.	DITTO BUT 630 KVA CABLE BOX ON BOTH SIDES.	Rubber	3				
13.	DITTO BUT 1000 KVA CABLE BOX ON BOTH SIDES.	Porcelain	3				
14.	DITTO BUT 1500 KVA CABLE BOX ON BOTH SIDES.	Porcelain	2				
15.	33/0.415 kV , 630 KVA, 3- PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH BUSHINGS ON BOTH SIDES.	Porcelain	11				
16.	33/0.415 kV , 630 KVA, 3- PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH BUSHINGS ON BOTH SIDES.	Rubber	6				
17.	DITTO BUT 1000 KVA.	Porcelain	7				
18.	DITTO BUT 1000 KVA.	Rubber	3				
19.	DITTO BUT 1500 KVA.	Porcelain	2				
20.	11/0.415 kV , 400 KVA, 3- PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH A CABLE BOX ON THE LV SIDE.	Porcelain	9				
21.	11/0.415 kV , 400 KVA, 3- PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH A CABLE BOX ON THE LV SIDE.	Porcelain	3				

TOTAL PRICE C&F AQABA PORT ITEMS (1-21) <i>(must be appeared in tender summary)</i>					
22.	cost for two EDCO engineer to witness FAT at the manufacture for one week				

SCHEDULE (B-3)
PRICES SCHEDULES

Each required transformer with cable box on M.V side shall be supplied with suitable right-angle boot with the bushing and cable box for insulating and clearances purposes.

DESCRIPTION	QTY AND UNIT	UNIT PRICE (US\$)		TOTAL PRICE C&F AQABA – JORDAN
		FOB	Fright cost	
– Right angle boot suitable for 33 KV bushing of cable box transformers at M.V side	15 set of three			

The offer shall include the right-angle boot component.

SCHEDULE (B-4)
PRICES SCHEDULES
DETAILED REQUIREMENTS OF SPARE PARTS

The quantities in this Schedule should be estimated by the Bidder which might be needed during the life time of the transformers. The Purchaser (EDCO) has the right to award part of these items or all of them or none of them.

DESCRIPTION	QTY AND UNIT	UNIT PRICE (US\$)		TOTAL PRICE C&F AQABA – JORDAN
		FOB	Fright cost	
SPARE PARTS AS DETAILED BELOW				
33 KV PORCELAIN BUSHINGS with gasket FOR OIL TYPE:				
– 25 KVA Transformers.	pcs			

– 50 KVA Transformers.	pcs			
– 100 KVA Transformers.	pcs			
– 250 KVA Transformers.	pcs			
– 400 KVA Transformers	pcs			
– 630 KVA Transformers.	pcs			
– 1000 KVA Transformers.	pcs			
– 1500 KVA Transformers	pcs			
33 KV silicon rubber BUSHINGS with gasket FOR OIL TYPE:				
– 50 KVA Transformers	pcs			
– 100 KVA Transformers.	pcs			
– 250 KVA Transformers	pcs			
– 400 KVA Transformers	pcs			
– 630 KVA Transformers.	pcs			
– 1000 KVA Transformers.	pcs			
11 KV PORCELAIN BUSHINGS FOR OIL TYPE:				
– 400 KVA Transformers	pcs			
0.415 KV PORCELAIN BUSHINGS FOR:				
– 25 KVA Transformers.	pcs			
– 50 KVA Transformers.				
– 100 KVA Transformers.	pcs			
– 250 KVA Transformers.	pcs			
– 400 KVA Transformers.	pcs			
– 630 KVA Transformers.	pcs			
– 1000 KVA Transformers.	pcs			
– 1500 KVA Transformers.	pcs			
11 KV silicon rubber BUSHINGS :				
– 400 KVA Transformers.				
COMPLETE SET OF PREFABRICATED GASKET FOR:				
– 25 KVA Transformers.	Set			
– 50 KVA Transformers.	Set			
– 100 KVA Transformers.	Set			
– 250 KVA Transformers.	Set			
– 400 KVA Transformers.	Set			
– 630 KVA Transformers.	Set			
– 1000 KVA Transformers.	Set			
– 1500 KVA Transformers.	Set			
BREATHING COMPLETE (where applicable) FOR:				
– 25 KVA Transformers.	Set			
– 50 KVA Transformers.	Set			

– 100 KVA Transformers.	Set			
– 250 KVA Transformers.	Set			
– 400 KVA Transformers.	Set			
– 630 KVA Transformers.	Set			
– 1000 KVA Transformers.	Set			
– 1500 KVA Transformers.	Set			
GLASS FOR BREATHERS (<u>were applicable</u>)	pcs			
TOTAL PRICE FOR ALL ABOVE (US\$)				

SCHEDULE (C)
GUARANTEED DELIVERY PERIODS IN DAYS

ITEM NO.	<u>DESCRIPTION</u>	Unit Item	Bushing Type	DELIVERY PERIOD FOB PORT OF LOADING-SPECIFY PORT	DELIVERY PERIOD TO AQABA PORT-JORDAN
1.	33/.46 kV, 25 KVA, SINGLE PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED	NO.	Porcelain		
2.	33/0.415 kV , 25 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH A CABLE BOX ON THE LV SIDE.	NO.	Porcelain		
3.	DITTO BUT 50 KVA.	NO.	Porcelain		
4.	DITTO BUT 50 KVA.		Rubber		
5.	DITTO BUT 100 KVA.	NO.	Porcelain		
6.	DITTO BUT 100 KVA.		Rubber		
7.	DITTO BUT 250 KVA.	NO.	Porcelain		
8.	DITTO BUT 250 KVA.		Rubber		
9.	DITTO BUT 400 KVA.		Porcelain		
10.	DITTO BUT 400 KVA.		Rubber		
11.	DITTO BUT 630 KVA CABLE BOX ON BOTH SIDES.	NO.	Porcelain		

12.	DITTO BUT 630 KVA CABLE BOX ON BOTH SIDES.		Rubber		
13.	DITTO BUT 1000 KVA CABLE BOX ON BOTH SIDES.	NO.	Porcelain		
14.	DITTO BUT 1500 KVA CABLE BOX ON BOTH SIDES.	NO.	Porcelain		
15.	33/0.415 kV , 630 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH BUSHINGS ON BOTH SIDES.	NO	Porcelain		
16.	33/0.415 kV , 630 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH BUSHINGS ON BOTH SIDES.		Rubber		
17.	DITTO BUT 1000 KVA.	NO	Porcelain		
18.	DITTO BUT 1000 KVA.	NO	Rubber		
19.	DITTO BUT 1500 KVA.	NO	Porcelain		
20.	11/0.415 kV , 400 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH A CABLE BOX ON THE LV SIDE.	NO	Porcelain		
21.	11/0.415 kV , 400 KVA, 3-PHASE OIL TYPE DISTRIBUTION TRANSFORMER AS SPECIFIED WITH A CABLE BOX ON THE LV SIDE.	NO	Porcelain		

SCHEDULE (D)
TECHNICAL PARTICULARS AND GUARANTEES
DISTRIBUTION TRANSFORMERS

The tenderer shall complete this schedule, and the particulars and guarantees will be binding on the contractor.

<u>REQUIREMENTS</u>	Unit	ITEM (1)	ITEM (2)	ITEM (3)	ITEM (4)	ITEM (5)
Maximum continuous site rating (ONAN)	KVA	25	25 CB on LV side	50 CB on LV side	50 CB on LV side	100 CB on both sides
Number of phases		1	3	3	3	3
Normal ratio of transformation	KV	33/0.46	33/0.415	33/0.415	33/0.415	33/0.415
Frequency	Hz	50	50	50	50	50
Type of cooling		ONAN	ONAN	ONAN	ONAN	ONAN
Vector group reference IEC 60076		-	Dyn11	Dyn11	Dyn11	Dyn11
Type of transformation ratio control.		OFF-LOAD	OFF-LOAD	OFF-LOAD	OFF-LOAD	OFF-LOAD
Range of transformation ratio MV/LV	%	±5	±5	±5	±5	±5
Size of transformation ratio steps.	%	2.5	2.5	2.5	2.5	2.5
Type of windings: copper/ Aluminum						
<u>PARTICULARS AND GUARANTEES</u>						
Impedance at 75° C on principal tapping	%					
Maximum flux density in core at normal voltage and frequency	TESLA					
Type of core steel						
Winding type/group for MV						
Winding type/group for LV						
Thickness of laminations	mm.					
Insulation of laminations						
Short circuit current	KA					
Type of paper insulation on conductors						
No load losses at normal ratio and 50 Hz	KW					

Load losses at CMR, 75°C and normal ratio	KW					
-Efficiency at :- Full load unity P.F. % Full load 0.8 P.F. % 3/4 Full load unity P.F. % 3/4 Full load 0.8 P.F. % 1/2 Full load unity P.F. % 1/2 Full load 0.8 P.F. %						

REQUIREMENTS	Unit	ITEM (1)	ITEM (2)	ITEM (3)	ITEM (4)	ITEM (5)
R.M.S. Exciting current at normal voltage on principal tap (MV-side)	Amps					
-R.M.S Fundamental current	Amps					
-R.M.S 3rd harmonic current	Amps					
-R.M.S 5th harmonic current	Amps					
-R.M.S 7th harmonic current	Amps					
Maximum current density In windings at CMR on Normal tap :-						
(a) MV windings	Amps/mm ²					
(b) L.V windings	Amps/mm ²					
Impedance voltage at 75°C (at CMR of lower voltage winding) between MV and LV winding.						
Temperature rise of windings at CMR above specified design ambient temp.	°C					
Temperature rise of top oil at CMR above specified design ambient	°C					
Temperature rise of core at CMR and rated voltage						
Min duration at 40°C of over loading of rating 133%	In min					
Min duration at 40°C of over loading of rating 150%	In min					
Impulse withstand voltage of complete transformer :-						
Phase connections						
(I) 1.2 /50 Microsecond full wave	kV (peak)					
(II) 1.2 /50 Microsecond chopped wave	kV (peak)					

-Thickness of Transformer tank :-						
A- Sides	mm.					
B- Bottom	mm.					
C- Cooling tubes	mm.					
Total oil required	Liters					
Weight of complete transformer (including oil)	Kg					
The offered transformer is similar to the type and special tested transformer in one of the STL group laboratory	Yes/No					

REQUIREMENTS	Unit	ITEM (1)	ITEM (2)	ITEM (3)	ITEM (4)	ITEM (5)
<u>M.V. BUSHING INSULATORS</u>						
Make						
Type						
Voltage rating	KV					
Current rating	Amps					
Length of insulator (Overall)	mm.					
Weight of insulator	Kg					
Total creepage distance of bushing	mm.					
Protected creepage distance of bushing	mm.					
Dry withstand power frequency voltage without arcing horns	KV					
Routine power frequency test voltage (1 minute)	KV					
Impulse withstand voltage						

(1.2/50 microsecond full wave): (A) Positive (B) Negative						
Wet withstand power Frequency voltage without arcing horn	KV					
Maximum diameter of bushing when passing through tank top	mm.					
Penetration of bushing into tank measured from bottom of fixing flange	mm.					
Overall dimensions of complete transformer:-						
Length	mm.					
Width	mm.					
Height	mm.					
Manufacturer name and place						
Testing Authority name and Place						

SCHEDULE (D) (CONT'D)
TECHNICAL PARTICULARS AND GUARANTEES
DISTRIBUTION TRANSFORMERS

<u>REQUIREMENTS</u>	Unit	ITEM (6)	ITEM (7)	ITEM (8)	ITEM (9)	ITEM (10)
Maximum continuous site rating (ONAN)	KVA	100 CB on LV sides	250 CB on LV sides	250 CB on LV sides	400 CB on LV sides	400 CB on LV sides
Number of phases		3	3	3	3	3
Normal ratio of transformation	KV	33/0.415	33/0.415	33/0.41 5	33/0.415	33/0.41 5
Frequency	Hz	50	50	50	50	50
Type of cooling		ONAN	ONAN	ONAN	ONAN	ONAN
Vector group reference IEC 60076		Dyn11	Dyn11	Dyn11	Dyn11	Dyn11
Type of transformation ratio		OFF-	OFF-	OFF-	OFF-	OFF-

control.		LOAD	LOAD	LOAD	LOAD	LOAD
Range of transformation ratio MV/LV	%	± 5	± 5	± 5	± 5	± 5
Size of transformation ratio steps.	%	2.5	2.5	2.5	2.5	2.5
Type of windings: copper/ Aluminum						
PARTICULARS AND GUARANTEES						
Impedance at 75°C on principal tapping	%					
Maximum flux density in core at normal voltage and frequency	TESLA					
Type of core steel						
Winding type/group for MV						
Winding type/group for LV						
Thickness of laminations	mm.					
Insulation of laminations						
Short circuit current	KA					
Type of paper insulation on conductors						
No load losses at normal ratio and 50 Hz	KW					
Load losses at CMR, 75°C and normal ratio	KW					
-Efficiency at :- Full load unity P.F. % Full load 0.8 P.F. % 3/4 Full load unity P.F % 3/4 Full load 0.8 P.F. % 1/2 Full load unity P.F % 1/2 Full load 0.8 P.F. %						

REQUIREMENTS	Unit	ITEM (6)	ITEM (7)	ITEM (8)	ITEM (9)	ITEM (10)
R.M.S. Exciting current at normal voltage on principal tap (MV-side)	Amps					
-R.M.S Fundamental current	Amps					
-R.M.S 3rd harmonic current	Amps					
-R.M.S 5th harmonic current	Amps					
-R.M.S 7th harmonic current	Amps					
Maximum current density In						

windings at CMR on Normal tap :-						
(a) MV windings	Amps/ mm ²					
(b) L.V windings	Amps/ mm ²					
Impedance voltage at 75°C (at CMR of lower voltage winding) between MV and LV winding.						
Temperature rise of windings at CMR above specified design ambient temp.	°C					
Temperature rise of top oil at CMR above specified design ambient	°C					
Temperature rise of core at CMR and rated voltage						
Min duration at 40°C of over loading of rating 133%	In min					
Min duration at 40°C of over loading of rating 150%	In min					
Impulse withstand voltage of complete transformer :-						
Phase connections						
(I) 1.2 /50 Microsecond full wave	kV (peak)					
(II) 1.2 /50 Microsecond chopped wave	kV (peak)					
-Thickness of Transformer tank :-						
A- Sides	mm.					
B- Bottom	mm.					
C- Cooling tubes	mm.					
Total oil required	Liters					
Weight of complete transformer (including oil)	Kg					
The offered transformer is similar to the type and special tested transformer in one of the STL group laboratory	Yes/N o					

REQUIREMENTS	Unit	ITEM (6)	ITEM (7)	ITEM (8)	ITEM (9)	ITEM (10)
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<u>M.V. BUSHING INSULATORS</u>						
Make						
Type						
Voltage rating	KV					
Current rating	Amps					
Length of insulator (Overall)	mm.					
Weight of insulator	Kg					
Total creepage distance of bushing (min 32/mm/kV of rated system voltage)	mm.					
Protected creepage distance of bushing	mm.					
Dry withstand power frequency voltage without arcing horns	KV					
Routine power frequency test voltage (1 minute)	KV					
Impulse withstand voltage (1.2/50 microsecond full wave): (A) Positive (B) Negative						
Wet withstand power Frequency voltage without arcing horn	KV					
Maximum diameter of bushing when passing through tank top	mm.					
Penetration of bushing into tank measured from bottom of fixing flange	mm.					
Overall dimensions of complete transformer:-						
Length	mm.					
Width	mm.					
Height	mm.					
Manufacturer name and place						
Testing Authority name and Place						

SCHEDULE (D) (CONT'D)

TECHNICAL PARTICULARS AND GUARANTEES
DISTRIBUTION TRANSFORMERS

<u>REQUIREMENTS</u>	Unit	ITEM (11)	ITEM (12)	ITEM (13)
Maximum continuous site rating (ONAN)	KVA	630 C.B on both sides	630 C.B on both sides	1000 C.B on both sides
Number of phases		3	3	3
Normal ratio of transformation	KV	33/0.415	33/0.415	33/0.415
Frequency	Hz	50	50	50
Type of cooling		ONAN	ONAN	ONAN
Vector group reference IEC 60076		Dyn11	Dyn11	Dyn11
Type of transformation ratio control.		OFF-LOAD	OFF-LOAD	OFF-LOAD
Range of transformation ratio MV/LV	%	±5	±5	±5
Size of transformation ratio steps.	%	2.5	2.5	2.5
<u>Type of windings: copper/ Aluminum</u>				
<u>PARTICULARS AND GUARANTEES</u>				
Impedance at 75°C on principal tapping	%			
Maximum flux density in core at normal voltage and frequency	TESLA			
Type of core steel				
Winding type/group for MV				
Winding type/group for LV				
Thickness of laminations	mm.			
Insulation of laminations				
Short circuit current	KA			
Type of paper insulation on conductors				
No load losses at normal ratio and 50 Hz	KW			
Load losses at CMR, 75°C and normal ratio	KW			
-Efficiency at :- Full load unity P.F. % Full load 0.8 P.F. % 3/4 Full load unity P.F % 3/4 Full load 0.8 P.F. % 1/2 Full load unity P.F % 1/2 Full load 0.8 P.F. %				

REQUIREMENTS	Unit	ITEM (11)	ITEM (12)	ITEM (13)
R.M.S. Exciting current at normal voltage on principal tap (MV-side)	Amps			
-R.M.S Fundamental current	Amps			
-R.M.S 3rd harmonic current	Amps			
-R.M.S 5th harmonic current	Amps			
-R.M.S 7th harmonic current	Amps			
Maximum current density In windings at CMR on Normal tap :-				
(a) MV windings	Amps /mm ²			
(b) L.V windings	Amps /mm ²			
Impedance voltage at 75°C (at CMR of lower voltage winding) between MV and LV winding.				
Temperature rise of windings at CMR above specified design ambient temp.	°C			
Temperature rise of top oil at CMR above specified design ambient	°C			
Temperature rise of core at CMR and rated voltage				
Min duration at 40°C of over loading of rating 133%	In min			
Min duration at 40°C of over loading of rating 150%	In min			
Impulse withstand voltage of complete transformer :-				
Phase connections				
(I) 1.2 /50 Microsecond full wave	kV (peak)			
(II) 1.2 /50 Microsecond chopped wave	kV (peak)			
-Thickness of Transformer tank :-				
A- Sides	mm.			
B- Bottom	mm.			
C- Cooling tubes	mm.			
Total oil required	Liters			
Weight of complete transformer (including oil)	Kg			
The offered transformer is similar to the type and special tested transformer in one of the STL group laboratory	Yes/ No			

REQUIREMENTS	Unit	ITEM (11)	ITEM (12)	ITEM (13)
<u>M.V. BUSHING INSULATORS</u>				
Make				
Type				
Voltage rating	KV			
Current rating	Amps			
Length of insulator (Overall)	mm.			
Weight of insulator	Kg			
Total creepage distance of bushing (min 32/mm/kV of rated system voltage)	mm.			
Protected creepage distance of bushing	mm.			
Dry withstand power frequency voltage without arcing horns	KV			
Routine power frequency test voltage (1 minute)	KV			
Impulse withstand voltage (1.2/50 microsecond full wave): (A) Positive (B) Negative				
Wet withstand power Frequency voltage without arcing horn	KV			
Maximum diameter of bushing when passing through tank top	mm.			
Penetration of bushing into tank measured from bottom of fixing flange	mm.			
Overall dimensions of complete transformer:-				
Length	mm.			
Width	mm.			
Height	mm.			
Manufacturer name and place				
Testing Authority name and Place				

SCHEDULE (D) (CONT'D)
TECHNICAL PARTICULARS AND GUARANTEES
DISTRIBUTION TRANSFORMERS

<u>REQUIREMENTS</u>	Unit	ITEM (14)	ITEM (15)
Maximum continuous site rating ONAN	KVA	1500 C.B on both sides	630 bushing on both sides
Number of phases		3	3
Normal ratio of transformation	KV	33/0.415	33/0.415
Frequency	Hz	50	50
Type of cooling		ONAN	ONAN
Vector group reference IEC 60076			
Type of transformation ratio control.		OFF- LOAD	OFF- LOAD
Range of transformation ratio MV/LV	%	±5	±5
Size of transformation ratio steps.	%	2.5	2.5
<u>Type of windings: copper/ Aluminum</u>			
<u>PARTICULARS AND GUARANTEES</u>			
Impedance at 75°C on principal tapping	%		
Maximum flux density in core at normal voltage and frequency	TESLA		
Type of core steel			
Winding type/group for MV			
Winding type/group for LV			
Thickness of laminations	mm.		
Insulation of laminations			
Short circuit current	KA		
Type of paper insulation on conductors			
No load losses at normal ratio and 50 Hz	KW		
Load losses at CMR, 75°C and normal ratio	KW		
-Efficiency at :- Full load unity P.F. % Full load 0.8 P.F. % 3/4 Full load unity P.F % 3/4 Full load 0.8 P.F. %			

1/2 Full load unity P.F. %			
1/2 Full load 0.8 P.F. %			

REQUIREMENTS	Unit	ITEM (14)	ITEM (15)
R.M.S. Exciting current at normal voltage on principal tap (MV-side)	Amps		
-R.M.S Fundamental current	Amps		
-R.M.S 3rd harmonic current	Amps		
-R.M.S 5th harmonic current	Amps		
-R.M.S 7th harmonic current	Amps		
Maximum current density In windings at CMR on Normal tap :-			
(a) MV windings	Amps /mm ²		
(b) L.V windings	Amps /mm ²		
Impedance voltage at 75°C (at CMR of lower voltage winding) between MV and LV winding.			
Temperature rise of windings at CMR above specified design ambient temp.	°C		
Temperature rise of top oil at CMR above specified design ambient	°C		
Temperature rise of core at CMR and rated voltage			
Min duration at 40°C of over loading of rating 133%	In min		
Min duration at 40°C of over loading of rating 150%	In min		
Impulse withstand voltage of complete transformer :-			
Phase connections			
(I) 1.2 /50 Microsecond full wave	kV (peak)		
(II) 1.2 /50 Microsecond chopped wave	kV (peak)		
-Thickness of Transformer tank :-			
A- Sides	mm.		
B- Bottom	mm.		
C- Cooling tubes	mm.		
Total oil required	Liters		

Weight of complete transformer (including oil)	Kg		
The offered transformer is similar to the type and special tested transformer in one of the STL group laboratory	Yes/ No		

REQUIREMENTS	Unit	ITEM (14)	ITEM (15)
<u>M.V. BUSHING INSULATORS</u>			
Make			
Type			
Voltage rating	KV		
Current rating	Amps		
Length of insulator (Overall)	mm.		
Weight of insulator	Kg		
Total creepage distance of bushing	mm.		
Protected creepage distance of bushing	mm.		
Dry withstand power frequency voltage without arcing horns	KV		
Routine power frequency test voltage (1 minute)	KV		
Impulse withstand voltage (1.2/50 microsecond full wave): (A) Positive (B) Negative			
Wet withstand power Frequency voltage without arcing horn	KV		
Maximum diameter of bushing when passing through tank top	mm.		
Penetration of bushing into tank measured from bottom of fixing flange	mm.		
Overall dimensions of complete transformer:-			
Length	mm.		

Width	mm.		
Height	mm.		
Manufacturer name and place			
Testing Authority name and Place			

SCHEDULE (D) (CONT'D)
TECHNICAL PARTICULARS AND GUARANTEES
DISTRIBUTION TRANSFORMERS

<u>REQUIREMENTS</u>	Unit	ITEM (16)	ITEM (17)	ITEM (18)	ITEM (19)	ITEM (20)	ITEM (21)
Maximum continuous site rating ONAN	KVA	630 bushing on both sides	1000 bushing on both sides	1000 bushing on both sides	1500 bushing on both sides	400 C.B on L.V side.	400 C.B on L.V side.
Number of phases		3	3	3	3	3	3
Normal ratio of transformation	KV	33/0.415	33/0.415	33/0.415	33/0.415	11/0.415	11/0.415
Frequency	Hz	50	50	50	50	50	50
Type of cooling		ONAN	ONAN	ONAN	ONAN	ONAN	ONAN
Vector group reference IEC 60076		Dyn11	Dyn11	Dyn11	Dyn11	Dyn11	Dyn11
Type of transformation ratio control.		OFF-LOAD	OFF-LOAD	OFF-LOAD	OFF-LOAD	OFF-LOAD	OFF-LOAD
Range of transformation ratio MV/LV	%	±5	±5	±5	±5	±5	±5
Size of transformation ratio steps.	%	2.5	2.5	2.5	2.5	2.5	2.5
<u>Type of windings:</u> <u>copper/ Aluminum</u>							
<u>PARTICULARS AND GUARANTEES</u>							
Impedance at 75° C on principal tapping	%						
Maximum flux density	TES						

in core at normal voltage and frequency	LA						
Type of core steel							
Winding type/group for MV							
Winding type/group for LV							
Thickness of laminations	mm.						
Insulation of laminations							
Short circuit current	KA						
Type of paper insulation on conductors							
No load losses at normal ratio and 50 Hz	KW						
Load losses at CMR, 75° C and normal ratio	KW						
-Efficiency at :- Full load unity P.F. % Full load 0.8 P.F. % 3/4 Full load unity P.F. % 3/4 Full load 0.8 P.F. % 1/2 Full load unity P.F. % 1/2 Full load 0.8 P.F. %							

REQUIREMENTS	Unit	ITEM (16)	ITEM (17)	ITEM (18)	ITEM (19)	ITEM (20)	ITEM (21)
R.M.S. Exciting current at normal voltage on principal tap (MV-side)	Amps						
-R.M.S Fundamental current	Amps						
-R.M.S 3rd harmonic	Amp						

current	s						
-R.M.S 5th harmonic current	Amps						
-R.M.S 7th harmonic current	Amps						
Maximum current density In windings at CMR on Normal tap :-							
(a) MV windings	Amps/m ²						
(b) L.V windings	Amps/m ²						
Impedance voltage at 75°C (at CMR of lower voltage winding) between MV and LV winding.							
Temperature rise of windings at CMR above specified design ambient temp.	°C						
Temperature rise of top oil at CMR above specified design ambient	°C						
Temperature rise of core at CMR and rated voltage							
Min duration at 40°C of over loading of rating 133%	In min						
Min duration at 40°C of over loading of rating 150%	In min						
Impulse withstand voltage of complete transformer :-							
Phase connections							
(I) 1.2 /50 Microsecond full wave	kV (peak)						
(II) 1.2 /50 Microsecond	kV (peak)						

chopped wave	k)						
-Thickness of Transformer tank :-							
A- Sides	mm.						
B- Bottom	mm.						
C- Cooling tubes	mm.						
Total oil required	Liter s						
Weight of complete transformer (including oil)	Kg						
The offered transformer is similar to the type and special tested transformer in one of the STL group laboratory	Yes/ No						

REQUIREMENTS	Unit	ITEM (16)	ITEM (17)	ITEM (18)	ITEM (19)	ITEM (20)	ITEM (21)
<u>M.V. BUSHING INSULATORS</u>							
Make							
Type							
Voltage rating	KV						
Current rating	Amp s						
Length of insulator (Overall)	mm.						
Weight of insulator	Kg						
Total creepage distance of bushing	mm.						
Protected creepage	mm.						

distance of bushing							
Dry withstand power frequency voltage without arcing horns	KV						
Routine power frequency test voltage (1 minute)	KV						
Impulse withstand voltage (1.2/50 microsecond full wave): (A) Positive (B) Negative							
Wet withstand power Frequency voltage without arcing horn	KV						
Maximum diameter of bushing when passing through tank top	mm.						
Penetration of bushing into tank measured from bottom of fixing flange	mm.						
Overall dimensions of complete transformer:- Length Width Height							
	mm.						
	mm.						
	mm.						
Manufacturer name and place							
Testing Authority name and Place							

SCHEDULE (E)

LIST OF TEST CERTIFICATES FOR TRANSFORMERS

Tenderers shall provide the information required below for the test certificates covering the equipment offered to IEC recommendations & shall be submitted with the tender.

Failure to provide copies of test certificates/reports will result in rejection of the tender.

TYPE AND SPECIAL TEST MADE ON IDENTICAL DESIGNS OF EQUIPMENT TO THOSE OFFERED	CERTIFICATE NO.	CERTIFICATE AUTHORITY

SCHEDULE (F)

SERVICE EXPERIENCE OF TRANSFORMERS

Tenderers shall provide the information required below for the service experience of transformers, where separate list for AL and Cu winding should be submitted.

CUSTOMER	NO. OF UNITS SUPPLY	RATED POWER & VOLTAGE	NO. OF YEARS IN SERVICE

Note: A list of end user certificates must be submitted with the tender.

SCHEDULE (G)

DEVIATIONS FROM SPECIFICATION IF ANY

TO BE COMPLETED BY THE TENDERER

ITEM NO.	BREIF DESCRIPTION	DEVIATIONS

SCHEDULE H

COST OF TYPE AND SPECIAL TESTS

Currency:

Kind of test	In manufacturers laboratories (or other accepted, but should be specified)
Rate for Hot Spot Test	
Rate for Frequency Response Analysis Test	

* All Tenderers shall complete the above schedule.

SCHEDULE I

MANUFACTURERS AND PLACES OF MANUFACTURE AND TESTING

<u>Item</u>	<u>Manufacturer</u>	<u>Place of Manufacturer</u>	<u>Place of Testing and Inspection</u>
<u>OIL TYPE DISTRIBUTION TRANSFORMERS</u>			
Transformers			
MV Bushings : -porcelain -silicon rubber			
LV Bushings			
MV insulators			
LV insulators			

Insulating cylinders			
Insulating Paper			
Tap Changers			
Copper/aluminum			
Core plates			
Steel. Castings			
Tanks			
Radiators			
Thermometer			
Temperature Indicators			
Pressure relief device			
De-hydrating breather			
Oil valves			
Oil pipes			
Transformer's oil			
Gaskets			

The Tenderer shall state the town and country where Manufacture, Testing and Inspection to take place.