



Government of Goa
Office of the Executive Engineer,
Electricity Department,
Division-VII, Curchorem-Goa Pin Code 403706



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“BY SPEED POST/HAND DELIVERY”

No.EE/Div.-VII/Tech-2/Quot- 21(20-21)/1662/2020-21

Date: 13/08/2020

Sub: - Quotation for the work of supply, erection, testing and commissioning of Battery Bank and Battery Charger at 33/11KV Waddem Substation under the jurisdiction of Elect Sub Div-III, Sanguem.

On Behalf of the Governor of Goa, quotation for the below mentioned work as per the Terms and Conditions depicted in Annexure-I, II & III is invited.

QUOTATION

Sl. no.	Description of work	Qty.
1.	Supply, erection, testing and commissioning of Battery Bank and Battery Charger at 33/11KV Waddem Substation under the jurisdiction of Elect Sub Div-III, Sanguem.	As per bidding schedule enclosed
E.M.D:Rs. 8, 247/- (Rupees Eight Thousand Two Hundred Forty Seven only)		
Time allowed for completion of work : 15days		
Last date & time of receipt of quotation: 20/08/2020 upto 15.00hrs.		
Date & time of opening of quotation: 20/08/2020 at 15.30hrs.		
All other Rules & Regulations in force shall be applicable		
For more details please visit either Goa Govt. State portal or this office on any working day between 14:30 to 17:00hrs		

Sealed quotation alongwith attached Terms and Conditions duly signed & super scribed on the top of envelop as “Quotation for the work of supply, erection, testing and commissioning of Battery Bank and Battery Charger at 33/11KV Waddem Substation under the jurisdiction of Elect Sub Div-III, Sanguem.” should be inserted in the quotation box kept at office of the Executive Engineer, Elect, Dept., Div-VII (O & M) Curchorem on or before 20/08/2020 upto 15.00hrs.

Name:

Signature:

Stamp of the Contractor:

Encl: as above.

Sd/-
EXECUTIVE ENGINEER-VII

To,

Copy to:-

- 1) The Superintending Engineer, Elect. Dept., Circle-I/II, Margao/Panaji.... For information.
- 2) The Executive Engineer, Elect. Dept, Div. Nos: I/II/III/IV/V/VI/VIII/IX/X/XI/XII/XIII/XIV/XV/ XVI/ XVII /XVIII Panaji/Margao/Ponda/Bicholim/Mapusa/Tivim/Vasco/Xeldem/Corlim/Verna/ Patto Plaza Panaji.....For information.
- 3) The Divisional Accountant, Accounts Section, Elect. Div-VII, Curchorem....He is directed to be present on the day of opening.
- 4) The Sub Divisional Engineer, Elect. Sub-Div-III, Sanguem.
- 5) The Director of Information Technology, IT HUB, 2nd Floor, Altinho, Panaji-Goa.... With a request to publish the quotation called by this office on Goa Govt. State portal by 14/08/2020. (E-mail sent to stateportal.goa@nic.in)

BIDDING SCHEDULE

FOR THE WORK OF SUPPLY, ERECTION, TESTING AND COMMISSIONING OF BATTERY BANK AND BATTERY CHARGER AT 33/11KV WADDEM SUBSTATION UNDER THE JURISDICTION OF ELECT SUB DIV-III, SANGUEM.

SUPPLY OF MATERIALS CONFORMING TO THE DETAILED TECHNICAL SPECIFICATIONS ENCLOSED WITH THE QUOTATION

1) ALL RATES OF SUPPLY & ERECTION OF MATERIALS QUOTED SHALL INCLUDE GST & ALL OTHER TAXES APPLICABLE, DUTIES, TRANSPORTATION TO SITE, OTHER CHARGES ETC., AS SPECIFIED IN TERMS & CONDITIONS ENCLOSED WITH THE QUOTATION.

2) TEST CERTIFICATE FROM THE MANUFACTURE & ORIGINAL DELIVERY CHALLAN TO BE FURNISHED AS SPECIFIED IN QUOTATION

Sr. No	Description of materials/works	Qty	Unit	Cost of Material		Cost of Erection	
				Rate in figures & words	Amount in figures only	Rate in figures & words	Amount in figures only
1	Supply Installation Testing and Commissioning of 30V, 150 Amp Hr, Valve Regulated Lead Acid (VRLA) type maintenace free batteries set at 10 hr discharge rate consisting of 16 Nos, each of 2 V, cell having terminal connectors, self supporting stack fully charged ready to use complete with all other accessories alongwith nut & Bolts, as per the specification mentioned.	1	No				
2	Supply Installation Testing and Commissioning of Thyristor controlled Battery Charger set with full wave rectification, 3 phase, 440 V, 50 Hz, input voltage for charging above specified 30 V, 150 Amphr battery with provision for float and boost charging and automatic changeover with necessary indicating meters and annunciation, required cable, connectors complete as per the specification mentioned.	1	No				
	Add GST @28% on supply cost of Battery Bank					--	
	Add GST@18% on erection cost of Battery Bank				--		
	Add GST@18% on supply and erection cost of Battery Charger						
	Sub Total in Rs.						

Add cost of erection including GST							
Grand Total in Rs							
Say Rs.							
(Rupees)

1. I have understood that the whole contract is governed by all relevant clauses of CPWD Manual 2014. All the said terms & conditions mentioned therein shall be binding on me once the offer is accepted.

2. Submission of my offer shall be deemed to imply that I have made myself acquainted with the actual site conditions, etc. where the proposed works are to be carried out. The materials will be supplied as per the technical specifications indicated in Annexure-III.

Name of Contractor:-

Signature:-

Address:-

EXECUTIVE
ENGINEER-VII
CURCHOREM-GOA.

ANNEXURE-I
ADDITIONAL TERMS & CONDITIONS

1. RATES:- The Rates quoted should be firm.
2. TAXES & DUTIES:- The rates quoted shall be inclusive of GST & The landing cost shall include the following:
 - a]. Cost of material / equipment
 - b] All applicable taxes and duties
 - c] Packing, forwarding, freight, clearing charges etc.
 - d] Cost of packets, containers, cases, etc.
 - e] Insurance and other similar charge
 - f] Freight charges upto destination and transportation charges upto the site or work place, loading, unloading, etc.
 - g] All incidentals up to testing commissioning, etc.
3. VALIDITY:- The Rates quoted should be valid for a period of 90 days from the date of opening of the quotation.
4. TIME ALLOWED FOR COMPLETION OF WORK: 15 days from the date of firm order.
5. EARNEST MONEY DEPOSIT:- An amount of Rs 8, 247/- towards EMD shall be furnished in a separate envelope, sealed and superscribed as "EMD FOR QUOTATION"(ENVELOPE-A). (Quotation No, & detail of Quotation to be specified) EMD shall be in the form of Demand Draft drawn in the name of The Executive Engineer, Elect, Division VII, Curchorem, on any schedule Bank guaranteed by Reserve Bank of India and made payable at par on any Branches in Goa. EMD payment by cash, cheque, fixed & short term deposit shall not be entertained. Quotation unaccompanied by EMD as above will be summarily rejected. The quotations for the work shall remain open for a period of 90 days from the opening of quotations. The Government shall without prejudice to any other right or remedy, be at liberty to forfeit 50 % of the earnest money if any bidder withdraws his quotation before that date or makes any modifications in terms & conditions which are not acceptable to the Department, and to forfeit the whole of the earnest money if the bidder, whose quotation is accepted, fails to commence the work specified in NIQ (Along with changes in scope) in the prescribed time or abandons the work before its completion. The 2nd envelope superscribed as "Financial bid" (Quotation No, & detail of Quotation to be specified) shall contain Price bid / Bidding schedule, duly signed by the tenderer on each page over their official rubber stamp, on all pages alongwith the financial bid and other documents (ENVELOPE-B). The 3rd cover (ENVELOPE-C) pertaining to the tender shall be superscribed as detailed in quotation shall contain the other two envelopes (Envelope-A & Envelope-B) superscribed "EMD for quotation" and "Financial bid". Name of the tenderer shall be written on the left hand side corner of the envelopes.
6. PERFORMANCE SECURITY: - In case of acceptance of the offer the performance security of 5% of the order value shall be deposited with this office within 15 days of acceptance letter and the same shall be refundable on completion of the work and recording of the work completion certificate.
7. SECURITY DEPOSIT: - Security deposit amounting to 2.5% of the ordered value will have to be paid or the same will be deducted from the bills adjusting the EMD paid. The security deposit will be retained in this office till expiry of guarantee period and thereafter the same will be refunded against an application in Form-28, subject to the condition that no defects are noticed and the service is to the entire satisfaction to the Engineer-in-charge and on recovery of any amount due to the Govt.
8. PAYMENT:-Payment will be only after completion of entire work. The contractor shall indicate Income Tax PAN No. & GSTIN registered with the Income Tax Department & Central Board of Excise & Customs in the invoices/receipts and also submit document indicating up to date GST compliance for effecting payment.
9. CONTRACT CONDITON: Orders will be governed by the conditions of P.W.D. agreement Form No.10.
10. THE RIGHT TO REJECT:-The right to reject any or all the quotations, without assigning any reasons, shall rest with the undersigned.
11. DATE OF RECEIPT & OPENING OF QUOTATION:-The quotation will be received up to 15:00 hours on 20/08/2020 & it will be opened at 15.30 hours on the same day.

EXECUTIVE ENGINEER,
DIVISION-VII, CURCHOREM

ANNEXURE - II
GENERAL TERMS & CONDITIONS

1. In case the contractor comes across any incorrect/missed out punctuations, typographical errors in spelling, leading incorrect impression or no meaning to the text, then they are advised to get the same clarified from the department. The interpretation of the Engineer-in-charge, in such cases shall be final.
2. The contractor shall furnish the attested copy of electrical contractor's license issued by the licensing board, Govt. Of Goa, to enable them to execute the work in the state of Goa.
3. The rates quoted by the contractor shall be firm, whether he has actually inspected the site or not. Any claim on the veracities of the site conditions at a later stage shall not be entertained.
4. The offer shall be valid for a minimum period of 90 days from the date of opening of the quotation.
5. It is not intend to specify completely herein all details of design and construction. However the work should conform in all respect to quotation of Engineering design and workmanship as per relevant applicable I.S. and shall be able to perform in continues commercial operation in a manner acceptable to the Engineer-in-charge, who will interpret the meaning of drawings and specifications and shall have the power to reject any work, which in his judgment, is not in accordance therewith.
6. The whole contract shall be governed by the agreement under CPWD form 10 for the contract for works. The contractor shall be responsible for arranging all tools and plants, instruments etc. required for erection, testing and commissioning of all the equipments and materials covered under this contract.
The work shall be supervised by the Engineer In-charge or by his authorized representatives. The work shall be carried out as per the tender terms and conditions, specifications, besides site directives if any.
7. **CONTRACTOR IS REQUESTED TO PAY DUE ATTENTION TO THIS ASPECT**
 - (a) QUANTITIES:
The quantities given under bidding schedule of this contract are tentative. The department reserves the right to finalize quantities for which the unit rates quoted in the bidding schedule by the contractor, shall be valid and binding irrespective of the quantities finalized by the Department
 - (b) COMPLETENESS OF THE CONTRACT:
Any fittings or accessories which may not have been specifically mentioned in the specifications but which are usual or necessary in the case of similar works or for efficient working of the same shall be deemed to be included in the contract and shall be provided by the contractor without extra charges. All works activities shall be completed in all details whether such details are mentioned in the specifications or not, within completion period.
 - (c) BIDDING:
The rates quoted against activities/ work in the bidding schedules shall be for the activity/work including GST as per the technical specifications in the bidding schedule and shall be complete in all respects. Successful contractor should have to submit document indicating upto date GST compliance, before placing of order
8. STANDARD:
Unless otherwise specified all the work shall comply in all respects with the requirements of the specifications attached with this bidding schedule amended up to date and any revisions thereof that may be issued during the currency of the contract.
9. COMPLIANCE WITH THE REGULATIONS:
All the works shall be carried out in accordance with I.E. Act 2003 & I.E. Rules 1956 as amended up to date and all revision thereof that may be issued during the currency of the contract. The work shall also conform to Electricity Department rules/procedures within the said Acts & Rules.
10. PAYMENTS:
No advance payment shall be made along with the order. Payment will be made for the activities completed in all respects; payment will be made activity wise. No payment will be made unless the items in a particular activity are completed. No payment will be made for the purpose of storing of the materials, transportation, freight and insurance charges, taxes and duty, etc. all of which are deemed to have been included in the quoted rates whether expressively specified or not. Final payment will be done only after completion of the entire work by the Contractor and submission of detailed reports in triplicate as stated in Technical specification.

Deductions: - The GST and income tax shall be deducted at source from the eligible payments to the contractor as applicable from the bill. Department shall issue necessary TDS certificate to the contractor.
11. AGREEMENT AND GOVERNMENTING CONDITIONS:
The contractor whose offer is accepted will have to enter in to an agreement in the C.P.W.D. Form-10

12. METHOD OF WORK

Before commencement of work, the line/apparatus should be made non live by taking proper Shutdown in the presence of departmental Engineer-in-charge. Necessary earthing should also be got done to the line at the transformer center from the departmental Engineer-in-charge. All the Precautions should be taken in advance to avoid electrical & mechanical accidents.

13. CONDITION:

The proposed work should be executed in the presence of authorized departmental Electrical Engineer-in-charge only.

14. COMPARISON OF BIDDING:

The tenderer shall offer biddings in the prescribed bidding schedule attached with this quotation for all the activities mentioned therein.

15. INTERCHANGEABILITY: All the parts shall be made accurately to standard gauge wherever possible so as to facilitate replacement and requirement including the spare parts shall be interchangeable.

16. DEVIATIONS: Any deviation to these specifications if found necessary by the tenderer shall clearly be set forth in the separate schedule annexed to this quotation giving valid basis for such deviations. The advantage claimed if any to such deviation shall be clearly indicated.

17. GUARANTEE:-

17.1 The contractor shall warrant that the materials/equipments will be new and in accordance with the specification and that the equipment structures etc. will be free from defects in materials & workmanship. The contractor shall furnish performance guarantee for a period of 12 calendar months (Guarantee period) from the date of commissioning for the entire contracted work. Any defects in failure observed during the period of guarantee will be the duty of the contractor to attend and rectify it on priority basis when informed or noticed at his own cost.

17.2 Completion period: The time allowed for completion of all the activities covered under this contract shall be of 15 days.

17.3 Compensation for failure to complete the work within stipulated time period. The time allowed for carrying out the works as entered in the agreement shall be strictly observed by the contractor and shall be deemed to be of essence of the contractor on the part of the contractor date on which order to commence the work is issued to the contractor. Delay in the execution of the work as per clause 2 & 3 of CPWD 8 shall attract the compensation/penalty @1% of the value of work order per day for every day the work remains uncompleted or unfurnished after the stipulated completion date put to subject to total compensation not exceeding 10% on total cost of work as per work order.

NAME OF THE CONTRACTOR

EXECUTIVE ENGINEER
DIVISION VII, CURCHOREM.

ADDRESS/SEAL OF THE CONTRACTOR
SIGNATURE

ANNEXURE-III
TECHNICAL SPECIFICATION

SCOPE OF WORK: -

“Quotation for the work supply, erection, testing and commissioning of Battery Bank and Battery Charger at 33/11KV Waddem Substation under the jurisdiction of Elect Sub Div-III, Sanguem.

The scope of work involved is as follows:

1. Supply, erection, testing and commissioning of Battery bank01No.
2. Supply, erection, testing and commissioning of battery charger.....01No.

SECTION: GENERAL TECHNICAL REQUIREMENT

FOREWORD

The provisions under this section are intended to supplement general requirements for the materials, equipments and services covered under other sections of bidding documents and is not exhaustive. However in case of conflicts between the requirements specified in this section and requirements specified under other sections, the requirements specified under this sections shall prevail.

GENERAL REQUIREMENT

The bidders shall submit all the technical requirements, details and information as per the technical data provided in the bid documents.

The bidders shall furnish catalogues, engineering data, technical information, design documents, drawings etc. in full conformity with the technical specification.

It is recognized that the Bidder may have standardized on the use of certain components, materials, processes or procedures different from those specified herein. Alternate proposals offering similar equipment based on the manufacturer’s standard practice will also be considered provided such proposals meet the specified designs, standard and performance requirements and are acceptable to the Department. Unless brought out clearly, the Bidder shall be deemed to conform to the NIQ specifications and the general technical requirements, scrupulously. All deviations from the specification shall be clearly brought out in the specific technical deviation Schedule A2 without which it will not be considered as valid deviation.

Whenever a material or article is specified or defined by the name of a particular brand, Manufacturer or Vendor, the specific name mentioned shall be understood as establishing type, function and quality and not as limiting competition.

Equipment furnished shall be complete in every respect with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and/or needed for erection, completion and safe operation of the equipment as required by applicable standards / codes, though they may not have been specifically mentioned or detailed in the Technical Specifications. Materials and components not specifically stated in the specification but which are necessary for commissioning and satisfactory operation of the work, unless specifically excluded, shall be deemed to be included in the scope of the specification and shall be supplied without any extra cost. All similar standard components / parts of similar standard equipment provided shall be inter-changeable with one another.

STANDARDS

The works covered by the specification shall be designed, engineered, manufactured, built, tested and commissioned in accordance with the Acts, Rules, Laws and Regulations of India.

The equipment to be furnished under this specification shall conform to latest issue with all amendments of standards specified under Annexure-A of this section.

The Bidder shall note that standards mentioned in the specification are not mutually exclusive or complete in themselves, but intended to complement each other.

The Bidder shall also note that list of standards presented in this specification is not complete. Whenever necessary the list of standards shall be considered in conjunction with specific IS/IEC.

When the specific requirements stipulated in the specifications exceed or differ than those required by the applicable standards, the stipulation of the specification shall take precedence.

Other internationally accepted standards which ensure equivalent or better performance than that

specified in the standards referred shall also be accepted. Copies of such standards shall be submitted by the bidder along with the bid.

In case governing standards for the equipment is different from IS or IEC, the salient points of difference shall be clearly brought out in additional information schedule along with English language version of standard or relevant extract of the same. The equipment conforming to standards other than IS/IEC shall be subject to Department's approval.

The bidder shall clearly indicate in his bid the specific standards in accordance with which the works will be carried out.

SERVICES TO BE PERFORMED BY THE EQUIPMENT BEING FURNISHED

All equipments shall perform satisfactorily under various other electrical, electromechanical and meteorological conditions of the site of installation.

All equipment shall be able to withstand all external and internal mechanical, thermal and electromechanical forces due to various factors like wind load, temperature variation, ice & Snow, (wherever applicable) short circuit etc. for the equipment.

ENGINEERING DATA AND DRAWINGS

The engineering data shall be furnished by the Bidder in accordance with the Schedule for each set of equipment as specified in the Technical Specifications.

The list of drawings/documents which are to be submitted to the department during detailed engineering shall be discussed and finalized at the time of award.

The Bidder shall necessarily submit all the drawings/documents unless anything is waived.

The Bidder shall submit 4 (Four) sets of drawings/design documents/data/test reports as may be required for the approval of the Department.

DRAWINGS

All drawings submitted by the Bidder including those submitted at the time of bid shall be in sufficient detail to indicate the type, size, arrangement, material description, Bill of Materials, weight of each component, break-up for packing and shipment, dimensions, internal & the external connections, fixing arrangement required and any other information specifically requested in the specifications.

Each drawing submitted by the Bidder shall be clearly marked with the name of the Department, the unit designation, the specifications title, the specification number and the name of the Project. If standard catalogue pages are submitted, the applicable items shall be indicated therein. All the dimensions should be in metric units.

Further work of the Bidder shall be in strict accordance with these drawings and no deviation shall be permitted without the written approval of the Department, if so required.

The review of these data by the Department will cover only general conformance of the data to the specifications and documents interfaces with the equipment provided under the specifications, external connections and of the dimensions which might affect substation layout. This review by the Department may not indicate a thorough review of all dimensions, quantities and details of the equipment, materials, any devices or items indicated or the accuracy of the information submitted. This review and/or approval by the Department shall not be considered by the Bidder, as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications and documents.

All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawings shall be at the Bidder's risk. The Bidder may make any changes in the design which are necessary to make the equipment conform to the provisions and intent of the Contract and such changes will again be subject to approval by the Department. Approval of Bidder's drawing or work by the Department shall not relieve the Bidder of any of his responsibilities and liabilities under the Contract.

All engineering data submitted by the Bidder after final process including review and approval by the Department shall form part of the Contract Document and the entire works performed under these specifications shall be performed in strict conformity, unless otherwise expressly requested by the Department in writing.

MATERIAL/WORKMANSHIP

General Requirement

Where the specification does not contain references to workmanship, equipment, materials and components of the covered equipment, it is essential that the same must be new, of highest grade of the best quality of their kind, conforming to best engineering practice and suitable for the purpose for which they are intended.

In case where the equipment, materials or components are indicated in the specification as “similar” to any special standard, the Department shall decide upon the question of similarity. When required by the specification or when required by the Department the Bidder shall submit, for approval all the information concerning the materials or components to be used in manufacture. Machinery, equipment, materials and components supplied, installed or used, without such approval, shall run the risk of subsequent rejection; it being understood that the cost as well as the time delay associated with the rejection shall be borne by the Bidder.

All materials and equipment shall be installed in strict accordance with the manufacturer’s recommendation(s). Only first-class work in accordance with the best modern practices will be accepted. Installation shall be considered as being the erection of equipment at its permanent location. This, unless otherwise specified, shall include unpacking, cleaning and lifting into position, grouting, leveling, aligning, coupling of or bolting down to previously installed equipment bases/foundations, performing the alignment check and final adjustment prior to initial operation, testing and commissioning in accordance with the manufacturer’s tolerances, instructions and the specification All oil, grease and other consumables used in the Works/Equipment shall be purchased

in India unless the Bidder has any special requirement for the specific application of a type of oil or grease not available in India. If such is the case, he shall declare in the proposal where such oil or grease is available. He shall help Department in establishing equivalent Indian make and Indian supplier. The same shall be applicable to other consumables too.

Provisions for Exposure to Hot and Humid climate

Outdoor equipment supplied under the specification shall be suitable for service and storage under tropical conditions of high temperature, high humidity, heavy rainfall and environment favorable to the growth of fungus and mildew.

DESIGN IMPROVEMENTS/CO-ORDINATION

The Bidder shall note that the equipment offered by him in the bid only shall be accepted for supply. However, the Department or the Bidder may propose changes in the specification of the equipment or quality thereof and if the Department & Bidder agrees upon any such changes, the specification shall be modified accordingly.

If any such agreed upon change is such that it affects the price and schedule of completion, the parties shall agree in writing as to the extent of any change in the price and/or schedule of completion before the Bidder proceeds with the change. Following such agreement, the provision thereof, shall be deemed to have been amended accordingly.

The Bidder shall be responsible for the selection and design of appropriate equipment to provide best co-ordinate performance of the entire system. The basic design requirements are detailed out in this specification. The design of various components, sub-assemblies and assemblies shall be so done that it facilitates easy field assembly and maintenance.

The bidder has to co-ordinate designs and termination with the agencies (if any) who are Consultants for the department. The names of agencies shall be intimated to the successful bidder.

QUALITY ASSURANCE PROGRAMME

To ensure that the equipment and services under the scope of this contract whether manufactured or performed within the contractor's works or at his sub-contractor's premises or at the purchaser's site or at any other place of work are in accordance with the specifications, the Contractors shall adopt suitable quality assurance programme which shall be broadly outlined by the contractor and finalized after discussions before the award of contract. The detailed programme shall be submitted by the contractor after the award of contract and finally accepted by Electricity Department after discussion.

A quality assurance programme of the contractor shall generally cover the following:

- a) His organization structure for the management and implementation of the proposed quality assurance programme;
- b) Documentation control system;
- c) Qualification data for bidder's key personnel;
- d) The procedure for purchases of materials, parts components and selection of sub-contractor's services including vendor analysis, source inspection, raw material inspection, verification of material purchases etc
- e) System for shop manufacturing and site erection controls including process controls and fabrication and assembly control;

- f) Control of non-conforming items and system for corrective actions;
- g) Inspection and test procedure both for manufacture and field activities.
- h) Control of calibration and testing of measuring instruments and field activities.
- i) System for indication and appraisal of inspection status;
- j) System for quality audits;
- k) System for authorizing release of manufactured product to the Purchaser.
- l) System for maintenance of records;
- m) System for handling storage and delivery; and
- n) A manufacturing quality plan detailing out the specific quality control measures and procedures adopted for controlling the quality characteristic relevant to each item of equipment furnished and / or services rendered.
- o) A field quality plan covering field activities

The manufacturing and field quality plans shall be mutually discussed and approved by the purchaser after incorporating necessary corrections by the contractor as may be required.

The purchaser or his duly authorized representative reserves the right to carry out quality audit and quality surveillance of the system and procedure of the contractor/ his vendors quality management and control activities

QUALITY ASSURANCE DOCUMENT

The contractor would be required to submit all the quality assurance documents as stipulated in the quality plan at the time of purchaser inspection of equipment/ material

TESTS

Pre-commissioning Test

On completion of erection of the equipment and before charging, each item of the equipment shall be thoroughly cleaned and then inspected jointly by the Department and the Bidder for correctness and completeness of installation and acceptability for charging, leading to initial pre-commissioning tests at site. The list of pre-commissioning tests to be performed is given in respective chapters and shall be included in the Bidder's quality assurance programme.

Commissioning Tests

The available instrumentation and control equipment will be used during such tests and the bidder will use all such measuring equipment and devices duly calibrated as far as practicable. However, immeasurable parameters shall be taken into account in a reasonable manner by the bidder for the requirement of these tests. The tests will be conducted at the specified load points and as near the specified cycle condition as practicable. The bidder will apply proper corrections in calculation, to take into account conditions which do not correspond to the specified conditions

Any special equipment, tools and tackles required for the successful completion of the Commissioning tests shall be provided by the Bidder, free of cost.

The specific tests to be conducted on equipment have been brought out in the respective chapters of the technical specification.

The Bidder shall be responsible for obtaining statutory clearances from the concerned authorities for commissioning of the equipment.

PACKAGING & PROTECTION

All the equipments shall be suitably protected, coated, covered or boxed and crated to prevent damage or deterioration during transit, handling and storage at Site till the time of erection. On request of the Department, the Bidder shall also submit packing details/associated drawing for any equipment/material under his scope of supply, to facilitate the Department to repack any equipment/material at a later date, in case the need arises. While packing all the materials, the limitation from the point of view of availability of Railway wagon sizes in India should be taken into account. The Bidder shall be responsible for any loss or damage during transportation, handling and storage due to improper packing. Any demurrage, wharf age and other such charges claimed by the transporters, railways etc. shall be to the account of the Bidder. Department takes no responsibility of the availability of the wagons.

FINISHING OF METAL SURFACES

All metal surfaces shall be subjected to treatment for anti-corrosion protection. All ferrous surfaces for external use unless otherwise stated elsewhere in the specification or specifically agreed, shall be hot-dip galvanized after fabrication. High tensile steel nuts & bolts and spring washers shall be electro galvanized to service condition 4. All steel conductors including those used for earthing / grounding (above ground level) shall also be galvanized according to IS: 2629.

HOT DIP GALVANISING

The minimum weight of the zinc coating shall be 610 gm/sq.m and minimum thickness of coating shall be 85 microns for all items thicker than 6 mm. For items lower than 6mm thickness, requirement of coating thickness shall be as per relevant ASTM. For surface, which shall be embedded in concrete, the zinc coating shall be 610 gm/sq.m minimum.

The galvanized surfaces shall consist of a continuous and uniform thick coating of zinc, firmly adhering to the surface of steel. The finished surface shall be clean and smooth and shall be free from defects like discolored patches, bare spots, unevenness of coating, spelter which is loosely attached to the steel globules, spiky deposits, blistered surface, flaking or peeling off, etc. The presence of any of these defects noticed on visual or microscopic inspection shall render the material liable to rejection.

After galvanizing no drilling or welding shall be performed on the galvanized parts of the equipment excepting that nuts may be threaded after galvanizing. Sodium dichromate treatment shall be provided to avoid formation of white rust after hot dip galvanization.

The galvanized steel shall be subjected to six one minute dips in copper sulphate solution as per IS-2633.

Sharp edges with radii less than 2.5 mm shall be able to withstand four immersions of the Standard Presses test. All other coatings shall withstand six immersions. The following galvanizing tests should essentially be performed as per relevant Indian Standards.

- Coating thickness.
- Uniformity of zinc.
- Adhesion test.
- Mass of Zinc coating.

Galvanized material must be transported properly to ensure that galvanized surfaces are not damaged during transit. Application of zinc rich paint at site shall not be allowed. However cold galvanization spray of approved quality may be used to repair the damage, if any, to give the damaged surface equal protection as that of the hot dipped galvanized surface.

PAINTING

All sheet steel work shall be degreased, pickled, phosphated in accordance with the IS:6005 "Code of practice for phosphating iron and steel". All surfaces which will not be easily accessible after shop assembly shall beforehand be treated and protected for the life of the equipment. The surfaces which are to be finished painted after installation or require corrosion protection until installation, shall be shop painted with at least two coats of primer. Oil, grease, dirt and swarf shall be thoroughly removed by emulsion cleaning. Rust and scale shall be removed by pickling with dilute acid followed by washing with running water, rinsing with slightly alkaline hot water and drying.

After phosphating, thorough rinsing shall be carried out with clean water followed by final rinsing with dilute dichromate solution and oven drying. The phosphate coating shall be sealed with application of two coats of ready mixed, stoving type zinc chromate primer. The first coat may be "flash dried" while the second coat shall be stoved.

After application of the primer, two coats of finishing synthetic enamel paint shall be applied, each coat followed by stoving. The second finishing coat shall be applied after inspection of first coat of painting.

The exterior color of the paint shall be as per shade no. 697 of IS-5 and inside shall be glossy white for all equipment, marshalling boxes, junction boxes, control cabinets, panels etc. unless specifically mentioned under respective sections of the equipments. Each coat of primer and finishing paint shall be of slightly different shade to enable inspection of the painting. A small quantity of finishing paint shall be supplied for minor touching up required as site after installation of the equipments.

In case the Bidder proposes to follow his own standard surface finish and protection procedures or any other established painting procedure, like electrostatic painting etc., the procedures shall be submitted alongwith the Bids for Department's review & approval.

HANDLING, STORING AND INSTALLATION

In accordance with the specific installation instructions as shown on manufacture's drawings or as directed by the Department or his representative, the Bidder shall unload, store, erect, install, wire, test and place into commercial use all the equipment included in the contract. Equipment shall be installed in a neat, workmanlike manner so that it is level, plumb, and square and properly aligned and oriented. Commercial use of switchyard equipment means completion of all site tests specified and energization at rated voltage.

Bidder may engage manufacturer's Engineers to supervise the unloading, transportation to site, storing, testing and commissioning of the various equipment being procured by them separately. Bidder shall unload, transport, store, erect, test and commission the equipment as per instructions of the manufacturer's supervisory Engineer(s) and shall extend full cooperation to them.

In case of any doubt/misunderstanding as to the correct interpretation of manufacturer's drawings or instructions, necessary clarifications shall be obtained from the Department/ Manufacturer. Bidder shall be held responsible for any damage to the equipment consequent to not following manufacturer's drawings/instructions correctly.

Bidder shall be responsible for examining all the shipment and notify the Department immediately of any damage, shortage, discrepancy etc. for the purpose of Department's information only. The Bidder shall submit to the Department every week a report detailing all the receipts during the weeks. However, the Bidder shall be solely responsible for any shortages or damages in transit, handling and/or in storage and erection of the equipment at site. Any demurrage, wharf age and other such charges claimed by the transporters, railways etc. shall be to the account of the Bidder.

The Bidder shall be fully responsible for the equipment/material until the same is handed over to the Department in an operating condition after commissioning. Bidder shall be responsible for the maintenance of the equipment/material while in storage as well as after erection until taken over by Department, as well as protection of the same against theft, element of nature, corrosion, damages etc.

Where material/equipment is unloaded by Department before the Bidder arrives at site or even when he is at site, Department by right can hand over the same to Bidder and there upon it will be the responsibility of Bidder to store the material in an orderly and proper manner.

The Bidder shall be responsible for making suitable indoor storage facilities, to store all equipment which requires indoor storage.

The words 'erection' and installation used in the specification are synonymous. Similarly the words 'Equipment' and 'Materials' as also 'Bidder' and 'Contractor' 'owner' and Department used in the specifications are synonymous.

Exposed live parts shall be placed high enough above ground to meet the requirements of electrical and other statutory safety codes.

The design and workmanship shall be in accordance with the best engineering practices to ensure satisfactory performance throughout the service life. If at any stage during the execution of the Contract, it is observed that the erected equipment(s) do not meet the above minimum clearances, the Bidder shall immediately proceed to correct the discrepancy at his risks and cost.

TOOLS AND TACKLES

The Bidder shall supply with the equipment one complete set of all special tools and tackles for the erection, dis-assembly and maintenance of the equipment. However, these tools and tackles shall be separately, packed and brought on to Site.

The successful bidder shall supply 2 (two) copies of the above mentioned standards and codes, latest editions, and copies of any other standards/literature referred for design purpose, to the department within 30 days of placing of work order. The successful tenderer shall supply these copies free of cost to the Department.

MAINTENANCE FREE VALVE REGULATED LEAD ACID BATTERY AND BATTERY CHARGER.

All the materials/components used in battery chargers and batteries shall be free from flaws and defects and shall conform to the relevant Indian Standards and good engineering practice.

The contractor shall submit the drawings and get the owners approval before proceedings.

Battery:

The DC battery bank (consisting of 16nos. of 2V Cells) shall be made up of stationary, maintenance free, value regulated (VRLA type) Lead Acid cells. The battery shall work on the gas recombination principle and has to be designed to meet the requirements of a wide range of applications. These batteries shall be suitable for a long life under continuous float operations at 2.15 to 2.25 Volts per cell, and occasional high discharges. The Battery bank voltage shall be 30V DC. The construction of cells shall conform to latest revisions of relevant IS as applicable, IEC 60896-2:1995, TEC. spec. G/BAT-01/02 of March 2000, BS 6290 Part-IV and IEEE 1188 Standards.

The battery shall be designed for high integrity and long life, safe use, ease of installation, eco-friendly cadmium free alloy and leak and explosion proof.

Float life of the battery shall be designed for 20years at 27degree C on full float with recommended charging methods. The Cyclic life at 27 degree C shall be 1200Cycles at 80% depth of discharge, 2000cycles at 50% depth of discharge and, 4000 cycles at 20% depth of discharge.

Operating range of temperature shall be (-) 20 degree C to (+) 55 degree C.

Cell terminals: All cell terminals shall be lead plated copper core inserts for high conductivity, Cell terminal posts shall be equipped with connection bolts having acid resisting bolts and nuts.

Container: Containers shall be made of high impact polypropylene co-polymer (preferably of flame retardant polypropylene UL 94 V 0/28 % LOI), with ribbed jar design for better heat dissipation. Containers shall be robust, heat resistant, leak proof, non-absorbent, acid resistant and free from flaws. The container and cover sealing shall be done using heat sealing method for better joint strength.

Safety Valve: self sealing. Pressure regulated and explosion proof safety valve shall be provided.

Plates: The positive plate shall be flat pasted type with lead calcium high Tin alloy grid to resist corrosion and for longer life. The negative plate shall be flat pasted type with lead calcium alloy grid for maintenance free characteristics. The plates shall be designed for maximum durability during all services conditions including high rate of discharge and rapid fluctuations of load. The construction of plates shall conform to latest revision of relevant IS as applicable. and IEC 60896-2:1995, TEC Spec. G/BAT-01/02 of March 2000 and also conforming to BS 6290 Part-IV & IEEE 1188.

Separators: The separators shall have low resistance, high porosity and highly absorbent type glass mat separator (AGM) and shall maintain the electrical insulation between the plates and shall allow the electrolyte to flow freely. The positive and negative terminal posts shall be clearly marked.

Horizontal plate stacking shall be adopted in order to increase consistency of performance, better heat dissipation, eliminate acid stratification and for longer life.

Electrolyte: The electrolyte shall be prepared from battery grade high purity sulphuric acid conforming to IS :226 to minimize self life.

There shall be no requirement of water topping throughout the battery life. Also no corrosive fumes.

Manufacture's identification system

The following information shall be indelibly marked on outside of each cell:

Manufacturer's name and trade mark

Country and year of manufacture

Manufacturer's type designation

AH Capacity at 10 hr. discharge rate.

Serial number

Upper and lower electrolyte level in case of transparent containers

Connectors and fasteners

Lead coated copper connectors shall be used for connecting up adjacent cells, rows and end take off. Bolts, nuts and washers shall be effectively lead coated to prevent corrosion. End take off connectors shall be provided for end connections from positive and negative poles of the batteries to the power cables. More than one cable may be required to be connected to the battery terminals. Suitable arrangement for termination of multiple cables shall be provided so as to avoid extra load on the battery terminals. The cable will be single core having stranded aluminum conductor and PVC insulation which will be arranged by the employer separately. All the connectors and lugs shall be capable of continuously carrying the 30 minute discharge current of the respective batteries and shall be capable to carry 4KA for 1 Sec.

Battery racks: The cells /battery shall be supplied with compact, non-corrosive, self-supporting, floor mounted stand of robust design.

Tests

3.1 Batteries shall conform to all type tests as per the latest revisions of relevant IS as applicable. IEC 60896-2:1995, TEC Spec. G/BAT-01/02 of March 2000, BS 6290 Part-IV and IEEE 1188 Standards the latest issue of IS:1651 or IS:1652 (Whichever is applicable depending on type of battery being offered).

3.2 All acceptance test as required by the relevant Indian standards and other standards cited above shall be carried out at site after completion of installation. The capacity tests shall be carried out for 10 hr discharge rating. The contractor shall arrange for all necessary equipment, including the variable resistor, tools, tackles and instruments. If a battery fails to meet the guaranteed requirements the owner shall have the option of asking the contractor to replace the same with appropriate batteries at no extra cost and without affecting the commissioning schedule of the employer.

3.3 If successful contractor has not manufactured and commissioned the specified cell size, they must manufacture and test the prototype in advance and employer's approval for the same.

Following type test shall be carried out on each type of cells in the presence of employer's representative, if desired by the owner.

1. Capacity test
2. Watt hour and AH efficiency test

The contractor shall give at least three weeks advance notice of the date when the test are to be carried out. Three copies of the type test certificates shall be furnished to the employer for approval before dispatch of the equipment from works. The cost of the cells to be used for type tests shall be included in the respective types tests charges quoted by contractor, these cells shall not be supplied.

Accessories

The following information shall be given on the instruction cards supplied with the battery:

- a) Manufacturer's instruction/literature/drawings and relevant details.
- b) Designation of cell in accordance with relevant IS and other standards mentioned at Clause 3.1 (Whichever applicable)

A complete set of all the accessories and devices for maintenance of batteries shall be supplied along with each type of battery bank. The following items comprise the complete set of accessories:

- 1) 6 nos. of cell testing voltmeter (3-0-3V) conforming to IS:1248.
- 2) 4 pairs of rubber gloves
- 3) 4 set of spanners

4) 6 nos. of instructions cards

BATTERY CHARGER

The DC system shall be of 30 Volt. The battery charger as well as their automatic regulators shall be static type. The battery charger shall be thyristor controlled and designed for charging 150 AH VRLA type maintenance free lead acid battery.

Battery charger shall be capable of continuous operation at the respective rated load in float charging mode, i. e. float charging the associated DC lead acid batteries while supplying the DC load. The chargers shall also be capable of boost charging the associated DC battery.

The battery charger shall be designed for constant potential charging with current limited to 20% of the rated capacity of the battery ($0.2 C_{10}$ Amp). The float voltage shall be 2.25 ± 0.01 VPC at 27 degree C and the boost voltage shall be 2.30 ± 0.01 VPC at 27 degree C. The AC ripple current shall not exceed 3% RMS.

Battery charger shall be provided with facility for both automatic and manual control of output voltage and current. A selector switch shall be provided for selecting the mode of output voltage/current control, whether automatic or manual. When on automatic control mode during float charging, the charger output voltage shall remain within $\pm 1\%$ of the set value, for AC input voltage variation of $\pm 10\%$ frequency variation of $\pm 5\%$, a combined voltage and frequency variation of $\pm 10\%$ and a DC load variation from zero to full load.

Battery charger shall have constant voltage characteristics throughout the range (from zero to full load) at the floating value of the voltage so as to keep the battery fully charged but without harmful overcharge.

Battery charger shall have load limiters having drooping characteristics which shall cause when the voltage control is in automatic mode, a gradual lowering of the output voltage when the DC load current exceeds the load limiter setting of the charger. The load limiter characteristics shall be such that any sustained overload or short circuit in DC system shall not damage the charger, nor shall it cause blowing of any of the charger fuses. The charger shall not trip on overload or external short circuit.

Uniform and step less adjustment of voltage setting (in both manual and automatic modes) shall be provided on the front of the charger panel covering the entire float charging output range specified. Stepless adjustment of the Load-limiter setting shall also be possible from 80% to 100% of the rated output current for charging mode.

During boost charging the battery charger shall operate on constant current mode (when automatic regulator is in service). It shall be possible to adjust the boost charging current continuously over a range of 50 to 100% of the rated output current for boost charging mode.

The charger output voltage shall automatically go on rising, when it is operating on boost mode, as the battery charges up. For limiting the output voltage of the charger, a potentiometer shall be provided on the front of the panel, whereby it shall be possible to set the upper limit of this voltage anywhere in the output range specified for boost charging mode.

The charger manufacture may offer an arrangement in which the voltage setting device for float charging mode is also used as output voltage limit setting device for boost charging mode and the load-limiter of float charging mode is used as current setting device in boost charging mode.

Suitable filter circuit shall be provided in all the chargers to limit the ripple content (peak to peak) in the output voltage to 1%, irrespective of the DC load level, when they are not connected to a battery.

MCCB

All battery chargers shall have 1no. MCCB on the input side to receive cables from one source. It shall be of P2 duty and suitable for continuous duty. MCCBs should have auxiliary contacts for annunciation/hooter.

Rectifier Transformer

The rectifier transformer shall be continuously rated, dry air cooled (A.N.) and of class F insulation type. The rating of the rectifier transformer shall have 10% overload capacity.

Rectifier assembly

The rectifier assembly shall be fully/half controlled bridge type and shall be designed to meet the duty as required by the respective charger. The rectifier shall be provided with heat sink having

their own heat dissipation arrangements with natural air-cooling. Necessary surge protection devices and rectifier type fast acting HRC fuses shall be provided in each arm of the rectifier connections.

Instruments

One AC voltmeter and one AC ammeter alongwith selector switches shall be provided for all chargers. One DC voltmeter and DC ammeter (with shunt) shall be provided for all chargers. The instruments shall be flush type, dust proof and moisture resistant. The instruments shall have easily accessible means for zero adjustments. The instruments shall be of 1.5 accuracy classes.

Air Break Switches

One DC output switch shall be provided in all charges. They shall be air break type suitable for 500Volts AC/250Volt DC. The contacts of the switches shall open and close with a snap action. The operating handle of the switch shall be fully insulated from circuit. 'ON' and 'OFF' position on the switch shall be clearly indicated,. Rating of switches shall be suitable for their continuous load. Alternatively, MCCBs of suitable ratings shall also acceptable in place of Air break Switch.

Fuses.

All fuses shall be HRC link type. Fuses shall be mounted on fuse carriers which are in turn mounted on fuse bases. Wherever it is not possible to mount fuses on carriers fuses shall be directly mounted on plug-in type base. In such case one insulated fuse pulling handle shall be supplied for each charger. The contractor depending on the circuit requirement shall choose fuse rating. All fuses in the chargers shall be monitored. Fuse failure annunciated shall be provided on the failure of any fuse.

Blocking Diode

Blocking diode shall be provided in the positive pole of the output circuit of each charger to prevent current flow from the DC battery into the charger.

Annunciation system

Audio visual indications through bright LEDs shall be provided in all charges for the following abnormalities:

AC power failure

DC failure

Rectifier/chargers fuse blown

Over voltage across the battery when boost charging

Abnormal voltage (High/Low)

Any other annunciation if required.

Potential free NO contacts of above abnormal conditions shall also be provide for common remote indication "CHARGER TROUBLE" in employer's control board. Indication for charger in float mode and boost mode through indication lamps shall be provided for chargers. A potential free contact for float/boost mode shall be provided for external interlocks.

Name plates and marking

The nameplates shall be white with black engraved letters. On top of each Charger on front as well as rear sides, larger and bold nameplates shall be provided to identify the charger. Name plates with full and clear inscriptions shall also be provided on and inside of the panels for identification of the various equipments and ease of operation and maintenance.

Charger construction

The Charger shall be indoor, floor mounted, self-supporting sheet metal enclosed cubicle type. The contractor shall supply all necessary base frames, anchor bolts and hardware. The Chargers shall be fabricated from 2.0mm cold rolled sheet steel and shall have folded type of construction. Removable gland plates for all cables and lugs for power cables shall be supplied by the contractor. The lugs for power cables shall be made of electrolytic copper with tin coat. Power cable sizes shall be advised to the contractor at a later date for provision of suitable lugs and drilling of gland plates. The charger shall be tropicalized and vermin proof. Ventilation louvers, if provided shall be backed with screens. All doors and covers shall be fitted with synthetic rubber gaskets. The charger shall have hinged double leaf doors provided on front and on backside for adequate access to the charger's internals. All the charger cubicle doors shall be properly earthed. The degree of protection of charger enclosure shall be at least IP-42 as per IS: 2147.

All indicating instruments, control switches and indicating lamps shall be mounted on the front side of the charger.

Each charger shall be furnished completely wired upto power cable lugs and terminal blocks and ready for external connections. The control wiring shall be carried out with PVC insulated, 1.5Sq.mm. Stranded copper wires. Control terminals shall be suitable for connecting two wires, with 2.5Sq.mm stranded copper conductor. All terminals shall be numbered for ease of connections and identification. Each wire shall bear a ferrule or tag on each end for identification. At least 20% spare terminals shall be provided for control circuits.

The insulation of all circuits, except the low voltage electronic circuits shall withstand test voltage of 2KV AC for one minute. An air clearance of at least ten (10) mm shall be maintained throughout for such circuits, right up to the terminal lugs. Whenever this clearance is not available, the live parts shall be insulated or shrouded.

Painting

All sheet steel work shall be pretreated in tanks, in accordance with IS : 6005 Degreasing shall be done by alkaline cleaning. Rust and scale shall be removed by pickling with acid. After pickling, the parts shall be washed in running water. Then these shall be rinsed in slightly alkaline hot water and dried. The phosphate coating shall be 'class-C' as specified in IS :6005. Welding shall not be done after phosphating. The phosphating surfaces shall be rinsed and passivated prior to application of stoved lead oxide primer coating. After primer application, two coats of finishing synthetic enamel paint of shade-692(smoke grey) of IS: 5 shall be applied unless required otherwise by the employer. The inside of the charges shall be glossy white. Each coat of finishing synthetic enamel paint shall be properly staved. The paint thickness shall not be less than fifty (50) microns.

Tests

Battery chargers shall conform to all type tests as per relevant Indian Standard. Performance test on the chargers as per specification shall also be carried out on each charger as per specification. Rectifier transformer shall conform to all type tests specified in IS: 4540 and short circuit test as per IS: 2026. Following type tests shall be carried out for compliance of specification requirements:

- a) Voltage regulation test
- b) Load limiter Characteristics test
- c) Efficiency tests
- d) High Voltage tests
- e) Temperature rise tests
- f) Short circuit test at no load and full load at rated voltage for sustained short circuit.
- g) Degree of protection tests.
- h) Measurement of ripple by oscilloscope.

The contractor may be required to demonstrate to the owner that the chargers conform to the specification particularly regarding continuous rating, ripple free output, voltage regulation and load limiting characteristic, before dispatch as well as after installation at site. At site the following tests shall be carried out:

- 1) Insulation resistance test
- 2) Checking of proper annunciation system operation.

If a charger fails to meet the specified requirements, the contractor shall replace the same with appropriate charger without affecting the commissioning schedule of the sub-station and without any extra cost to the owner.

The contractor shall present for inspection, the type and routine test certificates for the following components whenever required by the owner.

Switches

Relays/MCCBs

Instruments

DC Fuses

SCR

Diodes

Condensers

Potentiometers

Semiconductor

Annunciator

Control Wiring

Push buttons for contactors.

The following drawings shall be supplied with the tender:-

- a) Outline drawing of all apparatus showing sufficient details to enable the purchaser to determine whether the design proposed can be installed satisfactorily or not.
- b) Wiring diagram of battery charger.

MATERIALS:-

All materials such as clamps, bolts & Nuts, etc. required for this work should be hot dip galvanized as per relevant I.S.S.

NOTE:

All the materials to be supplied by the contractor should be confirming to relevant I.S. standards as amended up-to-date & as per the approved designs of the department. Where such standard does not exist one should strictly confirmed to the drawings, specification & general standards mentioned/enclosed. The materials offered by the contractor shall be the makes approved by the department in the enclosed list.

(APPROVED MAKES OF EQUIPMENTS)

Sr.No	Name of Equipment	Preferred Makes
1.	2V SMF VRLA DC Battery	Exide, Amaraja, HBL Power System Ltd., Tata Green.
2.	Battery Charger	Amaraja, Mastech, HBL-Niff Power System Ltd., Emerson Network Power.

Name of contractor:

Sign :

EXECUTIVE ENGINEER (DIV.VII)

Stamp of the contractor: