

REF: TIFR/PD/CF19-107/190831

Date: 02-01-2020

WORK DESCRIPTION

TWO PART LIMITED TENDER

Supply, installation, Testing and Commissioning of Internal electrification and all related works , etc for Hanger Building-2 of TIFR facility at 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District, Hyderabad-500107.

Note:

- The bid shall be in two parts i.e. TECHNICAL BID (PART ‘I’) and FINANCIAL BID (PART ‘II’)
- Estimated Cost of Tender: **Rs.7,00,000**
- Tender Fee: **Rs. 500/-** (Demand Draft to be drawn in favour of “**TIFR Centre for Interdisciplinary Sciences**”, Hyderabad)
- Cost of EMD: **Rs. 14,000/-** (Demand Draft to be drawn in favour of “**TIFR Centre for Interdisciplinary Sciences**”, Hyderabad)
- Pre-Bid Meeting Date, Time and Place : **09.01.2020 at 03.00 p.m. at Tata Institute of Fundamental Research (TIFR), Service Building I, Survey No. 36/P, Gopanpally Jn, Post: Gopanpally, Hyderabad-500 107**
- Time of Completion: **30 Days**
- Tender should reach us on or before **22.01.2020 up to 13:00 hrs.**
- **Tender will be opened (Only Technical Bid-Part-“I”) on 22.01.2020 at 15:00 hrs.**
- In case the Part “I” and Part “II” bids are not sealed in separate envelopes the tender will be rejected.
- The technical bid should not contain any indication of the price.
- The Technical Bid received without payment of tender fees and EMD shall be summarily rejected.
- Contacts: Shri. R. Rajasekhar- Head Technical Services, Tel: 040-20203010 and Mr. Krishna E Tel: 040-20203009 for clarifications.

The Tender Technical Bid (Part ‘I’) and Financial Bid (Part ‘II’) should be submitted in two separate sealed envelope duly super scribing our enquiry reference and due date in bold letters, and put in master cover addressed to the TATA INSTITUTE OF FUNDAMENTAL RESEARCH(TIFR), SERVICE BUILDING I, SURVEY NO. 36/P, GOPANPALLY JN, POST: GOPANPALLY, HYDERABAD-500 107 so as to reach on or before due date specified. Quotation sent by hand delivery/courier are to be handover at security after obtaining stamp, date and signature of the concern person at security.

Due date for submitting your offer is on or before **22.01.2020 up to 13:00 hrs.**



Head-Technical Services
For and on behalf of TIFR, Hyderabad

Contractor’s Signature & Seal



TENDER DOCUMENT

Supply, Installation, Testing & Commissioning of Internal Electrification and all related works, etc. for Hanger Building-2 of TIFR facility as per Enclosed Specifications, Drawings & Schedule of Quantities for TIFR, Hyderabad



PART – I

TECHNICAL BID

Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Junction,
Post: Gopanpally, Hyderabad - 500 107



Tender Notice : TIFR/PD/CF19-107/190831

Name of Work : Supply, Installation, Testing & Commissioning of Internal Electrification and all related works, etc for Hanger Building-2 of TIFR facility

Location : Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally village, Serilingampally Mandal,
Ranga Reddy District, Hyderabad – 500046.

Estimated Cost : **Rs. 7,00,000/-**

EMD : **Rs. 14,000/-**

Delivery Period : 30 Days

Validity : One eighty (180) days after opening of Part-I, Technical Bid



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SECTION-I

IMPORTANT INFORMATION

INTRODUCTION

The Tata Institute of Fundamental Research is a National Centre of the Government of India, under the umbrella of the Department of Atomic Energy, as well as a deemed University awarding degrees for master's and doctoral programs. Tata Institute of Fundamental Research Centre for Interdisciplinary Sciences, Hyderabad invites bids for the following work:

Name of work : Supply, Installation, Testing & Commissioning of Internal Electrification and all related works, etc. for Hanger Building-2 of TIFR facility at 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District, Hyderabad

1. PARTICULARS:

a)	Location	Survey No. 36/P, Gopanpally Village, Serilingampally (Mandal) Ranga Reddy Dist., Hyderabad
b)	Pre-bid Meeting	09/01/2020
c)	Issue of note-worthy replies / clarifications to Pre-bid queries	13/01/2020
d)	Closing date & time of receipt of bids	22/01/2020 & 13:00 Hrs
e)	Date & time of opening of Sealed Cover-I containing Technical Bid	22/01/2020 & 15:00 Hrs
f)	Date of opening of Sealed cover-II containing Financial Bid of eligible bidders	To be intimated to eligible bidders subsequently which is likely to be sometime around 15 Days

2. GENERAL INSTRUCTIONS

- a) TIFR shall award the contract for the project through the two Bid systems.
- b) The Contractor are advised to visit and examine the site of work and its surroundings and obtain any information that may be necessary, in addition to those provided in this document. . The Contractor shall be deemed to have fully acquainted himself about the site condition, whether he inspects it or not.
- c) The Contractor should adhere to the building bye-laws applicable for the area.
- d) All clarifications shall be sought before the date of pre-bid meeting. The bidders may make suggestions which shall be considered during the Pre Bid Meeting. No further clarifications shall be issued after issue of noteworthy replies to the pre-bid queries.
- e) The submission of the bid by Contractor would imply that they have carefully read and agreed to the terms and conditions contained in this bid document.
- f) The bid for the work shall remain open for acceptance for a period of 180 (one eighty) days from the date of submission of the bids, which period may be extended by mutual agreement and the Contractor shall not cancel or withdraw the offer during this period.
- g) This bid document shall form a part of the contract agreement.

3. SUBMISSION OF BIDS

Bids shall be submitted to Head- Technical Services, *TIFR, Survey No. 36/P, Gopanpally Junction, Post:Gopanpally, Serilingampally, Hyderabad-500 107* in a sealed Master envelope super scribed “Bid for **Supply, Installation, Testing & Commissioning of Internal Electrification and all related works, etc. for Hanger Building-2 of TIFR facility at 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District, Hyderabad**” with our enquiry no. and due date, containing two separate sealed covers clearly super scribed as “Technical Bid” and “ Financial Bid” before the closing date and time of submission in the following manner:

- a) “Technical Bid”: This will contain Technical part, Eligibility Documents along with testimonials. Earnest Money Deposit (EMD).
- b) “Financial Bid”: This will contain the complete bidding document with duly filled in Schedule of Financial Quote of Financial Bid & Tender Drawings.

The Bids without signature of the authorized person of bidder and seal, without EMD, with conditions or conditional rebates shall be summarily rejected.

4. EVALUATION OF BID:

- a) **EVALUATION OF TECHNICAL BID:** The bids received will first be first opened and will be examined for EMD, Eligibility Criteria, Conditions, etc. Conditional Tenders and Tenders without EMD shall be summarily rejected.
- b) **EVALUATION OF FINANCIAL BID:** The Financial Bid should contain the complete bid document with duly filled in Schedule of Financial Quote of Financial Bid and signed Tender drawings. Financial Bids of Technically qualified Bidders will only be opened. Work will be awarded to lowest bidder (L1) based on their quotes after making necessary arithmetical checks.

5. SCOPE & OBJECTIVE

The Objective of the tender is to Supply, Installation, Testing & Commissioning of Internal Electrification and all related works, etc for Hanger Building-2 of TIFR facility at 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District, Hyderabad as per the specifications and Bill of quantities mentioned in the Financial Bid.

Period of Completion of Work: 60 days from the date of issue of work order

Defect Liability Period: 6 months from the date of handing over of completed structure as per tender.

6. PAYMENT SCHEDULE:

The contractor shall submit the bills for payments along with detailed statement showing the actual works carried out under different heads of items in the format specified by the TIFR. Minimum value of the work for interim payment (Running Bills) shall be **Rs. 3,00,000/-**. All interim and final bills will be settled based on the joint measurements of each item of works and certified by TIFR Engineer. The bills for nonperishable materials on site may also be submitted and the payment by TIFR against the same shall be to the maximum extent of 90% of the value of these materials on production of sufficient documentary evidence ie. Original invoice, Inventory, etc. All interim bills will be paid within **30** days from the date of submission and Final Bill will be settled within **30** days from the date of submission with certification of TIFR Engineer.



SECTION-II	ELIGIBILITY CRITERIA FOR TENDER QUALIFICATION
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A. Eligibility Criteria for Tender Qualification

1. The Agencies/Contractors will be qualified for Supply, Installation, Testing & Commissioning of Internal Electrification and all related works, etc for Hanger Building-2 of TIFR facility at 36/P, Gopanpally Village, Serilingampally Mandal, Rangareddy District, Hyderabad.
2. Eligibility criteria:
 1. The Agencies/Contractors shall hold valid ‘A’ grade electrical contractor license issued by appropriate authority and must be valid throughout the contractual period
 2. The Agencies/Contractors shall hold valid labour license issued by appropriate authority and must be valid throughout the contractual period
 3. The Agencies/Contractors shall be in profit for last three financial years and should have valid PAN from Income Tax Authority, PF Registration No., GST registration No. etc. and any other registration applicable/mandatory for contract.
 4. The Agencies/Contractors should have executed successfully at least one similar work costing **Rs. 5.6 lakhs** or two similar works costing **Rs. 4.2 lakhs** or 3 similar works costing **Rs. 2.8 Lakhs** during last 7 financial years ended on March 31st 2019 for Research Institutes, Universities, Private Laboratories, R & D institutes, etc. in any Government /PSU/Private organizations of repute.
 5. The Agencies/Contractors should furnish copies of work orders, completion certificates from the clients in support of the above.
 6. The Agencies/Contractor shall be registered with Government / Semi Government/Municipal Authorities of any other Public Organization. (Enclose certified copies of document as evidence)
 7. IT Returns for the last three consecutive financial years ended on March 31, 2019 audited by CA.



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Tel. No.:040- 20203010, 20203009

Email: rajasekharr@tifrh.res.in Website: www.tifrh.res.in

8. Agencies/Contractors should have full-fledged in-house project management team to undertake the jobs.
9. The Agencies/Contractors shall **strictly furnish** aforesaid information in the formats/schedules given. **Non adherence to furnishing of information in the given format/schedules given will lead to disqualification of tender.**
10. Instructions to Agencies/Contractors for furnishing the information is given as under:
 - i. Each page of the application shall be signed by a person having necessary authority to do so.
 - ii. If the space in the proforma is insufficient for furnishing full details, such information may be given in separate sheets.
 - iii. Applicants are required to furnish information against each item of the application. In case certain item is not applicable, please write NA. Application containing incorrect and or inadequate information is liable to be rejected.
 - iv. For any further clarification, the applicant may contact Head- Technical Services, Tata Institute of Fundamental Research, Survey No. 36/P, Gopanpally Junction, Post: Gopanpally, Serilingampally, Hyderabad – 500 107.



SCHEDULE – A

BASIC INFORMATION

1. Name of the firm :

2. a) Address :
- b) Telephone/ Fax No. :
- c) Mobile No. Contact Person :
- d) PAN No. :
- e) PF/ESI Registration Details:
- f) GST Registration No. :
- g) Labour License Dtails :

3. Branch Office if any in :
Hyderabad

4. Type of Organization :
(Proprietorships/ Partnership)
Ltd. Co. / Co-Operative)
(Copy of relevant document
to be enclosed)
5. Date of Incorporation :

6. Nature of Business :



7. Experience as prime :
Agencies/Contractors (in Yrs.)
8. Details of Electrical license
- i. Registering Authority :
- ii. Reg No. :
- iii. Date of issue. :
- iv. Date of expiry. :
- (Copies to be enclosed).
9. Name and address of :
Bankers.
10. Organization chart of the :
Company including names
and positions of directors /
key personnel/

Signature of the Applicant (s)



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Schedule – B

Major Internal Electrification works (Copies of the completion certificate to be enclosed)

A. Similar work of costing **Rs. 5.6 lakhs** or two similar works of costing **Rs. 4.2 lakhs** or 3 similar works of costing **Rs. 2.8 Lakhs** during last 7 financial year ending March 31st 2019 for Research Institutes, Universities, Private Laboratories, R & D institutes, etc.

Sr. No.	Name of the Project & Address	Description of work in brief	Name of the Electrical Engineer	Name of the Client. Also indicate whether Govt. or semi Govt. or Pvt. Body with full postal address.	Contract Amount in (Rs.)	year of commencement	Date of Completion		Whether work was left incomplete or contract was terminated from either side? Give Details	Any other relevant information
							Stipulated	Actual		

B. List of works in progress above **Rs. 2.8 lakhs**.

Sr. No.	Name of the project & Address	Description of work in brief	Name of the Electrical Engineer with full postal address.	Name of the Client. Also indicate whether Govt. or semi Govt. or Pvt. Body with full postal address	Contract Amount in (Rs.)	Date of Completion	Present stage of work with reasons if the work is getting delayed	Anyother relevant information
1.								
2.								

Signature of the Applicant (s)



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SCHEDULE – C

TECHNICAL PERSONNEL & SPECIAL EXPERIENCE

List of technical personnel in your establishment giving details about their technical qualification and experience

Sr No.	Name	Age	Qualifications	Project Experience	Nature of works handled	Name of the project Handled	Date from which employed in organization	Indicate special experience in Electrical installation & Testing projects in which were employed
1								
2								

2. Indicate other points if any to show your technical and managerial competency to indicate any important point in your favour.

Signature of the Applicant (s)



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SCHEDULE – D

FINANCIAL POSITION AND WORKING RESULTS

		2016-17	2017-18	2018-19
1.	Annual turnover	:	Rs.	
2.	Net Profit	:	Rs.	
3.	Credit Facilities from the Bank	:	Rs.	
	a) Cash Credit	:	Rs.	
	b) Overdraft Limit	:	Rs.	
	c) Guarantee	:	Rs.	
	d) Others	:	Rs.	
4.	Certificate from the Bankers regarding financial soundness of the applicant	:	Enclosed (Yes / No)	
5.	Solvency Certificate from the Bankers	:	Enclosed (Yes / No)	

Signature of the Application (s)



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SCHEDULE – E

MICELLANEOUS INFORMATION

1. Whether it would be possible to process Bank Guarantee for various advances during execution of the work. :
2. Details of Civil Suits / Litigations arised during execution of the contracts in the last 5 years. :
3. Latest Income Tax Clearance Certificate :
4. Name of the two senior official of Organizations preferably Govt./Semi Govt/ Autonomous/ Public Sector Organization for whom you have executed important and major Electrical works, who may be directly contracted by TIFR to gather information about your ability, competence and capacity of your work/organization/etc. :
5. Number of Supplementary sheets attached. :

Signature of the Applicant (s)



SECTION-III

NOTICE AND INSTRUCTIONS

1. Sealed item rate tenders in the prescribed form are invited from Head-Technical Services, Tata Institute of Fundamental Research, Centre for Interdisciplinary Services, Hyderabad, for the following:

Tender Notice No.	TIFR/PD/CF19-107/190831
Name of Work	Supply, installation, Testing and Commissioning of Internal electrification and all related works , etc. for Hanger Building-2 of TIFR facility at 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District, Hyderabad.
Estimated Cost	Rs. 7,00,000
Time Limit	30 days
Earnest Money Deposit	Rs.14,000 (Rs Fourteen Thousand Only)
Tender Fee	Rs 500 (Rs Five Hundred only)
Pre-bid meeting	09/01/2020 at 03.00 p.m. in TIFR, Service Building-I, Survey No. 36/P, Gopanpally Junction, Post: Gopanpally, Serilingampally, Hyderabad-500 107
Last Date & Time of Submission of Tender	22.01.2020 up to 13:00 hrs
Date & Time of Opening of Technical Bid	22.01.2020 up to 15:00 hrs

2. Submission of Tender & Opening: Tenders shall be submitted in a sealed envelope super scribed with Tender enquiry No., Due Date and with heading as “Supply, installation, Testing and commissioning of Internal electrification and all related works for Hanger Building-2 at 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District, Hyderabad” containing two separate sealed covers clearly super scribed as “TECHNICAL BID” and “FINANCIAL BID” on or before the closing date and time of submission in the following manner:

“TECHNICAL BID”: This will contain the following:

- a) Proof of Tender Cost paid already
- b) Earnest Money Deposit as stipulated
- c) Schedules giving information on Eligibility Criteria with supporting documents specified for tender qualification.

“FINANCIAL BID”: Signed copy of the Financial Bid quoting amount in the stipulated format and signed copies of the tender drawings.

3. Earnest Money Deposit (EMD) EMD shall be submitted in the form of Demand Draft / Pay Order / Banker's cheque issued by a Scheduled Bank, drawn in favour of "TIFR Centre for Interdisciplinary Sciences", (To be enclosed with the Technical Bid Part –I).

4. Performance guarantee: The tenderer, whose tender is accepted, will be required to furnish a performance guarantee of 5% of the tendered amount within 7 (seven) working days from the date of intimation. This guarantee shall be in the form Demand Draft / Pay Order / Banker's cheque / Deposit or Government Securities / Fixed Deposit Receipt (FDR) or Guarantee Bonds (BG) of any Scheduled Bank in accordance with the form as Annexure – I here to. In case a fixed deposit receipt of any Bank is furnished by the contractor to TIFR as part of the performance guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to TIFR to make good the deficit.

The Performance Guarantee shall be initially valid up to the stipulated date of completion plus 60 days beyond that. In case the time for completion of work gets enlarged, the contractor shall get the validity of performance Guarantee extended to cover such enlarged time for completion of work. The performance guarantee shall be returned to the contractor, without any interest, after recording of the completion certificate for the work by the competent authority.

The Engineer-in-charge shall make a claim under the Performance guarantee for amounts to which TIFR entitled under the contract (notwithstanding and / or without prejudice to any other provisions in the contract agreement) in the event of:

- a) Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer-in-charge may claim the full amount of the Performance guarantee.
- b) Failure by the contractor to pay TIFR, Hyderabad any amount due, either as agreed by the contractor or determined under any of the Clauses / Conditions of the agreement, within 30 days of the service of notice to this effect by Engineer-in-charge.

In the event of the contract being determined under provisions of any of the relevant clauses of the agreement, the performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of TIFR, Hyderabad.

5. Security Deposit: The tenderer, whose tender is accepted, will also be required to furnish by way of Security Deposit for fulfillment of his contract, an amount equal to 5% of the tendered value of the work. Earnest Money deposited at the time of tenders will be treated as part of the Security Deposit.

or

The successful tenderer shall permit TIFR, Hyderabad at the time of making any payment to him for work done under the contract to deduct a sum at the rate of 5% of the gross amount of each running bill till the sum along with the sum already deposited as earnest money, will amount to security deposit of 5% of the tendered value of the work. Such deductions will be made and held by TIFR by way of Security Deposit unless he has / they have deposited the amount of Security at the rate mentioned above in cash or in the form of Fixed Deposit Receipts.

In case a fixed deposit receipt of any bank is furnished by the contractor to TIFR, Hyderabad as part of the security deposit and the bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to TIFR, Hyderabad to make good the deficit.



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All compensation or the other sums of money payable by the contractor under the terms of this contract may be deducted from, or paid by the sale of a sufficient part of his security deposit or from the interest arising there from, or from any sums which may be due to or may become due to the contractor by TIFR or any account whatsoever and in the event of his Security Deposit being reduced by reason of any such deductions or sale as aforesaid, the contractor shall within 10 days make good in cash or fixed deposit receipt tendered by the State Bank of India or by scheduled banks (if deposited for more than 12 months) endorsed in favour of the TIFR, HYDERABAD, any sum or sums which may have been deducted from, or raised by sale of his security deposit or any part thereof.

Security Deposit as deducted above can be released against Bank Guarantee issued by a Scheduled Bank. Bank Guarantee should be submitted which will be valid up to the expiry of defect liability period.

6. Acceptance of Tender: The competent authority, on behalf of TIFR, Hyderabad does not bind itself to accept the lowest or any other tender, and reserves to himself the authority to reject any or all the tenders received, without assignment of any reason. All tenders, in which any of the prescribed condition is not fulfilled or any condition, including that of conditional rebates is put forth by the tenderer, shall be summarily rejected.

The Competent Authority, on behalf of TIFR, Hyderabad reserves to itself the right of accepting the whole or any part of the tender and the tenderer shall be bound to perform the same at the rates quoted. The officer inviting tenders shall have the right of rejecting all or any of the tenders and will not be bound to accept the lowest tender or any other tender.

7. Validity of Tender: The tender for the work shall remain open for acceptance for a period of 180 days from the last date of submission of tenders. If any tenderer withdraws his tender before the said period, or before issue of Letter of Intent, whichever is earlier, or makes any modifications in the terms and conditions of the tender which are not acceptable to the Department, then TIFR, Hyderabad shall, without prejudice to any other right or remedy, be at liberty to forfeit 50% of the said earnest money absolutely. Further the tenderer shall not be allowed to participate in the retendering process of the work.

8. Levy / Taxes payable by contractor:

- i. GST or any other tax on materials and services in respect of this contract shall be payable by the contractor and TIFR shall not entertain any claim whatsoever in this respect.
- ii. The contractor shall deposit royalty and obtain necessary permit as required for supply of the sand, aggregate, stone etc. from local authorities.

9. Deduction of Income Tax : As per Section 194-C of Income tax Act 1961, as amended by letter No. 275/9/72/9-TJ (Circular No. 86) dated 19.5.72 and No. 275/14/91-IT (B) (Circular No. 593) dated 5.2.91, received from Ministry of Finance, Department of Revenue, Central Board of Direct Taxes, New Delhi, the Income tax @ 2% and Surcharge thereon @12% (or any other amended rate by Ministry of Finance from time to time), of the gross value of the work done will be recovered from the bills. A certificate for the amount so recovered will be issued by the Department.



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10. Site visit by the tenderer before tendering: Tenderers are advised to inspect and examine the site and its surroundings during working hours and satisfy themselves before submitting their tenders as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed.

11. Signing of Tender and receipts for payments: In the event of the tender being submitted by a firm, it must be signed separately by each partner thereof or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power-of-attorney authorizing him to do so, such power of attorney to be produced with the tender, and it must disclose that the firm is duly registered under the Indian Partnership Act-1952. Receipts for payments made on account of work, when executed by a firm, must also be signed by all the partners, except where contractors are described in their tender as a firm, in which case the receipts must be signed in the name of the firm by one of the partners, or by some other person having due authority to give effectual receipts for the firm.

12. Tenderer's responsibilities: The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a tender by a tenderer implies that they have read this notice & all other contract documents, and has made himself aware of the scope & specifications of the work to be done and local conditions and factors having a bearing on the execution of the work.

13. Signing of contract: The Notice Inviting Tender shall form a part of the contract document. The successful tenderer / contractor, on acceptance of his tender by the Accepting Authority, shall, within 15 days from the stipulated date of start of the work, sign the contract consisting of: the Notice Inviting Tender, all the documents including all conditions, specifications and drawings, if any, forms the tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto.

14. Canvassing, either directly or indirectly, in connection with the tenders is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable to rejection and may be barred from the future participation in TIFR works.

Head-Technical Services

For and on behalf of TIFR, Hyderabad

SECTION –IV

GENERAL CONDITIONS OF CONTRACT

1 Definition of Terms:

- 1.1 In constructing these general conditions and the specifications the following works shall have the meanings herein assigned to them unless there is something in the subject or context inconsistent with such construction.
- 1.2 The 'Purchaser' shall mean Tata Institute of Fundamental Research- -Hyderabad, Tata Institute of Fundamental Research, 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District, Hyderabad 500107 and shall include the Purchaser's heirs, successors and assigns.
- 1.3 The term 'Engineer In-Charge' and 'Engineer' shall mean Engineer In-Charge, TIFR- Hyderabad or some other person for the time being or from time to time duly appointed in writing by the Purchaser to act as Engineer In-Charge for the purpose of the Contract or in default of such appointment the Purchaser.
- 1.4 The term 'Contractor'/'Supplier'/'Bidder'/'Vender' shall mean the Bidder whose tender has been accepted by the Owner and shall include the Bidder's heirs, successors and assigns approved by the Purchaser:
- 1.5 The term 'Sub-Contractor' shall mean the firm or persons named in the contract for any part of the work or any person to whom any part of the work has been sublet with the consent in writing of the Engineer In-Charge and shall include his heirs, successors and assigns approved by the Purchaser.
- 1.6 The Term 'Inspector' shall mean any person appointed by or on behalf of the Purchaser to inspect supplies, stores or work under the contract or any person deputed by the Inspector for the purpose.
- 1.7 The term 'Particulars' shall mean, the following :
- a) Specifications
 - b) Drawing (ANNEXURE-III)
 - c) Sealed Pattern denoting a pattern sealed and signed by the Inspector.
 - d) Proprietary make denoting the produce of an individual firm.
 - e) Any other details governing the construction manufacture and/or supply as existing for the contract.
- 1.8 The term 'Specification' shall mean the specifications annexed to or issued with these Conditions of Contract.
- 1.9 The term 'Site' shall mean the place or places at which the Equipment is to be delivered or work done by the Contractor; and shall include, where applicable, the lands and buildings upon or in which the works are to be executed and shall also include the place or places at which fabrication and other work is being carried out by the Contractor.
- 1.10 'Electrical Equipment', 'Stores', 'Work' or 'Works' shall mean and include equipment and materials to be provided and work to be done by the Contractor under the Contract.
- 1.11 The 'Contract' shall mean acceptance of the work order placed on contractor/supplier under section (2) of these conditions and shall include these conditions of Contract, Specifications, Schedule, Drawing, Letter of Intent of the Purchaser and any subsequent amendments mutually agreed upon.
- 1.12 'Tests on Completion' shall mean such tests which are prescribed by the specifications or have been mutually agreed to between the Contractor/Supplier and the Purchaser to be made before the equipment is taken over by the Purchaser.
- 1.13 'Writing' shall include any manuscript, typewritten or printed statement under or over signature or seal as the case may be. Words importing 'person' shall include firms, companies, corporations and association of individuals whether incorporate or not.
- 1.14 Words importing singular shall also include plural and vice versa where context requires.
- 1.15 Bidders are advised to visit and inspect the work-site to make themselves fully conversant with the site conditions and nature of work. Any claim by them after the opening of bids on account of themselves being unaware of any site condition shall not be entertained.

2 Contract:

Contractor/Supplier/Manufacturer should send their acceptance letter on receipt of 'Letter of Intent' or 'Work Order' or 'Purchase Order' within stipulated period. On expiry of said period or exorbitant delay in commencing or executing the work, the Purchaser shall not be liable to any claim from the Contractor/ Supplier for work entrusted to and may revoke the contract.

3 Work at Site

3.1 Access to the works shall be allowed only to the Contractor/Supplier, Sub-Contractors or his duly appointed representatives. The Contractor/ Supplier shall not object to the execution of other works by other contractors or tradesmen and shall afford them every facility for execution of their several works simultaneously with his own.

3.2 Work at the Purchaser's premises shall be carried out at such time as the Purchaser may approve but the Purchaser shall give the Contractor/ Supplier all reasonable facilities for the same. The Contractor/Supplier shall provide sufficient fencing, notice boards etc. to guard the works and warn the public.

3.3 The Contractor shall obey Central, Local and State regulations and enactments pertaining to workmen and labour and the Engineer In-Charge shall have the right to enquire into and decide all complaints on such matters. The Contractor should comply with the Minimum Wages Act and should also ensure that safe practices are followed by his people at site.

4 Delays:

The Contractor/Supplier shall not be entitled to any compensation for any loss suffered by him on account of delays in commencing or executing the work, whatever the cause for such delays may be, including delays in procuring Government controlled or other materials and delay in obtaining instructions and decisions from the Engineer In-Charge.

5 Taking Over:

The equipment when erected at site shall be deemed to have been taken over by the Purchaser when the Engineer In-Charge will have certified in writing that the equipment has fulfilled the contract conditions.

6 Extension of Time:

If the Contractor/Supplier is delayed in the progress of work by changes ordered in the work, or by any cause, which the Engineer In-Charge shall decide to justify the delay, then the time of completion shall be extended by a reasonable time. In this regard, Contractor shall maintain proper hindrance register and record all such events with due signature of E-I-C on occurrence of such instants for seeking extension of time. However, no such extension shall be allowed unless requested for extension is made in writing by the Contractor/Supplier to the Engineer In-Charge within 15 days from the date of occurrence of the delay.

7 Liquidated Damages:

7.1 For all delays, which do not, merit any extension of time, the Contractor/ Supplier shall attract 1% penalty per week for the first 4 weeks of delay and 2% penalty per week for the next 4 weeks of the total contract value. The amount of liquidated damages shall be recoverable from the payment due to the Contractor/Supplier up to maximum of 10% of value of contract.

7.2 The deduction of liquidated damages shall not, however, absolve the Contractor/Supplier of his responsibility and obligations under the contract to complete the work in its entirety and shall also be without



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SURVEY NO.36/P, GOPANPALLY JN, POST: GOPANPALLY, HYDERABAD-500107

Tel. No.:040- 20203010, 20203009

Email: rajasekharr@tifrh.res.in Website: www.tifrh.res.in

prejudice to action by the Purchaser under clause: 'Termination of Contract by the Purchaser'. After that the same shall be completed by the Purchaser at the Contractor's/Supplier's risk and cost.

8 Other Damages:

8.1 The Contractor/Supplier/Manufacturer shall be responsible for all injury to persons, animals or things and for all damage to the works, structure of, and decorative work in the property which may arise from operation or neglect of himself or any of his Sub-Contractor or of his or Sub-Contractor's employees, whether such injury or damage may arise from carelessness, accident or any other cause whatever in any way connected with the carrying out of this contract. This clause shall be held to include any damage to buildings, whether immediately adjacent or otherwise, any damage to roads, streets, foot paths, as well as all damage caused to the works forming the subject of this contract by frost or other inclemency of weather. The Contractor/Supplier shall indemnify the Purchaser and hold him harmless in respect of all and any expenses on property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of Government or otherwise and also in respect of any award of compensation or damages consequent upon such claim. Contractor shall furnish necessary insurance documents (Contractor All Risk Policy) taken for the site before commencement of work

8.2 The Contractor/Supplier/Manufacturer shall reinstate all damage of every sort mentioned in this clause, so as to deliver up the whole of the contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to the property of the Owner/third parties.

8.3 The Contractor/Supplier/Manufacturer shall indemnify the Purchaser against all claims which may be made against the Purchaser, by any member of the public or other party, in respect of anything which may arise in respect of the works or in consequence thereof and shall, at his own expense, effect and maintain, until the work has been 'Taken Over' under clause 5.

8.4 The Contractor/Supplier/Manufacturer shall also indemnify the Purchaser against all claims which may be made upon the Purchaser whether under the Workmen's Compensation Act or any other statute in force during the currency of this contract or at common law in respect of any employee of the Contractor/Supplier or of any of his sub-contractor and shall at his own expense effect and maintain until the work has been 'Taken Over', with an approved office. Contractor shall furnish copy of labour licence, PF, ESI, etc before commencement of work. If the aforesaid are not applicable contractor should furnish declaration to this effect and shall indemnify TIFR-Hyderabad, Hyderabad for violation of any such compliances.

8.5 The Purchaser, with the concurrence of the Engineer In-Charge, shall be at liberty and is hereby empowered to deduct the amount of any damages compensation costs, charges and expenses arising or accruing from or in respect of any such claims or damages from any sums due to or become due to the Contractor/Supplier.

9 Earnest Money Deposit, Performance Guarantee and Security Deposit:

9.1 Earnest Money Deposit (EMD):

Every Bidder has to pay EMD of amount as specified elsewhere in this tender by Demand Draft in favour of the TIFR- Hyderabad along with the offer or submit valid MSME certificate & declaration for exemption if any. Quotation received without EMD shall be rejected and no correspondence whatsoever will be entertained.

For successful bidder the EMD will be adjusted against Performance Guarantee and will be refunded after completion of work /supply of material at site and for unsuccessful bidders EMD will be refunded after placing the order to successful bidder.

9.2 Performance guarantee:

The tenderer, whose tender is accepted, will be required to furnish a performance guarantee of 5% of the tendered amount within 7 (seven) working days from the date of intimation ie (including adjustment of EMD amount submitted). This guarantee shall be in the form Demand Draft / Pay Order / Banker's cheque / Deposit or Government Securities / Fixed Deposit Receipt (FDR) or Guarantee Bonds (BG) of any Scheduled Bank in accordance with the form as Annexure – I hereto. In case a fixed deposit receipt of any Bank is furnished by the contractor to TIFR as part of the performance guarantee and the Bank is unable to make payment against the said fixed deposit receipt, the loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to TIFR to make good the deficit.

The Performance Guarantee shall be initially valid up to the stipulated date of completion plus 60 days beyond that. In case the time for completion of work gets enlarged, the contractor shall get the validity of performance Guarantee extended to cover such enlarged time for completion of work. The performance guarantee shall be returned to the contractor, without any interest, after recording of the completion certificate for the work by the competent authority.

The Engineer-in-charge shall make a claim under the Performance guarantee for amounts to which TIFR-Hyderabad entitled under the contract (notwithstanding and / or without prejudice to any other provisions in the contract agreement) in the event of:

- a) Failure by the contractor to extend the validity of the Performance Guarantee as described herein above, in which event the Engineer-in-charge may claim the full amount of the Performance guarantee.
- b) Failure by the contractor to pay TIFR- Hyderabad any amount due, either as agreed by the contractor or determined under any of the Clauses / Conditions of the agreement, within 30 days of the service of notice to this effect by Engineer-in-charge.

In the event of the contract being determined under provisions of any of the relevant clauses of the agreement, the performance guarantee shall stand forfeited in full and shall be absolutely at the disposal of TIFR-Hyderabad, Hyderabad.

9.3 Security Deposit (SD):

Deductions towards Security Deposit shall be made from all running bills @ 5% of the billed amount. The Security Deposit shall be released after the Defect Liability Period reckoned from the date of completion as certified by the Engineer In-Charge.

10 Guarantee and Defects Liability Period:

10.1 The Contractor/Supplier/Manufacturer shall guarantee that all equipments shall be free from any defect due to the defective materials and bad workmanship and that the equipment shall operate satisfactorily and that the performance and efficiencies of the equipment shall be not less than the guaranteed values. The guarantee shall be valid for a period of 6 months after the date of commissioning as certified by the Engineer In-Charge. Any parts found defective shall be replaced free of all costs by the Contractor/Supplier. The services of the Contractor's/Supplier's personnel if requisitioned during this period for such work shall be made available free of any cost to the Purchaser.

10.2 If the defects be not remedied within a reasonable time, the Purchaser may proceed to do so at the Contractor's/Supplier's risk and expense without prejudice to any other rights.

11 Terms of Payment:

The contractor will be paid only 1 Running Account (RA) Bill and Final Bill considering the progress of works based on measurement of works completed. The contractor shall submit the bills for payments along with detailed statement showing the actual works carried out under different heads of items in the format specified by TIFR-, Hyderabad. Minimum value of the work for interim payment shall be Rs. 3,00,000/-. No advance for supplying material will be made by TIFR.

BILL FORMAT

Tender Item No.	Description of Items (At least 2 lines)	Unit	Tender Quantity	Executed Quantity	Rate	% work done	Amount

NOTE: All quantities in the bill should be in cumulative.

All measurements should be in the order of tender sequence and should be recorded in the measurement book.

The Measurement should be strictly in the below mentioned format only.

MEASUREMENT FORMAT

Tender Item No.	Description of Item & Location against each Measurement taken	Nos.	Length	Breadth /width	Height	Qty.	Remarks

The works which have been certified for running bills will also be verified along with the final bill and any defects found need to be replaced / rectified by the contractor at his cost. Till the time, the site is handed over in full, it is the contractor's liability to safeguard the works done and completed at site. The Progress of work should not be affected in any way quoting the reason of non-availability of funds / materials / releasing of Running bill. The liability of contractor is to complete all works in his scope in the scheduled time as per the terms of contract and will not relieve the contractors from his obligations once the Running bill is paid / kept pending.

Final Payment

Payments of Final bill shall be made after deduction of Security Deposit as specified. The Security Deposit, shall be refunded on expiry of the Defects Liability Period after rectifying all defects to the satisfaction of the TIFR-Hyderabad/E.I.C. The acceptance of payment of the final bill by the Contractor would indicate that he would have no further claim in respect of the work executed.

12 Special conditions of Contract governing supplies of the Equipment of this Tender:

12.1 Scope:

12.1.1 This specification covers the supply of material as per the enclosed details and quantities and supervision of erection/installation, testing and commissioning of the material.

12.1.2 The Contractor/Manufacturer/Supplier shall quote for all the materials along with accessories as mentioned in the enquiry.

12.1.3 All the supply shall be in accordance with relevant I.S. Specifications and recognized standards.

12.2 Inspection & Testing of Material:

12.2.1 Contractor/Manufacturer/Supplier shall submit the lists of Type Tests and Routine Tests to be conducted on the material in Technical Data Sheet.

12.2.2 All the materials shall be tested at factory as per IS Specifications of material by Purchaser's Engineer In-Charge/Engineers before dispatch at the cost of Contractor/Manufacturer/Supplier.

12.2.3 Contractor/Manufacturer/Supplier shall inform the concerned Engineer In-Charge for inspection and testing in accordance and fix up suitable date for the same.

12.3 Test Certificates:

Contractor/Manufacturer/Supplier shall submit the Test Certificates of all materials.

12.4 Taxes & Duty:

12.4.1 Contractor/Manufacturer/Supplier shall quote the basic price of material. Excise Duty, Custom Duty, Sales Tax, GST, Octroi, Delivery Charges, Transit Insurance and/or any other charges, if any, must be indicated separately.

12.4.2 TIFR being a research institute of Govt. of India, is eligible for Excise Duty Exemption on equipment supplies. Necessary exemption certificate will be provided by TIFR.

12.4.3 Transit Insurance: The Transit Insurance from the point of dispatch to the site of erection shall be in the scope of Supplier and the cost shall be indicated separately.

12.5 Delivery of Material:

12.5.1 Packing:

The Contractor/Manufacturer/Supplier shall be held responsible for loading of all equipment and for the stores being sufficiently and properly packed for transport by rail, road, sea or air so as to ensure their being free from any loss or damage on arrival at destination. The packing and marking of packages shall be done by and at the expenses of Manufacturer/Supplier. Each package shall contain a packing note quoting purchase order number and detail of the contents.

12.5.2 All the materials must be delivered at site i.e. Hyderabad - TIFR at 36/P, Gopanpally Village, Serilingampally Mandal, Ranga Reddy District, Hyderabad-500107. The unloading and positioning of all equipments at the designated locations specified by the Engineer In-Charge shall be in the scope of the Supplier. The Supplier shall arrange for handling equipment, labour for rigging, etc. as required.

12.5.3 Material must be delivered at site in all respects as mentioned in the Purchase Order.

12.6 Guarantee:

If during the period of guarantee any fault or defect arises, the material shall be replaced/repared immediately free of cost, as well as any replacement of accessories required shall be done free of cost.

12.7 Mistake in Drawing:

The Contractor/Supplier shall be responsible for and shall pay for any alterations in works due to any discrepancies, errors or omissions the drawings or other particulars supplied by him whether such drawings or particulars have been approved by the Purchaser or not.

12.8 Responsibility for Completeness:

Any fittings or accessories which may not be specifically mentioned in the specifications but which are usual or necessary are to be provided by the Contractor/Supplier without extra charge and the equipment must be complete in all details.

12.9 Extra/Deviation items & Variations in quantity

TIFR-Hyderabad has right to omit/delete any of the item and also increase/decrease the quantities mentioned in the tender. No claim or any compensation in this regard will be accepted or paid to the contractor. However, if there are any new /additional items/deviated items are to be executed, contractor is bound to execute such items with prior approval from TIFR-Hyderabad after furnish the proper rate analysis for such extra/deviated items.

12.10 Rejection of Defective Equipment:

If the equipment after the acceptance thereof is discovered to be defective, notwithstanding that such defects could have been discovered at the time of inspection or found to have failed to fulfill the requirements of the contract or developed defects after the erection within a period of 12 months from the date of erection, even if such erection is done by the Purchaser, he shall be entitled to give a notice on the Contractor/Supplier setting forth details of such defects or failure and the Contractor/Supplier shall, provided such notice is given within a period of 14 months from the date of such erection or acceptance, forthwith make the defective equipment good or alter the same to make it comply with the requirements of the contract at his own cost and further if in the opinion of the Purchaser, the defects are of such a nature that the defects cannot be made good or required without impairing the efficiency or workability of the equipment or if in the opinion of the

Purchaser the Equipment cannot be repaired or altered to make it comply with the requirements of the Contract, the Contractor/Supplier shall, provided a notice given by the Purchaser in this behalf within a period of 14 months from the date of erection or acceptance thereof, remove and replace the same with the equipment conforming to the stipulated particulars, in all respects at the Contractor's/Supplier's own cost. Should he fail to do so within a reasonable time, the Purchaser may reject and replace, at the cost of the Contractor/Supplier, with equipment of the same particulars or if equipment conforming to the stipulated particulars are not in the opinion of the Purchaser readily procurable, such opinion being final, then with the nearest substitutes.

In the event of such rejection the Purchaser shall be entitled to use the Equipment in a reasonable and proper manner for a time reasonably sufficient to enable him to obtain replacement equipment as herein before provided.

12.11 Inspection and Final Tests:

All tests necessary to ensure that the Equipment complies with the particulars and guarantee shall be carried out at such place or places as may be determined by the Inspector. Should, however, it be necessary for the final test as to performance or guarantee to be held over until the Equipment is erected at site they shall be carried out within one month of completion of erection.

12.12 Intimation about Delivery:

If the Purchaser shall have notified the Contractor/Supplier in writing that the former is not ready to take delivery, no equipment or materials shall be forwarded until intimation in writing shall have been given to the Contractor/Supplier by the Purchaser that he is ready to take delivery.

12.13 Delay in erection:

Wherever erection of an equipment or machinery is the responsibility of the Contractor/Supplier as a term of the contract and in case the Contractor fails to carry out the erection as and when called upon as to do within the period specified by the Purchaser, the Purchaser shall have right to get the erection done through any source of his choice. In such an event, the Contractor/Supplier shall be liable to bear any additional expenditure that the Purchaser may incur towards erection. The Contractor/Supplier shall, however not be entitled to any gain due to such an action by the Purchaser.

12.14 Definition of Equipment:

The work 'Equipment' wherever, it appears in these 'Special Conditions of Contract' governing supplier of Equipments in this Tender shall mean all switchgears, panels, etc. or parts thereof or what the Contractor/Supplier agrees to supply under Contract as specified in the work order.

12.15 Force Majeure:

Normally Force Majeure shall cover only act of God, fire, wars, strike, riots and civil commotion, floods, epidemic, quarantine related strikes, freight embargoes, etc. The contractor shall not be liable for any liquidated damages for delay or any failure to perform the contract arising out of Force Majeure conditions, provided that the contractor shall within ten days from the beginning of such delay notify to the department in writing the cause of delay along with convincing supporting evidence. The department once convinced and accepted the reason may extend the supply completion period by a suitable / reasonable margin.

13 Termination of Contract by the Purchaser:

13.1 If the Contractor/Supplier commits any 'Act of Insolvency' or shall be adjudged an Insolvent or shall have an order for compulsory winding up made against him or pass effective resolution for winding up voluntarily, or if the Contractor/Supplier shall suffer any payment under this contract to be attached by or on behalf of any of the creditors of the Contractor/ Supplier, or shall assign the Contract without the prior consent in writing of the Engineer In-Charge, or shall charge or encumber this Contract or any payments due or which may become due to the Contractor/Supplier there under, or if the Engineer In-Charge shall certify in writing to the Purchaser that the Contractor/Supplier –

a) has abandoned the contract, or

b) has failed to commence the works, or has without any lawful excuse these conditions suspended the progress of the works for seven days after receiving from the Engineer In-Charge written notice to proceed,
or

c) has failed to proceed with the work with such due diligence and failed to make such due progress as would enable the works to be completed in accordance with the approved programme of work,

or

d) has failed to remove materials from the site or to pull down and replace work for seven days after receiving from the Engineer In-Charge written notice that the said materials or work were condemned and rejected by the Engineer In-Charge under these conditions,

or

e) has neglected or failed persistently to observe and perform all or any of the acts matters or things by this contract to be observed and performed by the Contractor for seven days after written notice shall have been given to the Contractor/ Supplier requiring the Contractor/Supplier to observe or perform the same,

or

f) has to the detriment of good workmanship or in defiance of the Engineer In-Charge's instructions to the contrary sub-let any part of the contract, then and in any of the above said causes, the Purchaser with the written consent of the Engineer In-Charge may, notwithstanding any previous waiver, after giving seven days' notice in writing under the provisions of this clause to the Contractor/Supplier, determine the contract but without prejudice to the powers of the Engineer In-Charge or the obligations and liabilities of the Contract, the whole of which shall continue to be in force as if the contract has not been so determined and as if the work subsequently executed has been executed by and on behalf of the Contractor/ Supplier.

13.2 After the issue of such notice, the Contractor/Supplier shall not be at liberty to remove from site any equipment, tools and materials belonging to him which shall have been placed thereon for the purpose of the works and the Purchaser shall have lien upon such equipment, tools or materials to subsist from the date of such notice and until the notice shall have been complied with.

13.3 If the Contractor/Supplier shall fail to comply with the requirements of said notice for seven days after such notice has been given, the Purchaser shall have the power to enter upon and take possession of the works and site and all equipment, tools and materials thereon, and to engage any other person, firm or agency to complete the works, utilizing the equipment, tools and materials to the extent possible. The

Purchaser shall not in any way be responsible for damage or loss of the tools, equipment and materials and the Contractor/Supplier shall not have any compensation therefore.

13.4 Upon completion of the works, the Engineer In-Charge shall certify the amount of expenditure properly incurred consequent on and incidental to the default of the Contractor/Supplier as aforesaid and such amount shall be deducted from the payments due to the Contractor/Supplier, including the Security Deposit. If the said amount exceeds the payment due to the Contractor/Supplier, the Purchaser shall be at liberty to dispose off any of the Contractor's/Supplier's materials, tools or equipment and apply the proceeds for the payments due from the Contractor/Supplier and recover the balance by process of law.

13.5 After the works have been completed after the amounts due to the Contractor/Supplier, the Engineer In-Charge shall give notice in writing to the Contractor/Supplier to remove the surplus equipment and material from site. If such equipment and materials are not removed within a period of 14 days after such notice, the Purchaser shall have the power to remove and sell the same holding the proceed less the cost of removal and sale, to the credit of the Contractor/Supplier. The Purchaser shall not be responsible for any loss sustained by the Contractor/Supplier from the sale of the equipment and material.

14 Contractor's Representative:

The Contractor/Supplier shall employ at least one qualified representative (ie. Electrical supervisory License with minimum 3 years of experience of similar works as stipulated by TIFR- Hyderabad in the work order) whose name shall have previously been communicated in writing to the Engineer In-Charge and approved by him to supervise the erection. Any written order or instructions given to the representative shall be deemed to have been given to the Contractor/Supplier.

The Engineer In-Charge shall be at liberty to object to any particular representative/or any persons employed by the Contractor/Supplier on the work and the Contractor/Supplier shall remove the person objected to, on the receipt of the Engineer In-Charge, in writing, a request requiring him to do so and shall provide in his place another competent representative acceptable to the Engineer In-Charge.

The Contractor's/Supplier's representative shall be a qualified electrical/ mechanical engineer and possessing adequate site experience in similar nature of works.

15 Completion Time:

Unless otherwise agreed in writing between the Purchaser and the Contractor/Supplier, the work contract shall be completed within the stipulated period mentioned elsewhere in this tender document from the date of Work/Purchase Order issued to Contractor/Supplier by the Purchaser.

16 Delivery of Material at Site:

The Contractor/Supplier/Manufacturer shall arrange for safe transit and delivery of material at site and unloading the material at site.

17 Validity of Tender:

The quotation should be valid for 90 days after opening of the Part—I : Technical Bids.

18 Measurements:

All joint measurements of quantities shall be done by the Contractor at his own cost in the presence of the Engineer In-Charge or any authorized person deputed by him who will certify the routes, length and quantities etc. for the purpose of determination of the amount payable.

19 Spare Parts & Manuals:

Manufacturer/Contractor/Supplier should submit operation, maintenance and spare part list and manuals for all equipments.

20 Training:

Manufacturer/Contractor/Supplier should provide training for operation and maintenance free of cost for equipment supplied.

21 Special Instruction for bidding process

This tender is a two part tender. The Part-I: Technical Bid and Part-II: Financial Bid. Bidder shall seal each bid separately with a clear label on the envelope about its content. Both the bids should be submitted in single drop two cover method. Any pricing details must not appear in the Part-I: Technical Bid.

22 Drawings and Documentation: As-built drawings as specified in this technical specifications shall be submitted by the Contractor.

23 Permissions and Approvals: All statutory permissions and approvals from Electricity authority as may be required for commissioning of the entire system shall be carried out by the contractor. All necessary documentation for obtaining such permissions and approvals shall be done by the contractor. Purchaser shall assist in providing required declarations. Statutory fees shall be paid by the purchaser.

24 Guarantee:

The equipments shall be guaranteed against all design and manufacturing defects, poor workmanship etc. for a period of 6 months from the date of commissioning. Any defects discovered during this period shall be rectified by the vendor free of cost to purchaser.

SECTION –V

TECHNICAL SPECIFICATIONS

SCOPE OF WORK

The following works are in the scope of work of this tender:

1.1 LT Cables

Supply, installation, termination, testing and commissioning of 1.1kV LT Aluminium stranded sector shaped conductor with XLPE insulation armoured cables suitable for 415 V, 3 Phase, 4 Wire 50 Hz AC supply system and to be laid directly o in a ground at a depth of 900mm below ground level (cost of excavation shall be measured separately) sand bedding, laying of baked bricks on side & top backfilling, dewatering, consolidation, disposal of excess earth and making good to the original finish etc. providing brass cable number tags as per the enclosed technical specifications & conforming to IS: 7098 (Part-I & II)

1.3 Readymade Power Distribution Boards:

Supply, installation, testing and commissioning of VTPN/TPN/SPN power distribution boards suitable for 415 V, 3 Phase, 4 Wire/230V, 1 phase, 50 Hz AC supply system with double door suitable mounting for incoming MCCB/ELCB/MCB, outgoing MCB, Neutral Bus, earth bus and earth studs and built-in distribution board.

1.4 MCCB, MCB, Industrial sockets, Power contactors and Switches & sockets:

Supply, installation, testing and commissioning of various ratings of MCCBs, ELCBs, MCBs, industrial sockets, power contactors, 6/16A switch & sockets and Emergency push buttons suitable for 415 V, 3 Phase, 4 Wire/230V, 1 phase, 50 Hz AC supply system and suitable for DIN rail mounted.

1.5 Power and Lighting system:

Supply, installation, testing and commissioning of power and lighting wiring, socket outlets, lighting fixtures etc.

1.6 FRLS PVC insulated Copper flexible wires for sub main circuits & power points:

Supply, laying on the wall/slab (saddling)/PVC trunking and termination of 1 core/ multi core FRLS PVC insulated flexible copper conductor cable/wire for wiring the Single phase/three phase sub main circuits from power DB to switch boards/industrial sockets/ Work bench/ light fixtures/various equipment.

1.7 UPVC Modular snap on DLP trunking and UPVC casing capping (Cable Management System)

Supply and installation of snap on DLP trunking routing sections and accessories and UPVC casing capping routing sections and accessories as per manufacturer's instructions for running the main circuits & sub main circuits The European standard EN 50085-2-1 describes the performances of cable management systems (plastic and metal products) installed along the wall.



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(A Deemed University)

SURVEY NO.36/P, GOPANPALLY JN, POST: GOPANPALLY, HYDERABAD-500107

Tel. No.:040- 20203010, 20203009

Email: rajasekharr@tifrh.res.in Website: www.tifrh.res.in

1.8 Modular Switched and Sockets

Supply and installation of Modular 6A Switches and 16A Sockets in the Modular Switch boards or DLP trunking and UPVC casing capping. Switch shall conform to IS 3854 & Socket shall conform to IS 1293.

1.9 Earth Station and earth conductor:

Construction of earth pits and supply, installation, testing and commissioning of 600 x 600 x 3mm tinned copper plate electrodes and 600 x 600 x 6mm GI plate electrodes and laying of earthing conductors for grounding system and related works.

1.10 Liaison Work:

All liaison work with documentation, test certificates, co-ordination with concerned authorities for obtaining permission to commission the entire system.

1.11 Civil works: Floor cutting/chipping to make a trench for floor raceways, PCC finishing of cable trench, supply and fixing of GI chequer plate with suitable fasteners on flooring to cover the cable trench, Supply and erection of supporting structures for cable trays and all other civil works which are required as per site conditions.

1.12 Other Works: All other works which might not have been specifically mentioned in the specifications and in Schedule of quantities but are essential for operational requirement of the entire system shall be in the scope of work. Bidder shall specifically brought out such items in Technical bid and submit quote in separate sheet along with the Financial Bid.

1.13 MV Cubical panels (250 Amp)

Design, supply, installation, testing and commissioning of frame mounted, indoor type, cubical type MV panel suitable for 415 V, 3 Phase, 4 Wire 50 Hz AC supply system fabricated in compartmentalized (preferably) design from CRCA sheet steel of 2 mm, having 250 Amp capacity, extensible type, TPN tinned copper bus bars of high conductivity, DMC/ SMC bus bar supports, with short circuit withstand capacity of 50kA at 415V for 1 Sec., and with incoming TPN disconnect switch, outgoing MCCBs, Spare space of additional MCCB for future expansion shall be provided.

GENERAL & CODES

2.1 All the supply and work shall be in accordance with the relevant I.S. Specification and recognized standards and modern approved practice and shall meet the requirement of the latest issue of applicable codes, factory rates and regulations, supply codes and all standard accepted practice in locality where the installation is to be made.

2.2 All the materials and accessories provided by Contractor under terms of this contract shall conform to the relevant Indian Standard Specifications. Samples of all equipment, materials and accessories to be supplied by the Contractor shall be submitted for the approval of the Engineer before they are supplied and used.

2.3 Contractor shall provide all necessary labour, tools, and other requisite work like drilling, cutting, welding etc. at his own cost.

2.4 Good workmanship is the essence of this contract and shall be complied with at all time. The Contractor shall have the works supervised by qualified and experienced engineers. All the defects pointed out by the engineer shall be rectified immediately by the Contractor free of cost.

2.5 The installation shall generally be carried out strictly in conformity with the requirement of latest edition of the Indian Electricity Act, 1910 as amended and the Indian Electricity Rules, 1956 framed there under and all others statutory regulations that may be relevant to the installation.

2.6 No alteration which may affect the structures and architecture of building shall be done without the prior approval of the engineer. All work shall be carried out in such a manner that it should not cause any inconvenience to other works which are under progress. The Contractor shall cooperate with other agencies in the area for the smooth execution of all works.

2.7 Accidental damage to any property shall be reported immediately to site engineers and letter confirmed in writing.

2.8 The equipment shall comply with the requirement of latest revision of following standard issued by BIS (Bureau of Indian Standards), unless otherwise specified.

<i>S. No.</i>	<i>Standard</i>	<i>Title</i>	<i>Reaffirm Date</i>	<i>Amdt.</i>
1.	IS 732:1989	Code of practice for electrical wiring installations (third revision)	March 2010	
2.	IS 4648:1968	Guide for electrical layout in residential buildings	August 2012	
3.	IS 8061:1976	Code of practice for design, installation and maintenance of service lines up to and including 650 V	March 2011	
4.	IS 5578:1984/ IEC 60391 (1972)	Guide for marking of insulated conductors (first revision)	March 2011	
5.	IS 11353:1985/ IEC 60445 (1973)	Guide for uniform system of marking and identification of conductors and apparatus terminals	July 2012	

6.	IS 13234:1991/ IEC 60909: 1988	Guide for short circuit current calculations in three-phase ac systems (superseding IS 5728)	August 2012	
7.	IS 7752 (Part 1): 1975	Guide for improvement of power factor in consumer installation: Part 1 Low and medium supply voltages	March 2011	
8.	IS 10118 (Part 1):1982	Code of practice for selection, installation and maintenance of switchgear and controlgear : Part 1 General	March 2011	
9.	IS 10118 (Part 2):1982	Code of practice for selection, installation and maintenance of Switchgear and controlgear : Part 2 Selection	March 2011	
10.	IS 10118 (Part 3):1982	Code of practice for selection, installation and maintenance of switchgear and controlgear : Part 3 Installation	March 2011	
11.	IS 10118 (Part 4):1982	Code of practice for selection, installation and maintenance of switchgear and controlgear : Part 4 Maintenance	March 2011	
12.	IS 3043:1987	Code of practice for earthing	March 2011	2
13.	IS 5216 (Part 1):1982	Recommendations on safety procedures and practices in electrical work: Part 1 General (first revision)	March 2010	
14.	IS 5216 (Part 2):1982	Recommendations on safety procedures and practices in electrical work: Part 2 Life saving techniques (first revision)	March 2010	
15.	IS 4237:1982	General requirements for switchgear and control gear for voltages not exceeding 1000 volts ac or 1200 volts dc (first revision) [superseded by IS 13947 (Part 1):1993]		
16.	IS 6875 (Part 1):1973	Control switches (switching devices for control and auxiliary circuits including contactor relays) for voltages up to and including 1000 V ac & 1200 V dc: Part 1 General requirements [superseded by IS 13947 (Part 5/Section 1)]		
17.	IS 6875 (Part 2): 1973	Control switches (switching devices for control and auxiliary circuits including contactor relays) for voltages upto and including 1000 V ac and 1200 V dc: Part 2 Push- buttons and related control switches [Superseded by IS 13947 (Part 5/Section1)]		
18.	IS 6875 (Part 3): 1980	Control switches (switching devices for control and auxiliary circuits including contactor relays) for voltages up to and including 1000 V ac and 1200 V dc : Part 3 Rotary control switches [superseded by IS 13947 (Part 5/Section 1)]		
19.	IS 2675:1983	Enclosed Distribution Fuse Boards and Cut Outs for voltages not exceeding 1000 V A.C. or 1200 V D.C.	March 2011	
20.	IS 8828:1996	Circuit-breakers for over current protection for household and similar installations (second revision)		
21.	IS 13032:1991	Miniature circuit breaker boards for voltage up to and including 1000 Volt ac	March 2011	1
22.	IS 12640 (Part 1): 2008	Residual current operated circuit-breakers for household and similar uses : Part 1 circuit-breakers without integral over current protection (RCCBs) (First Revision)		

23.	IS 12640 (Part 2): 2008	Residual current operated circuit-breakers for household and similar uses: Part 2 circuit breakers with integral over current protection (RCBOs) (First Revision)		
24.	IS 2959:1985	Contactors for voltages not exceeding 1000 V ac or 1200V dc (first revision) [superseded by IS 13947 (Part 4/ Section 1)]		
25.	IS 694:1990/ IEC 60227-1 to 5 (1979)	PVC Insulated cables for working voltages up to and including 1100 V	February 2010	5
26.	IS 694: 2010	Polyvinyl chloride insulated sheathed and unsheathed cables with rigid and flexible conductor for rated voltages Up to and including 450/750 V		1
27.	IS 1554 (Part 1): 1988/ IEC 60502 (1983)	PVC insulated (heavy duty) electric cables: Part 2 For working voltages up to and including 1100 V (Third revision)		
28.	IS 3961 (Part 1): 1967	Recommended current ratings for cables: Part 1 Paper insulated lead sheathed cables	November 2011	
29.	IS 4288:1988	PVC insulated (heavy duty) electric cables with solid aluminium conductors for voltages up to and including 1100 V (second revision) (withdrawn)		
30.	IS 4289 (Part 1): 1984/ IEC 60245-5	Flexible cables for lifts and other flexible connections:Part 1 Elastomeric insulated cables (first revision)		
31.	IS 9537 (Part 1): IEC 60614-1 (1978)	Conduits for electrical installations: Part 1 General	November 2010	(1)
32.	IS 9537 (Part 2): 1981	Conduits for electrical installations: Part 2 Rigid steel conduits (superseding IS:1653)	May 2012	(2)
33.	IS 3480:1966	Flexible steel conduits for electrical wiring	May 2012	(1)
34.	IS 2667:1988	Fittings for rigid steel conduits for electrical wiring (first revision) [Superseded by IS 14768 (Part 2): 2003]	February 2008	
35.	IS 3837:1976 IS 9537 (Part 4): 1983	Accessories for rigid steel conduits for electrical wiring (first revision) Conduits for electrical installations: Part 4 Pliable self- recovering conduits of insulating materials	May 2012	(1)
36.	IS 9537 (Part 5): IEC 60614-2- 3(1990)	Conduits for a electrical installations: Part 5 Pliable [Superseding IS 6946]	June 2010	

Technical Specifications

1 . CABLES

LOW VOLTAGE (L.V.) CABLES

1.1. Wires

The design manufacture, testing and supply of single core FRLS PVC insulated 1.1 KV grade stranded twisted wires under this specifications shall comply with latest edition of following standards.

IS : 3961 Current rating for cables.

IS : 5831 HRPVC/PVC insulation and sheath of electric cables.

IS : 694 HRPVC/PVC insulated cables for working voltage up to and including 1100V

IEC : 754(i) FRLS PVC/HFFR insulated cable.

Copper/Aluminium stranded twisted conductor HRPVC / FRLS PVC / PVC insulated wires shall be used in conduit as per item of work. Aluminium for power cables and copper for control cables shall be used.

The wires shall be colour coded R Y B, for phases, Black for neutral and Green for earth. Progressive automatic in line indelible, legible and sequential marking of the length of cable in meters at every one meter shall be provided on the outer sheath of cable.

1.2. Cables

The design, manufacture, testing and supply of the cable under this specification shall comply with latest edition of following standards:

IS : 8130 Conductors for insulated electric cables and flexible cords.

IS : 5831 HRPVC/PVC insulation and sheath of electric cables.

IS : 3975 Mild steel wires, strips and tapes for armouring cables.

IS : 3961 Current rating of cables.

IS : 694 HRPVC/PVC insulated (heavy duty) electric cables for working voltage up to and including 1100 volts.

IS : 424-1475 (F-3) Power cable-flammability test.

IS : 7098(I) Specification for cross linked polyethylene insulated XLPE/PVC sheathed cable for working voltage up to 1.1 KV. IS : 1554 Specification for PVC insulated (heavy duty) electric cables for working voltages up to and including 1100 volts.

IS : 10810 Testing method of cable.

IS : 6121 Cable glands.

ASTM-D : 2863 Standard method for measuring the minimum oxygen concentration to support candle-like combustion of plastics (Oxygen Index). Page | 16 ASTM-D : 2843 Standard test method for measuring the density of smoke from the burning or decomposition.

IEEE : 383 Standard for type of test Class-IE, Electric cables, field splicers and connections for power generation station.

ASTME : 662IEC : 754 (A) Standard test method for specific optical density of smoke generated by solid materials.

IS : 10418 Cable drums.



TATA INSTITUTE OF FUNDAMENTAL RESEARCH
Autonomous Institution of the Department of Atomic Energy, Government of India
(A Deemed University)

SURVEY NO.36/P, GOPANPALLY JN, POST: GOPANPALLY, HYDERABAD-500107

Tel. No.:040- 20203010, 20203009

Email: rajasekharr@tifrh.res.in Website: www.tifrh.res.in



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1.3. Technical Requirements

- The cables shall be suitable for laying in racks, ducts, trenches conduits and under-ground buried installation with uncontrolled back fill and chances of flooding by water.
- They shall be designed to withstand all mechanical, electrical and thermal stresses under steady state and transient operating condition.
- The aluminium/copper wires used for manufacturing the cables shall be true circular/sector in shape before stranding and shall be of uniformly good quality, free from defects. The conductor used in manufacture of the cable shall be of H2 grade.
- The cable should withstand 1 – 50 KA for 1 sec with insulation armour insulated at one end. Bidder shall furnish calculation in support of capability to withstand the earth fault currents. The current carrying capacity of armour and screen (as applicable) shall not be less than the earth fault current values and duration. Copper screen of each core shall be suitable for carrying full fault/earth current.
- The fillers and inner sheath shall be of non-hygroscopic fire retardant materials and shall be suitable for the operating temperature of the cable.
- Filler and inner sheath shall not stick to insulation and outer sheath. Progressive automatic in line indelible, legible and sequential marking of the length of the cable in meters at every one meters shall be provided on the outer sheath of all cables and at every 5 meter 'FRLS' marking in case of 'FRLS' cables.
- Strip/Wire armouring following method mentioned in IS:3975 shall only be acceptable. For single core cable aluminium wire armouring shall be used.
- Allowable tolerance on the overall diameter of the cables shall be + 2mm.
- The normal current rating of all PVC insulated cables shall be as per IS:3961.
- A distinct inner sheath shall be provided by pressure extrusion process for all multicore armoured and unarmoured cables as per IS:5831.
- Outer sheath shall be provided by extrusion process as per IS:5031.
- The breaking load of armour joint shall not be less than 95% of that armour wire. Zinc rich paint shall be applied on armoured joint surface.
- In plant repairs to the cables shall not be accepted.
- All the cables shall be supplied in non-returnable drums as per IS:10418.

1.4. FRLS Cables

- The inner and outer sheath of cables shall have an oxygen index of not less than 29 as per ASTM D : 2863.
- The maximum acid gas generation by weight as per IEC:754 (i) shall not be more than 20% for outer sheath material of all cables. Bidder shall also guarantee the maximum theoretical acid gas generation with 20% by weight of outer sheath.
- The cables inner and outer sheath shall meet the requirement of light transmission of 40% (minimum and shall be tested as per ASTM D:2843). In case the test for light transmission is conducted as per ASTM E:662. The bidder shall furnish smoke density values as per this standard and shall correlate the anticipated light transmission when tested as per ASTM D:2843.

- The cable shall pass the fire resistance test as per SS:42, 41, 475 (I) and flammability test as per IEEE:383.
- Smoke/light density rated shall be 40% (minimum) and 65% (maximum).

1.5. Inspection

All cables shall be inspected at manufacture place and on receipt of the same at site checked for any damage during transit.

1.6. Joint in Cables

The contractor shall take care that the cables received at site are distributed to various locations in such a manner as to ensure maximum utilization and avoidance of cable jointing. Cable shall be rechecked before cutting in lengths, where the joints are unavoidable, the location of such joints shall be got approved from the Owner/Consultant. The joints shall be done by qualified jointer strictly in accordance with manufacturer's instruction/drawings.

1.7. Joint Boxes for Cables

The cable joint boxes shall be of appropriate size suitable for type of cable of particular voltage rating.

1.8. Jointing of Cables

- All cable joints shall be made in suitable, approved cable joints boxes, on the jointing of cables in the joint box and the filling in of compound shall be done in accordance with manufacturer's instructions and in an approved manner. All straight through joints shall be done in epoxy mould boxes with epoxy resins. Straight through joints shall not be permitted unless the length of run is in excess of cable drum.
- End terminations of cables more than 1.1 KV grade shall be done with epoxy mould boxed and epoxy resin. Cable glands shall be 1.1KV grade double compression type and made to tin plated heavy duty brass casting and machine finished. Glands shall be of robust construction capable of clamping cable and cable armour, firmly without injury of cable.
- All washers and hardware shall be made of brass tinned. Rubber components used in the glands shall be made of neoprene of tested quality.
- Cable lugs shall be tinned copper/aluminium solderless crimping type conforming to IS:8309 suitable for aluminium or copper conductor.
- Crimping of terminals shall be done by using Corrosion inhibitory compound, with crimping tool.
- The contractor shall liaise fully with all other contractors to achieve an efficient and properly coordinated installation where equipment has to be re-positioned due to lack of site liaison, no extra cost shall be incurred by the client.

1.9. Testing of Cables

- Cables shall be tested at factory as per requirement of IS:1554 Part-I. The tests shall incorporate routine tests, type tests and acceptance tests. Prior to dispatch of cables.

- All the testes will be witnessed by Employer / Consultant in accordance with testing procedure approved by Consultant at no extra cost to Employer. Besides that the following tests shall be carried out:
- Insulation test between phases and phase to earth for each length of cable before and after jointing. On completion of cable laying work, the following test shall be conducted in the presence of Architect/Owner.
- Insulation resistance test (Sectional and overall) 1000/5000V depending upon the voltage grade of cable.
- Continuity test.
- Laying of Cable
- The cable drum shall be placed on jacks before unwinding the cable. Great care shall be exercised in laying cables to avoid forming kinks. At all changes in directions in horizontal & vertical places, the cable shall be bent with a radius of bend not less than 12 – 15 times diameter and 8 times only at places of space constraints.
- The cable of 1.1KV grade shall be laid not less than 750mm below ground level in a 375mm wide trench (throughout), where more than one cable is to be laid in the same trench, the width of the trench shall be increased such that the interaxial spacing between the cables except where otherwise specified shall at least be 150mm minimum or as per site requirements or as approved by the Engineer-in charge. Where single core cables are used in multiphase systems, the cables shall be installed in trefoil where possible.
- In case the cables are laid in vertical formation due to unavoidable circumstance the depth per tier shall be increased by 200mm (minimum). Cable shall be laid in reasonably straight line, where a change in direction takes place a suitable curvature shall be i.e. either 20 times the dia meter of the cable or the radius of the bend shall not be less than twice the diameter of the cable drum or whichever less. Minimum 3 meter long loop shall be provided at both sides of every straight through joint & 3 meters at each end of cable or as directed at site.
- Greater care shall be exercised in handling the cable in order to avoid forming ‘Kinks’. the cable drum shall in-verbally conveyed on wheels and the cable unrolled in right direction as indicated on the drum by the manufacturer. The cable shall be pulled over rollers in the trench steadily and uniformly without jerks and strains.
- Cables laid in trenches in single tier formation, 10cms in total sand cushioning be provided below and above the cable before a protective cover is laid. For every additional vertical tier. The 30cm of sand cushion be provided over the initial tier. The cable shall be protected by 2nd class bricks of size not less than 230x115x75mm, stone tiles/RCC curved channel be placed on top of the sand breadth wise for the full length of the cable and where more than one cable is to be laid in the same trench the brick shall cover all cables and project at least 8cms over the outer sides of the end cables. Filling of trenches shall be done after the sand cushioning and laying of tiles or bricks are carried out to the satisfaction of the Engineer-in-charge (Refer drawing). Back fill for trenches shall be filled in layer not exceeding 150 mm. Each layer shall be properly rammed & consolidate before laying the next laye
- RCC pipe shall be provided for all road crossing. The size of the pipe shall be according to the cable and a minimum 100mm dia. pipe shall be provided. The pipe shall be laid in ground with special arrangement and shall be cement jointed and concreting shall be made as per relevant IS with latest amendment. Nothing extra shall be paid on this account. Location of cables laid directly underground shall be indicated by cable marker at an interval of 30 meters & with change of direction. Aluminium strip cable tag of 20mm wide with engraved tag no. shall be provided at both ends of cable.
- Where the cables are to be laid in ducts (masonry trenches) inside the building, they will have to be laid on MS rack/ on MS cable trays grouted in walls trenches. Cables sizing through floors shall be

protected from mechanical damage by a steel channel to a height of one meter above the floor where cable pass through wall they shall be sleeved with PVC/steel conduit.

- Where the cables are laid in open (in building) along walls, ceiling or above false ceiling, cable rack (ladder type) or cable tray shall be provided. The size of the cable tray or rack shall depend on the number of cables to pass over that rack. Cable tray/rack shall be properly supported through wall/ceiling according to the site conditions. Cable laid on tray & riser shall be neatly dressed & clamped at an interval of 1000 mm & 750mm for horizontal & vertical cable run respectively either side at each bend of cable. All power cables shall be clamped individually & control cables shall be clamped in groups of three or four cables. Clamps for multicore cables shall be fabricated of 25x3 GI flats. Single core power cable shall be laid in trefoil formation & clamped with trefoil clamps made of PVC/fiber glass. Cable openings in wall/floor shall be sealed by the contractor suitably by Hessian tape & bitumen compound or by any other proven to prevent ingress of water. After the cables are laid, shall be tested as per IS and the results submitted to Architects/Engineer and in case the results found unsatisfactory, all the repairing/ replacing of cables will be done by the contractor free of charge.

Cable shall be installed so that separations shown in the table below are observed.

HV Cable	-	HV Cable	50 mm
ELV & LV 230 V/433 V	-	ELV & LV cable 230 V/433 V	50 mm
HV cables	-	ELV & LV cables 230 V/433 V	300 mm
LV cables 433 V	-	Telephone/Instrument cable	350 mm
All cables	-	All wet / hot pipe work	600 mm

2 MV PANEL:

- 2.1.1 MV Panel: Design, manufacture, inspection and testing at factory before delivery, supply, delivery at site, positioning at site, pre-commissioning tests and final commissioning or part thereof of floor mounted 250A, 415V, MV Cubicle Distribution Panel
- 2.1.2 Installation: Positioning at site, installation, testing, commissioning of the MV Cubicle Distribution Panel as per the instructions of E.I.C and as per I.S. specification and I.E. Rules including incidental minor civil work required for installation. statutory Permissions: All statutory permissions, if required, for installation and commissioning of the equipment and associated work from statutory authorities.
- 2.1.3 The scope of work of MV Panel does not include foundation, termination of incoming power cables and connection to earth pits. These works are included separately in the tender.

2.1.4 All fittings and accessories which may not be specifically mentioned in this specification but those are usually necessary for the equipment shall be specified and shall be deemed to be included in the specification and shall be furnished by the bidder without extra charges.

2.1.5 Delivery (including unloading) shall be made to the destination / location as specified in this tender document. The contractor shall arrange all road clearances / permit etc. as may be necessary for transportation. TIFR-TCIS may assist in arranging Road Permit wherever possible.

2.2 Codes and General Conditions

The equipment shall comply with the requirement of latest revision of following standard issued by BIS (Bureau of Indian Standards), unless otherwise specified.

IS-2147	- Degree of Protection provided by enclosures for low voltage Switch gear exceeding 1000 V
IS-0237	- General requirement of switch gear & control gear for voltage not exceeding 1000 V
IS-3043	- Code of Practice for earthing
IS-3618	- Method of pre-treatment of MS Sheets for phosphetizing
IS-6005 (1979)	- Method of pre-treatment of MS Sheets for phosphetizing
IS-0375 (1963)	- Marking & arrangement of Bus Bars, Power & Control/ Auxiliary wiring
IS-5578 (1970)	- Marking & arrangement of Bus Bars, Power & Control/ Auxiliary wiring
IS-8626	- Factory Built Assemblies of Switch Boards
IS-3914	- Code of Practice for selection of A.C. Induction Motor Starter - Specification for heavy duty Air Break Switches & composite units of Air Break Switches & fuses for voltage not exceeding 1000 V
IS-4604	- A.C. Motor Starters of voltage not exceeding 1100 V
IS-1882	- A.C. Contactors of voltage not exceeding 1000 V
IS-2959	
IS-0694 (1977)	- PVC insulated cable & Aluminium conductor
IS-8130 (1976)	- PVC insulated cable & Aluminium conductor
IS-1248	- Direct acting Electrical Indicating Instruments
IS-2208	- Low voltage fuses
IS-9224 (1979)	- Low voltage fuses
IS-2705	- Current Transformer
IS-2516	- A.C. Breakers
IS-6875	- Control Switches & Push Buttons
IS-0722	- Integrating Instruments
IS-3231	- Relays
IS-1554	- PVC Armoured Cable
IS-7098	- XLPE cable

2.3.1 All the supply and work shall be in accordance with the relevant I.S. Specification and recognized standards and modern approved practice and shall meet the requirement of the latest issue of applicable codes, factory rates and regulations, supply codes and all standard accepted practice in locality where the installation is to be made.

- 2.3.2 All the materials and accessories provided by Contractor under terms of this contract shall conform to the relevant Indian Standard Specifications. Samples of all equipment, materials and accessories to be supplied by the Contractor shall be submitted for the approval of the Engineer In-Charge before they are used.
- 2.3.3 The installation shall generally be carried out strictly in conformity with the requirement of latest edition of the Indian Electricity Act, 1910, as amended from time to time, and the Indian Electricity Rules, 1956, framed therein and all other statutory regulations that may be relevant to the installation.
- 2.3.4 In case of any contradiction between various referred standards/specifications/data sheet and statutory regulations, the following order of priority shall govern.
- i. Statutory Regulation
 - ii. The Specification
 - iii. Relevant Codes & Standards

2.4 General Conditions

Contractor shall provide all necessary labour, tools, and other requisite work like drilling, cutting, welding etc. as may be necessary for the work at his own cost.

Good workmanship is the essence of this contract and shall be complied with at all time. The Contractor shall have the works supervised by his qualified and experienced engineers. All the defects pointed out by the Engineer In-Charge shall be rectified immediately by the Contractor free of cost.

No alteration which may affect the structures and architecture of building shall be done without the prior approval of the Engineer In-Charge. All work shall be carried out in such a manner that it should not cause any inconvenience to other works which are under progress. The Contractor shall cooperate with other agencies in the area for the smooth execution of all works.

Contractor shall bring all roads, pathways, ground and other surfaces and installations which were affected during the execution of this work by the contractor to the original state and finish to the satisfaction of the Engineer In-Charge.

Accidental damage to any property shall be reported immediately to site engineers and latter confirmed in writing to the Engineer In-Charge.

2.5.1 Drawings

The Contractor must submit all required GA drawing and necessary design details to the Purchaser for approval. However, it shall be noted that such approval by the purchaser shall not relieve the Contractor of his liabilities as mentioned in this Tender Document.

2.5.2 Technical Data, Routine and Type Test Certificates

- a) Type test certificates of similar equipment offered or of similar design and capacity from a Govt. recognized laboratory. Type test certificates should not be more than 5 (five) years old.
- b) Manufacturer's literature, brochures, catalogues etc.
- c) List of customers to whom similar such equipment has been supplied.
- d) Detail lists of successfully commissioned similar equipments of equivalent rating during the last three years. Contractor should note that failure to comply with the provision of this clause might be sufficient reason to reject the bid.

The equipment shall conform to the provisions of Indian Electricity Rules and other Statutory Regulations currently in force in the country.

In case Indian Standards are not available for any equipment, standards issued by IEC/BS/VDE/IEEE/NEMA or equivalent agency shall be applicable.

2.5.3 Inspection & Testing

TIFR reserves the right to witness any or all the tests.

TIFR reserves the right to witness any stage of manufacturing of the equipments.

Makes for all the testing equipments installed in the work of the bidder/manufacturer shall be furnished along with the calibration/latest test results carried out on these equipments from a Govt. approved Test House.

TIFR shall have the option to check the input of material including weights, dimension, current density, flux density, etc anytime during the manufacturing process or at final inspection.

2.5.4 Drawing & Documents:

Vendor shall submit following information/drawing along with bid.

Within two weeks of the Letter of Intent /Purchase Order, vendor shall submit 4 sets of the following drawing for approval of TIFR.

1. GA drawing
2. Wiring diagram
3. Control circuit drawing
4. Foundation drawings

2.6 **Standard Specification of 250A, 415V MV Distribution Panels**

TPN Disconnecter switch	:	250 A, 415V, Make: Schneider
1. Operation	:	Manual
2. Poles, Incomer	:	3 pole / 4 pole
3. Poles, Outgoing	:	3 pole / 4 pole
4. Protection type	:	NA
5. Protection, Incomer	:	NA
6. Protection, Outgoing	:	NA
7. Mounting	:	
8. Remote Monitoring	:	NA
 MCCB	:	 100A/63A, 415V Make: Schneider
1. Operation	:	Manual
2. Poles, Incoming	:	4 pole
3. Poles, Outgoing	:	4 pole
4. Protection type	:	Micro-processor based
5. Protection, Incoming	:	Over-current, short-time, Instantaneous, Earth fault
6. Protection, Outgoing	:	Over-current, Instantaneous
7. Remote Monitoring	:	Yes
 Terminal Arrangement		
ii) Incoming, 250A TPN Disconnecter switch	:	½C x 300 sq mm XLPE, Armoured Aluminium Cable
iii) Outgoing, other ratings	:	3½C of various sizes XLPE, Armoured Aluminium Cable
 Bus Bar	:	 250 A, Copper
 Indication Lamps	:	 RYB, OFF/TRIP/ON

2.6.1 Fabrication Process

Shearing, bending and straightening shall be done on machines only.

Nut, bolts, washer, screws shall be of SS 304 (Stainless Steel SS304).

Suitable brackets and clamps shall be provided inside the cable alley and cable chamber to hold cable and earthing strip.

Compartment having MCCB should have 4 mm Bakelite sheet partition between MCCB terminals.

2.6.2 Proper identification marking shall be provided.

2.6.3 Bus bar shall be of hard drawn electrolytic high conductivity tinned Copper and shall be fixed on supports constructed from Epoxy cast resin insulator/Porcelain insulators suitable for 11 kV. The supports must be sufficiently close and robust to withstand short circuit current as per IS specifications.

2.6.4 The bus bar shall be properly spaced in cubicle and shall be insulated with heat shrinkable bus bar insulating tubing etc. with proper colour code.

2.6.5 Two bolt type earthing terminals shall be provided on panels as per IS Specifications.

2.6.6 Each feeder should be provided with openable door with pivot type hinges to access the cable & setting device.

2.6.7 The cable alley to be provided with screwed, openable doors.

2.7 Testing & Inspection:

2.7.1 Contractor shall have all the testing facilities for testing at Factory & site mentioned below including any other test as specified in IS Specification. Contractor shall arrange for all the tests and inspection at factory and site at his own cost. Contractor should arrange for the visit of two engineers deputed by purchaser for factory inspection.

2.7.2 The successful bidder shall furnish to the purchaser Routine test certificates for prior approval before dispatch of any equipment from the works and the approval in writing from the purchaser is essential to affect the dispatch of the equipment. The test reports shall be submitted completed with identification data including serial number of equipment.

2.7.3 Test shall be performed in presence of purchaser's representative, if so desired by the purchaser. The successful bidder should give at least thirty days' advance notice of the date when the tests are to be carried out.

2.7.4 Inspection/Testing at Factory:

Following tests shall be carried out on the equipment at factory:

- 1) Physical inspection of Switch Boards frame.
- 2) High Voltage Test at 2500 V for one minute.
- 3) Insulation Resistance Test at 1000 V Megger.
- 4) Phase Sequence Test.
- 5) Continuity Test.
- 6) Temperature Rise test

2.7.5 Inspection/Testing at Site/Stores:

All tests mentioned above shall also be conducted at site after delivery of material at site along with the physical inspection before commissioning.

Contractor has to provide 2 sets of approved drawings and Test Certificates of all the components after completion of job.

2.8 Panel Fabrication Details

2.9.1 Switchboard Configuration

1. The Switchboard shall be configured with TPN Disconnect switch (isolator), MCCB's, MCB's and other equipment as called for in the schedule of quantities.
2. The Switchboards shall be of adequate size with a provision of spare space to accommodate possible future additional switch gear.

Constructional Features

3. The Switchboards shall be metal clad totally enclosed, floor mounted free standing type of modular extensible design suitable for indoor mounting.
4. Incomer and bus section panels or sections shall be separate and independent and shall not be wired with sections required for feeder. The incomer panel shall be suitable for receiving bus trunking or MV cable of size specified.
5. Switchboards shall be made up of requisite vertical sections, which when coupled together, shall form continuous dead front switchboards.
6. Switchboard shall be readily extensible on both sides by addition of vertical sections after removal of the end covers.
7. The switchboards shall be designed for use in high ambient temperature and humid tropical conditions as specified. Ease of inspections, cleaning and repairs while maintaining continuity of operation shall be provided in the design.
8. Metal based neoprene gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust and vermin proof to provide a degree of protection of IP 42 or as stipulated in schedule of quantities. The unused openings within the switchboards shall be closed using suitable grommets.
9. Special care to be taken to ensure effective earthing of the frame and doors of the switchboards
10. Each vertical section shall be provided with a rear or side cable chamber housing the cable end connections and power/control cable terminations. There should be generous availability of space for ease of installation and maintenance with adequate safety for working in one vertical section without coming into contact with

any live parts. The design of the switchboard shall allow standard extension chambers if required to accommodate cables.

11. Switchboard panels and cubicles shall be fabricated with CRCA Sheet Steel of thickness not less than 2.0 mm and shall be folded and braced as necessary to provide a rigid support for all components. The doors and covers shall be fabricated from CRCA sheet steel of thickness not less than 2 mm. Joints of any kind in sheet metal shall be seam welded and all welding slag ground off and welding pits wiped smooth with plumber metal.
12. All panels and covers shall be properly fitted and square with the frame. The holes in the panel shall be correctly positioned.
13. Switchboard shall be provided with "Danger Notice Plate" conforming to relevant Indian Standards.
14. The enclosures shall be designed to take care of normal stress as well as abnormal electro-mechanical stress due to short circuit conditions. All covers and doors provided shall offer adequate safety to operating persons and provide ingress protection of IP 42 unless otherwise stated. Ventilating openings and vent outlets, if provided, shall be arranged such that same ingress protection of IP 42 is retained.

2.9.2 Switchboard Dimensional Limitations

1. The overall height of the switchboard shall be limited to 2000 mm for all the Bus bar ratings and type of switchboards.
2. The height of the operating handle, push buttons etc. shall be restricted between 300 mm and 1800 mm from finished floor level.
3. Other dimensional limits if any are specified separately.

2.9.3 Switchboard Compartmentalization

1. For compartmentalized switchboards, separate totally enclosed compartments shall be provided for horizontal bus bars, vertical bus bars, Disconnecter switch (Isolators), MCCBs, and cable alloys.
2. Sheet steel hinged lockable doors for each separate compartment shall be provided and duly interlocked with the breaker in "ON" and "OFF" position.
3. For all Circuit Breakers separate and adequate compartments shall be provided for accommodating instruments, indicating lamps, control contactors and control MCB etc. These shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker, busbars and connections.
4. Each switchgear cubicles shall be fitted with label in front and back identifying the circuit, switchgear type, rating and duty. All operating device shall be located in front of switchgear only.
5. Cable compartments shall be of adequate size for easy termination of all incoming and outgoing cables entering from bottom or top. The construction shall include necessary and adequate and proper support shall be provided in cable compartments to support and clamping the cable in the cable alley / cable chamber.

2.9.4 Switchboard Bus Bars

1. Busbars shall be made of high conductivity, 99.9% purity, high strength Copper. Busbars shall be of rectangular cross sections, not more than 5mm thickness suitable for full load current for phase bus bars and half/ full-rated current for neutral bus bar or as stipulated in schedule of quantities. Busbar shall be suitable to withstand the stresses of fault level as specified in schedule of quantities.
2. The bus bars shall be supported on non-breakable, non-hygroscopic epoxy resin or glass fiber reinforced polymer insulated supports able to withstand operating temperature of 110^o C at regular intervals, to withstand the forces arising from a fault level as stipulated in schedule of quantities. The material and the

spacing of the Busbar supports should be same as per the type tested assembly

3. Auxiliary buses for control power supply, space heater power supply or any other specified service shall be provided. These buses shall be insulated, adequately supported and sized to suit specific requirement. The material for auxiliary supply bus will be insulated electrolytic copper.
4. Clearances between phases should be in line with IEC.

2.9.5 Switchboard Interconnection

1. All connection and tap offs shall be through adequately sized connectors appropriate for fault level at location. This shall include tap off to feeders and instrument/control transformers.
2. For unit ratings up to 250 amps, PVC insulated 105 dg withstand, copper conductor wires of adequate size to carry full load current shall be used. The terminations of such interconnections shall be crimped. Solid connections shall be used for all rating of above 250 amps..
3. All connections, tapping, clamping, shall be made in an approved manner to ensure minimum contact resistance. All connections shall be firmly bolted and clamp with even tension. Before assembly joint surfaces shall be filed or finished to remove burrs, dents and oxides and silvered to maintain good continuity at all joints. All screws, bolts, washers shall be zinc plated.

2.9.6 Instrument Accommodation

1. All voltmeter and ammeter and other instruments shall be flushed mounted type with digital read-out. All voltmeter shall be protected with MCBs/Fuse.
2. Instruments and indicating lamps shall be mounted on Compartment door for which a separate and adequate compartment shall be provided and the instrumentation shall be accessible for testing and maintenance without danger of accidental contact with live parts of the Switchboard.
3. For MCCBs, instruments and indicating lamps can be provided on the compartment doors.
4. The current transformers for metering and for protection shall be mounted on the solid bus bars with proper supports.
5. On all the incomers of switch boards ON/OFF indicators lamps shall be provided suitable for operation on AC 240 volts supply. All lamps shall be protected by MCBs/Fuse.
6. For Incomer, comprehensive intelligent panel meter shall be provided which shall display A , V, Pf , Hz ,KW , KVA, KVAR, etc.,
7. Wiring
All wiring for meters shall be with PVC insulated copper conductor wires. The wiring shall be coded and labeled with approved ferrules for identification. The minimum size of copper conductor control wires shall be 2.5 sq. mm. Runs of wires shall be neatly bunched and suitably supported and clamped. Means shall be provided for easy identification of wires. Identification ferrules shall be used at both end of wires. All control wires meant for external connections are to be brought out on a terminal board.

2.9.7 Earthing

Continuous earth bus sized for prospective fault current to be provided with arrangement for connecting to station earth at two points. Hinged doors / frames are to be connected to earth through adequately sized flexible braids.

2.9.8 Sheet Steel Treatment And Painting

Sheet steel used in the fabrication of switchboards shall undergo a rigorous cleaning and surface treatment seven tank process comprising of alkaline degreasing, descaling in dilute sulphuric acid and a recognised phosphating process after which a coat of primer paint compactively with the final paint shall be applied over the treated surface. Final paint coat of oven baked powder coating, of minimum 50 micron thickness, of shade approved by Engineer-in-Charge shall then be provided.

2.9.9 Name Plates And Labels

Suitable engraved white on black name plates and identification labels of metal for all Switchboards and Circuits shall be provided. These shall indicate the feeder number and feeder designation.

2.10 Switchgear

2.10.1 Moulded Case Circuit Breaker (MCCB)

General

1. The circuit breakers shall comply with the requirement of IEC 60 947 / IS 13947 : 1993. MCCBs shall be suitable for nominal voltage of 3 phase 690 Volts AC 50 HZ supply.
2. The circuit breaker shall comply with the isolation function requirement of IEC 60 947-2 section 7.1.2 to be marked as suitable for isolation / disconnection to facilitate safety of operating personnel while the breaker is in use.
3. The circuit breaker shall provide class II insulation between the front cover and internal power circuits to avoid any accidental contact with the live main current carrying path with the front cover open.
4. The MCCBs shall be of double break contacts.
5. The MCCB shall be fixed type, manually operated with rotary handle.
6. All MCCBs shall have micro-processor based protection and trip system.

Constructional features

1. Three/four pole MCCBs shall have a common handle for simultaneous operation and tripping of all the poles.
2. The contact tips shall be made of suitable arc resistant sintered alloy. Terminals shall be of liberal design with adequate clearances.
3. Suitable arc extinguishing devices shall be provided for each contact.

Operating mechanism

4. The operating handle of the MCCBs shall be quick make / break, trip free type.
5. The operating handle of the MCCBs shall have suitable, ON, OFF and TRIP indicators.
6. The operating handle and mechanical trip push button shall be at the front of and integral with the circuit breaker
7. MCCBs shall comprise of the mechanism designed to trip the circuit breaker in the event of high value short circuit currents.
8. Earth fault protection if specified should be an integral part of the breaker, direct operating type and adjustable

9. MCCBs range shall have established and documented discrimination charts readily available.
10. MCCBs should be of the same family.

Circuit Breaker Interlocking

MCCBs shall be provided with following interlocking devices.

1. Handle interlock to prevent unnecessary manipulations of the breaker.
2. Door interlock to prevent door being opened when the breaker is in ON position
3. De-interlocking device to open the door even if the breaker is in ON position.

Type test certificate

The contractor shall submit type test certificate from a international recognized test house for the circuit breakers offered.

2.10.2 MCB

The MCB's shall be of the completely moulded design suitable for operation at 240/415 Volts 50 Hz system.

The MCB's shall have a rupturing capacity of 10 KA at 0.5 pf.

The MCB's shall have inverse time delayed thermal overload and instantaneous magnetic short circuit protection.

2.10.3 Manufacturing Facilities

Sheet steel manufacturing shall be done according to the drawings on in-house CNC cutting and bending machines.

The manufacturer must have established stores with proper procedures for checking incoming material, stocking, rejection etc so that non-Quality material does not enter the shop.

In house facility for routine testing of the switchboards

The complete facility should have ISO 9001 certification.

2.11 Inspection & Testing

Test shall be made at any ambient air temperature below 50°C. Where it is required, test results shall be corrected to a reference temperature of 75°C.

2.12 Packing:

Panels with all accessories shall be dispatched to site packed in wooden crates wherever applicable. It shall be wrapped in Polyethylene sheets before putting in crates and it shall be ensured that damage to the equipment does not occur during handling/transportation.

2.13 Guarantee:

The Panels shall be guaranteed against all design and manufacturing defects, poor workmanship etc. for a period of 12 months from the date of commissioning or 18 months from the date of supply, whichever is earlier. Any defects discovered during this period shall be rectified by the vendor free of cost to purchaser.

2.14 As Built Drawings

Contractor shall submit 4 sets of hardcopy As-Built drawings for the entire works carried out in this tender. Separate drawings shall be prepared for all sub-systems describing all details of the system. In addition, softcopy of the said drawings, compatible to AutoCAD or in standard/approved format, shall also be submitted by the contractor for purchaser approval and record.

Contractor shall make suitable arrangements to erect the panel on the floor.

All necessary arrangements eg extenders, cable boxes, etc. shall be provided by the contractor, if required, for termination of cables to the panels.

All panels shall be subjected to, but not limited to, Meggar test and Heat Run test (full load test) in presence of the purchaser's representative at the manufacturer's premises.

All MCCBs shall be with micro-processor based protection, fixed type and shall be suitable for remote monitoring. All MCCBs shall be of same type.

All meters shall be digital with selection facility.

Contractor shall submit GA drawings of panels within two weeks of placing order by TIFR for approval. Fabrication of panel shall be started only after the approval of GA drawings.

3. **GENERAL ELECTRIFICATION**

3.0 Scope

This specification covers the following as stipulated in Schedule of Quantities in Part – II : Financial Bid.

3.1 FRLS PVC cable: Design, manufacture, inspection and testing at factory before delivery, supply, delivery at site, laying direct in soil / in trench, pre-commissioning tests and final commissioning of FRLS PVC insulated, armoured, 1100V grade, copper conductor, cable as mentioned in this technical specifications and schedule of quantities.

3.2 Earth Stations:

All earth stations shall conform to IS-3043 and all other relevant standards and as per approved methods to the satisfaction of the Engineer in-charge.

Resistance of all earthing stations shall be measured individually and in isolation. Value of earth resistance shall be submitted to the Engineer in-charge.

All earth stations shall be marked with name plates made of brass, describing its identification number etched prominently on the plate. The earth stations shall be complete with salt, charcoal, watering arrangement, and CI cover plate on the masonry pit.

3.3 General Wiring:

- 3.3.1 All wiring shall be carried out with copper conductor. Standard / approved wiring practices shall be adopted by the contractor to the satisfaction of the Engineer in-charge.
- 3.3.2 All necessary materials eg conduits, spacers, saddles, clips, joints, etc for completion of the job shall be included by the contractor in scope of work irrespective of whether these are mentioned in the schedule or not. Wherever PVC DLP trunking is used, it shall be of approved make only.
- 3.3.3 Switch boxes shall be suitable for modular type plates and shall be made of PVC.
- 3.3.4 Contractor shall submit schematic layout drawings for approval before starting the job.

4. SUB DISTRIBUTION BOARD (READYMADE BOARD)

Sub Distribution Board shall be double door type with extended loose wire box at the top and suitable for flush installation. All Sub Distribution Boards shall be of three phases (415 Volts) or single phase (240 volts) type with incoming disconnect switch(Isolator) or MCCB/ MCB and/or ELCB as in Schedule of Quantities. Sub Distribution Boards shall contain plug in / DIN rail mounted miniature circuit breaker.

Bus bars shall be of electrolytic copper. Neutral bus bars shall be provided with the same number of terminals as there are single ways on the board, in addition to the terminals for incoming mains. An earth bar of similar size as the neutral bar shall also be provided.

Phase barrier shall be fitted and all live parts shall be screened from the front. Ample clearance shall be provided between all live metal and the earth case and adequate space for all incoming and outgoing cables.

All Sub Distribution Board enclosures shall have powder coated painting after metal treatment. A circuit identification card in clear plastic cover shall be provided for each distribution board.

Sub Distribution Board with single phase outgoings requirement shall be Horizontal type. Sub Distribution Board with three phase outgoings requirement shall be Vertical type. Sub Distribution Board installed in indoor dry locations shall conform to IP-42. Sub Distribution Board installed in outdoor & wet locations shall conform to IP- 65.

5.0 EARTHING STATION

5.1 Installation of Earthing Plate

Installation of earthing plate shall conform to I.E.E. rules and I.S. Specifications. The Copper/GI earth plate of size mentioned in schedule should be buried at the depth necessary to reach moist earth surface, but not less than 2.5 mtrs. Earth plate should be properly brazed and bolted with 25X6 mm Copper strip. Earth plate should be provided with 25 mm GI pipe funnel for watering and brick masonry/PCC chamber with heavy duty cast iron cover over it.

The excavated pit should be filled with alternate layer of charcoal and salt till the earth plate is submerged. Above this the earth should be filled back.

Each layer of Earth shall be rammed properly including spraying of water and allowing sufficient time for settlement. Extra earth shall be removed from the place as decided by Engineer In-Charge and carried away to the designated location.

Earthing Resistance should be less than or equal to 2 ohm.

5.2 General Rules for laying Copper strip:

Installation shall be carried out in neat workman like manner by skilled, experienced and competent workmen in accordance with standard practice.

Copper strip shall be laid in one piece length.

Method of installation, routing of Copper strip etc. shall in every case be as per schedule and subject to approval of Engineer-In-Charge.

Care shall be exercised by providing suitable props for supporting other service lines in ground at the time of excavation where cutting of road/lawn becomes necessary it should be done with the approval of Engineer-In-Charge.

5.3 Excavation of the trenches shall be executed and the vertical side of the trenches are kept as straight as possible. The exact location of the trench shall be settled by the Engineer-In-Charge on the site, when contractor is in the position to commence the work.

After the Copper strip is laid the trench shall be filled in layer, the earth in each layer shall be well rammed by spraying water and sufficient allowance made for settlement.

The interval between the supports shall not exceed 400 mm for horizontal, 500 mm for vertical run.

Wherever Copper strip joint is necessary it should be done with 6" overlap, proper soldering and bolting.

Proper tapping holes should be provided on the Copper strip at an interval of 300 mm. while laying inside the room.

Drawings and Documentation: As-built drawings as specified in this technical specifications shall be submitted by the Contractor.

6.0 All statutory permissions and approvals from Electricity authority as may be required for commissioning of the entire system shall be carried out by the contractor. All necessary documentation for obtaining such permissions and approvals shall be done by the contractor.

7.0 **Lighting Fixtures:**

Contractor shall make all necessary arrangements for fixing of fixtures on false ceiling, streetlight poles, etc. For wall or ceiling mounting, all necessary fixing arrangements, eg brackets, conduit-drops, etc if required as per site condition, shall be provided by the contractor within the scope of work.

8.0 Site/Climate Conditions:

The Equipment shall be suitable for installation and satisfactory continuous operation in a sub-station in a generally hot and humid atmosphere. The equipment shall be designed to operate continuous under site condition as specified below.

i) Location	: Hyderabad
ii) Max. ambient air temperature, °C	:50 ⁰ C
iii) Min. ambient air temperature, °C	:10 ⁰ C
iv) Max. average daily ambient air temp., °C	:40 ⁰ C
v) Max. yearly weighed average ambient temp, °C	:32 ⁰ C
vi) Max. relative humidity, %	:95%
vii) Average Annual rainfall, mm	: 800 mm
viii) Max. altitude above mean sea level (Meters)	: 540 m

9.0 Completeness of work:

Contractor shall include and provide all necessary materials and labour for completing the job in approved manner following all applicable standards and code of practices.

SECTION –VI

LIST OF APPROVED MAKE OF MATERIALS

S.No	Item Description	Approved Makes
1	LT Cables	Poly Cab/ Universal/Havells/KEI/ Equivalent
2	Brass Cable Gland	Dowells/Crompton/Bico/Siemens/Commet/ Equivalent
3	PVC Glands	Peeco,/ Commet,/ Dowells's/ Equivalent
4	Cu Lugs	Peeco/, Commet, /Dowells's/ Equivalent
5	Distribution Boards	Legrand/Schnider/Hager/ Equivalent
6	MS enclosure	Legrand/Schnider/Hager/ Equivalent
7	MCB	Legrand/Schnider/Hager/ Equivalent
8	MCCB	Legrand/Schnider/Hager/Equivalent
9	Cu strip	99% Electrolyte Copper
10	LED lights	Phillips/Havells/Wipro/ Equivalent
11	Industrial Sockets	Legrand/Schnider/Hager/ Equivalent
12	Switches & Sockets	Legrand/MK/Equivalent
13	PVC conduit	Sudhakar/Equivalent
14	PVC trunking with cover	Legrand/MK/ Equivalent
15	All other items not covered above	AS PER SAMPLES APPROVED



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SURVEY NO.36/P, GOPANPALLY JN, POST: GOPANPALLY, HYDERABAD-500107

Tel. No.:040- 20203010, 20203009

Email: rajasekharr@tifrh.res.in Website: www.tifrh.res.in

SECTION –VII

ANNEXURES

ANNEXURE-I

FORM OF PERFORMANCE GUARANTEE (BY BANK GUARANTEE)

1. In consideration of the TIFR-Hyderabad, Hyderabad having agreed under the terms and conditions of Letter of Intent / Agreement No..... dated..... made betweenand (hereinafter called “ the said Contractor{s}“) for the work (hereinafter called “ the said Letter of Intent / Agreement”) having agreed to production of a irrevocable bank Guarantee for Rs. (Rupees only), as a security / guarantee from the contractor(s) for compliance of his obligations in accordance with the terms and conditions in the said agreement, we (Indicate the name of the Bank) (hereinafter referred to as “the Bank”) hereby undertake to pay to TIFR an amount not exceeding Rs. (Rs.only) on demand by TIFR.

2. We (indicate the name of Bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from TIFR stating that the amount claimed is required to meet the recoveries due or likely to be due from the said Contractor(s). Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs..... Rupees.....only).

3. We, the said bank, further undertake to pay to TIFR any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any Court or Tribunal relating thereto, our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment thereunder and the Contractor(s) shall have no claim against us for making such payment.

4. We..... (indicate the name of Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of TIFR under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till Engineer-in-charge on behalf of the TIFR certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.

5. We (indicate the name of Bank) further agree with TIFR that TIFR shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by TIFR against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor(s) or for any forbearance, act of omission on the part of TIFR or any indulgence by TIFR to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

7. We, (indicate the name of Bank) lastly undertake not to revoke this guarantee except with the previous consent of TIFR in writing.

8. This guarantee shall be valid up to, unless extended on demand. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs. (Rupees only) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee, all our liabilities under this guarantee shall stand discharged.

Signed and sealed

Dated the day of for (indicate the name of Bank)

* * * (Note: The Letter of Intent shall form part of the Agreement)



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Tel. No.:040- 20203010, 20203009

Email: rajasekharr@tifrh.res.in Website: www.tifrh.res.in

ANNEXURE II

UNDERTAKING BY THE TENDERER

I / We have read and examined the Tender document including terms & conditions, specifications, Schedule of quantities, drawings and designs, general rules & directions, General Conditions of Contract, Special Conditions of Contract and all relevant other documents, publications and rules referred to in the Conditions of Contract and all other contents in the tender documents for the work.

I / We, hereby tender for execution of the work specified for the TIFR-Hyderabad, Hyderabad within the time specified and in accordance in all respects with the specifications, designs, drawings and instructions in writing.

We agree to keep the tender open for **One eighty (180) days** from the last date of its submission and not to make any modifications in its terms and conditions. A sum of Rs has been deposited in cash / receipt treasury challan / deposit at call receipt of scheduled bank / fixed deposit receipt of scheduled bank / demand draft of a scheduled bank / Bank Guarantee issued by a Scheduled Bank as earnest money. If I / we, fail to furnish the prescribed performance guarantee within prescribed period, I / we agree that the said TIFR-Hyderabad, Hyderabad or its authorized officer shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely. Further, if I / we fail to commence work as specified, I / we agree that the TIFR-Hyderabad, Hyderabad shall without prejudice to any other right or remedy available in law, be at liberty to forfeit the said earnest money and the performance guarantee absolutely, otherwise the said earnest money shall be retained by TIFR-Hyderabad, Hyderabad towards security deposit to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to therein.

Further, I / We agree that in case of forfeiture of earnest money or both Earnest Money & Performance Guarantee as aforesaid, I / We shall be debarred for participation in the re-tendering process of the work.

I / We hereby declare that I / We shall treat the tender documents, drawings and other records connected with the work as secret / confidential documents and shall not communicate information derived there-from to any person other than a person to whom I / We am / are authorized to communicate the same or use the information in any manner prejudicial to the safety of the State.

Seal & Signature of Contractor

Postal Address

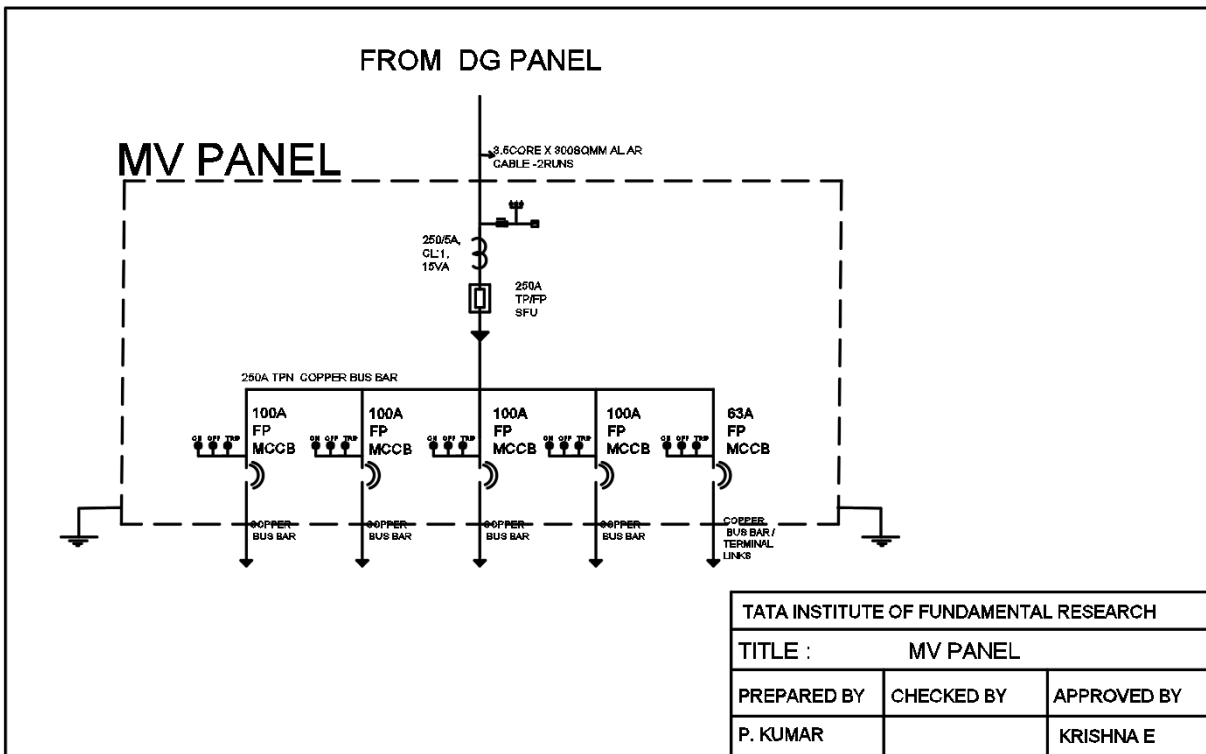
Dated

Witness

Address

Occupation

ANNEXURE III





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SECTION - VIII

FINANCIAL BID

INVITATION OF BIDS

FOR

**Supply, installation, Testing and Commissioning of Internal electrification and all related works for
Hanger Building-2 at Survey No. 36/P, Gopanpally Village,
Serilingampally Mandal, Ranga Reddy District, Hyderabad**

PART II

FINANCIAL BID



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Tel. No.:040- 20203010, 20203009

Email: rajasekharr@tifrh.res.in Website: www.tifrh.res.in

S.No.	Item Description	Unit	Qty (A)	Supply Rate / Unit (B)	GST @ (C)	Total (D)= B+C	Amount for Supply (E) = AXD	Installation Rate/Unit (F)	GST @ (G)	Total (H)= F+G	Amount for Installation (I)=AXH	Grand Total (J) = E+I
1	Excavation/digging of cable trench of size: 0.5 Meter to 1.0 Meter wide × 0.9 Meter to 1.5 Meter depth for 250 Meters length (ie. +/-15% variation) at a site, in the earth of soil or soft/hard murum or rock as encountered during the excavation work and refilling the trench with the excavated material.	Cu. Mtr	30									
2	Supply, laying, testing and commissioning of LT 1100 Volts, 3.5 Core, 300 sq.mm, Aluminium stranded sector shaped conductor with XLPE insulation cable IS:7098 (Part-I & II) in a ground at a depth of 900mm below ground level (cost of excavation shall be measured separately) sand bedding, laying of baked bricks on side & top backfilling, dewatering, consolidation, disposal of excess earth and making good to the original finish etc providing brass cable number tags as per the enclosed technical specifications & as per the E.I.C.,	Mtrs	70									
3	Supply and Installation of suitable single compression brass Cable Glands for Sr. No. 2	Nos	4									



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4	<p>MV Panel: Design, manufacture, supply, installation, testing & commissioning of floor mounting MV Panel shall be front operated, front access, extensible type, cubicle panel totally enclosed, dust and vermin proof with IP-42 protection with hinged and lockable doors. Panel shall be fabricated from 2 mm thick CRCA sheets including interconnections, tinned copper strip /Wire crimping lugs, bonding to earth suitable for use at 415 V, 3 phase 4 wire 50 Hz system, and to withstand a fault level of 50kA as specified, symmetrical at 415 V complete as per specifications, as required & as below. All switchboards shall have provision for entry of cables from the top/bottom as required. All live accessible parts shall be shrouded and all equipment shall be finger touch proof. The bus bars shall be insulated with heat shrinkable sleeves. SMC/DMC shrouds and busbar supports shall be used.</p> <p>Panels feed from DG power supply -(Emergency) - RAL 7024 (Graphite grey)</p> <p>Incomer :-</p> <p>a)1 no. 250 A TPN switch disconnecter. b) 1 set of RYB indication lamp with HRC protection fuses c) 3 nos 250/5 A ratio, class-I, 15VA cast resin current transformer d) 1 no 3 phase 4 wire, 240 V (L-N) 5 A, Class-I Intelligent panel meter , flush mounted , 96 sq.mm , similar to Schneider Energy Meters, EM6433H or equivalent approved.</p> <p>Bus bar 250 A TPN tinned copper bus bar having maximum current density of 800 A/sq.inch to withstand symmetrical fault level of 50kA at 415 V. The neutral bus bar shall have 100% capacity</p> <p>Outgoings :-</p> <p>1. 4 nos.100 A TP MCCB with microprocessor release and adequate size tinned Cu. neutral link 2. 1no 63 A TP MCCB with microprocessor release and adequate size tinned Cu. Neutral link.</p> <p>Note: 1) All G.A. & fabrication drawings shall be got</p>	Nos	1											
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<p>approved from the E.I.C. Final painting of panel to be done with powder coating. Necessary touch up may be done at site, incase if required. The scope includes all tests as specified in department's specification, relevant I.S. and as required by E.I.C, shall have to be performed at factory & at installation site and shall be included in the quoted rate.</p> <p>2) The equipment shall be designed to ensure complete safety during operation inspection, connection of cables etc.</p> <p>3) Control wires shall be of 1.1 KV 1.5 / 2.5 sq.mm FRLS copper wires and neatly bunched separately and adequately supported so as to prevent sagging and strain on termination.</p> <p>4) A minimum of 10% spare terminals shall be provided on each terminal block.</p> <p>5) All non- current carrying metallic parts of the equipment shall be earthed with copper flexible wire / strip of adequate size.</p> <p>6) All concealed hinged doors and covers shall be provided with suitable flexible earthing connections.</p> <p>7) The size of the earth bus chosen shall be to withstand full fault current of 50kA, as specified at 415V.</p> <p>8) Earth bus bar shall be supported at suitable intervals.</p> <p>9) All the current transformers are resin cast type class-I only.</p> <p>10) Scope includes cable end boxes, reverse entry boxes as per site conditions and extension of bus bars as required for terminating the number of cables as per schematic diagram.</p> <p>11) G.A. & detailed fabrication drawing and short circuit forces and temp rise calculation for panel including the panel fabricator shall be submitted for dept approval.</p> <p>12) Bimetallic washers to be used for all aluminium to copper joints wherever required & it shall be of approved make & quality wherever required.</p> <p>13) Indication lamp shall be cluster heavy duty type LED</p> <p>14) All Outgoing feeders shall have 'ON', 'OFF', 'Auto trip'.</p> <p>15) All neutral shall be isolatable type.</p>											
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	<p>16) All inter connection for incoming & outgoing should be with copper bus bar.</p> <p>17) Vertical bus rating shall be based on outgoing feeders.</p> <p>18) All MCCBs shall have Ics= 50kA as specified, at 415V</p> <p>19) Cubicle illumination lamp & space heater in the cable alley should be provided</p> <p>Make: Jackson/L&T/Other competent CPRI approved panel manufacturer from Hyderabad</p>											
5	<p>Supply, installation , testing & commissioning of 6Way Ready Made TPN Distribution Boards shall be surface/recess mounting vertical/horizontal type ,415 volts TPN MCB distribution board of sheet steel, dust protected ,duly powder painted, inclusive of 100 amps tinned copper interconnections with appropriate capacity size of PVC insulated copper conductor wires (ISI marked) suitable for mounting necessary isolators /MCBs/ELCBs etc, and suitable for concealed mounting /wall mounting with M.S enclosure fabricated out of min 18 SWG/20SWG thick M.S CRCA sheet as per manufacturers standard, with concealed hinged door locking arrangement etc, including earthing clamps ,common neutral link, earth bar, din bar for mounting MCB's (but without MCB's) as required as per IS:13032 and IEC 60647-2 equivalent to Legrand Cat No.607716 (Make : Legrand/ Seimens /equivalent approved)</p>	Nos	11									
6	<p>Supply, installation , testing & commissioning of ISI Marked and accepted standard of 25A FP Miniature Circuit Breaker (MCB) of 'C' series suitable for 240/415 Volts, 50Cycle, 10kA Value AC supply confirming to IS: 8828 : 1996, IEC: 60898 : 2002. MCBs and Distribution Boards should be same make only. approved (Make:Legrand/ABB/Seimens/Schneider/Equivalent approved)</p>	Nos	1									
7	<p>Supply, installation , testing & commissioning of ISI Marked and accepted standard of 6-32A Single Pole Miniature Circuit Breaker (MCB) of 'C' series suitable for 240/415 Volts, 50Cycle, 10kA Value AC supply confirming to IS: 8828 : 1996, IEC: 60898 : 2002. MCBs and Distribution Boards should be same make only. approved</p>	Nos	8									



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	(Make:Legrand/ABB/Seimens/Schneider/Equivalent approved)											
8	Supply, Preparation of Copper plate Earth electrode : (as per I.S.3043) a) Excavation of rocky earth/soft murrum/hard murrumetc and black filling with garden soil for the earth station. The earth pit size is 1000mm x 1000mm x 3000mm deep. b) supply and burring of copper plate of size 600 x 600 x 3.00mm at a depth of 8 feet in the vertical position with all accessories in the above excavated earth pit. c) supplying and laying 25mm x 6mm copper strip bolted with copper plate from bottom level with all accessories required and bring upto the ground level. d) supply and fixing of 25mm dia , 2.5mtrs length GI B class pipe for watering with all accessories. e) supply and fixing of one set of funnel with mesh with all accessories. f) supply and making alternate layers of the following in the earth station. i) 75 kg Charcoal. ii) 50 Kg Original salt and watering g) Construction of earth pit chamber including necessary brick work of size 450mm x 450mm x 450mm. h)Supply and fixing of 6mm thick CI Cover of size 18" x 18" complete as per site requirement with watering arrangement etc complete Note: 1. Each earthing electrode resistance value should be measured as per I.S. 2. Contractor should take care such that individual earth electrode resistance value should be below 2 Ohms after erection	Sets	2									
9	Supply, Preparation of Hot dipped GI Plate Earth electrode : (as per I.S.3043) a) Excavation of rocky earth/soft murrum/hard murrumetc and black filling with garden soil for the earth station. The earth pit size is 1000mm x 1000mm x 3000mm deep. b) supply and burring of Hot dipped GI Plate of size 600 x 600 x 6.00mm at a depth of 8 feet in the vertical	Sets	2									



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	<p>position with all accessories in the above excavated earth pit.</p> <p>c) supplying and laying 25mm x 6mm GI Strip bolted with GI plate from bottom level with all accessories required and bring upto the ground level.</p> <p>d) supply and fixing of 25mm dia , 2.5mtrs length GI B class pipe for watering with all accessories.</p> <p>e) supply and fixing of one set of funnel with mesh with all accessories.</p> <p>f) supply and making alternate layers of the following in the earth station.</p> <p>i) 75 kg Charcoal.</p> <p>ii) 50 Kg Original salt and watering</p> <p>g) Construction of earth pit chamber including necessary brick work of size 450mm x 450mm x 450mm.</p> <p>h)Supply and fixing of 6mm thick CI Cover of size 18" x 18" complete as per site requirement with watering arrangement etc complete</p> <p>Note:</p> <p>1. Each earthing electrode resistance value should be measured as per I.S.</p> <p>2. Contractor should take care such that individual earth electrode resistance value should be below 2 Ohms after erection</p>											
10	<p>Supply of 25X3 mm GI strip and fixing on wall/side of trench/slab /column /beam/shaft connection to panel/DBs/SFU's etc. with 5mm thick G.I. Spacers & 2mm thick G.I. Saddle in ground at 750 mm. below including excavation in ground with protective baked bricks, excavation in ground, refilling & removal of excess earth within a radius of 500 m, temporary instatement & back filling of trench, consolidation, interconnection of earth strip/wire with brass bolt & nuts & washers & solder jointing, painting with two coats of black bituminous paint for earth wire/strip in ground & green enamel paint for earth wire /strip on surface etc.</p>	Mtrs	30									
11	<p>Supply, installation, testing & commissioning of 3C X1.5 sq.mm FR PVC insulated copper conductor cable as per IS 694 with latest amendments , for Lighting circuits and laying on existing cable tray or on wall or</p>	Mtrs	50									



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	floor raceways fixed with required Copper lugs, wood screws/coach screws all fixing accessories etc complete.											
12	Supply, installation, testing & commissioning of 300mm dia , 900 rpm Exhaust Fans , single phase complete with blades, motor, scope includes supply of 3C copper 1.5 sq.mm. flexible chord of suitable length with 6A 3pin plug top.	Nos	6									
13	Supply , fixing, testing and Commissioning of 3 Module (6A switches -3Nos) approved make modular type PVC boxes with modular base, cover plates with modular switches with interconnections and fixing on wall /Partition/slab as required (Make: Legrand / Equivalent approved)	Nos	6									
14	Supply and laying and fixing of 25 mm Heavy Duty PVC conduit of ISI marked, laying on cable tray wall/ceiling/false celing /flooring/on wall concealed complete with all necessary spacers, saddles, joints as per site condition.	Mtrs	50									
15	Supply, Installation, testing and Commissioning of 2 feet 9-Watt Straight Linear LED Tube Light and Light fixtures with all required accessories required to be fixed on wall/cable tray as per specifications, site conditions & as per the instructions of engineer in charge	Nos	15									
Grand Total												
Grand Total in words Rs.....only)												

Note:

1. Rates are all inclusive of profit, Transport, Taxes, Etc.

2. TIFR, Hyderabad has right to delete any of above items from scope of work or may increase/reduce quantities as per its requirement during execution of work. No claim or compensation for such deletion/increase/decrease will be accepted/paid to contractor. Payment will be made as per actual quantities executed at tender rates