



INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI – 600 036
ENGINEERING UNIT

Technical Bid – Volume-1

T. No 13/2013–2014/Eldb

Name of work	: Providing substation equipments and power cables for the new boys and girls Hostels at IIT Madras
Value put to Tender	: Rs. 87.98 lakhs
Earnest money Deposit	: Rs. 1,75,960/-
Cost of Tender Schedule	: Rs. 1050/- (inclusive of VAT (Rs.50/-))
Date and Time of Submission	: Date: 10/06/2013 Time: 03.00 pm
Date and Time of Opening	: Date: 10/06/2013 Time: 03.10 pm
Venue	: Engineering Unit Conference Room Admin Block 3rd Floor I.I.T, Madras

Signed-
Consultant (Elec)

Signed-
Executive Engineer (Elec)

INDIAN INSTITUTE OF TECHNOLOGY MADRAS CHENNAI-36
ENGINEERING UNIT
TENDER DOCUMENTS

TENDER No.13/2013-14/Eldb

Name of Work:- Providing substation equipments and power cables for the new boys and girls Hostels at IIT Madras

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This tender document contains 79 (Seventy Nine) pages in Volume I and 12 pages in Volume II only. The contractor will take print out as published in the website and enclose the entire documents. If the contractor has not submitted all the pages, the tender will be liable for rejection.

INDIAN INSTITUTE OF TECHNOLOGY MADRAS CHENNAI-36
ENGINEERING UNIT
TENDER No.13/2013-14/Eldb
1.0 BRIEF NOTICE TO TENDERERS

The Executive Engineer, Engineering Unit, Indian Institute of Technology Madras, Chennai on behalf of the Chairman, Board of Governors, IITM, invites item rate tenders (Technical & Price bid) for the following work from reputed contractors of having **Grade EA electrical license** and above, who have met the eligibility criteria as stipulated below. Enlisted contractor of **Category I with Grade EA/ESA** in IIT, Madras shall also submit the tender.

Sl. No	Name of Work and Location	Estimated Cost	Earnest Money In Rs	Time allowed for completion	Last date and time of receipt of tender	Last date and time of opening of tender
1.	Providing substation equipments and power cables for the new boys and girls Hostels at IIT Madras	87.98 lakhs	1,75,960/-	6 months	10/06/2013 3.00 P.M.	10/06/2013 3.10 P.M.

Eligibility criteria: Interested contractors should have successfully completed any of the following combination of similar works during last 7 years ending one month prior to the date of tender in Central Govt/Central autonomous bodies/Central public sector undertaking.

- a. three similar works each costing not less than 40 % of the estimated cost or
 - b. two similar works each costing not less than 50% of the estimated cost (or)
 - c. one similar work costing not less than 80% of the estimated cost
- The technical bid will be rejected at initial level if the contractor doesn't meet the above norms. Proof of completion of similar works should be enclosed along with copy of valid electrical license in technical bid. Copy of work order will not be considered as a proof of completion.

The tender documents can be downloaded from the Institute website (tenders.iitm.ac.in). The cost of tender document so downloaded has to be paid in the form of DD while submitting the tender. Tender documents may also be purchased up to 07.06.2013, 3.00 P.M. from the office of the Executive Engineer, Engineering Unit, 3rd Floor, Administration building on payment of Rs. 1050/- in the form of crossed demand draft drawn in the name of Indian Institute of Technology Madras from any Scheduled bank and payable at Chennai. The tender, without cost of tender document, will be summarily rejected.

Tenders should be accompanied by an EMD for an amount of Rs 1,75,960/- in the form of demand draft drawn in the name of Indian Institute of Technology Madras, Chennai on any scheduled bank and payable at Chennai.

The EMD in the above form and the technical bid shall be put in a cover super scribed with the name of the work and wording 'EMD + Technical bid' (cover 1). The price bid consisting of the BOQ shall be put in another cover super scribed with the name of the work and the wording 'Price Bid' (Cover 2). Both the cover 1 & 2 may be put in a third cover super scribed with the name of work (cover 3).

The tender shall be deposited in the tender box kept at the office of the Executive Engineer on or before the stipulated date and time of opening of the tender.

At the time fixed for opening of the tender, the cover 3 shall be opened and then cover containing the EMD and Technical bid will be opened. If the EMD submitted is in the acceptable form then the Technical bid will be evaluated, if not the tender will be returned to the tenderer. If the eligibility criteria mentioned in the Technical bid is met, then the tender containing the price bid will be opened. Otherwise the tender will be returned to the tenderer

Signed-
Executive Engineer (E)

INDIAN INSTITUTE OF TECHNOLOGY MADRAS
ENGINEERING UNIT

2.0 NOTICE INVITING TENDERS

- 2.1 Item rate tenders are invited on behalf of the Chairman Board of Governors, Indian Institute of Technology Madras (IITM) for the work of **“.Providing Substation equipments and power cables for the new boys and girls Hostels at IIT Madras ”** from those contractors who fulfill the eligibility criteria as given in the N.I.T
- 2.2 The work is estimated to cost **Rs.87.98 lakhs**
- 2.3 Agreement shall be drawn with the successful tenderer in Form 8 of CPWD duly modified to suit IITM requirements.
- 2.4 Time allowed for carrying out the work is **6 months** which shall be reckoned from the 10th day after the date of written orders to commence the work or from the first day of handing over of the site whichever is later.
- Tender documents may be purchased from the Office of the Executive Engineer on payment of **Rs. 1050/-** in the form of a demand draft drawn in favour of Indian Institute of Technology Madras, Chennai from any scheduled bank and payable at Chennai, up to 3:00 PM on **07.06.2013**. Request for the sale of tender documents after the due date shall not be entertained. The tender documents can also be downloaded from our Institute website (tenders.iitm.ac.in). The cost of tender document however is to be paid in the form of DD while submitting the tender. The tender without cost of tender, the booklet will be summarily rejected.
- 2.5 Tender documents consisting of plans, specifications, the schedule of quantities of the various classes of work to be carried out and the terms and conditions of contract to be complied with by the tenderer and other documents can be seen in the office of the Executive Engineer IITM between 11:00 AM and 4:00 PM from **20.05.2013 to 10.06.2013** except on IITM holidays.
- 2.6 Tenders should be accompanied by Earnest Money Deposit for an amount of **Rs.1,75,960/-**.
- 2.7 The description of the work is given below
- “.Providing Substation equipments and power cables for the new boys and girls Hostels at IIT Madras ”**. The details of works to be carried out are indicated in the bill of quantities”.
- 2.8 Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves, before submitting their tenders, as to the nature of the ground and sub soil, the form and nature of site, the means of access to the site, the availability of space for storage of materials etc and in general obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender. A tenderer is deemed to have full knowledge of site whether he inspects it or not and no extra charges consequent on any misunderstanding or other wise shall be allowed. The area that shall be made available for storage of materials etc is indicated in the drawing enclosed. The tenderer shall study the same and satisfy himself the quantum of material that can be stored and area available for other activities. The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools, water, electricity, access 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 the tenderer has read this notice and all other contract documents and has made himself aware of the conditions, specification of the work to be done and of conditions and rates at which stores, tools and plants etc if any will be issued to him by the Institute and local conditions and other factors having a bearing on the execution of work.
- 2.9 The competent authority does not bind itself to accept the lowest or any other tender and reserve itself the authority to reject any or all the tenders received without the assignment of any reason. Tenders in which any of the prescribed conditions is not fulfilled or with any conditions including that of conditional rebate put forth by the tender shall be summarily rejected.
- 2.10 Canvassing whether directly or indirectly, in connection with the tender is strictly prohibited and the tenders of the tenderers who resort to canvassing will be liable for rejection.
- 2.11 The competent authority reserves to itself the right of accepting part or whole of the tender and the tenderer shall be bound to perform the same at the rate quoted.

- 2.12 The tenderer shall not be permitted to tender for works in IITM if his near relative is posted as Divisional Accountant, Asst. Registrar (EU) or as an officer in any capacity in the grades of Executive Engineer to Junior Engineer (All inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him who are near relatives to any officer in IITM. Any violation of this by the tenderer would render him liable to be removed from the approved list of tenderers and the tender is liable to be rejected
- 2.13 No Engineer or other officers employed in Engineering unit of IITM or other Gazetted officers employed in Engineering or Administrative duties in any Engineering establishment of Government of India shall be allowed to work as a tenderer or employee of the tenderer in IITM for a period of two years after his/her retirement from service, without previous permission of IITM / Government of India. Any violation by the tenderer would render the tenderer liable to be removed from the approved list of tenderer and the tender is liable to be rejected.
- 2.14 The tender for the works shall remain open for acceptance for a period of thirty days from the date of opening of tender. Any tenderer who withdraws his tender before the said period or issue of acceptance, whichever is earlier or makes any modification in the terms and conditions of the tender which are not acceptable to the Institute, then the tenderer will forfeit 50 % of the said Earnest Money aforesaid to IIT Madras without prejudice to any other right or remedy. Further the tenderer who withdraws or makes modifications, which are not acceptable, shall not be allowed to participate in the future tenders of IITM.
- 2.15 This notice inviting tender including additional conditions, specifications and drawings, if any, shall form a part of the contract document. The successful tenderer on acceptance of his tender, shall within 15 days from the stipulated date of start of the work, sign the contract consisting of Notice inviting tender, all the documents including additional conditions, specifications and drawings, if any, forming the tender as issued at the time of invitation and acceptance thereof together with any correspondence there to and General Conditions of contract for CPWD works (Standard CPWD form 8) duly modified to suit IITM.

**INDIAN INSTITUTE OF TECHNOLOGY MADRAS CHENNAI-36
ENGINEERING UNIT**

ITEM RATE TENDER & CONTRACT FOR WORKS

Tender for the work of "Providing Substation equipments and power cables for the new boys and girls Hostels at IIT Madras

(i) To be submitted by 3.00 P.M. hours on 10/06/2013 at the office of the Executive Engineer IITM at Third floor of Administrative block.

(ii) To be opened on the same day in the presence of tenderers who may be present at 3.10 P.M. Hours in the office of the Executive Engineer, Engineering Unit, 3rd floor, Administration Building, IITM, Chennai.

Issued to

Signed-
Signature of the Officer issuing the documents:

Designation:-

Date of Issue:-

3.0 TENDER

I / We have read and examined the notice inviting tender, schedules A, B, C, D, E & F, specifications applicable, drawings, Conditions of contract and other documents 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 the execution of the work specified for the Indian Institute of Technology Madras, within the time specified in Schedule – 'F' and in accordance in all respects with the specifications, designs, drawings and instructions in writing referred to in General Rules and Directions and in Clause 11 of form 8 (General conditions of contract) and with such materials as are provided for, by, and in all respects in accordance with such conditions so far as applicable.

We agree to keep the tender open for 30 days from the due date of opening thereof and not to make any modifications in its terms and conditions

A sum of **Rs. 1,75,960/-** is enclosed in the form of demand draft towards EMD.

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 the 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.

Dated

Signature of the Tenderer

Postal Address

Witness

Signature

Name

Postal Address

Occupation

4.0 ACCEPTANCE

The above tender (as modified by you as provided in the letters mentioned hereunder) is accepted by me for an on behalf of the Indian Institute of Technology Madras, for a sum of

Rs. _____

(Rupees _____)

The letters referred to below shall form part of this contract Agreement:

- a)
- b)
- c)

For & on behalf of Indian Institute of Technology

Signature _____

Designation: Executive Engineer

Engineering Unit

Dated _____

5.0 NOTE ON GENERAL CONDITION OF CONTRACT

- 5.1 The general condition of contract for CPWD works 2005 comprising of general rules and directions, conditions of contract, and the contract clauses in Form 8 should be read in conjunction with all Correction Slip (C.S.) issued by the DG (Works), CPWD, New Delhi up to 30 – 04 – 2007
- 5.2 Wherever the expression “The President of India” or “The Government” or “The CPWD” appears in the clauses it should be substituted by the expression “IITM” representing “Indian Institute of Technology Madras”.
- 5.3 Wherever the expression “divisional Officer” appears in the Clauses, it should be substituted by the expression “Executive Engineer”.
- 5.4 “Engineer in Charge” means Executive Engineer, IITM, and the Engineer means the officer representing the Engineer-in-Charge of the Project.

6.0 General Rules and Directions

- 6.1 The tender must be signed by the person / persons competent to sign as indicated in para 8.13 of the document. Same stipulations will also apply in the case of Receipt for payments made on account of work when executed by a firm.
- 6.2 Any person who submits a tender shall fill up the form, stating at what rate he is willing to undertake each item of the work. Only one rate shall be given in words & figures for each item. Tenders, which propose any alteration in the work specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other condition of any sort including conditional rebates, will be summarily rejected. Tender shall have the name and number of the work to which they refer, written on the envelopes. Amount must be quoted in full rupees by ignoring fifty paise and below and considering more than fifty paise as rupee one.
- 6.3 The officer inviting tender or his duly authorized assistant will open the tenders in the presence of any intending tenderers or their authorized agents who may be present at the time and will enter the amounts of the several tenders in a comparative statement in a suitable form. In the event of a tender being accepted, a receipt for the Earnest Money forwarded therewith shall thereupon be given to the tenderers. In the event of a tender being rejected, the Earnest Money forwarded with such unaccepted tender shall thereupon be returned to the tenderers remitting the same, without any interest.
- 6.4 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 or any other tender.
- 6.5 The memorandum of work tendered for and the schedule of materials to be supplied by the Institute and their issue-rates, shall be filled and completed in the office of the officer inviting tender before the tender form is sold. If a form issued to an intending tenderer is without these details the tenderer shall request the officer to have this done before he completes and delivers his tender.
- 6.6 The tenderers shall sign a declaration under the Official Secret Act, 1923, for maintaining secrecy of the tender documents, drawings or other records connected with the work given to them.
- 6.7 In the case of Item Rate Tenders, only rates quoted shall be considered. Any tender containing percentage below/above the rates quoted is liable to be rejected. Rates quoted by the tenderer in item rate tender in figures and words shall be accurately filled in so that there is no discrepancy in the rates written in figures and words. However, if a discrepancy is found, the rates that correspond with the amount worked out by the tenderers shall, unless otherwise proved, be taken as correct. If the amount of an item is not worked out by the tenderer or it does not correspond with the rates written either in figures or in words, then the rates quoted by the tenderer in words shall be taken as correct. Where the rates quoted by the tenderer in figures and in words tally but the amount is not worked out correctly, the rates quoted by the tenderer, will, unless otherwise proved, be taken as correct and not the amount.
- 6.8 In the case of any tender where unit rate of any item/items appear unrealistic, such tender will be considered as unbalanced and in case the tenderer is unable to provide satisfactory explanation, such a tender is liable to be disqualified and rejected.
- 6.9 All rates shall be quoted on the tender form. The amount for each item should be worked out and the requisite totals given. Special care should be taken to write the rates in figures as well as in words and the amount in figures only in such a way that interpolation is not possible. The total amount should be written both in figures and in words. In case of figures, the word 'Rs.' should be written before the figure of 'Rupees' and the word ' P ' after the decimal figures, e.g.' Rs.2.15P' and in case of words, the word, "Rupees" should precede and the word 'Paise' should be written at the end. Unless the rate is in whole rupees and followed by the word 'only', it should invariably be up to two decimal places. While quoting each rate in schedule of tender, the word 'only' should be written closely following the rate and it should not be written in the next line.

- 6.10 a) The tenderer shall be required to deposit 5% of the tendered value of work (as mentioned in the letter of acceptance) as performance guarantee in the form of irrevocable bank guarantee bond of any scheduled bank or State Bank of India in accordance with the form prescribed or in cash or in the form of Govt. Security or fixed deposit receipt, within 15 days of the issue of letter of acceptance.
- b) The tenderer whose tender is accepted, will be required to furnish by way of Security Deposit for the fulfillment of his contract, an amount equal to 5 % of the tendered value of the work. The Security deposit will be collected by deductions from the running bill of the contractor at the rates mentioned above and the earnest money deposited at the time of tender, will be treated as a part of this Security Deposit. The SD amount will also be accepted in cash or in the shape of Government securities. Fixed deposit receipt of a scheduled bank or State bank of India will also be accepted for this purpose provided confirmatory advice is enclosed.
- 6.11 On acceptance of the tender, the name of the accredited representative(s) of the contractor who would be responsible for taking instructions from the Engineer-in-Charge shall be communicated in writing to the Engineer-in-Charge.
- 6.12 Sales tax (VAT), service tax, purchase tax, turnover tax, works contract tax or any other tax on material, labour and works in respect of this contract shall be payable by the contractor and IITM will not entertain any claim whatsoever in respect of the same.
- 6.13 The contractor shall give a list of officers and staff of IITM who are related to him.
- 6.14 The tender for the work shall not be witnessed by a contractor or contractor who himself / themselves has/have tendered for the same work. Failure to observe this condition would render tenders of the contractor tendering, as well as witnessing the tender, liable to summary rejection.
- 6.15 The contractor shall comply with the provisions of the Apprentices Act 1961, and the rules and orders issued there under from time of time. If he fails to do so, his failure will be a breach of the contract and the Executive Engineer may in his discretion, without prejudice to any other right or remedy available in law, cancel the contract. The contractor shall also be liable for any pecuniary liability on account of any violation by him of the provisions of the said Act.

7.0 CONDITIONS OF CONTRACT

- 7.1 The **Contract** means the documents forming the tender and acceptance thereof and the formal agreement executed between the competent authority on behalf of the IITM and the contractor, together with the documents referred to therein including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Engineer-in-charge and all these documents taken together, shall be deemed to form one contract and shall be complementary to one another.
- 7.2 In the contract, the following expressions shall, unless context otherwise requires, have the meanings, hereby respectively assigned to them:-
- 7.2.1 The expression 'works' or 'work' shall, unless there be something either in the subject or context repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract contracted to be executed whether temporary or permanent, and whether original, altered, substituted or additional.
- 7.2.2 The Site shall mean the land/or other places on, into or through which work is to be executed under the contract or any adjacent land, path or street through which work is to be executed under the contract or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract.
- 7.2.3 The tenderer shall mean the individual, firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assignees of such individual, firm or company.
- 7.2.4 The Engineer-in-charge means the Engineer officer who shall supervise and be in-charge of the work and who shall sign the contract on behalf of IITM as mentioned in Schedule 'F' hereunder.
- 7.2.5 Accepting Authority shall mean the authority mentioned in Schedule 'F'.
- 7.2.6 Excepted Risk are risks due to riots (other than those on account of tenderer's employees), war (whether declared or not) invasion, act of foreign enemies, hostilities, civil war, rebellion, revolution, insurrection, military or usurped power, any acts of IITM, damages from aircraft, acts of God, such as earthquake, lightning and unprecedented floods, and other causes over which the tenderer has no control and accepted as such by the Accepting Authority or causes solely due to use or occupation by IITM of the part of the works in respect of which a certificate of completion has been issued or a caused solely due to IITM faulty design of works.
- 7.2.7 Market Rate shall be the rate as decided by the Engineer-in-charge on the basis of the cost of materials and labour at the site where the work is to be executed plus the percentage mentioned in Schedule 'F' to cover, all overheads and profits.
- 7.2.8 Schedules(s) referred to in these conditions shall mean the relevant schedule(s) annexed to the tender papers or the standard schedule of Rates of the CPWD mentioned is schedule 'F' hereunder, with the amendments thereto issued up to the date of receipt of the tender.
- 7.2.9 Department means IITM which invites tenders.
- 7.2.10 District specification means the specifications followed by the state of Tamil Nadu in the area where the work is to be executed.
- 7.2.11 Tendered value means the value of the entire work as stipulated in the letter of award.
- 7.3 Where the context so requires, words imparting the singular only also include the plural and vice versa. Any reference to masculine gender shall whenever required include feminine gender and vice versa.
- 7.4 Headings and marginal notes to the General Conditions of contract shall not be deemed to form part thereof be taken into consideration in the interpretation or construction thereof of the contract.
- 7.5 The contractor shall be furnished, free of cost one certified copy of the contract documents, except standard specifications, Schedule of Rates and such other printed and published documents, together with all drawings as may be forming part of the tender papers. None of these documents shall be used for any purpose other than that of his contract.

- 7.6 The work to be carried out under the contract shall, except as otherwise provided in these conditions, include all labour, materials, tools, plants, equipments and transport which maybe required in preparation of and for and in the full and entire execution and completion of the works. The descriptions given in the Schedule of quantities (Schedule-A) shall, unless otherwise states, be held to include wastage on materials, carriage and cartage, carrying and return of empties, hoisting, setting, fitting and fixing in position and all other labours necessary in and for the full and entire execution and completion of the work as aforesaid in accordance with good practice and recognized principles.
- 7.7 The contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and prices quoted in the schedule of Quantities, which rates and prices shall except as otherwise provided cover all his obligations under the contract and all matters and things necessary for the proper completion and maintenance of the works.
- 7.8 The several documents forming the contact are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small scale drawing and figured dimensions in preference to scale and special conditions in preference to General conditions.

7.8.1 In the case of discrepancy between the schedule of Quantities, the specifications and/or the Drawings, the following order of preference shall be observed.

Description of Schedule of Quantities.

7.8.1.2 Particular Specifications and special conditions, if any

7.8.1.3 Drawings.

7.8.1.4 C.P.W.D Specifications

7.8.1.5 Indian Standard specifications of B.I.S.

7.8.2 If there are varying or conflicting provisions made in any one document forming part of the contract, the Accepting Authority shall be the deciding authority with regard to the intention of the documents and his decision shall be final and binding on the contractor.

7.8.3 Any error in description, quantity or rate in schedule of Quantities or any omission there from shall not vitiate the contract or release the contractor from the execution of the whole or any part of the works comprised therein according to drawings and specifications or from any of his obligations under the contract.

7.9 The successful 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:-

7.9.1 The notice inviting tender, all the tender documents including drawings in 3 volumes, forming the tender as issued at the time invitation of tender and acceptance there of together with any correspondence leading thereto.

7.10.1 ORDER OF PRECEDENCE IN INTERPRETATION OF DOCUMENTS

7.10.1 The several documents forming the contract are to be taken as mutually explanatory of one another. In cases of ambiguities or discrepancies the same shall be brought to the attention of the Engineer who shall thereupon issue instructions to the contractor.

7.10.2 In case of any conflict in interpretation of contract documents, the following order of precedence shall prevail.

7.10.2.1 For Contract Conditions, Special Conditions shall prevail over General Conditions and Clauses of contract. Addenda / Corrigenda / clarifications issued shall prevail over conditions of contract including special conditions and clauses of contract.

7.10.2.2 For Technical clarifications and general guidelines on technical specification and workmanship, provisions in conditions of contract will be applicable.

7.10.2.3 Drawings shall prevail overall for scope of work, read in conjunction with bill of quantities, technical specifications and conditions of contract.

7.10.2.4 For drawings, written dimensions shall prevail over scaled dimensions. Enlarged details shall prevail over general plan, section, elevation etc.

ADDITIONAL CONDITIONS

- 8.1 The Electrical power shall be made available at a near by location of the proposed site. Contractor shall make arrangement for laying cables etc to the site of work and make necessary payments for the electrical consumptions at the rate of **Rs.10.50/-** per unit.
- 8.2 Some restrictions may be imposed by the security staff etc., on the working and on movement of labour, materials etc. The contractor shall be bound to follow all such restrictions/instructions and nothing extra shall be payable on this account. Necessary entry passes have to be obtained for entry of labour and materials. Contractor should take advance action for obtaining such passes and no claim on this account shall be entreated.
- 8.3 The contractor shall give a performance test of the installation(s) as per standing specifications before the work is finally accepted and nothing extra whatsoever shall be payable to the contractor for the test.
- 8.4 Construction labour shall not be permitted (except staff for watch and ward) to stay inside the campus. The contractor has to arrange for necessary photo identity passes for the labour for entry in to the campus. The labour movement should be restricted to the areas where work is carried out.
- 8.5 A complete set of Architectural Drawings are available with the Executive Engineer(E), Engineering Unit. Tenderers are advised to study the drawing before tendering.
- 8.6 Samples of various materials, finishes, etc are available in the office of the Executive Engineer. The same may be seen by the tenderers before submission of the tender.
- 8.7 Sample of all materials to be used in this work shall be got approved in advance from the Engineer-in-Charge before taking up the work.
The contractor shall produce all the materials in advance so that there is sufficient time for testing and approving the material and clearance of the same before use in work.
- 8.8 A prospective Tenderer requiring any clarification on the Tender Document may notify the Executive Engineer(E), IITM at Chennai. The Executive Engineer will respond to any request for clarification, which he receives earlier than 5 days prior to the deadline for submission of Tenders.
- 8.9 Before the deadline for submission of Tenders, the Tender Document may be modified by IITM by issue of Addenda. Any Addendum issued shall be part of the Tender Documents and shall be communicated in writing to all who have purchased the tender documents. The prospective Tenderers shall acknowledge receipt of each Addendum in writing to the Executive Engineer / IITM. To give prospective Tenderers reasonable time in which to take the Addenda into account in preparing their tenders, extension of the deadline for submission of Tenders may be given as necessary.
- 8.10 The Tender should be accompanied by Earnest Money for an amount of **Rs. 1,75,960/- (Rupees one Lakhs Seventy five thousand Nine hundred and Sixty rupees only)**. The EMD should be enclosed in cover – 1. Any tender not accompanied by Earnest Money in an acceptable form shall be rejected by the Employer as non-responsive.

The Earnest Money of the Tenderers whose tenders are found not acceptable will be returned as soon as scrutiny of tender has been completed by the Employer.

The Earnest Money of the successful Tenderer will be taken as part of the Security Deposit as stipulated in Clause 1A of "General conditions of Contract".

The Earnest Money will be forfeited to an extent of 50%, if during the period of Tender Validity, the tenderer

8.10.1 Withdraws his Tender

or

8.10.2 Makes any modifications in the terms and conditions of the Tender which are not acceptable to the Employer.

The Earnest Money will be forfeited in full if the successful Tenderer.

8.10.3 Fails to commence the work on 16th day after the date on which the Employer issues written order to commence the work/ handing over the site which ever is later.

8.11 The Tenderers shall submit offers, which comply strictly with the requirements of the Tender Document. Alternatives or any modification shall render the Tender invalid.

- 8.12 The tender shall be submitted in a cover containing cover 1 and cover 2
- Cover 1** shall contain the EMD and Technical Bid. This shall be marked as "EMD + Technical Bid". Each page of the document shall be signed and affixed with the seal of the contractor.
- Cover 2** shall contain BOQ and shall be marked as " Price Bid". Each page of the document shall be signed and affixed with the seal of the contractor.
- Cover 3** shall contains cover 1 & Cover 2

8.13 AUTHORITY TO SIGN

- 8.13.1 If the tenderer is an individual, he should sign above his full type written name and current address.
- 8.13.2 If the tenderer is a proprietary firm, the Proprietor should sign above his full type written name and the full name of his firm with its current address.
- 8.13.3 If the tenderer is a firm in partnership, the Documents should be signed by all the Partners of the firm above their full type written names and current addresses. Alternatively the Documents should be signed by a Partner holding Power of Attorney for the firm and in this case a certified copy of the Power of Attorney should accompany the Documents. In both cases a certified copy of the Partnership Deed and current address of all the partners of the firms should be furnished.
- 8.13.4 If the tenderer is a limited Company, or a Corporation, the Documents shall be signed by a duly authorized person holding Power of Attorney for signing the Documents, accompanied by a copy of the Power of Attorney. The tenderer should also furnish a copy of the Memorandum of Articles of Association duly attested by a Public Notary
- 8.14 Tenders must be received by the Employer at the following address not later than 3.00 PM of the receipt date mentioned. In the event of the specified date for the submission of the Tender being declared as a holiday by the Employer, the Tenders will be received up to the appointed time on the next working day.

Address for Submission of Tender

The Executive Engineer (E)
Engineering Unit, Administrative Building, 3rd floor,
Indian Institute of Technology Madras, Chennai – 600036.

The Employer may extend the deadline for submission of Tenders by issuing an amendment

Any Tender received after the deadline prescribed will be returned unopened to the Tenderer.

8.15 Evaluation of tenders wherein tenderers has not quoted rate(s) for one or more items

In the case of item Rate Tenders, only rates quoted shall, be considered. Any tender containing percentage below / above the rates quoted is liable to be rejected. Rates quoted by the contractor in item rate tender in figures and words shall be accurately filled in so that there is no discrepancy in the rates written in figures and words. However if a discrepancy is found, the rates, which correspond with the amount worked out by the contractor, shall, unless otherwise proved, be taken as correct. If the amount of an item is not worked out by the contractor or it does not correspond with the rates written either in figures or in words, then the rates quoted by the contractor in words shall be taken as correct. Where the rates quoted by the contractor in figures and in words tally but the amount is not worked out correctly, the rates quoted by the contractor will, unless otherwise proved, be taken as correct and not the amount. In event no rate has been quoted for any item(s), leaving space both in figure(s), words(s) and amount blank, it will be presumed that the contractor has included the cost of this / these item(s) in other items and rate for such items(s) will be considered as zero and work will be required to be executed accordingly.

8.16 Contractor Superintendence, Supervision, Technical Staff & Employees

- 8.16.1 The contractor shall provide all necessary superintendence during execution of the work and as long thereafter as may be necessary for proper fulfilling of the obligations under the contract.

The contractor shall immediately after receiving letter of acceptance of the tender and before commencement of the work, intimate in writing to the Engineer-in-Charge the name(s), qualifications, experience, age, address(s) and other particulars along with certificates, of the principal technical representative to be in charge of the work and other technical representative(s) who will be supervising the work. Minimum requirement of such technical representative(s) and their qualifications and experience shall not be lower than that specified in Schedule 'F'. The Engineer-in-Charge shall within 3 days of receipt of such communication, intimate in writing his approval or otherwise of such representative(s) to the contractor. Any such approval may at any time be withdrawn and in case of such a withdrawal, the contractor shall appoint another such representative(s) according

to the provisions of this clause. Decision of the tender accepting authority shall be final and binding on the contractor in this respect. Such a principal technical representative and other technical representative(s) shall be appointed by the contractor soon after receipt of the approval from Engineer-in-Charge and shall be available at site before start of work.

All the provisions applicable to the principal technical representative under the Clause will also be applicable to other technical representative(s). The principal technical representative and other technical representative(s) shall be present at the site of work for supervision at all times when any construction activity is in progress and also present himself /themselves, as required, to the Engineer-in-Charge and/or his designated representative to take instructions. Instructions given to the principal technical representative and other technical representative(s) shall be deemed to have the same force as if these have been given of the contractor. The principal technical representative(s) and other representatives shall be actually available full time during all stages of execution of work, recording/checking/ test checking of measurement of work and wherever so required by Engineer-in-Charge and shall also note instructions conveyed by the Engineer-in-Charge or his designated representative(s) in the site order book and shall affix his/their signature in token of noting down the instructions and in of acceptance of measurements/checked measurements/test checked measurements. The representative(s) shall not look after other works in addition to the work covered under this contract. Substitutes, duly approved by Engineer-in-Charge of the work in manner as aforesaid shall be provided of absence of any of the representative for more than two days.

If the Engineer-in-Charge, whose decision in this respect is final and binding on the contractor, is convinced that no such technical representation is/are effectively appointed or is/are effectively attending or fulfilling the provision of this clause, a recovery (non-refundable) shall be effected from the contractor as specified in Schedule 'F' and the decision of the Engineer-in-Charge as recorded in the site order book and measurements checked/test checked in Measurement books shall be final and binding on the contractor. Further if the contractor fails to appoint suitable Principal technical representative and other technical representative(s) or if such appointed persons are not effectively present or absent by more than two days without duly approved substitute or do not discharge their responsibility satisfactorily, the Engineer-in-Charge shall have powers to suspend the execution of the work until such date as suitable other representative(s) is/are appointed and the contractor shall be held responsible for the delay so caused to the work. The contractor should submit a certificate of employment of the technical representatives(s) along with every on account of bill / final bill and shall produce evidence at any time if required by the Engineer in charge.

8.17 INSURANCE TO BE TAKEN BY THE TENDERER AND EMPLOYER TO BE INDEMNIFIED

8.17.1 Insurance of Works

The contractor shall effect contractor's all risk insurance policy (CAR policy) in the joint names of the Employer and the contractor, the name of the former being placed first in the policy, covering the following:

- 8.17.1.1 The Works at the contract price together with the materials for incorporation in the works at their replacement value.
- 8.17.1.2 All plants, machinery and equipment and other things brought to the site by the contractor at their replacement value.

The insurance shall be against all losses or damages from whatever causes, other than excepted risks, as defined in Clause 2 of Conditions of Contract, for which the contractor is responsible under the Contract. The insurance cover shall be for the period of contract and also for the period of maintenance, for loss or damage arising from a cause prior to commencement of the period of maintenance, and for any loss or damage, occasioned by the contractor in the course of any operations carried out for the purpose of complying with his obligations during maintenance period under Clause 17 of Clauses of Contract.

Such insurance shall be effected with an insurer and with terms approved by the Employer. The contractor shall produce the policy or policies and the receipts for payment of the current premiums.

8.17.2 Third Party Insurance

Before commencing the execution of the Works, the contractor shall insure against the liability for any material or physical damage, loss or injury which may occur to any property or life including that of the Employer or to any person, including any employee of the Employer, by or arising out of the execution of the works or in the carrying out of the Contract. The sum insured will be for Rs.5.00 lakhs, Such insurance shall be effected with an insurer and in terms approved by the Employer. The contractor shall produce before the Engineer-in-charge the policy or policies of insurance and the receipts of payment of the current premiums. This third party insurance can either be included in the CAR policy or taken separately.

8.17.3 Workmen's Insurance

IITM shall not be liable for any payment in respect of any damages or compensation payable according to law in respect or in consequence of any accident or injury or loss of life to any workman or other person in the employment of the contractor or any sub-contractor, except an accident or injury resulting from any act or default of the Employer, his agents or servants. The contractor shall insure against such liability with an insurer approved by the Employer for sum as per established norms during the entire period till completion including Maintenance period.

8.17.4 Recovery from the contractor

Without prejudice to the other rights of the Employer against the contractor in respect of such default, the Employer shall be entitled to deduct from any sums payable to the contractor the amount of any damages, compensation costs, charges and other expenses paid by the Employer and which are payable by the contractor under this clause.

8.17.5 Extension of time

The contractor, in case of rebuilding or reinstatement, shall be entitled to such extension of time for completion as the Engineer-in-charge may deem fit, but shall, however not be entitled to reimbursement by the Employer of any shortfall or deficiency in the amount finally paid by the insurer in settlement of any claim arising as set out herein.

8.17.6 Insurance by Sub-Contractors

Without prejudice to his liability under this clause the contractor shall also cause all Sub- contractors to effect, for their respective portions of the works, similar policies of insurance in accordance with the provisions of this clause and shall produce or cause to produce to the Employer such policies. The contractor shall not permit a Sub- contractor to commence work at the site unless the said insurance policies are submitted. In the event of failure of the Sub-contractor to take out such a policy of insurance before commencing the works at the site, the contractor shall be responsible for any claim or damage attributable to the said Sub-contractor.

8.17.7 Period of Policies

All the insurance covers mentioned above shall be kept alive during the complete period of the contract including maintenance period.

8.17.8 Remedy on Contractor's Failure to Insure

If the contractor fails to effect and keep in force the insurance referred to above, or any other insurance which he may be required to effect under the terms of the Contract, then and in any such case the Employer on advice of the Engineer-in-Charge may effect and keep in force any such insurance and pay such premium or premiums as may be necessary for that purpose and from time to time deduct the amount so paid by the Employer as aforesaid from any moneys due or which may become due to the contractor, or recover the same as debt due from the contractor.

8.17.9 Damage to Persons and Property – Employer to be Indemnify

The contractor shall indemnify the Employer against all losses and claims in respect of injuries or damages to any person or material or physical damage to any property whatsoever which may arise out of or in consequence of the execution and maintenance of the works and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto, except any compensation or damages for or with respect to:

- 8.17.9.1 The permanent use or occupation of land by the works or any part thereof.
 - 8.17.9.2 The right of the Employer to execute the works or any part thereof on, over, under, in or through any land.
 - 8.17.9.3 Injuries or damage to persons or property resulting from any act or neglect of the Employer, his agents, servants or other contractors, not being employed by the contractor or for or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or where the injury or damage was contributed to by the contractor, his servants or agents, such part of the compensations as may be just and equitable having regard to the extent of the responsibility of the Employer, his servant or agent or other contractor, for the damage or injury.
- 8.17.10** The contractor shall make arrangement for construction of a temporary site office as required by the Engineer-in-charge for which no extra payment will be paid.

Signature of Contractor

**Signed-
Executive Engineer (E)**

9.0 SPECIAL CONDITIONS

- 9.1 No labour camps shall be permitted inside the IITM Campus. Workers should be made to confine themselves to the work areas and should not wander in to the near by areas / buildings/ forests.
- 9.2 If night work is required to be carried out to fulfill the agreed rate of progress, all arrangement shall be made by the Contractor, inclusive of lighting the area without any claim for extra rate. To the extent possible engaging women labour in the night shift should be avoided.
- 9.3 The works shall be carried as per C.P.W.D specifications with Addenda and Corrigenda issued up to 30-04-2007 and as per best Engineering practice.
- 9.4 No variations from, additions to and omissions from in the items of work shall vitiate the contract. All such variations, additions, substitutions etc shall be decided as per the terms of the contract agreement.
- 9.5 Child Labour is strictly prohibited.
- 9.6 Water required for construction shall be arranged by the contractor. No water shall be supplied by the Institute and bore well / open wells etc shall not be permitted in side the campus.

9.7 Protection for Environment

- 9.7.1 The debris / construction waste and other waste generated from the work spot should not be thrown in the campus outside the designated construction area. All waste and debris material should be taken out of the campus and disposed off in a legal and environmental friendly way.
- 9.7.2 All construction material should be stored only at places earmarked by the engineer-in-charge. Material like cement, aggregate, steel etc should not be stored in buildings that are in use. If any material is stored in an unauthorized location the same will be removed at cost to the contractor.
- 9.7.3 Necessary display boards indicating the following shall be displayed in a conspicuous place near the work spot.
 - Name of the work
 - Name of the contractor and Contact Number
 - Tendered cost
 - Date of start and stipulated date of completion
 - AEE and JE in charge for the work and Contact number
- 9.7.4 A Suggestion box should be kept near the above said board.
- 9.7.5 For intercarting of various materials animal drawn vehicles are strictly prohibited.
- 9.7.6 Preparation of concrete and mortars on the roads, pavements, under the building bare floors is strictly prohibited.
- 9.7.7 No vegetation inside the campus should be damaged.
- 9.7.8 Drinking water requirement of the labour should be arranged by the contractor and they should be instructed not to misuse the facilities available in the various buildings.
- 9.7.9 All labour should be dressed properly attending to work. Wearing loose cloths like dhotis, lungies should be avoided to the extent possible.
- 9.7.10 No labour camps shall be permitted inside the IITM campus. Workers should be made to confine themselves to the work areas and should not wander in to the near by areas / buildings/ forests.
- 9.7.11 While transporting the materials along the road, spillage of material should be avoided. If any spillage occurs the same should be got cleaned immediately.
- 9.7.12 Toilets facilities for the workers should be provided within the designated construction area.

Any violation of above will attract levy of compensation by the engineer-in-charge on the contractor.

9.8. Safety at the Site

The contractor must appoint a full time qualified person as safety-in-charge for taking care of implementation of the safety system.

The contractor shall submit the Project Safety Plan stating the methodology of implementation of systems to ensure the safe and environment friendly work place.

The Safety Plan must include the following:

9.8.1 Organization Chart

Reporting relationship of the safety function in a flow chart

9.8.2 Safety Committee

Structure – Chairman, secretary and committee members – Roles & Responsibilities

Applicable Statutory requirements, standards and codes related to safety and its adherence

9.8.3 General safety rules and regulations concerning

Use of personal protective equipment and safety devices relevant to site activities

Awareness and Training Programs

Motivational schemes and programs

Access, Egress and workstation safety

Safe use of construction power supply and upkeep / maintenance of installations

Work permit systems

Use, maintenance and inspection of Plant & machinery

Scaffold & formwork norms

Use, maintenance and inspection of Lifting Tools

Fire Protection and prevention

Emergency preparedness

Status of Safety implementation at site shall be discussed in the Weekly Review meeting.

Tenderer must submit the safety statistics every month in the enclosed format.

Merit Certificate will be issued for the achievement of safety mile stones like 0.5 million safe man hours, one million safe man hours, 1.5 million safe man hours and so on.

The General Guidelines governing the safety implementation shall include the following Rules, while preparing the safety plan.

- 9.8.3.1 No child labour shall be employed in the work
- 9.8.3.2 All the workmen shall undergo Safety Induction, screening before engaging them on the job. Physical fitness of the person to certain critical jobs like working at height or other dangerous locations should be ensured before engaging the person on work.
- 9.8.3.3 Smoking is strictly prohibited at workplace.
- 9.8.3.4 Sub-contractors shall ensure adequate supervision at workplace. They shall ensure that all persons working under them shall not create any hazard to self or to co-workers.
- 9.8.3.5 Nobody is allowed to work without wearing safety helmet. Chinstrap of safety helmet shall be always on. Drivers, helpers and operators are no exception.
- 9.8.3.6 No one is allowed to work at or more than three meters height without wearing safety belt and anchoring the lanyard of safety belt to firm support preferably at shoulder level.
- 9.8.3.7 No one is allowed to enter into workplace and work at site without adequate foot protection.
- 9.8.3.8 Usage of eye protection equipment shall be ensured when workmen are engaged for grinding, chipping, welding and gas-cutting. For other jobs as and when site safety co-coordinator insists eye protection has to be provided.
- 9.8.3.9 All PPE like Safety shoes, Safety helmet, Safety belt, Safety goggles etc. shall be arranged before starting the job.

- 9.8.3.10 All excavated pits shall be barricaded & barricading to be maintained till the backfilling is done. Safe approach to be ensured into every excavation.
- 9.8.3.11 Adequate illumination at workplace shall be ensured before starting the job at night.
- 9.8.3.12 All the dangerous moving parts of the portable / fixed machinery being used shall be adequately guarded.
- 9.8.3.13 Ladders being used at site shall be adequately secured at bottom and top. Ladders shall not be used as work platforms.
- 9.8.3.14 Erection zone and dismantling zone shall be barricaded and nobody will be allowed to stand under suspended loads.
- 9.8.3.15 Contractors should spray water using Water browser periodically in the site to reduce the dust rising due to wind.
- 9.8.3.16 Horseplay is completely prohibited at workplace. Running at the site is completely prohibited, except in the case of emergency.
- 9.8.3.17 Material shall not be thrown from the height. If required, the area shall be barricaded and one person shall be posted outside the barricading for preventing the trespassers from entering the area.
- 9.8.3.18 Other than electricians, with red helmet, no one is allowed to carry out electrical connections, repairs on electrical equipment or other jobs related thereto.
- 9.8.3.19 All electrical connections shall be made using 3 or 4 core cables, having a earth wire.
- 9.8.3.20 Proper Earthing pits at site to be constructed and the sensitivity must be maintained at less than 1 ohm
- 9.8.3.21 Main panel boards should have MCBs and RCCB / ELCBs (30 mA sensitivity).
- 9.8.3.22 Inserting of bare wires for tapping the power from electrical sockets is completely prohibited.
- 9.8.3.23 All major, minor accidents and near misses to be recorded and reported to the IITM and the contractor must take necessary steps to avoid the recurrence.
- 9.8.3.24 Scaffoldings used should be of proper construction. No Casuarina pole / bamboo scaffolding is permitted. It should be inspected by competent person(s) before use.
- 9.8.3.25 All tools and tackles shall be inspected before use. Defects to be rectified immediately. No lifting tackle to be used unless it is certified by the competent authority.
- 9.8.3.26 All tools and tackles shall be tested and have a Identification no., SWL and date of next test marked on them.
- 9.8.3.27 A tools and tackles inspection register must be maintained and updated regularly.
- 9.8.3.28 Good housekeeping to be maintained. Passages shall not be blocked with materials. Materials like bricks shall not be stacked to the dangerous height at workplace.
- 9.8.3.29 All the Earth moving vehicles and Equipments used at site should have reverse horn.
- 9.8.3.30 Debris, scrap and other materials to be cleared from time to time from the workplace and at the time of closing of work everyday.
- 9.8.3.31 Adequate fire fighting equipment shall be made available at workplace and persons are to be trained in fire fighting techniques with the co-ordination of site safety coordinator.
- 9.8.3.32 All unsafe conditions, unsafe acts identified by contractors, reported by site supervisors and / or safety personnel to be corrected on priority basis.
- 9.8.3.33 No children shall be allowed to enter the workplace.

- 9.8.3.34 Other than the Driver / operator, no one shall travel in a tractor / tough rider etc.
- 9.8.3.35 All the lifting tools and tackles shall be stored properly when not in use.
- 9.8.3.36 Clamps shall be used on Return cables to ensure proper earthing for welding works.
- 9.8.3.37 Return cables shall be used for earthing.
- 9.8.3.38 All the pressure gauges used in gas cutting apparatus shall be in good working condition.
- 9.8.3.39 Proper eye washing facilities shall be made in areas where chemicals are handled.
- 9.8.3.40 Connectors and hose clamps shall be used for making welding hose connections.
- 9.8.3.41 Proper warning boards and caution notices to be displayed at required areas inside the site.
- 9.8.3.42 All cranes must have a trained signal man for signaling.
- 9.8.3.43 All underground cables for supplying construction power shall be routed using conduit pipes.
- 9.8.3.44 Spill trays shall be used to contain the oil spills while transferring / storing them.
- 9.8.3.45 Tapping of power by cutting electric cables in between must be avoided. Proper junction boxes must be used.
- 9.8.3.46 A monthly site safety statistics shall be submitted by the tenderer on the first week of succeeding month to the Engineer in charge, in the perfoma given below.

9.8.3.47 MONTHLY SITE SAFETY STATISTICS

A) TOTAL MANHOURS WORKED DURING THE MONTH

Sl. No.	Description	Number	Man-hours worked	OT Performed	Total
1	Company Staff				
2	Subtenderer's Workmen (including security personnel)				
GRAND TOTAL OF MANHOURS WORKED DURING THE MONTH					

B) Total Man-hours worked since start of work _____

C) Safe man hours from last reportable Lost time/ injury : _____

D) Details of Reportable Lost Time / Injury

S. No	Name of Injured	Date of Accident	Resumed duty on	Man days lost			Claim Status
				Up to last month (1)	This month (2)	Total (1+2)	

Man days Lost during the month (Cumulative of 2)

E) Number of Dangerous Occurrences: _____

F) No of Near Miss Cases : _____

Routed through

Site In charge Site Safety Co-ordinator / Time Keeper

Signature: _____ Signature: _____

10.0 SCHEDULES**SCHEDULE – ‘A’**

The Bill of Quantities:- vide page Nos. 1 to 12 (vol.II) as Price Bid.

SCHEDULE – ‘B’

Schedule of materials proposed to be issued to the tenderer

NO MATERIAL SHALL BE ISSUED TO THE TENDERER BY IITM

SCHEDULE – ‘C’

Schedule of tools and plants proposed to be hired to the tenderer

NO TOOLS AND PLANTS SHALL BE HIRED TO THE CONTRATOR BY IITM

SCHEDULE – ‘D’

Extra schedules for specific requirements / documents for the work, if any.

1. No labour shall be permitted to stay in the campus
2. The construction activities should be restricted within the area earmarked around the proposed blocks.

SCHEDULE – ‘E’**SCHEDULE – ‘F’**

Reference to General conditions of contract

Name of work : "Providing Substation equipments and power cables for the new boys and girls Hostels at IIT Madras

Estimated cost or work :	Rs. 87.98lakhs
i). Earnest money	Rs. 1,75,960/-
ii). Security Deposit	5% of tendered value
iii) Bank Guarantee	5% of tendered value

General Rules and Directions:

Officer inviting tender	Executive Engineer, IITM
Maximum percentage for quantity of items work to be executed beyond which rates are to be determined in accordance with clause 12.2 and 12.3.	See below

Definition

2 (v)	Engineer in charge	Executive Engineer
2(viii)	Accepting authority	Director, IIT Madras
2 (x)	Percentage on cost of material and labour to cover all overheads and profits.	} 10%
2 (xi)	Standard schedule of rates	
2 (xii)	Department	IIT Madras
9(ii)	Standard CPWD contract form	CPWD form 8 with modification and correction

Terms of Payment

70% of the item rate for supply of materials
 20% for after erection and testing
 10% commissioning and handing over of the work.

Clause 2

Authority for fixing compensation under clause 2.	Executive Engineer.
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Clause 2a

Whether clause 2a shall be applicable Yes applicable

Clause 5

Number of days from the date of issue of letter of acceptance for reckoning date of start	10 Days
Time allowed for execution of work	6 months
Authority to give fair and reasonable	Executive Engineer
Extension of work for completion of work	IITM

Clause 7

Gross work to be done together with net Payment / adjustment of advances for material collected, if any, since the last such payments for being eligible to interim payment.	Rs.5.0 Lakhs
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Clause 10 CA and 10C

Not applicable

Clause 11

Specification to be followed for execution of work

Particular specifications CPWD Specifications 1996 Vol. I to VI and revised CPWD Specifications 2003, general specifications for electrical works part – I 2004, , general specifications for electrical works part-IV Sub Station

IS codes, Manufacturer's specifications, General Engineering Practice.

(The specification mentioned earlier will prevail over the one mentioned later unless decided other wise by the Engineer in Charge)

Clause 12

Deviation limit beyond which clauses
12.2 & 12.3 12.2 & 12.3

30%

Clause 16

Competent Authority for
Deciding reduced rates.

}

Executive Engineer
IITM

Clause 36(i)

Designation	Minimum qualification and experience required	Discipline	Rate of recovery per month
Technical Representatives	Graduate with 2 years experience or Diploma holder with 3 years experience - 1 No	Electrical Engineering	Rs.10000

11.0 MEASUREMENT & PREPARATION OF BILL

11.1 Computerized Bill to be submitted by the Contractor

Conventional measurement book shall be replaced by a bound volume of computerized measurements to be furnished by the contractor, duly machine numbered for the pages, and with MB number given by the Institute. The pages of these measurements books shall be of A4 size. All these measurements books shall be serially numbered and a record of these computerized measurements book shall be maintained in a separate register. The same format as in existing measurement books shall be used for the computerized measurement books. The measurements shall be carried forward from the previous recorded measurement as per the existing procedure.

11.2 Mode of measurements

The measurements shall be recorded and entered in the computerized format in the first instance by the contractor and a hard copy shall be submitted to the Institute. All entries shall be made as per the existing procedure.

This measurements shall then be 100% checked by the Junior Engineer/ Assistant Engineer, and test checked by the Asst. Executive Engineer and Executive Engineer as per the existing procedure. If Junior Engineer is not available, then the Asst Executive Engineer shall perform 100% check of the measurements.

The contractor shall incorporate all such changes or corrections, as may be done during the checks / test checks, to his draft computerized measurements and submit the final computerized measurements in the form of a book, duly hard bound in red colour on the lines of the conventional measurements books now in use with its pages machine numbered.

The Junior Engineer / Asst. Engineer, Assistant Executive Engineer, Executive Engineer shall check the computerized measurements to ensure that all the changes or corrections made by them earlier in the draft measurements are correctly incorporated in the final measurements. This book shall be treated as computerized measurement.

The Junior Engineer/ Asst. Engineer, Assistant Executive Engineer and Executive Engineer shall record the necessary certificate for their checks and test checks as per the existing procedure in this computerized measurement books.

The computerized measurements book shall be allotted a serial number as per the register of computerized measurement books maintained by IITM.

11.3 Cuttings / over writing/ insertions in the computerized measurements books are not allowed.

The computerized measurements books given by the contractor, duly bound, with its pages numbered, shall have no cutting or over writing.

In case of any error, computerized misprints shall be canceled and the contractor shall re submit a fresh computerized measurements books.

This should be done before submission of corresponding computerized billing

The contractor shall submit as many copies of computerized measurement books as may be required and as specified in the NIT / contract for the purpose of reference and recording the various office of the department.

11.4 Computerized bill to be submitted by the contractor

The contractor shall submit his running and final bill in a computerized form in the same format as the existing conventional bills with all the pages machine numbered and hard bound made and with all the entries as per the existing procedure. The contractor shall submit as many copies of the computerized bills as may required for the purpose of reference and record. The bill shall be carried forward from the previous running account bill as per the existing procedure.

The computerized bill as may be processed as per the existing procedure.

12.0 ADDENDA & CORRIGENDA TO CLAUSES OF CONTRACT

12.1 Clause 25 "Settlement of Disputes & Arbitration"

shall be substituted by the following.

12.1.1 Settlement of Disputes & Arbitration

Except where otherwise provided in the contract all question and disputes relating to the meaning of the specifications, designs, drawings and instructions here-in before mentioned and as to the quality of workmanship or materials used or as to any other question, claim, right, matter or thing whatsoever in any way arising out of or relating to the contract, designs, drawings, specifications, estimates, instructions, orders of these conditions or otherwise concerning the works or the execution or failure to executes the same whether arising during the progress of work or after the cancellation, termination, completion or abandonment thereof shall be dealt with as mentioned herein after.

12.1.1.1 If the contractor considers any work demanded of him to be outside the requirements of the contract, or disputed any drawings, record or decision given in writing by the Engineer-in-charge or any matter in connection with or arising out of the Contract or carrying out of the work, to be unacceptable, he shall promptly within 15 days request the Executive Engineer in writing for written instruction or decision. Thereupon, the Executive Engineer shall give his written instructions or decisions within a period of one month from the receipt of the contractor's letter.

If the Executive Engineer fails to give his instructions or decisions in writing within the aforesaid period or if the contractor is dissatisfied with the instructions or decision of the Executive Engineer, the contractor may, within 15 days of the receipt of Executive Engineer's decision appeal to the Chairman (Engineering Unit), IITM who shall afford an opportunity to the contractor to be heard, if the matter so desires and to offer evidence in support of his appeal. The Chairman (Engineering Unit), IITM shall give his decision within 30 days of receipt of contractor's appeal.

12.1.1.2 If the contractor is dissatisfied with the decision of the Chairman (Engineering Unit), he may within a period of 15 days of the receipt of the Chairman's decision appeal to the Director, IITM who shall afford an opportunity to the contractor to be heard, if the matter so desires and to offer evidence in support of his appeal. The Director, IITM shall give his decision within 30 days of receipt of contractor's appeal.

12.1.1.3 If the contractor is dissatisfied with the decision of the Director IITM, he shall within 30 days of the receipt of the decision give notice to the Director, IITM for appointment of an arbitrator to adjudicate his claims, failing which the said decision of the Director, IITM shall be final and binding on the contractor.

12.1.1.4 Except where the decision has become final, binding and conclusive in terms of Sub para (iii) above, disputes or difference shall be referred for adjudication through a sole arbitrator appointed by the Director, IITM. If the arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reason whatsoever, another sole arbitrator shall be appointed in the manner aforesaid. Such person shall proceed with the reference from the stage at which it was left by his predecessor.

It is a term of this contract that the party invoking arbitration shall give list of disputes with amounts claimed in respect of each such dispute along with the notice for appointment of arbitrator and giving reference to the rejection by the Director, IITM of the appeal.

It is also a term of this contract that no person other than a person appointed by such Director, IITM, as aforesaid should act as arbitrator.

It is also a term of this Contract that if the contractor does not make any demand for appointment of arbitrator in respect of any claims in writing as aforesaid within 120 days of receiving the intimation from the Engineer-in-charge that the final bill is ready for payment, the claim of the contractor shall be deemed to have been waived and absolutely barred and IITM shall be discharged and released of all liabilities under the Contract in respect of these claims.

The arbitration shall be conducted in accordance with the provisions of the Arbitration and Conciliation Act 1996 (26 of 1996) or any statutory modifications or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceeding under this clause.

It is also term of this Contract that the arbitrator shall adjudicate on only such disputed as are referred to him by the Director, IITM and give separate award against each dispute and claim referred to him and in all cases where the total amount of the claims by any party exceeds **Rs.1,00,000/-** the arbitrator shall give reasons for the award.

It is also a term of the Contract that if any fees are payable to the arbitrator, these shall be paid equally by both the parties.

It is also a term of the Contract that the arbitrator shall be deemed to have entered on the reference on the date of issues notice to both the parties calling them to submit their statement of claims and counter statement of claims. The venue of the arbitration shall be such place as may be fixed by the arbitrator in his sole discretion. The fees, if any, of the arbitrator shall, if required to be paid before the award is made and published, be paid half and half by each of the parties. The cost of the reference and of the award (including the fees, if any, of the arbitrator) shall be in the discretion of the arbitrator who may direct to any by whom and in what manner, such costs or any part thereof shall be paid and fix or settle the amount of costs to be so paid.

12.2 Clause 37 "Levy / Taxes Payable by Contractor"

Para (i) shall be substituted as under

"Sales tax including VAT if any or any other tax on materials as well as on Labour and Works in respect of this Contract shall be payable by the Contractor and IITM shall not entertain any claim whatsoever in this respect."

CLAUSES OF CONTRACT

CLAUSE 2

If the contractor fails to maintain the required progress in terms of clause 5 or fails to complete the work and clear the site on or before the contract or extended date of completion, he shall, without prejudice to any other right or remedy available under the law to the Institute on account of such breach, pay as agreed compensation the amount calculated at the rates stipulated below as the Executive Engineer (E) (whose decision in writing shall be final and binding) may decide on the amount of tendered value of the work for every completed day / month (as applicable) that the progress remains below the specified in clause 5 or that the work remains incomplete.

This will also apply to items or group of items for which a separate period of completions has been specified.

- i. Compensation for delay of work. @ 1.5 % per month of
 delay to be Computed on
 per day basis

Provided always that the total amount of compensation for delay to be paid under this condition shall not exceed 10 % of the tendered value of work or of the tendered value of the item or group of items of work for which a separate period of completion is originally given.

The amount of compensation may be adjusted or set-off against any sum payable to the Contractor under this or any other contract with the Institute.

CLAUSE 3

Subject to other provisions contained in this clause, the Engineer-in-charge may, without prejudice to his any other rights remedy against the contractor in respect of any delay, inferior workmanship, any claims for damages and / or any other provisions of contract or otherwise, and whether the date of completion has or has not elapsed, by notice in writing absolutely determined to contract in any of the following cases:

- i. If the contractor having been given by the Engineer-in-charge a notice writing to rectify, reconstruct or replace any defective work or that work is being performed in an insufficient or otherwise improper or unworkman like manner shall omit to complete with a requirement of such notice for a period of 7 days thereafter.
- ii. If the contractor being a company shall pass a resolution or the court shall make an order that the company shall be wound up or if a receiver or a manager on behalf of creditor shall be appointed or if circumstances shall arise which entitle the court or the creditor to appoint a receiver or a manager or which entitle the court to make a winding up order.
- iii. If the contractor has, without reasonable case, suspended the progress of the work or has failed to proceed with the work with due diligence so that in the opinion of the Engineer-in-charge (which shall be final and binding) he will be unable to secure completion of the work by the date of completion and continues to do so after a notice in writing of seven days from the Engineer-in-charge.
- iv. If the contractor fails to complete the work within the stipulated date or items of work with individual date of completion, if any stipulated, on or before such date(s) of completions and does not complete then within the period specified in a notice given in writing that behalf by the Engineer-in-charge.
- v. If the contractor persistently neglects to carry out his obligations under the contract and / or commits default complying with any of the terms and conditions of the contract and does not remedy it or takes effective steps to remedy it within 7 days after a notice in writing is given to him in that behalf by the Engineer-in-charge.
- vi. If the contractor commits any act mentioned in clause 21 hereof.
- vii. If the work is not started by the contractor within 1/8th of the stipulated time.

When the contractor has made himself liable for action any of the cases aforesaid, the Engineer-in-charge on behalf of the Institute shall have powers.

- a. To determine or rescind the contract as aforesaid (of which termination or rescission notice in writing to the contractor under the hand of the Engineer-in-charge shall be conclusive evidence). Upon such determination or rescission, the Earnest Money Deposit, Security Deposit already recovered and performance guarantee under the contract shall be liable to be forfeited and shall be absolutely at the disposal of the Institute.
- b. After giving notice to the contractor to measure up the work of the contractor and to take such whole, or the balance or part there of, as shall be un-executed out of his hands and to give it to another contractor to complete the work. The contractor, whose contract is determined or rescind as above, shall not be allowed to participate in the tendering process for the balance work.

In the event of above courses being adopted by the Engineer-in-charge, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any material or entered into any engagements or made any advance on account or with a view to the execution of the work or the performance of the contract. And in case action is taken under any of the provision aforesaid, the contractor shall not entitled to recover or be paid any sum for any work thereof actually performed under this contract unless and until the Engineer-in-charge has certified in writing the performance of such work and value payable in respect thereof and he shall only be entitled to be paid the value so certified.

CLAUSE 3 A

In case, the work cannot be started due to reason not within the control of the contractor within 1/8th of the stipulated time for the completion of the work, either party may close the contract. In such a eventuality, the earnest money deposit and performance guarantee of the contractor shall be refunded, but no payment on account of interest, loss of profit or damages etc. shall be payable at all.

CLAUSE 4

In any case in which any of the powers conferred upon Engineer-in-charge by clause 3 thereof, shall have become exercisable and the same or not exercised, the non exercised thereof shall not constitute a waiver of any of the conditions hereof and such powers shall not withstanding the exercisable in the event of any future case of default by the contractor and the liability of the contractor for compensations shall remain unaffected. In the event of Engineer-in-charge putting in force all or any of the powers vested in him under the preceding clause he may, if he so desires after giving a notice in writing to the contractor, take positions of (or at the sole discretion of the Engineer-in-charge which shall be final and binding on the contractor) use as on hire, (the amount of the hire money being also in the final determination of the Engineer-in-charge) all

or any tools, plants, materials and stores in or upon the works, or the site thereof belonging to the contractor, or procured by the contractor and intended to be used for the execution of the work / or any part thereof, paying or allowing for the same in account at the contract rates, or, in the case of this not being applicable, at current market rates to be certified by the Engineer-in-charge, whose certificate thereof shall be final, and binding on the contractor, clerk of the work, foreman or other authorized agent to remove such tools, plant, materials, or stores from the premises (within a time to be specified in such notice) in the event of the contractor failing to comply with any such requisition, the Engineer-in-charge may remove them at the contractor's expense or sell them by auction or private sale on account of the contractor on his risk in all respects and certificate of the Engineer-in-charge as to the expenses of any such removal and the amount of the proceeds and expenses of any such sale shall be final and conclusive against the contractor.

CLAUSE 5

The time allowed for execution of the works as specified in schedule 'F' or the extended time in accordance with these conditions shall be the essence of the contract. The execution of the work shall commence from such time period as mentioned in letter of acceptance or from the date of handing over of the site whichever is later. If the contractor commits default in commencing the execution of the work as aforesaid. Institute shall without prejudice to any other right to remedy available in law, be at the liberty to forfeit the earnest money absolutely.

5.1 As soon as possible after the contract is concluded the contractor shall submit a time and progress chart for each mile stone and get it approved by the Engineer-in-charge. The chart shall be prepared in direct relation to the time slated in the contract

documents for completion of items of the works. It shall indicate the forecast of the dates of commencement and completion of various trades of sections of the work and may be amended as necessary by agreement between the Engineer-in-charge and the contractor within the limitations of time imposed in the contract documents, and further to ensure good progress during the execution of the work, the contractor shall in all cases in which the time allowed for any work, exceeds one month (save for special jobs for which a separate programmer has been agreed upon) complete the work as per mile stones given in Schedule 'F'.

5.2 If the work(s) be delayed by :

- I. force majeure, or
- II. abnormally bad weather, or
- III. serious loss or damage by fire, or
- IV. civil commotion, local commotion of workmen, strike or lockout, affecting any of the trades employed on the work, or
- V. delay on the part of other contractors or tradesmen engaged by Engineer-in-charge in executing work not forming part of the contract, or
- VI. non-availability of stores, which are the responsibility of Institute to supply or
- VII. non-availability or break down of tools and plant to be supplied or supplied by Institute or
- VIII. any other cause which, in the absolute discretion of the authority mentioned in Schedule 'F' is beyond the Contractor's control then upon the happening of any such event causing delay, the contractor shall immediately give notice thereof in writing to the Engineer-in-charge but shall nevertheless use constantly his best endeavours to prevent or make good the delay and shall do all that may be reasonably required to the satisfaction of the Engineer-in-charge to proceed with the works.

5.3 Request for rescheduling of milestones and extension of time, to be eligible for consideration, shall be made by the contractor in writing within fourteen days of the happening of the events causing delay on the prescribed form. The contractor may also, if practicable, indicate in such a request the period for which extension is desired.

5.4 If any such case the authority mentioned in Schedule 'F' may give a fair and reasonable extension of time and reschedule in the mile stone for completion of work. Such extension shall be communicated to the contractor by the Engineer-in-charge in writing, within 3 months of the date of receipt of such request. Non application by the contractor for extension of time shall not be a bar for giving a fair and reasonable extension by the Engineer-in-charge and this shall be binding on the contractor.

CLAUSE 7

No payment shall be made for work, estimated to cost Rs.20,000/- or less till after the whole of the work shall have been completed and certificate of completion given. For works estimated to cost over Rs.20,000/- the interim of running account bill shall be submitted by the contractor for the work executed on the basis of such recorded measurements on the format of the Institute in triplicate on or before the date of every month fixed for the same by the Engineer-in-charge. The contractor shall not be entitled to be paid any such interim payment if the gross work done together with net payment / adjustment of advances for material collected, if any, since the last such payment is less than the amount specified in schedule 'F' in which case the interim bill shall be prepared on the appointed date of the month after the requisite progress is achieved. Engineer-in-charge shall arrange to have the bill verified by the taking or causing to be taken, where necessary, the requisite measurement of the work. In the event of the failure of the contractor to submit the bills Engineer-in-charge shall prepare or cause to be prepared such bills in which the events no claims whatsoever due to delays on payment including that of interest shall be payable to the contractor. Payment on account of amount admissible shall be made by the Engineer-in-charge certifying the sum to which the contractor is considered entitled by way of interim payment of such rates as decided by the Engineer-in-charge. The amount admissible shall be paid by 10th working day after the day of presentation of bill by the contractor to the Engineer-in-charge or his Asst. Engineer together with the account of the material issued by the Institute or dismantled materials, if any.

All such interim payments shall be recorded as payment of advance against final payment. Only and shall not withhold the recurring of bad, unsound and imperfect or unskilled work to be rejected, removed, taken away and reconstructed or re-erected. Any certificate given by the Engineer-in-charge relating to the work done or materials delivered forming part of such payments,

may be modified or corrected by any subsequent such certificate(s) by the final certificate and shall not itself be conclusive evidence that any work or materials to which it relates is / are in accordance with the contract and specifications. Any such interim payment, or any part thereof shall not be in any respect conclude determine or affect in any powers of Engineer-in-charge under the contract or any of such payments treated as final statement and adjustments of accounts or in any vary or affect the contract.

Pending consideration of extension of date of completion. Interim payment shall continue to be made as herein provided without prejudice to the right of the department to take action under the terms of this contract for delay in the completion of the work. If the extension of date of completion is not granted by the competent authority.

The Engineer-in-charge in his sole discretion on the basis of a certificate from the Assistant Executive Engineer to the effect that work has been completed up to the level in question make interim advance without details measurement for work done (other than foundation, item, to be covered under finished items) upto lintel level (including sunshade) and slab level for each floor working out at 75 % of the assessed value. The advance payment so allowed shall be adjusted in the subsequent interim bill by taking detailed measurement thereof.

CLAUSE 8

Within 10 days of the completion of the work the contractor shall give notice of such completion to the Engineer-in-charge and within 30 days of the receipt of such notice the Engineer-in-charge shall inspect the work and if there is no defect in the work shall furnish the contractor a final certificate of completion, otherwise a provisional certificate of physically completion indicating defects (a) to be rectified by the Contractor and / or (b) for which payment will be made at reduced rates, shall be issued. But no final certificate of the completion shall be issued, nor shall the work be considered to be completed until the contractor shall have removed from the permission on which the work shall be executed all scaffolding, surplus materials, rubbish, all huts and sanitary arrangements required his / their work people on the site in connection with the execution of the work shall have been erected or constructed by the contractor(s) and clean of the dirty from all wood work, doors, windows, walls, floor, other part of the buildings, in, upon, or above which the work is to be executed or which he may have had positions for the purpose of the execution thereof, and not until the work shall have been measured by the Engineer-in-charge. If the contractor shall fail to comply with the requirement of this clause as to removal of scaffoldings, surplus materials and rubbish and all huts and sanitary arrangements as aforesaid and cleaning of dirty on or before the date fixed for the completion of the work. The Engineer-in-charge may at the expense of the contractor remove such scaffoldings, surplus materials and rubbish etc. and dispose of the same as he thinks fit and clean of such dirty as aforesaid and the contractor shall have no claim in respect of scaffolding surplus materials as aforesaid except for any some actually realized by the sale thereof.

CLAUSE 8 B

The contractor shall submit completion plan as required vide general specification for electrical works (Part I – Internal) 1972 and (Part II – External) 1974 as applicable within 30 days of the completion of the work.

In case the contractor fails to submit the completion plan as aforesaid, he shall be liable to pay a sum equivalent to 2.5 % of the value of the subject to a ceiling of Rs.50000/- (Rupees fifty thousand only) as may be fixed by the Executive Engineer concerned and in this respect the decision of the Executive Engineer shall be final and binding on the contractor.

CLAUSE 9

The final bill shall be submitted by the contractor in the same manner as specified in interim bills within three months of physical completion of the work or within one month of the final certificate of completion furnished by the Engineer-in-charge whichever is earlier. No further claim shall be made by the contractor after submission of the final bill and these shall be deemed to have been waived and extinguished. Payments of those items of this bill in respect of which there is no dispute and of items in dispute, for quantities and rates as approved by Engineer-in-charge, will, as far as possible be made within the period specified herein under, the period being reckoned from the date of receipt of the bill by the Engineer-in-charge or his authorized Assistant Executive Engineer, completion with account of materials issued by the Department and dismantled materials.

- i. if the tendered value of work is upto Rs.5 Lakhs: 3 months.
- ii. if the tendered value of work is upto Rs.5 Lakhs: 6 months.

CLAUSE 9 A

Payments due to the contractor may, if so desired by him, be made to his bank registered financial co-operative or thrift societies or recognized financial institutions instead of direct to him provide that the contractor furnish the Engineer-in-charge (1) an authorization in the form of a legally valid document such as a power of attorney conferring authority on the bank. Registered, Financial, Co-operative or Thrift Societies or recognized financial institutions to receive payments and (2) his own acceptance of the correctness of the amount made out as due to him by Government or his signature on the bill or other claim performed against Government before settlement by the Engineer-in-charge of the account of claim by payment to the Bank, registered, financial, co-operative or thrift society, recognized financial institutions. While the receipt given by such banks, registered, financial, co-operative or thrift societies or recognized financial institutions shall constitute a full and sufficient discharge for the payment. The contractor shall whenever possible present his bill duly receipted and discharged through his bank, registered financial, co-operative or thrift society, recognized financial institutions.

Nothing herein contained shall operate to create in favour of the bank, registered financial co-operative or thrift society, recognized financial institutions any rights or equities vis-à-vis the Institute.

CLAUSE 10 D

The contractor shall treat all materials obtained during dismantling of a structure, excavation of the site for a work, etc. as Government's property and such materials shall be disposed off to the best advantage of Government according to the instructions in writing issued by the Engineer-in-charge.

CLAUSE 11

The contractor shall execute the whole and every part of the work in the most substantial and work manlike manner both as regards materials and otherwise in every respect in strict accordance with the specifications. The contractor shall also confirm exactly, fully and faithfully to the design, drawings and instructions in writing in respect of the work signed by the Engineer-in-charge and the contractor shall be furnished free of charge one copy of the contract documents together with specifications, designs, drawings and instructions as are not included in the standard specification of Central Public Works Department specified in Schedule 'F' or in any Bureau of Indian Standard or any other, published standard or code or, schedule of rates or any other printed publication referred to elsewhere in the contract.

The contractor shall comply with the provisions of the contract and with the care and diligence execute and maintain the works and provide all labour and materials, tools and plants including for measurements and supervisions of all works, structural plans and other things of temporary or permanent nature required for such execution and maintenance in so far as the necessity for providing these, is specified or is reasonably inferred from the contract. The contractor shall take full responsibility for adequacy, suitability and safety of all the works and methods of construction.

CLAUSE 12

The Engineer-in-charge shall have power (i) to make alteration in, omissions from, additions to, or substitutions for the original specifications, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work, and (ii) to omit a part of the works in case of non-availability of a portion of the site or for any other reasons and the contractor shall be bound to carry out the works in accordance with any instructions given to him in writing signed by the Engineer-in-charge and such alterations, omissions, additions or substitutions shall form part of the contract as if originally provided therein any in any altered, additional or substituted work which the contractor may be directed to do in the manner specified above as part of the works, shall be carried out by the contractor on the same conditions in all respects including price on which he agreed to do the main work except as hereafter provided.

12.1 The time for completion of the works shall, in the event of any deviations resulting in additional cost over the tendered value sum being ordered, be extended, if requested by the contractor, as follows :

- i) In the proportion which the additional cost of the altered, additional or substituted work, bears to the original tendered value plus.
- ii) 25 % of the time calculated in (i) above or such further additional time as may be considered reasonable by the Engineer-in-charge.

12.2 In the case of extra item(s) the contractor may within fifteen days of receipt of order or occurrence of the item(s) claim rates, supported by proper analysis, for the work and the Engineer-in-charge shall within one month of the receipt of the claims supported by analysis, after giving consideration to the analysis of the rates submitted by the contractor, determine the rates on the basis of the market rates and the contractor shall be paid in accordance with the rates so determined.

In the case of substituted items, the rate for the agreement item (to be substituted) and substituted item shall also be determined in the manner as mentioned in the aforesaid para.

- a) If the market rate for the substituted item so determined is more than the market rate of the agreement item (to be substituted) the rate payable to the contractor for the substituted item shall be the rate for the agreement item (to be substituted) so increased to the extent of the difference between the market rates of substituted item and the agreement item (to be substituted).
- b) If the market rate for the substituted item so determined is less than the market rate of the agreement item (to be substituted) the rate payable to the contractor for the substituted item shall be the rate for the agreement item (to be substituted) so decreased to the extent of the difference between the market rates of substituted item and the agreement item (to be substituted).

In the case of contract items, substituted items, contract cum substituted items, which exceed the limits laid down in schedule 'F', the contractor may within fifteen days of receipt of order or occurrence of the excess, claim revision of the rates, supported by proper analysis, for the work in excess of the above mentioned limits, provided that if the rates so claimed are in excess of the rates specified in the schedule of quantities the Engineer-in-charge shall within one month of receipt of the claim supported by analysis, after giving consideration to the analysis of the rates submitted by the contractor, determine the rates on the basis of the market rates.

12.3 The provisions of the preceding paragraph shall also apply to the decrease in the rates of items for the work in excess of the limits laid down in Schedule 'F', and the Engineer-in-charge shall after giving notice to the contractor within one month of occurrence of the excess and after taking into consideration any reply received from him within fifteen days of the receipt of the notice, revise the rates for the work in question within one month of the expiry of the said period of fifteen days having regard to the market rates.

12.4 The contractor shall send to the Engineer-in-charge once every three months an upto date account giving complete details of all claims for additional payments to which the contractor may consider himself entitled and of all additional work ordered by the Engineer-in-charge which he has executed during the proceeding quarter failing which the contractor shall be deemed to have waived his right. However, the Executive Engineer may authorize consideration of such claims on merits.

12.5 For the purpose of operation of Schedule 'F', the following works shall be treated as works relating to foundation:

- i) For buildings, compound walls plinth level or 1.2 meters (4 feet) above ground level whichever is lower excluding items of flooring and D.P.C. but including base concrete below the floors.
- ii) For abutments, piers, retaining walls of culverts and bridges, walls of water reservoirs the bed of floor level.
- iii) For retaining walls where floor level is not determinate 1.2 meters above the average ground level or bed level.
- iv) For roads all items of excavation and filling including treatment of sub-base.

12.6 Any operation incidental to or necessarily has to be in contemplation of tenderer while filing tender, or necessary for proper execution of the item included in the Schedule of quantities or in the schedule of rates mentioned above, whether or not, specifically indicated in the description of the item and the relevant specifications, shall be deemed to be included in the rates quoted by the tenderer or the rate given in the said schedule of rates, as the case may be. Nothing extra shall be admissible for such operations.

CLAUSE 13

If at any time after acceptance of the tender, the Institute shall decide to abandon or reduce the scope of the works for any reason whatsoever and hence not require the whole or any part of the works to be carried out, the Engineer-in-charge shall give notice in writing to that effect to the contractor and the contractor shall act accordingly in the matter. The contractor shall have

no claim to any payment of compensation or otherwise whatsoever, on account of any profit or advantage which he might have derived from the execution of the works in full but which he did not derive in consequence of the foreclosure of the whole or part of the works.

The contractor shall be paid at contract rates full amount for works executed at site and, in addition, a reasonable amount as certified by the Engineer-in-charge for the items hereunder mentioned which could not be utilized on the work to the full extent in view of the foreclosure:

- i) Any expenditure incurred on preliminary site work, e.g. temporary access roads, temporary labour huts, staff quarters and site office; storage accommodation and water storage tanks.
- ii) Institute shall have the option to take over contractor's materials or any part thereof either brought to site or of which the contractor is legally bound to accept delivery from suppliers (for incorporation in or incidental to the work) provided, however, Institute shall be bound to take over the materials or such portions thereof as the contractor does not desire to retain. For materials taken over or to be taken over by Institute, cost of such materials as detailed by Engineer-in-charge shall be paid. The cost shall, however, take into account purchase price, cost of transportation and deterioration or damage which may have been caused to materials whilst in the custody of the contractor.
- iii) If any materials supplied by Institute are rendered surplus, the same except normal wastage shall be returned by the contractor to Institute at rates not exceeding those at which these were originally issued less allowance for any deterioration or damage which may have been caused whilst the materials were in the custody of the contractor. In addition, cost of transporting such materials from site to Government stores, if so required by Government, shall be paid.
- iv) Reasonable compensation for transfer of T & P from site to contractor's permanent stores or to his other works, whichever is less. If T & P are not transported to either of the said places, no cost of transportation shall be payable.
- v) Reasonable compensation for repatriation of contractor's site staff and imported labour to the extent necessary.

The contractor shall, if required by the Engineer-in-charge furnish to him books of account, wage books, time sheets and other relevant documents and evidence as may be necessary to enable him to certify the reasonable amount payable under this condition.

The reasonable amount of items on (i), (iv) and (v) above shall not be in excess of 2 % of the cost of the work remaining incomplete on the date of closure, i.e. total stipulated cost of the work as per accepted tender less the cost of work actually executed under the contract and less the cost of contractor's materials at site taken over by the Institute as per item (ii) above. Provided always that against any payments due to the contractor this account or otherwise the Engineer-in-charge shall be entitled to recover or be credited with any outstanding balances due from the contractor for advance paid in respect of any tool, plants and materials and any other sums which at the date of termination were recoverable by the Government from the contractor under the terms of the contract.

CLAUSE 14

If contractor:

- i) at any time makes default in proceeding with the works or any part of the work with the due diligence and continues to do so after a notice in writing of 7 days from the Engineer-in-charge, or
- ii) commits default to complying with any of the terms and conditions of the contract and does not remedy it or take effective steps to remedy it within 7 days after a notice in writing is given to him in that behalf by the Engineer-in-charge ; or
- iii) fails to complete the works or items of work with individual dates of completion, on or before the date(s) of completion, and does not complete them within the period specified in a notice given in writing in that behalf by the Engineer-in-charge; or

- iv) shall offer or give or agree to give to any person in Institute service or to any other person on his behalf any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other contract for Government ; or
- v) shall enter into a contract with Institute in connection with which commission has been paid or agreed to be paid by him or to his knowledge, unless the particulars of any such commission
- vi) and the terms of payment thereof have been previously disclosed in writing to the Accepting Authority / Engineer-in-charge; or
- vii) being an individual, or if a firm, any partner thereof shall at any time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation or composition (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) under any Insolvency Act for the time being in force or make any conveyance or assignment of his effects or composition or arrangement for the benefit of his creditors or purport so to do, or if any application be made under any insolvency act for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit of his creditors ; or
- viii) being an individual, or if a firm, any partner thereof shall at any time be adjudged insolvent or have a receiving order or order for administration of his estate made against him or shall take any proceedings for liquidation or composition (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) under any Insolvency Act for the time being in force or make any conveyance or assignment of his effects or composition or arrangement for the benefits of his creditors or purport so to do, or if any application be made under any insolvency act for the time being in force for the sequestration of his estate or if a trust deed be executed by him for benefit for his creditors; or
- ix) being a company, shall pass a resolution or the Court shall make an order for the winding up of the company, or a receiver or manager on behalf of the debenture holders of otherwise shall be appointed or circumstances shall arise which entitle the Court or debenture holders to appoint a receiver or manager ; or
- x) shall suffer an execution being levied on his goods and allow it to be continued for a period of 21 days; or
- xi) assigns, transfers, sublets (engagement of labour on a piece-work basis or of labour with materials not to be incorporated in the work, shall not be deemed to be subletting) or otherwise parts with or attempts to assign, transfer sublet or otherwise parts with the entire works or any portion thereof without the prior written approval of the Accepting Authority;

The accepting authority may, without prejudice to any other right or remedy which shall have accrued or shall accrue hereafter to Government, by a notice in writing to cancel the contract as a whole or only such items of work in default from the contract.

The Engineer-in-charge shall on such cancellation by the Accepting Authority have powers to :

- (a) take possession of the site and any materials, constructional plant, implements, stores etc., thereon ; and / or
- (b) carry out the incomplete work by any means at the risk and cost of the contractor.

On cancellation of the contract in full or part, the Engineer-in-charge shall determine what amount, if any, is recoverable from the contractor for completion of the works or part of the works or in case the works or part of the works is not to be completed, the loss or damage suffered by Institute. In determining the amount, credit shall be given to the contractor for the value of the work executed by him up to the time of cancellation, the value of contractor's materials taken over and incorporated in the work and use of plant and machinery belonging to the contractor.

Any excess expenditure incurred or to be incurred by Institute in completing the works or part of the works or the excess loss or damages suffered or may be suffered by Government as aforesaid after allowing such credit shall without prejudice to any other right or remedy available to Government in law be recovered from any moneys due to the contractor on any account, and if such moneys are not sufficient, the contractor shall be called upon in writing and shall be liable to payment same within 30 days.

If the contractor shall fail to pay the required sum within the aforesaid period of 30 days, the Engineer-in-charge shall have the right to sell any or all of the contractors' unused materials, constructional plant, implements, temporary buildings, etc. and apply the proceeds of sale thereof towards the satisfaction of any sums due from the contractor under the contract and if thereafter there be any balance outstanding from the contractor, it shall be recovered in accordance with the provisions of the contract.

Any sums in excess of the amounts due to Government and unsold materials, constructional plant, etc., shall be returned to the contractor, provided always that if cost or anticipated cost of completion by Government of the works or part of the works or part of the works is less than the amount which the contractor would have been paid had he completed the works or part of the works, such benefit shall not accrue to the contractor.

CLAUSE 15

- i) The contractor shall, on receipt of the order in writing of the Engineer-in-charge, (whose decision shall be final and binding on the contractor) suspend the progress of the works or any part thereof for such time and in such manner as the Engineer-in-charge may consider necessary so as not to cause any damage or injury to the work already done or endanger the safety thereof for any of the following reasons :
 - a) on account of any default on the part of the contractor or;
 - b) for proper execution of the works or part thereof for reasons other than the default of the contractor; or
 - c) for safety of the works or part thereof.

The contractor shall, during such suspension, properly protect and secure the works to the extent necessary and carry out the instructions given in that behalf by the Engineer-in-charge .If the suspension is ordered for reasons (b) and (c) in sub-para (i) above;

 - d) the contractor shall be entitled to an extension of time equal to the period of every such suspension PLUS 25 % for completion of the item or group of items of work for which a separate period of completion is specified in the contract and of which the suspended work forms a part, and ;
 - e) if the total period of all such suspensions in respect of an item or group of items or work for which a separate period of completion is specified in the contract exceeds thirty days, the contractor shall, in addition, be entitled to such compensation as the Engineer-in-charge may consider reasonable in respect of salaries and / or wages paid by the contractor to his employees and labour at site, remaining idle during the period of suspension, adding thereto 2 % to cover indirect expenses of the contractor. Provided the contractor submits his claim supported by details to the Engineer-in-charge within fifteen days of the expiry of the period of 30 days.
- ii) If the works or part thereof is suspended on the orders of the Engineer-in-charge for more than three months at a time, except when suspension is ordered for reason (a) in sub-para (i) above, the contractor may after receipt of such order serve a written notice on the Engineer-in-charge requiring permission within fifteen days from receipt by the Engineer-in-charge of the said notice, to proceed with the work or part thereof in regard to which progress has been suspended and if such permission is not granted within that time, the contractor, if he intends to treat the suspension, where is not granted within that time, the contractor, if he intends to treat the suspension, where it affects only a part of the works as an omission of such part by Government or where it affects whole of the works, as an abandonment of the works by writing of his intention to the Engineer-in-charge. In the event of the contractor treating the suspension as an abandonment of the contract by Government, he shall have no claim to payment of any compensation on account of any profit or advantage which he might have derived from the execution of the work in full but which he could not derive in consequence of the abandonment. He shall, however, be entitled to such compensation, as the Engineer-in-charge may consider reasonable, in respect of salaries and / or wages paid by him to his employees and labour at site, remaining idle in consequence adding to the total thereof 2 % to cover indirect expenses of the contractor provided the contractor submits his claim supported by details to the Engineer-in-charge within 30 days of the expiry of the period of 3 months.

- iii) Provided, further, that the contractor shall not be entitled to claim any compensation from Government for the loss suffered by him on account of delay by Government in the supply of materials in schedule 'B' where such delay is covered by difficulties relating to the supply of wagons, force majeure including non-allotment of such materials by controlling authorities, acts of God, acts of enemies of the state / country or any reasonable cause beyond the control of the government.

CLAUSE 16

All works under or in course of execution or executed in pursuance of the contract shall at all times be open and accessible to the inspection and supervision of the Engineer-in-charge, his authorized subordinates in charge of the work and all the superior officers, officer of the Quality Control wing of the Institute and of the Chief Technical Examiner's Officer (Govt. of India), and the contractor shall, at all times, during the usual working hours given to the contractor, either himself be present to receive order and instructions or have a responsible agent duly accredited in writing, present for that purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the contractor himself.

If it shall appear to the Engineer-in-charge or his authorized subordinates in charge of the work or to the Engineer in charge of quality control wing or his subordinate officers or to the Chief Technical Examiner or his subordinate officers, that any work has been executed with unsound, or unskillful workmanship, or with materials or articles provided – with unsound, imperfect, or unskillful workmanship, or with materials or articles provided by him for the execution of the work which shall be made within six months of the completion of the work from the Engineer-in-charge specifying the work, materials or articles complained of notwithstanding that the same may have been passed, certified and paid for forthwith rectify, or remove and reconstruct the work so specified in whole or in part, as the case may require or as the case may be, remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost. In the event of the failing to do so within a period specified by the Engineer-in-charge in his demand aforesaid, then the contractor shall be liable to pay compensation at the same rate as under clause 2 of the contract (for non-completion of the work in time) for this default.

In such case the Engineer-in-charge may not accept the item of work at the rates applicable under the contract but may accept such items at reduced rates as the competent authority may consider reasonable during the preparation of on account bills or final bill if the item is so acceptable without detriment to the safety and utility of the item and the structure or he may reject the work outright without any payment and / or get it and other connected and incidental items rectified, or removed and re-executed at the risk and cost of the contractor. Decision of the Engineer-in-charge to be conveyed in writing in respect of the same will be final and binding on the contractor.

CLAUSE 17

If the contractor or his working people or servants shall break, deface, injure or destroy any part of building in which they may be working, or any building, road, road kerb, fence, enclosure, water pipe, cables, drains, electric or telephone post or wires, trees, or any part is being executed, or if any damage shall happen to the work while in progress, from any cause whatever or if any damage shall happen to the work while in progress, from any cause whatever or if any defect, shrinkage or other faults appear in the work within twelve months (six months in the case of work costing Rupees Ten lacs and been given by the Engineer-in-charge as aforesaid arising out of defect or improper materials or workmanship the contractor shall upon receipt of a notice in writing on that behalf make the same good at his own expense or in default the Engineer-in-charge as aforesaid arising out of defect or improper materials or workmanship the contractor shall upon receipt of a notice in writing on that behalf make the same good at his own expense or in default the Engineer-in-charge cause the same to be made good by other workmen and deduct the expense from any sums that may be due or at any time thereafter may become due to the contractor, or from his security deposit of the contractor shall not be refunded before the expiry of twelve months after the issue of the certificate final or otherwise, of completion of work, or till the final bill has been prepared and passed whichever is later.

In case of Maintenance and Operation works of E & M services, the security deposit deducted from contractors shall be refunded within one month from the date of final payment or within one month from the date of final payment or within one month from the date of completion of the maintenance contract whichever is earlier.

CLAUSE 18

The contractor shall provide at his own cost all materials, plant, tools, appliances, implements, ladders, cordage, tackle, scaffolding and temporary works required for the proper execution of the work, whether original, altered or substituted and whether included in the specifications or other documents forming part of the contract or referred to in these conditions or not, or which may be necessary for the purpose of satisfying or complying with the requirements of the Engineer-in-charge as to any matter as to which under these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage therefore to and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials, necessary for the purpose of setting out works, and counting, weighing and assisting the measurement for examination at any time and from time to time of the work or materials. Failing his so doing the same may be provided by the Engineer-in-charge at the expense of the contractor, under this contract or otherwise and/or from his security deposit or the proceeds of sale thereof, or of a sufficient portions thereof.

CLAUSE 18 A

In every case in which by virtue of the provision sub-section (1) of Section 12, of the Workmen's Compensation Act, 1923, Government is obliged to pay compensation to a workman employed by the contractor, in execution of the works, Government will recover from the contractor, the amount of the compensation so paid; and without prejudice to the rights of the Government under sub-section (2) of section 12, of the said Act, Government shall be at liberty to recover such amount or any part there by deducting it from the security deposit or from any sum due by Government to the contractor whether under this contract or otherwise. Government shall not be bound to contest any claim made against it under sub-section (1) Section 12, of the said Act, except on the written request of the contractor and upon his giving to Government full security for all costs for which government might become liable in consequence of contesting such claim.

CLAUSE 18 B

In every case in which by virtue of the provisions Contract Labour (Regulation and Abolition) Act, and of the Contract Labour (Regulation and Abolition) Central Rules, 1971, Government is obliged to pay nay amount of wages to a workman employed by the contractor in execution of the works, or to incur any expenditure in providing welfare and health amenities required to be provided under the above said Act and the rules under clause 19H or under the C.P.W.D. contractors, labour regulations, or under the rules framed by Government of India from time to time for the protection of health and sanitary arrangements for workers employed by contractors, Institute will recover from the contractor, the amount of wages so paid or the amount of expenditure so uncured; and without prejudice to the rights of the Institute under sub-section(2) of Section 20, and sub-section (4) of Section 21, of the Contract labour (Regulation and Abolition) Act, 1970, Institute shall be at liberty to recover such amount or any part thereof by deducting it form the security deposit or from any sum due by Institute to the contractor whether under this contract or otherwise Institute shall not be bound to contest any claim made against it under sub-section (1) of Section 20, sub-section (4) of section 21, of the said Act, except on the written request of the contactor and upon his giving to the Institute full security for all costs for which Institute might become liable in contesting such claim.

CLAUSE 19

The contractor shall obtain a valid licence under the Contract Labour (R&A) Act 1970, and the Contract Labour (Regulation and Abolition) Central Rules 1971, before the commencement of the work and continue to have a valid license until the completion of the work. The contractor shall also abide by the provisions of the Child Labour (Prohibition and Regulation) Act, 1986.

The contractor shall also comply with the provision of the building and other construction workers (Regulation of Employment & Conditions of Service) Act, 1996 and the building and other Construction Workers Welfare Cess Act, 1996.

Any failure to fulfill these requirements shall attract the penal provisions of this contract arising out of the resultant non-execution of the work.

CLAUSE 19A

No labour below the age of fourteen years shall be employed on the work.

CLAUSE 19B

Payment of Wages:

- i) The contractor shall pay to labour employed by him either directly or through sub-contractors, wages not less than fair wages as defined in the C.P.W.D. Contractor's Labour Regulations or as per the provisions of the Contract Labour (Regulation and Abolition) Act 1970 and the contract Labour (Regulation and Abolition) Central Rules, 1971 wherever applicable.
- ii) The contractor shall, notwithstanding the provisions of any contract to the contrary, cause to be paid fair wage to labour indirectly engaged on the work, including any labour engaged by his sub-contractors in connection with the said work, as if the labour had been immediately employed by him.
- iii) In respect of all labour directly or indirectly employed in the works for performance of the contractor's part of this contract, the contractor shall comply with or cause to be complied with the Central Public Works Department contractor's Labour Regulations made by CPWD / Government of India from time to time in regard to payment of wages, wage period, deductions from wages recovery of wages not paid and deductions unauthorizedly made, maintenance of wage books or wage slips, publication of scale of wages and other terms of employment, inspection and submission of periodical returns and all other matters of the like nature or as per the provisions of the Contract Labour (Regulation and Abolition) Act 1970, and the Contract labour (Regulation and Abolition) Central Rules, wherever applicable.
- iv)
 - a) The Engineer-in-Charge concerned shall have the right to deduct from the moneys due to the contractor any sum required or estimated to be required for making good the loss suffered by a worker or workers by reason of non-fulfillment of the conditions of the contract for the benefit of the workers, non-payment of wages or of deductions made from his or their wages which are not justified by their terms of the contract or non-observance of the regulations.
 - b) Under the provision of Minimum wages (Central) Rules 1950, the contractor is bound to allow to the labours directly or indirectly employed in the works one day rest for 6 days continuous work and pay wages at the same rate as for duty. In the event of default, the Engineer-in-charge shall have the right to deduct the sum or sums not paid on account of wages for weekly holidays to any labors and pay the same to the persons entitled thereto from any money due to the contractor by the Engineer-in-charge concerned.
- v) The contractor shall comply with the provisions of the Payment of Wages Act, 1936, Minimum Wages Act, 1948, Employees Liability Act, 1938, Workmen's Compensation Act, 1923, Industrial Disputes Act, 1947 Maternity Benefits Act, 1961, and the Contractor's Labour (Regulation and Abolition) Act 1970, or the modifications thereof or any other laws relating thereto and the rules made thereunder from time to time.
- vi) The Contractor shall indemnify and keep indemnified institute against payments to be made under and for the observance of the laws aforesaid and the C.P.W.D. Contractor's labour Regulations without prejudice to this right to claim indemnity from his sub-contractors.
- vii) The laws aforesaid shall be deemed to be a part of this contract and any breach thereof shall be deemed to be a breach of this contract.
- viii) Whatever is the minimum wage for the time being, or fi the wage payable is higher that such wage, such wage shall be paid by the contractor to the workman directly without the intervention of Jamadar and that Jamadar shall not be entitled to deduct or recover any amount from the minimum wage payable to the workmen as and by way of commission or otherwise.
- ix) The contractor shall ensure that no amount by way of commission or otherwise is deducted or recovered by the Jamadar from the wage of workmen.

CLAUSE 19 C

In respect of all labour directly or indirectly employed in the work for the performance of the contractor's part of this contract, the contractor shall at his own expense arrange for the safety provisions as per C.P.W.D. Safety Code framed from time to time and safety provisions detailed in the special conditions enclosed in this document and shall at his own expense provide for all facilities in connection therewith. In case the contractor fails to make arrangement and provide necessary facilities as aforesaid, he shall be liable to pay a penalty of Rs.1000/- for each default and in addition the Engineer-in-Charge shall be at liberty to make arrangement and provide facilities as aforesaid and recover the costs incurred in that behalf from the contractor.

CLAUSE 19 D

The Contractor shall submit by the 4th and 19th of every month, to the Engineer-in-charge a true statement showing in respect of the second half of the preceding month and the first half of the current month respectively.

- (1) the number of labourers employed by him on the work,
- (2) their working hours,
- (3) the wages paid to them,
- (4) the accidents that occurred during the said fortnight showing the circumstances under which they happened and the extent of damage and injury caused by them, and
- (5) the number of female workers who have been allowed maternity benefit according to Clause 19F and the amount paid to them.

Failing which the contractor shall be liable to pay to Government, a sum not exceeding Rs.1000/- for each default or materially incorrect statement. The decision of the Engineer-in-charge shall be final in deducting from any bill due to the contractor the amount levied as fine and be binding on the contractor.

CLAUSE 19 E

In respect of all labour directly or indirectly employed in the worked for the performance of the contractor's part of this contract, the contractor shall comply with or cause to be compiled. with all he rules framed by Government of India/Institute from time to time for the protection of health and sanitary arrangements for workers employed by the Central Public Works Department and its contractors.

CLAUSE 19 F

Leave and pay during leave shall be regulated as follows :-

1. Leave :

- (i) In the case of delivery – maternity leave not exceeding 8 weeks, 4 weeks upto and including the day of delivery and 4 weeks following that day,
- (ii) in the case of miscarriage – upto 3 weeks form the date of miscarriage.

2. Pay :

- (i) In the case of delivery – leave pay during maternity leave will be at the rate of the women's average daily earnings, calculated on total wages earned on the days when full time work was done during a period of three months immediately preceding the date on which she gives notice that she expects to be confined or at the rate of Rupee one only a day whichever is greater.
- (ii) In the case of miscarriage – leave pay at the rate of average daily earning calculated on the total wages earned on the days when full time work was done during a period of three months immediately preceding the date of such miscarriage.

3. Conditions for the grant of maternity Leave.

No maternity leave benefit shall be admissible to a woman unless she has been employed for a total period of not less than six months immediately preceding the date on which she proceeds on leave.

4. The contractor shall maintain a register of Maternity 9Benefit) in the prescribed Form as shown in annexure – I and II, and the same shall be kept at the place of work.

CLAUSE 19 G

In the event of the contractor(s) committing a default or breach of any of the provisions of the Central Public Works Department, Contractor's Labour Regulations and Model Rules for the protection of health and sanitary arrangements for the workers as amended from time to time or furnishing any information or submitting or filing any statement under the provisions of the above regulations and Rules which is materially incorrect, he / they shall, without prejudice to any other liability, pay to the Government a sum not exceeding Rs.1000/- for every default, breach or furnishing, making, submitting, filing such materially incorrect statements and in the event of the contractors defaulting continuously in this respect, the penalty may be enhanced to Rs.1000/- per day for each day of default subject to a maximum of 5 per cent of the estimated cost of the work put to tender. The decision of the Engineer-in-charge shall be final and binding on the parties.

Should it appear to the Engineer-in-charge that the contractor(s) is / are not properly observing and complying with the provisions of the C.P.W.D. Contractor's Labour Regulations and Model Rules and the provisions of the Contract Labour (Regulation and Abolition) Act 1970, and the Contract Labour (R&A) Central Rules 1971, for the protection of health and sanitary arrangements for work-people employed by the contractor(s) (hereinafter referred as 'the said Rules') the Engineer-in-charge shall have power to give notice in writing to the contractor(s) requiring that the said Rules be complied with and the amenities prescribed therein be provided to the work-people within a reasonable time to be specified in the notice. If the contractor(s) shall fail within the period specified in the notice to comply with and / observe the said Rules and to provide the amenities to the work-people as aforesaid, the Engineer-in-charge shall have the power to provide the amenities herein before mentioned at the cost of the contractor(s). The contractor(s) shall erect, make and maintain at his/their own expense and to approved standards all necessary sanitary arrangements required for his / their work-people on the site in connection with the execution of the works, and if the same shall not have been erected or constructed, according to approved standards, the Engineer-in-charge shall have power to give notice in writing to the contractor(s) requiring the at the said sanitary arrangements be remodeled and/or reconstructed according to approved standards, and if the contractor(s) shall fail to remodel or reconstruct such sanitary arrangements according to approved standards within the period specified in the notice, the Engineer-in-charge shall have the power to remodel or reconstruct such sanitary arrangements according to approved standards at the cost of the contractor(s).

CLAUSE 19 I

The Engineer-in-charge may require the contractor to dismiss or remove from the site of the work any person or persons in the contractors employ upon the work who may be incompetent or misconduct himself and the contractor shall forthwith comply with such requirements.

CLAUSE 19 J

It shall be the responsibility of the contractor to see that the building under construction is not occupied by any body unauthorisedly during construction, and is handed over to the Engineer-in-charge with vacant possession of complete building, If such building through completed is occupied illegally, then the Engineer-in-charge shall have the option to refuse to accept the said building / buildings in that position. Any delay in acceptance on this account will be treated as the delay in completion and for such delay a levy upto 5% of tendered value of work may be imposed by the Executive Engineer whose decision shall be final both with regard to the justification and quantum and be binding on the contractor.

However, the Executive Engineer, through a notice, may require the contractor to remove the illegal occupation any time on or before construction and delivery.

CLAUSE 20

The contractor shall comply with all the provisions of the Minimum Wages Act, 1948, and Contract Labour (Regulation and Abolition) Act, 1970, amended from time to time and rules framed thereunder and other labour laws affecting contract labour that may be brought into force from time to time.

CLAUSE 21

The contract shall not be assigned or sublet without the written approval of the Engineer-in-Charge. And if the contractor shall assign or sublet his contract, or attempt to do so, or become insolvent or commence any insolvency proceedings or make any

composition with his creditors or attempt to do so, or if any bribe, gratuity, gift, loan, perquisite, reward or advantage pecuniary or otherwise, shall either directly or indirectly, be given, promised or offered by the contractor, or any of his servants or agent to any public officer or person in the employ of Government in any way relating to his office or employment, or if any such officer or person shall become in any way directly or indirectly interested in the contract, the Engineer-in-Charge on behalf of the Institute shall have power to adopt the course specified in Clause 3 hereof in the interest of Government and in the event of such course being adopted, the consequences specified in the said Clause 3 shall ensure.

CLAUSE 22

All sums payable by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied to the use of Government without reference to the act 49, loss or damage sustained and whether or not any damage shall have been sustained.

CLAUSE 23

Where the contractor is a partnership firm, the previous approval in writing of the Engineer-in-Charge shall be obtained any change is made in the constitution of the firm. Where the contractor is an individual or a Hindu undivided family business concern such approval as aforesaid shall likewise be obtained before the contractor enters into any partnership agreement where under the partnership firm would have the right to carry out the works hereby undertaken by the contractor. If previous approval as aforesaid is not obtained, the contract shall be deemed to have been assigned in contravention of Clause 21 hereof and the same action may be taken, and the same consequences shall ensure as provided in the said Clause 21.

CLAUSE 24

All works to be executed under the contract shall be executed under the direction and subject to the approval in all respects of the Engineer-in-Charge who shall be entitled to direct at what point or points and in what manner they are to be commenced, and from time to time carried on.

CLAUSE 26

The contractor shall fully indemnify and keep indemnified the Institute against any action, claim or proceeding relating to infringement or use of any patent or design or any alleged patent or design rights and shall pay any royalties which may be payable in respect of any article or part thereof included in the contract. In the event of any claims made under or action brought against Institute in respect of any such matters as aforesaid, the contractor shall be immediately notified thereof and the contractor shall be at liberty, at his own expense, to settle any dispute or conduct any litigation that may arise there from, provided that the contractor shall not be liable to indemnify the Institute if the infringement of the patent or design or any alleged patent or design right is the direct result of an order passed by the Engineer-in-Charge on this behalf.

CLAUSE 29

i) Whenever any claim or claims for payment of a sum of money arises out of or under the contract or against the contractor, the Engineer-in-Charge or the Government shall be entitled to withhold and also have a lien to retain such sum or sums in whole or in part from the security, if any deposited by the contractor and for the purpose aforesaid, the Engineer-in-Charge or the Government shall be entitled to withhold the security deposit, if any, furnished as the case may be and also have a lien over the same pending finalization or adjudication of any such claim. In the event of the security being insufficient to cover the claimed amount or amounts or if no security has been taken from the contractor, the Engineer-in-Charge or the Government shall be entitled to withhold and have a lien to retain to the extent of such claimed amount or amounts referred to above, from any sum or sums found payable or which may at any time thereafter become payable to the contractor under the same contract or any other contract with the Engineer-in-Charge of the Government or any contracting person through the Engineer-in-Charge pending finalization of adjudication of any such claim.

It is an agreed term of the contract that the sum of money or moneys so withheld or retained under the lien referred to above by the Engineer-in-Charge or Government will be kept withheld or retained as such by the Engineer-in-Charge or Government till the claim arising out of or under the contract is determined by the arbitrator and that the contractor will have no claim for interest or damages whatsoever on any account in respect of such withholding or retention under the lien referred to above and duly

notified as such to the contractor. For the purpose of this clause, where the contractor is a partnership firm or a limited company, the Engineer-in-Charge or the Government shall be entitled to withhold and also have a lien to retain towards such claimed amount or amounts in whole or in part from any sum found payable to any partner/ limited company as the case may be, whether in his individual capacity or otherwise.

ii) Government shall have the right to cause an audit and technical examination of the works and the final bills of the contractor including all supporting vouchers, abstract, etc., to be made after payment of the final bill and if as a result of such audit and technical examination any sum is found to have been overpaid in respect of any work done by the contractor under the contract or any work claimed to have been done by him under the contract and found not to have been executed, the contractor shall be liable to refund the amount of over-payment and it shall be lawful for Government to recover the same from him in the manner prescribed in sub-clause (i) of this clause or in any other manner legally permissible; and if it is found that the contractor was paid less than what was due to him under the contract in respect of any work executed by him under it, the amount of such under payment shall be duly paid by Government to the contractor, without any interest thereon whatsoever.

Provided that the Government shall not be entitled to recover any sum overpaid, nor the contractor shall be entitled to payment of any sum paid short where such payment has been agreed upon between the Executive Engineer on the one hand and the contractor on the other under any term of the contract permitting payment for work after assessment by the Executive Engineer.

CLAUSE 29A

Any sum of money due and payable to the contractor (including the security deposit returnable to him) under the contract may be withheld or retained by way of lien by the Engineer-in-Charge or the Government or any other contracting person or persons through Engineer-in-Charge against any claim of the Engineer-in-Charge or Government or such other person or persons in respect of payment of a sum of money arising out of or under any other contract made by the contractor with the Engineer-in-Charge or the Government or with such other person or persons.

It is an agreed term of the contract that the sum of money so withheld or retained under this clause by the Engineer-in-Charge or the Government will be kept withheld or retained as such by the Engineer-in-Charge or the Government or till his claim arising out of the same contract or any other contract is either mutually settled or determined by the arbitration clause or by the competent court, as the case may be and that the contractor shall have no claim for interest or damages whatsoever on this account or on any other ground in respect of any sum of money withheld or retained under this clause and duly notified as such to the contractor.

CLAUSE 30

The contractor shall not employ coal mining or controlled area labour falling under any category whatsoever on or in connection with the work or recruit labour from area within a radius of 32 km (20 miles) of the controlled area. Subject as above the contractor shall employ imported labour only i.e., deposit imported labour or labour imported by contractors from area, from which import is permitted.

Where ceiling price for imported labour has been fixed by State or Regional Labour Committees not more than that ceiling price shall be paid to the labour by the contractor.

The contractor shall immediately remove any labourer who may be pointed out by the Engineer-in-Charge as being a coal mining or controlled area labourer. Failure to do so shall render the contractor liable to pay to Government a sum calculated at the rate of Rs.100/- per day per labourer. The certificate of the Engineer-in-Charge about the number of coal mining or controlled area labourer and the number of days for which they worked shall be final and binding upon all parties to this contract.

It is declared and agreed between the parties that the aforesaid stipulation in this clause is one in which the public are interested within the meaning of the exception in Section 74 of Indian Contract Act, 1872.

Explanation : Controlled Area means the following areas :

Districts of Dhanbad, Hazaribagh, Jamtara – a Sub-division under Santhal Pargana Commissionery, Districts of Bankuara, Birbhum, Burdwan, District of Bilaspur

Any other area which may be declared a controlled area by or with the approval of the Central Government.

CLAUSE 31

The contractor(s) shall make his / their own arrangements for water required for the work and nothing extra will be paid for the same. This will be subject to the following conditions.

- i) That the water used by the contractor(s) shall be fit for construction purposes to the satisfaction of the Engineer-in-charge.
- ii) The Engineer-in-Charge shall make alternative arrangements for supply of water at the risk and cost of contractor(s) if the arrangements made by the contractor(s) for procurement of water are in the opinion of the Engineer-in-Charge, unsatisfactory.
- iii) No bore wells / open wells shall be constructed inside the IITM Campus for drawl of water.

CLAUSE 35

i) The contractor undertakes to make arrangement for the supervision of the work by the firm supplying the tar or bitumen used.

ii) The contractor shall collect the total quantity of tar or bitumen required for the work as per standard formula, before the process of painting is started and shall hypothecate it to the Engineer-in-Charge. If any bitumen or tar remains unused on completion of the work on account of lesser use of materials in actual execution for reasons other than authorized changes of specifications and abandonment of portion of work, a corresponding deduction equivalent to the cost of unused materials as determined by the Engineer-in-Charge shall be made and the material returned to the contractors. Although the materials are hypothecated to Institute, the contractor undertakes the responsibility for their proper watch, safe custody and protection against all risks. The materials shall not be removed from site of work without the consent of the Engineer-in-Charge in writing.

iii) The contractor shall be responsible for rectifying defects noticed within a year from the date of completion of the work and the portion of the security deposit relating to asphaltic work shall be refunded after the expiry of this period.

iv) The contractor shall provide and employ on the site only such technical assistants as are skilled and experienced in their respective fields and such foremen and supervisory staff as are competent to give proper supervision to the work. The contractor shall provide and employ skilled, semiskilled and unskilled labour as is necessary for proper and timely execution of the work.

The Engineer-in-Charge shall be at liberty to object to and require the contractor to remove from the works any person who in his opinion misconducts himself, or is incompetent or negligent in the performance of his duties or whose employment is otherwise considered by the Engineer-in-Charge to be undesirable. Such person shall not be employed again at works site without the written permission of the Engineer-in-Charge and the persons so removed shall be replaced as soon as possible by competent substitutes.

CLAUSE 37

i) Sales Tax (VAT) or any other tax on materials in respect of this contract shall be payable by the contractor and Government shall not entertain any claim whatsoever in this respect.

ii) The contractor shall deposit royalty and obtain necessary permit for supply of the red bajri, stone, kankar, etc. from local authorities.

iii) If pursuant to or under any law, notification or order any royalty, cess or the like becomes payable by the Institute and does not any time become payable by the contractor to the State Government/Local authorities in respect of any material used by the contractor in the works then in such a case, it shall be lawful to the Institute and it will have the right and be entitled to recover the amount paid in the circumstances as aforesaid from dues of the contractor.

CLAUSE 38

a. All tendered rates shall be inclusive of all taxes and levies payable under respective statutes. However, pursuant to the Constitution (46th Amendment) Act, 1982, if any further tax or levy is imposed by Statute, after the last stipulated date for the receipt of tender including extensions if any and the contractor thereupon necessarily and properly pays such taxes/levies, the contractor shall be reimbursed the amount so paid, provided such payments, if any, is not, in the opinion of the Executive Engineer (whose decision shall be final and binding on the contractor) attributable to delay in execution of work within the control of the contractor.

b. The contractor shall keep necessary books of accounts and other documents for the purpose of this condition as may be necessary and shall allow inspection of the same by a duly authorised representative of the Government and/or the Engineer-in-Charge and further shall furnish such other information/document as the Engineer-in-Charge may require from time to time.

c. The contractor shall, within a period of 30 days of the imposition of any such further tax or levy, pursuant to the Constitution (Forty Sixth Amendment) Act 1982, give a written notice thereof to the Engineer-in-Charge that the same is given pursuant to this condition, together with all necessary information relating

CLAUSE 39

Without prejudice to any of the rights or remedies under this contract if the contractor dies, the Engineer-in-charge on behalf of the Institute shall have the option of terminating the contract without compensation to the contractor.

CLAUSE 40

The contractor shall not be permitted to tender for works in the Institute of which his near relative is posted as Divisional Accountant or as an officer in any capacity between the grades of the Executive Engineer and Junior Engineer (both inclusive). He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him and who are near relatives to any Officer in the Institute. Any breach of this condition by the contractor would render him liable to be removed from the approved list of contractors of the Institute. If however the contractor is registered in any other department, he shall be debarred from tendering in Institute for any breach of this condition

NOTE: By the term "near relatives" is meant wife, husband, parents and grand parents, children and grand children, brothers and sisters, uncles, aunts and cousins and their corresponding in-laws.

CLAUSE 41

No engineer of gazetted rank or other gazetted officer employed in engineering or administrative duties in an engineering department of the Government of India shall work as a contractor or employee of a contractor for a period of two years after his retirement from government service without the previous permission of Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found at any time to be such a person who had not obtained the permission of Government of India as aforesaid before submission of the tender or engagement in the contractor's service. as the case may be.

CLAUSE 43

The work (whether fully constructed or not) and all materials, machines, tools and plants, scaffolding, temporary buildings and other things connected therewith shall be at the risk of the contractor until the work has been delivered to the Engineer-in-Charge and a certificate from him to that effect obtained. In the event of the work or any materials properly brought to the site for incorporation in the work being damaged or destroyed in consequence of hostilities or warlike operation, the contractor shall when ordered (in writing) by the Engineer-in-Charge to remove any debris from the site, collect and properly stack or remove in store all serviceable materials salvaged from the damaged work and shall be paid at the contract rates in accordance with the provision of this agreement for the work of clearing the site of debris, stacking or removal of serviceable material and for reconstruction of all works ordered by the Engineer-in-Charge, such payments being in addition to compensation upto the value of the work originally executed before being damaged or destroyed and not paid for. In case of works damaged or destroyed but not already measured and paid for, the compensation shall be assessed by the Executive Engineer concerned. The contractor shall be paid for the damages/destruction suffered and for the restoring the material at the rate based on analysis of rates tendered for in accordance with the provision of the-contract. The certificate of the Engineer-in-Charge regarding the quality and quantity of materials and the purpose for which they were collected shall be final and binding on all parties to this contract.

Provided always that no compensation shall be payable for any loss in consequence of hostilities or warlike operations (a) unless the contractor had taken all such precautions against air raid as are deemed necessary by the A.R.P. Officers or the Engineer-in-Charge (b) for any material etc. not on the site of the work or for any tools, plant, machinery, scaffolding, temporary building and other things not intended for the work. In the event of the contractor having to carry out reconstruction as aforesaid, he shall be allowed such extension of time for its completion as is considered reasonable by the Engineer-in-charge

CLAUSE 44

The contractor shall comply with the provisions of the Apprentices Act, 1961 and the rules and orders issued thereunder from time to time. If he fails to do so, his failure will be a breach of the contract and the Executive Engineer may, in his discretion, cancel the contract. The contractor shall also be liable for any pecuniary liability arising on account of any violation by him of the provisions of the said Act.

CLAUSE 45

Security Deposit of the work shall not be refunded till the claims, if any regarding non payment / short payment to labourers is settled and no complaint any labour or objection of the labour enforcement authorities are pending. The Engineer-in-charge may obtain necessary clause from the labour law enforcement authorities.

C.P.W.D. SAFETY CODE

1. Suitable scaffolds should be provided for workmen for all works that cannot safely be done from the ground, or from solid construction. If ladder is used for carrying materials as well suitable footholds and hand-hold shall be provided on the ladder and the ladder shall be given an inclination not steeper than 14 to 1 (14 horizontal and 1 vertical.)
2. Scaffolding of staging more than 3.6 mt. (12ft.) above the ground or floor, swung or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached or bolted, braced and otherwise secured at least 90 cm. (3ft.) high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends there of with only such opening as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.
3. Working platforms, gangways and stairways should be so constructed that they should not sag unduly or unequally, and if the height of the platform or the gangway or the stairway is more than 3.6 m (12ft.) above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in (2) above.
4. Every opening in the floor of a building or in a working platform shall be provided with suitable means to prevent the fall of person or materials by providing suitable fencing or railing whose minimum height shall be 90 cm.(3ft.)
5. Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9m. (30ft.) in length while the width between side rails in rung ladder shall in no case be less than 29 cm. (11 1/2") for ladder upto and including 3 m. (10 ft.) in length. For longer ladders, this width should be increased at least 1/4" for each additional 30 cm/1 foot of length. Uniform step spacing of not more than 30 cm shall be kept. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on any of the sites or work shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The contractor shall provide all necessary fencing and lights to protect the public from accident and shall be bound to bear the expenses of defence of every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit, action or proceedings to any such person or which may, with the consent of the contractor, be paid to compensate any claim by any such person.
6. Excavation and Trenching - All trenches of 1.2 m. (4ft.) or more in depth, shall at all times be supplied with at least one ladder for each 30 m. (100 ft.) in length or fraction thereof Ladder shall extend from bottom of the trench to at least 90 cm. (3ft.) above the surface of the ground. The side of the trenches which are 1.5 m. (5ft.) or more in depth shall be stepped back to give suitable slope or securely held by timber bracing, so as to avoid the danger of sides collapsing. The excavated materials shall not be placed within 1.5 m. (5ft.) of the edges of the trench or half of the depth of the trench whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or undercutting shall be done.
7. Demolition - Before any demolition work is commenced and also during the progress of the work,
 - a. All roads and open areas adjacent to the work site shall either be closed or suitably protected

- b. No electric cable or apparatus which is liable to be a source of danger or a cable or apparatus used by the operator shall remain electrically charged.
- c. All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or materials as to render it unsafe.
8. All necessary personal safety equipment as considered adequate by the Engineer-in-Charge should be kept available for the use of the person employed on the site and maintained in a condition suitable for immediate use, and the contractor should take adequate steps to ensure proper use of equipment by those concerned:- The following safety equipment shall invariably be provided.
- i. Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves and goggles.
 - ii. Those engaged in white washing and mixing or stacking of cement bags or any material which is injurious to the eyes, shall be provided with protective gloves and goggles.
 - iii. Those engaged in welding works shall be provided with welder's protective eye-shields.
 - iv. Stone breaker shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
 - v. When workers are employed in sewers and manholes, which are in active use, the contractors shall ensure that the manhole covers are opened and ventilated atleast for an hour before the workers are allowed to get into the manholes, and the manholes 50 opened shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to the public. In addition, the contractor shall ensure that the following safety measure are adhered to :
 - a) Entry for workers into the line shall not be allowed except under supervision of the JE or any other higher officer.
 - b) At least 5 to 6 manholes upstream and downstream should be kept open for at least 2 to 3 hours before any man is allowed to enter into the manhole for working inside.
 - c) Before entry, presence of Toxic gases should be tested by inserting wet lead acetate paper which changes colour in the presence of such gases and gives indication of their presence.
 - d) Presence of Oxygen should be verified by lowering a detector lamp into the manhole. In case, no Oxygen is found inside the sewer line, workers should be sent only with Oxygen kit.
 - e) Safety belt with rope should be provided to the workers. While working inside the manholes such rope should be handled by two men standing outside to enable him to be pulled out during emergency.
 - f) The area should be barricaded or cordoned off by suitable means to avoid mishaps of any kind. Proper warning signs should be displayed for the safety of the public whenever cleaning works are undertaken during night or day. .
 - g) No smoking or open flames shall be allowed near the blocked manhole being cleaned.
 - h) The malba obtained on account of cleaning of blocked manholes and sewer lines should be immediately removed to avoid accidents on account of slippery nature of the malba.
 - i) Workers should not be allowed to work inside the manhole continuously. They should be given rest intermittently. The Engineer-in-Charge may decide the time up to which a worker may be allowed to work continuously inside the manhole.
 - j) Gas masks with Oxygen Cylinder should be kept at site for use in emergency.
 - k) Air-blowers should be used for flow of fresh air through the manholes. Whenever called for portable air blowers are recommended for ventilating the manholes. The Motors for these shall be vapour proof and of totally enclosed type. Non sparking gas engines also could be used but they should be placed at least 2 metres away from the opening and on the leeward side protected from wind so that they will not be a source of friction on any inflammable gas that might be present.
 - l) The workers engaged for cleaning the manholes/sewers should be properly trained before allowing to work in the manhole.
 - m) The workers shall be provided with Gumboots or non sparking shoes bump helmets and gloves non sparking tools safety lights and gas masks and portable air blowers (when necessary). They must be supplied with barrier cream for anointing tile limbs before working inside the sewer lines.

- n) Workmen descending a manhole shall try each ladder stop or rung carefully before putting his full weight on it to guard against insecure fastening due to corrosion of the rung fixed to manhole well.
- o) If a man has received a physical injury, he should be brought out of the sewer immediately and adequate medical aid should be provided to him.
- p) The extent to which these precautions are to be taken depend on individual situation but the decision of the Engineer-in-Charge regarding the steps to be taken in this regard in an individual case will be final.
- vi) The following precaution should be taken while painting:
- a) White lead, sulphate of lead or product containing these pigment, shall not be used in painting operation except in the form of pastes or paint ready for use.
 - b) Measures shall be taken, wherever required in order to prevent danger arising from the application of a paint in the form of spray.
 - c) Measures shall be taken, wherever practicable, to prevent danger arising out of from dust caused by dry rubbing down and scraping.
 - d) Adequate facilities shall be provided to enable working painters to wash during and on cessation of work.
 - e) Overall shall be worn by working painters during the whole of working period.
 - f) Suitable arrangement shall be made to prevent clothing put off during working hours being spoiled by painting materials.
 - g) Cases of lead poisoning and suspected lead poisoning shall be notified and shall be subsequently verified by medical man appointed by Institute.
 - h) Institute may require, when necessary medical examination of workers.
 - i) Instructions with regard to special hygienic precautions to be taken in the painting trade shall be distributed to working painters.
- 10) When the work is done near any place where there is risk of drowning, all necessary equipments should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision, should be made for prompt first aid treatment of all injuries likely to be obtained during the course of the work.
- 11) Use of hoisting machines and tackle including their attachments, anchorage and supports shall conform to the following standards or conditions :
- i) (a) These shall be of good mechanical construction, sound materials and adequate strength and free from patent defects and shall be kept repaired and in good working order.
 - (b) Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength, and free from patent defects.
 - ii) Every crane driver or hoisting appliance operator, shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding winch or give signals to operator.
 - iii) In case of every hoisting machine and of every chain ring hook, shackle swivel and pulley block used in hoisting or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load. In case of a hoisting machine having a variable safe working load each safe working load and the condition under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.
 - iv) The contractor shall notify the safe working load of the machine to the Engineer-in-Charge whenever he brings any machinery to site of work who may get it verified.
12. Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as will reduce to the minimum the risk of accidental descent of the load. Adequate precautions should be taken to reduce to the minimum the risk of any part of a

suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energised, insulating mats, wearing apparel, such as gloves, sleeves and boots as may be necessary should be provided. The worker should not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

13. All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.

14. These safety provisions should be brought to the notice of all concerned by display on a notice board at a prominent place at work spot. The person responsible for compliance of the safety code shall be named therein by the contractor.

15. To ensure effective enforcement of the rules and regulations relating to safety precautions the arrangements made by the contractor shall be open to inspection by the Engineer-in-Charge or his representatives.

16. Notwithstanding the above clauses from (1) to (15) there is nothing in these to exempt the contractor from the operations of any other Act or Rule in force in the Republic of India.

1. APPLICATION

These rules shall apply to all buildings and construction works in IITM in which twenty or more workers are ordinarily employed or are proposed to be employed in any day during the period during which the contract work is in progress.

2. DEFINITION

Work place means a place where twenty or more workers are ordinarily employed in connection with construction work on any day during the period during which the contract work is in progress.

3. FIRST AID FACILITIES

i) At every work place there shall be provided and maintained, so as to easily accessible during working hours, first-aid boxes at the rate of not less than one box for 150 contract labour or part thereof ordinarily employed.

ii) The first-aid box shall be distinctly marked with a red cross on white back ground and shall contain the following equipment

a) For work places in which the number of contract labour employed does not exceed 50

Each first-aid box shall contain the following equipments :-

1. 6 small sterilised dressings
2. 3 medium size sterilized dressings.
3. 3 large size sterilized dressings.
4. 3 large sterilized burn dressings.
5. 1 (30ml) bottle containing a two per cent alcoholic solution of iodine
6. 1 (30 ml) bottle containing salvolatile having the dose and mode of administration indicated on the label.
7. 1 snakebite lancet.
8. 1 (30 gms.) bottle of potassium permanganate crystals
9. 1 pair scissors
10. 1 copy of the first-aid leaflet issued by the Director General, Factory Advice Service and Labour Institutes, Government of India.
11. 1 bottle containing 100 tablets (each of 5 gms) of aspirin.
12. Ointment for burns
13. A bottle of suitable surgical antiseptic solution.

b) For work places in which the number of contract labour exceed 50. Each first-aid box shall contain the following equipments.

1. 12 small sterilised dressings.
2. 6 medium size sterilised dressings.
3. 6 large size sterilised dressings.
4. 6 large size sterilised burn dressings.
5. 6 (15 gms.) packets sterilised cotton wool.

6. 1 (60 ml.) bottle containing a two per cent alcoholic solution iodine.
 7. 1 (60 ml.) bottle containing salvolatile having the dose and mode of administration indicated on the label.
 8. 1 roll of adhesive plaster.
 9. 1 snake bite lancet.
 10. 1 (30 gms) bottle of potassium permanganate crystals.
 11. 1 pair scissors
 12. 1 copy of the first-aid leaflet issued by the director General Factory Advice Service and labour Institutes / government of India.
 13. A bottle containing 100 tablets (each of 5 gms) of aspirin.
 14. Ointment for burns.
 15. A bottle of suitable surgical antiseptic solution.
- iii) Adequate arrangements shall be made for immediate recoupment of the equipment when necessary.
 - iv) Nothing except the prescribed contents shall be kept in the First-aid box.
 - v) The first-aid box shall be kept in charge of a responsible person who shall always be readily available during the working hours of the work place.
 - vi) A person in Charge of the First aid box shall be a person trained in First-aid treatment, in the work places where the number of contract labour employed is 150 or more.
 - vii) In work places where the number of contract labour employed is 500 or more and hospital facilities are not available within easy distance from the works. first-aid posts shall be established and run by a trained compounder. The compounder shall be on duty and shall be available at all hours when the workers are at work.
 - viii) Where work places are situated in places which are not towns or cities, a suitable motor transport shall be kept readily available to carry injured person or person suddenly taken ill to the nearest hospital.

4. DRINKING WATER

- (i) In every work place, there shall be provided and maintained at suitable places, easily accessible to labour, a sufficient supply of cold water fit for drinking.
- (ii) Where drinking water is obtained from an intermittent public water supply, each work place shall be provided with storage where such drinking water shall be stored.
- (iii) Every water supply or storage shall be at a distance of not less than 50 feet from any latrine drain or other source of pollution. Where water has to be drawn from an existing well which is within such proximity of latrine, drain or any other source of pollution, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be entirely closed in and be provided with a trap door which shall be dust and waterproof.
- (iv) A reliable pump shall be fitted to each covered well, the trap door shall be kept locked and opened only for cleaning or inspection which shall be done at least once a month.

5. WASHING FACILITIES

- I. In every work place adequate and suitable facilities for washing shall be provided and maintained for the use of contract labour employed therein.
- II. Separate and adequate cleaning facilities shall be provided for the use of male and female workers.
- III. Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition.

6. LATRINES AND URINALS

- i) Latrines shall be provided in every work place on the following scale namely:
 - a) Where female are employed there shall be at least one latrine for every 25 females.
 - b) Where males are employed, there shall be at least one latrine for every 25 males.

Provided that where the number of males or females exceeds 100, it shall be sufficient if there is one latrine for 25 males or females as the case may be upto the first 100, and one for every 50 thereafter.

ii. Every latrine shall be under cover and so partitioned off as to secure privacy, and shall have a proper door and fastenings.

iii. Construction of latrines: The inside walls shall be constructed of masonry or some suitable heat-resisting non-absorbent materials and shall be cement washed inside and outside at least once a year, Latrines shall not be of a standard lower than borehole system.

iv.

a) Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal, a notice in the language understood by the majority of the workers "For Men only" or "For Women Only" as the case may be.

b) The notice shall also bear the figure of a man or of a woman, as the case may be.

v) There shall be at least one urinal for male workers upto 50 and one for female workers upto fifty employed at a time, provided that where the number of male or female workmen, as the case may be exceeds 500, it shall be sufficient if there is one urinal for every 50 males or females upto the first 500 and one for every 100 or part thereafter.

vi) a) The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times.

b) Latrines and urinals other than those connected with a flush sewage system shall comply with the requirements of the Public Health Authorities.

vii) Water shall be provided by means of tap or otherwise so as to be conveniently accessible in or near the latrines and urinals.

viii) Disposal of excreta :- Unless otherwise arranged for by the local sanitary authority, arrangements for proper disposal of excreta by incineration at the work place shall be made by means of a suitable incinerator. Alternately excreta may be disposed of by putting a layer of night soil at the bottom of a pucca tank prepared for the purpose and covering it with a 15 cm. layer of waste or refuse and then covering it with a layer of earth for a fortnight (when it will turn to manure).

ix) The contractor shall at his own expense, carry out all instructions issued to him by the Engineer-in-Charge to effect proper disposal of night soil and other conservancy work in respect of the contractor's workmen or employees on the site. The contractor shall be responsible for payment of any charges which may be levied by Municipal or Cantonment Authority for execution of such on his behalf.

7. PROVISION OF SHELTER DURING REST

At every place there shall be provided, free of cost, four suitable sheds, two for meals and the other two for rest separately for the use of men and women labour, The height of each shelter shall not be less than 3 meters (10ft.) from the floor level to the lowest part of the roof. These shall be kept clean and the space provided shall be on the basis of 0.6 sq.m. (6 sft) per head.

Provided that the Engineer-in-Charge may permit subject to his satisfaction, a portion of the building under construction or other alternative accommodation to be used for the purpose.

8. CRECHES

(i) At every work place, at which 20 or more women worker are ordinarily employed, there shall be provided two rooms of reasonable dimensions for the use of their children under the age of six years. One room shall be used as a play room for the children and the other as their bedroom. The rooms shall be constructed with specifications as per clause 19H (ii) a, b & c.

(ii) The rooms shall be provided with suitable and sufficient openings for light and ventilation. There shall be adequate provision of sweepers to keep the places clean.

(iii) The contractor shall supply adequate number of toys and games in the play room and sufficient number of cots and beddings in the bed room.

(iv) The contractor shall provide one ayaa to look after the children in the creche when the number of women workers does not exceed 50 and two when the number of women workers exceed 50.

(v) The use of the rooms earmarked as creches shall be restricted to children, their attendants and mothers of the children.

9. CANTEENS

(i) In every work place where the work regarding the employment of contract labour is likely to continue for six months and where in contract labour numbering one hundred or more are ordinarily employed, an adequate canteen shall be provided by the contractor for the use of such contract labour.

(ii) The canteen shall consist of at least a dining hall, kitchen, storeroom, pantry and washing places separately for workers and utensils.

(iii) The canteen shall be sufficiently lighted at all times when any person has access to it.

(iv) The floor shall be made of smooth and impervious materials and inside walls shall be lime-washed or colour washed at least once in each year.

(v) Provided that the inside walls of the kitchen shall be lime-washed every four months.

(vi) The premises of the canteen shall be maintained in a clean and sanitary condition.

(vii) Waste water shall be carried away in suitable covered drains and shall not be allowed to accumulate so as to cause a nuisance.

(viii) Suitable arrangements shall be made for the collection and disposal of garbage.

(ix) The dining hall shall accommodate at a time 30 per cent of the contract labour working at a time.

(x) The floor area of the dining hall, excluding the area occupied by the service counter and any furniture except tables and chairs shall not be less than one square meter (10 sft) per diner to be accommodated as prescribed in sub-Rule 9.

(xi) a) A portion of the dining hall and service counter shall be partitioned off and reserved for women workers in proportion to their number.

b) Washing places for woman shall be separate and screened to secure privacy.

(xii) Sufficient tables, stools, chair or benches shall be available for the number of diners to be accommodated as prescribed in sub-Rule 9.

a) 1. There shall be provided and maintained sufficient utensils crockery, furniture and any other equipments necessary for the efficient running of the canteen.

2. The furniture utensils and other equipment shall be maintained in a clean and hygienic condition.

b) 1. Suitable clean clothes for the employees serving in the canteen shall be provided and maintained.

2. A service counter, if provided, shall have top of smooth and impervious material.

3. Suitable facilities including an adequate supply of hot water shall be provided for the cleaning of utensils and equipments.

xiv. The food stuffs and other items to be served in the canteen shall be in conformity with the normal habits of the contract labour.

xv. The charges for food stuffs, beverages and any other items served in the canteen shall be based on 'No profit, No loss' and shall be conspicuously displayed in the canteen.

xvi. In arriving at the price of foodstuffs, and other article served in the canteen, the following items shall not be taken into consideration as expenditure namely:

a) The rent of land and building.

b) The depreciation and maintenance charges for the building and equipments provided for the canteen.

c) The cost of purchase, repairs and replacement of equipments including furniture, crockery, cutlery and utensils.

d) The water charges and other charges incurred for lighting and ventilation.

e) The interest and amounts spent on the provision and maintenance of equipments provided for the canteen.

xvii) The accounts pertaining to the canteen shall be audited once every 12 months by registered accountants and auditors.

10. ANTI-MALARIAL PRECAUTIONS

The contractor shall at his own expense, conform to all anti-malarial instructions given to him by the Engineer-in-Charge including the filling up of any borrow pits which may have been dug by him.

11. The above rules shall be incorporated in the contracts and in notices inviting tenders and shall form an integral part of the contracts.

12. AMENDMENTS

Institute may, from time to time, add to or amend these rules and issue directions - it may consider necessary for the purpose of removing any difficulty which may arise in the administration thereof.

CPWD Contractors Labour regulation

1. SHORT TITLE

These regulations may be called the C.P.W.D./PWD (DA) Contractors Labour Regulations.

2. DEFINITIONS

1) **Workman** means any person employed by contractor directly or indirectly through a subcontractor with or without the knowledge of the Institute to do any skilled, semiskilled or unskilled manual, supervisory, technical or clerical work for hire or reward, whether the terms of employment are expressed or implied but does not include any person :

- a) Who is employed mainly in a managerial or administrative capacity: or
- b) Who, being employed in a supervisory capacity draws wages exceeding five hundred rupees per mensem or exercises either by the nature of the duties attached to the office or by reason of powers vested in him, functions mainly of managerial nature: or
- c) Who is an out worker, that is to say, person to whom any article or materials are given out by or on behalf of the principal employers to be made up cleaned, washed, latered, ornamental finished, repaired adopted or otherwise processed for sale for the purpose of the trade or business of the principal employers and the process is to be carried out either in the home of the out worker or in some other premises, not being premises under the control and management of the principal employer.

No person below the age of 14 years shall be employed to act as a workman.

ii) **Fair wages** means wages whether for time or piece work fixed and notified under the provisions of the Minimum Wages Act from time to time.

iii) **Contractors** shall include every person who undertakes to produce a given result other than a mere supply of goods or articles of manufacture through contract labour or who supplies contract labour for any work and includes a subcontractor.

iv) **Wages** shall have the same meaning as defined in the Payment of Wages Act.

i) Normally working hours of an adult employee should not exceed 9 hours a day. The working day shall be so arranged that inclusive of interval for rest, if any, it shall not. Spread over more than 12 hours on any day.

ii) When an adult worker is made to work for more than 9 hours on any day or for more than 48 hours in any week, he shall be paid over time for the extra hours put in by him at double the ordinary rate of wages.

- iii)
 - a) Every worker shall be given a weekly holiday normally on a Sunday, in accordance with the provisions of the Minimum Wages (Central) Rules 1960 as amended from time to time irrespective of whether such worker is governed by the Minimum Wages Act or not.
 - b) Where the minimum wages prescribed by the Government under the minimum Wages Act are not inclusive of the wages for the weekly day of rest, the worker shall be entitled to rest day wages at the rate applicable to the next preceding day, provided he has worked under the same contractor for a continuous period of not less than 6 days.

- c) Where a contractor is permitted by the Engineer-in-Charge to allow a worker to work on a normal weekly holiday, he shall grant a substituted holiday to him for the whole day on one of the five days immediately before or after the normal weekly holiday and pay wages to such worker for the work performed on the normal weekly holiday at overtime rate.

4. DISPLAY OF NOTICE REGARDING WAGES ETC.

The contractor shall before he commences his work on contract, display and correctly maintain and continue to display and correctly maintain in a clear and legible condition in conspicuous places on the work, notices in English and in the local Indian languages spoken by the majority of the workers giving the minimum rates of wages fixed under Minimum Wages Act, the actual wages being paid, the hours of work for which such wage are earned, wages periods, dates of payments of wages and other relevant information.

5. PAYMENT OF WAGES

- i) The contractor shall fix wage periods in respect of which wages shall be payable.
- ii) No wage period shall exceed one month.
- iii) The wages of every person employed as contract labour in an establishment or by a contractor where less than one thousand such persons are employed shall be paid before the expiry of seventh day and in other cases before the expiry of tenth day after the last day of the wage period in respect of which the wages are payable.
- iv) Where the employment of any worker is terminated by or on behalf of the contractor the wages earned by him shall be paid before the expiry of the second working day from the date on which his employment is terminated.
- v) All payment of wages shall be made on a working day at the work premises and during the working time and on a date notified in advance and in case the work is completed before the expiry of the wage period, final payment shall be made within 48 hours of the last working day.
- vi) Wages due to every worker shall be paid to him direct or to other person authorized by him in this behalf.
- vii) All wages shall be paid in current coin or currency or in both.
- viii) Wages shall be paid without any deductions of any kind except those specified by the Central Government by general or special order in this behalf or permissible under the Payment of Wages Act 1956.
- ix) A notice showing the wages period and the place and time of disbursement of wages shall be displayed at the place of work and a copy sent by the contractor to the Engineer-in-Charge under acknowledgment.
- x) It shall be the duty of the contractor to ensure the disbursement of wages in the presence of the Junior Engineer or any other authorized representative of the Engineer-in-Charge who will be required to be present at the place and time of disbursement of wages by the contractor to workmen.

The contractor shall obtain from the Junior Engineer or any other authorized representative of the Engineer-in-Charge as the case may be, a certificate under his signature at the end of the entries in the "Register of Wages" or the "Wage-cum Muster Roll" as the case may be in the following form:

Certified that the amount shown in column N has been paid to the workman concerned in my presence on at....."

6. FINES AND DEDUCTIONS WHICH MAY BE MADE FROM WAGES

- (i) The wages of a worker shall be paid to him without any deduction of any kind except the following:
 - a. Fines
 - b) Deductions for absence from duty i.e. from the place or the places where by the terms of his employment he is required to work. The amount of deduction shall be in proportion to the period for which he was absent.
 - c) Deduction for damage to or loss of goods expressly entrusted to the employed person for custody, or for loss of money or any other deduction which he is required to account, where such damage or loss is directly attributable to his neglect or default.
 - d) Deduction for recovery of advances or for adjustment of overpayment of wages, advances granted shall be entered in a register.

- e) Any other deduction which the Central Government may from time to time allow.
- ii) No fines should be impose on any worker save in respect of such acts and omissions on his part as have been approved of by the Chief Labour Commissioner.

Note :- An approved list of acts and omissions for which fines can be imposed.

- iii) No fine shall be imposed on a worker and no deduction for damage or loss shall be made from his wages until the worker has been given an opportunity of showing cause against such fines or deductions.
- iv) The total amount of fine which may be imposed in anyone wage period on a worker shall not exceed an amount equal to three paise in a rupee of the total wages, payable to him in respect of that wage period.
- v) No fine imposed on any worker shall be recovered from him by installment, or after the expiry of sixty days from the date on which it was imposed.
- vi) Every fine shall be deemed to have been imposed on the day of the act or omission in respect of which it was imposed.

7. LABOUR RECORDS

- f) The contractor shall maintain a Register of persons employed on work on contract in Form XIII of the CL (R &A) Central Rules 1971
- g) The contractor shall maintain a **Muster Roll** register in respect of all workmen employed by him on the work under Contract in Form XVI of the CL (R&A) Rules 1971
- h)The contractor shall maintain a **Wage Register** in respect of all workmen employed by him on the work under contract in Form XVII of the CL (R&A) Rules 1971
- (iv) Register of accident : The contractor shall maintain a register of accidents in such form may be convenient at the work place but the same shall include the following particulars :
- a) Full particulars of the labourers who met with accident
 - b) Rate of wages
 - c) Sex
 - d) Age
 - e) Nature of accident and cause of accident
 - f) Time and date of accident
 - g) Date and time when admitted in Hospital
 - h) Date of discharge from the Hospital
 - i) Period of treatment and result of treatment.
 - j) Percentage of loss of earning capacity and disability as assessed by Medical officer.
 - k) Claim required to be paid under Workmen's Compensation Act.
 - l) Date of payment of compensation
 - m) Amount paid with details of the person to whom the same was paid.
 - n) Authority by whom the compensation was assessed.

Remarks

- v) The contractor shall maintain a **Register of Fines** in the Form XII of the CL (R &A) Rules 1971 (Appendix-XI)
The contractor shall display in a good condition and in a conspicuous place of work the approved list of acts and omissions for which fines can be imposed (Appendix-X)
- vi) The contractor shall maintain a **Register of deductions for damage or loss** in Form XX of the CL (R&A) Rules 1971 (Appendix-XII)
- vii) The contractor shall maintain a **Register of Advances** in Form XXIII of the CL (R&A) Rules 1971 (Appendix-XIII)
- viii) The contractor shall maintain a **Register of Overtime** in Form XXIII of the CL (R&A) Rules 1971 (Appendix-XIV)

8. ATTENDANCE CARD-CUM-WAGE SLIP

- i) The contractor shall issue an **Attendance card – cum – wage slip** to each workman employed by him in the specimen form at (Appendix-VII)
- ii) The card shall be valid for each wage period.
- iii) The contractor shall mark the attendance of each workman on the card twice each day, once at the commencement
- iv) of the day and again after the rest interval, before he actually starts work..
- v) The card shall remain in possession of the worker during the wage period under reference.
- vi) The contractor shall complete the wage slip portion of the reverse of the card at least a day prior to the disbursement of wages in respect of the wage period under reference.
- vii) The contractor shall obtain the signature or thumb impression of the worker on the wage slip at the time of disbursement of wages and retain the card with himself.

9. EMPLOYMENT CARD

The contractor shall issue an Employment Card in Form XIV of the CL (R&A) Central Rules 1971 to each worker within three days of the employment of the worker

10. SERVICE CERTIFICATE

On termination of employment for any reason whatsoever the contractor shall issue to the workman whose services have been terminated, a Service certificate in Form XV of the CL (R&A) Central Rules 1971

11. PRESERVATION OF LABOUR RECORDS

All records required to be maintained under Regulations Nos. 6&7 shall be preserved in original for a period of three years from the date of last entries made in them and shall be made available for inspection by the Engineer-in-Charge or Labour Officer or any other officers authorised by the Ministry of Urban Development in this behalf,

12. POWER OF AUTHORISED PERSON TO MAKE INVESTIGATIONS OR ENQUIRY

Any person authorised by Institute on their behalf shall have power to make enquiries with a view to ascertaining and enforcing due and proper observance of Fair Wage clauses and the Provisions of these Regulations. He shall investigate into any complaint regarding the default made by the contractor or subcontractor in regard to such provision.

13. REPORT OF AUHTORISED PERSONS

The persons authorised as aforesaid shall submit a report of result of his investigation or enquiry to the Engineer-in-charge concerned indicating the extent, if any, to which the default has been committed with a note that necessary deductions from the contractor's bill be made and the wages arid other dues be paid to the labourers concerned, In case an appeal is made by the contractor under Clause 13 of these regulations, actual payment to labourers will be made by the Engineer-in-charge after a decision has been given on such appeal. The Engineer-in-charge shall arrange payments to the labour concerned within 45 days from the receipt of the report.

14. APPEAL AGAINST THE DECISION

Any person aggrieved by the decision and recommendations of the person so authorised may appeal against such decision to the Chairman (EU) concerned within 30 days from the date of decision, forwarding simultaneously a copy of his appeal to the Executive Engineer concerned but subject to such appeal, the decision of the officer shall be final and binding upon the contractor.

15. PROHIBITION REGARDING REPRESENTATION THROUGH LAWYER

- i) A workman shall be entitled to be represented in any investigation or enquiry under these regulations by :-
 - a) An officer of a registered trade union of which he is a member.
 - b) An officer of a federation of trade unions to which the trade union referred to in clause (a) is affiliated.
 - c) Where the employer is not a member of any registered trade union, by an officer of a registered trade union, connected with the industry in which the worker in employed or by any other workman employed in the industry in which the worker is employed.

- ii) An employer shall be entitled to be represented in any investigation or enquiry under these regulations by :-
 - a) An officer of an association of employers of which he is a member
 - b) An officer of a federation of associations of employers to which association referred to in clause (a) is affiliated.
 - c) Where the employer is not a member of any association of employers, by an officer of association of employer connected with the industry in which the employer is engaged.
- (v) No party shall be entitled to be represented by a legal practitioner in any investigation or enquiry under these regulations.

16. INSPECTION OF BOOKS AND SLIPS

The contractor shall allow inspection of all the prescribed labour records to any of his workers or to his agent at a convenient time and place after due notice is received or to the Labour Officer or any other person, authorised by the Central Government on his behalf.

17. SUBMISSIONS OF RETURNS

The contractor shall submit periodical returns as may be specified from time to time.

18. AMENDMENTS

The Central Government may from time to time add to or amend the regulations and on any question as to the application/Interpretation or effect of those regulations the decision of the Executive Engineer concerned shall be final.

TECHNICAL SPECIFICATIONS

1.0 11 kV SWITCHGEAR

1.1 DESIGN CRITERIA

A	Cubical	
1.0	Type: Fully compartmentalised metal clad horizontal draw out sheet steel enclosed conforming to IP42 and fully type tested as per IS 3427-1997/ IEC 298-1990/ IEC 694-1996. Further inter compartment partitions shall also conform to IP42.	
2.0	Thickness of sheet steel	
2.1	Sides/ bottom/ partition between panels	2mm hot rolled sheet steel
2.2	Front and rear hinged door and covers	2mm cold rolled sheet steel
3.0	Rated voltage	
3.1	Nominal system voltage	11 kV, 3phase, 50Hz, 3wire
3.2	Rated voltage for switchgear	12 kV, 3phase, 50Hz, 3wire
4.0	Continuous rated current	630 A (As per SLD) at 45 ⁰ C
5.0	Short circuit with stand capacity of switch board including busbars.	
5.1	Short time rating	18.4 kA (rms) for 3 secs
5.2	Dynamic rating	46.0 kA peak
6.0	Insulation level	
6.1	Impulse withstand voltage	75 kV peak
6.2	One minute PF withstand voltage	28 kV (rms)
7.0	Busbars	
7.1	Material of busbars	High conductivity electrical grade copper
7.2	Temperature rise of busbars at rated current over 45 ⁰ C ambient	40 ⁰ C
7.3	Inter panel busbar chamber partition	Cast resin bushings to be provided
7.4	Busbar joints	1 Cadmium plate bolts and tinned surface 2 Flexible connection if required
7.5	Insulation	Epoxy resin/ FRP encapsulation of busbars jumpers etc., for full insulation level i.e impulse of 75 kV peak and power frequency test voltage of 28 kV rms for one minute
7.6	Phase identification	Heat shrinkable color PVC sleeves
7.7	Support insulators	Non hygroscopic, non-tracking, epoxy resin cast insulator
8.0	Auxiliary connections	Silver plated, 16 A plug and socket with " necessary Intellocks.
9.0	Safety shutters	Automatically operated shutters with facility to lock the busbar and cable side shutters independently. Possibility of independent operation of busbars and cable side shutters may be confirmed.
10.0	Locking facility	1. Special door locking with key. 2. Integral locking facility for carnage position lock
11.0	Accessories with each cubicle	
11.1	Panel illumination lamp with switch	To be provided in metering compartment

11.2	Space heater	240V, AC, 50 Hz heater with thermostat & control switch
11.3	3 pin power socket with switch	To be provided
11.4	Base channels	Base channels as required shall be supplied as part of cubicle for grouting / welding to the plate inserts provided in the floor
11.5	Termination accessories	
	Compression type brass cable glands and tinned copper lugs for HT power, L T power and control cables to be terminated in the panels	
11.6	Name plates, inscription plates for components, switches, feeder identifications	As specified
11.7	Flexible copper connections between hinged doors and cubicle for earthing	To be provided
11.8	Breaker accessories visible and accessible from outside with the cubicle door closed	
	-Breaker position visible and accessible TEST / SERVICE	
	-Breaker ON/OFF, spring charged	
	-Mechanical "trip" push button accessible from outside with panel door closed	
	-Mechanical "close" push button accessible only after opening the door	
	-Earth switch ON/OFF position	
11.11	Breaker operation counter	To be provided
11.12	Components to be mounted on the front door of cubicle in the relay & metering compartment	Push buttons, control and selector switches (operating height shall not exceed 1800mm), lamps, meters, relays (all as per approved layout).
11.13	-Termination of incomer and outgoing	11 kV (E) cable termination with entry from bottom with cable sizes as per enclosed single line diagram.
11.14	-Termination of control cable	Bottom cable entry at the front / rear side of cubicles with necessary shielding / protection from HT cable termination.
11.15	Terminals	LT power, control, CT, DC, AC terminals shall be segregated and identified.
11.16	Indication lamps	
	Spring charged, breaker healthy, breaker ON, OFF, TRIP and heater ON.	
12.0	Operational clearances	
12.1	In front for withdrawal of truck	2.0 m
12.2	At the back of the panel	1.0 m
13.0	Minimum safety clearances in air	
13.1	Between phases	127 mm
13.2	Between phase and earth	127 mm
14.0	Control schemes	As per approved drawings of mfr
B	Breaker	
1.0	Type	Vacuum Circuit Breaker
2.0	Rated voltage	12 kV
3.0	Design ambient	45 ⁰ C
4.0	Ratings	
4.1	Rated current in IP 4X enclosure at 45 ⁰ C	630 A
4.2	Symmetrical breaking capacity	18.4 kA (rms) at 12 kV
4.3	Making capacity and dynamic stability rating	46.0 kA peak
4.4	Short time current rating	18.4 kA rms for 3 secs

5.0	Insulation level	
5.1	One minute PF withstand value	28 kV RMS
5.2	1.2/50 microsecond impulse withstand value	75 kV peak
6.0	Operating duty	0-3 min-co-3 min-co
7.0	Total break time	Less than 5 cycles
8.0	Critical current	Shall be restrike free
9.0	Arc extinction medium	Vacuum
10.0	First pole to clear factor	1.5
11.0	Operating mechanism	
11.1	Type of closing	Spring charged, stored energy – manual independent closing
11.2	Method of closing	Manual and motor drive
11.3	Spring charging motor	
	-Rated voltage	230 V, AC
	-Operating voltage	80 -110 % of rated voltage
11.4	Closing coil	
	-Rated voltage	110 V, DC
	-Operating voltage	80 -110 % of rated voltage
11.5	Shunt trip coil	
	-Rated voltage	110 V, DC
	-Operating voltage	50 -110 % of rated voltage
12.0	No. of poles / phase	One
13.0	No. of breaks / pole	One
14.0	Auxiliary contacts	8 NO + 8NC (silver plated contacts)
15.0	Rating of auxiliary contacts	10 A at 240 V AC, 5 A at 110 V DC
16.0	Wiring of auxiliary contacts	All auxiliary contacts shall be wired contacts to terminal block, external to draw out truck
17.0	Test service position of breaker	Without opening the door, Draw out type
18.0	Material of fixed and moving contacts	Silver plated copper fixed and moving contacts with self aligning feature having sufficient contact pressure
19.0	Breaker fully type tested as per	IEC-56-1987 and IS 13118-1991
20.0	Surge diverters in case of VCB's	To be provided as per requirement.
C	Current transformer	
1.0	Type/ratio	Resin cast, bar primary and 75A/5A
2.0	No. of cores, burden, accuracy	2 cores, 15 VA, 5P20 for protection and Class-1.0 for metering
3.0	Short time rating	18.4 kA (rms) for 3 seconds
3.1	Dynamic stability current	46.0 kA peak
4.0	Class of insulation	Class F
5.0	Insulation level	
5.1	Impulse withstand voltage	75 kV peak
5.2	PF withstand voltage	28 kV rms
6.0	Applicable standards	IS 2705
D(i)	Indicating meters	
1.0	Type of meter	Microprocessor based composite digital meter for current, voltage, frequency, power, power factor including energy functions (kWh, kVARh & kVAh) with serial communication port (RS485) for remote data transfer
2.0	Mounting	Flush mounting
3.0	Accuracy class	0.2
4.0	Voltage / current	110 V PT, 5 A CT secondary current

5.0	Range	As specified during drawing approval
6.0	Applicable Standards	IEC 1036,688,359 & 529
D (ii)	Integrating meters	To be provided as a part of item E(i)
E	Auxiliary equipment	
1.0	Protection relays	
a)	Type	Numerical relays with built in protection, control, measurement, event, fault & disturbance recording, monitoring and self diagnosis, display, serial communication and time synchronisation features, draw out type, 110V DC aux. voltage 110 V PT & 5A CT secondary
b)	Mounting	Flush mounting
c)	Voltage / Current	i) Aux voltage 110 V DC ii) 110 V PT & 5 A CT secondary
d)	Applicable Standard	IEC 255 & 529
2.0	Control switches	
	Type & rating	16A, 440V AC, 5A, 110 V DC quick make, quick break, flush mounted stay put / spring return.
	Applicable Standards	IS 4064
3.0	Push buttons	
	a) Type & rating	2A, 110 V DC, 10A, 440 V AC, 1 NO + 1 NC flush mounted
	b) Applicable Standards	IS 1336
4.0	Indicating lamps	110V DC, clustered LED lamp, with series resistors, colored lens, and suitable .for flush mounting. Assembly for bulb IS from the front
5.0	Control circuit protection fuses	Link type HRC fuse with insulating base and holder.
6.0	Control schemes	As per drawings during approval

1.2 TECHNICAL SPECIFICATION

1.2.1 General

The specification covers design, manufacture, inspection and testing at works, packing and forwarding, delivery at site of medium voltage Indoor switchgear (11 kV, 3 phase, 50 Hz, AC).

The switchgear shall comply with latest edition of applicable codes and standards and enclosed specification and drawings. The switchgear shall be factory assembled and fully type tested as per IEC for the following:

- Current rating and fault rating
- Switching capacity
- Insulation level
- Switching over voltages

1.2.2 Type of Gear

The switchgear shall be of metal clad, dead front, air insulated, natural air cooled, fully compartmentalised, fully draw-out, self standing indoor cubicle conforming to IP42 degree of protection. Each cubicle shall be constructed on unit principle each switchboard shall comprise of number of cubicles forming a single continuous board.

It shall be possible to perform all switching operations with door closed. Interlocks required for safe switching, operation and maintenance should be provided wherever possible, mechanical interlocks shall be provided in addition to electrical Interlocks.

1.2.2.1 Cubicle

Each cubicle shall be fully compartmentalised with metallic insulating partitions having separate chambers for main busbars, CTs and cable terminations, switching device, LV chamber for metering, protection and control equipment. The metallic partitions shall be earthed and compartments thus formed shall be dust and vermin proof. This state of the compartments shall be maintained while switching device is in service position.

Pressure relief flaps, which cannot be opened from outside shall be provided to vent upwards in case of arcing faults inside the cubicle To ensure personnel safety, the following conditions shall be met for internal arcing faults Further arcing fault tests shall have been carried out on the cubicles in each compartment as per the relevant IEC standards and the necessary test certificate for the tests shall be submitted along with the offer.

- Correctly secured doors, covers etc., must not open
- Parts that may cause hazard to personnel must not fly-off.
- Earthing connections must remain effective.

LV compartment, switching device and termination compartments shall be segregated from those of adjacent cubicles. Busbar chamber shall be provided preferably with seal-off bushings to segregate busbar chambers of adjacent panels and prevent spread of fire from one panel to the next.

Lockable lift-off type front door shall be provided for switching device compartment. LV compartment shall have independent hinged door with locking facility. Rear side of cubicle shall be provided with hinged doors with locking provision of removable covers with special tools.

All mechanical indications of breaker truck/carriage positions, Breaker ON/OFF/Trip conditions, spring charged indications shall be freely visible from outside Emergency trip pushbutton shall be accessible from outside.

All control switches, indication lamps, meters, protection and auxiliary relays shall be flush mounted on the swing panel of respective LV compartment. Height of operating handles of control switches, push buttons, reset rods of relays shall be less than 1800 mm from floor level of switchgear room

Cubicle shall be suitable for bottom cable entry both for HT power cable and control cables, at the rear side of respective cubicle. However control cable entry can be from the front also.

1.2.2.2 Busbars

Busbars shall be made of high conductivity electrical grade copper Maximum temperature of busbars, joints at rated current shall not exceed the limits specified. Provision shall be made for taking up changes in length of busbars due to change in temperature. Short time thermal withstand capability and dynamic stability of busbars shall be as applicable to the switchboard

Maximum current density at rated current shall not exceed 1.2 Amp/sq. mm for copper busbars. Main busbars shall have same cross sectional area throughout its length and feeder busbars shall be rated correspondingly to feeder rating.

Main and feeder busbars shall be fully insulated (covered) to rated insulation and busbar joints shall be provided with removable insulation shrouds. Entire bus work, shall be supported on resin cast insulators of adequate creepage distance

1.2.3 Circuit breaker

a) The circuit breaker shall be three pole vacuum break, horizontal draw-out type with stored energy, spring charged manual independent closing & shunt trip mechanism.

b) The circuit breaker design shall ensure restrike free operation and have very low value of chopping current under all switching duties, switching surge voltages while switching ON or OFF of low inductive currents, locked rotor currents, capacitive currents etc., shall not exceed 25 PV (Max.) In case switching voltage is more than 2.5 PV, the value shall be indicated in the offer. In case of possibility of high transient voltage, more than 2.5 PV, metal oxide, gapless surge arrestors shall be provided. The breaker with its operating mechanism and surge arrestors shall be suitable for high frequency of operation (switching ON and OFF) and shall be able to operate reliably with a long period of interval between maintenance. Further the surge arrestors shall be provided with pressure relief vents Provision of mechanical indication for the arrestor failure is preferred.

In case of switchgear With VCBs, for motor feeders surge diverters shall be provided as part of respective cubicle. Characteristics of surge diverter shall ensure full protection to the switchgear and equipment connected to the system

c) The air clearance between phases and between phase to earth at the breaker incoming and outgoing terminals shall not be less than those indicated in the IECI British Standards, corresponding to the basic insulation level of the circuit breaker or as indicated in the design criteria.

d) In case of breakers with multiple poles in each phase, equal current sharing between poles shall be ensured by means of current balance scheme. Each pole of the phase shall, preferably have rated switching and fault capacity If the poles are not identical, switching sequence shall be accordingly ensured with positive mechanical interlocks.

e) Breakers of same rating shall be identical and interchangeable at site Parts of the breaker required for maintenance, inspection or replacement shall be easily accessible.

1.2.3.1 Operating mechanism

a) All circuit breakers shall be provided with motor operated, spring charged, stored energy, manual independent closing and shunt trip mechanism with built in anti pumping feature and trip operating mechanism conforming to IEC. The shunt trip and closing coil and spring charging motor shall be suitable for AC or DC control supply indicated in design criteria.

In case of circuit breakers serving as motor feeders or substation incoming and bus coupler feeders both AC and DC shunt trip coil shall be provided

b) In case of circuit breakers with more than one operating spring, they shall be so interlocked that the springs are charged to the same extent and the breaker can be closed only if all the springs are charged to the required values.

In the event of manual charging of springs, means shall be provided through a limit switch in the operating mechanism to cut off the electrical circuit of spring charging motor on insertion of the operating lever

c) In order to ensure the reliability and long operating life for the mechanism, the mechanism shall be light, with a high mechanical strength and abrasion resistance to avoid high rate of wear / tear with few components. The number of components in the breaker and operating mechanism shall be kept to a minimum and they shall be designed to be free of undue stresses during normal or short circuit operations. Further they shall endure a high frequency of operations indicated in technical particulars All the moving parts of the mechanism requiring inspection, maintenance and lubrication shall be easily accessible

d) The life of the operating mechanism shall not be less than 10,000 operations.

e) Trip coil shall operate satisfactorily between 50% and 110% of rated voltage while closing coil and spring charging motor shall operate satisfactorily between 80% and 110% of rated voltage

The closing and tripping circuits shall be self opening on completion on their respective functions, irrespective of position of the breaker ON/OFF switch.

f) Mechanical breaker ON/OFF and spring charged indication shall be provided positively coupled to the operating mechanism and visible from the front with cubicle door closed.

Each breaker shall be provided with mechanical trip push button, accessible with door closed.

1.2.3.2 Auxiliary contacts

a. Each circuit breaker shall have required number of auxiliary contacts to control circuit changes for indication, protection, interlocking, supervision, metering and others

All auxiliary contacts shall be positively operated by the main apparatus and all contacts shall be adequate to make, carry and interrupt the currents in their circuits

Minimum of 2NO + 2NC auxiliary contacts shall be available for owner's exclusive use at site. Multiplication of breaker auxiliary contacts shall be avoided. However in case of necessity, electrically reset latched relays shall be used. Further these contacts shall be available in both test and service positions-

b. Breaker auxiliary contacts available in test and service position and those available in service position only shall be clearly indicated.

c. Normally open and normally closed contacts shall be interchangeable at site

d. All the contacts of relays / control switch / breaker including spare contacts shall be wired up to the terminal block

e. Advance and retard contacts as required by the control circuits shall be provided Contact sequence diagram shall be provided

f. Interlock with door limit switch shall be provided to ensure that the breaker cannot be closed in service position with door open

A readily identifiable mechanical emergency trip device as well as provision for manual charging of springs through the cubicle door shall be provided for each breaker. Further interlock shall be provided to prevent accidental electrical charging of the spring during manual charging.

1.2.3.3 Breaker truck / carriage

a) The Circuit breaker with its control units, operating mechanism, isolating and interlocking gears, auxiliary switches, isolating contacts and wiring shall be carried on a horizontally withdrawable, sheet steel dead front truck! carriage on wheels / guide channels The truck / carriage shall be provided with handles for manoeuvring the breaker into position. All Circuit breaker trucks/carriages of same rating shall be identical in all respects and shall be interchangeable at site. Cassette mounted breakers are also acceptable However breaker handling trolley shall be supplied

b) The circuit breaker truck / carriage shall have three clear positions viz. the service position where the control and power terminals of the circuit breaker are engaged; the test position, where the power terminals of the circuit

breaker are isolated, while the control terminals remain engaged; maintenance position where both power and control terminals of the circuit breaker are isolated.

The service and test position of the circuit breaker shall be within the cubicle and it should be possible to keep the door closed, with the breaker truck / carriage in either test or service position. However, the maintenance position can be with door open.

c) The truck movement inside the cubicle shall be within guide ways, on metal / nylon rollers and the movement of the truck shall be smooth and reasonably effortless. At the end of the travel i.e. in service position or in test position it shall be ensured that the breaker terminals engage positively. Further mechanical indications shall be provided to be visible from the front of cubicle door for the position of the truck carriage.

d) The truck/carriage shall be provided with locking arrangement for locking them in either test or service position, to prevent movement due to short circuit forces.

e) Spring loaded, sliding earth terminals shall be provided on both sides of the truck / carriage, making positive connection with the earth strip provided with cubicle to ensure that all non current carrying metal parts are securely earthed before moving the breaker truck / carriage to test and service positions. The location of the earth terminal shall be such that, it should be first to make and last to break to ensure personal safety. All the non current carrying metal parts shall be bonded together and connected to the earth terminal by means of a separate connection. Bolted connections of the frame work of the truck / carriage shall not be used as earth continuity conductors.

f) Interlocks

Mechanical interlocks shall be provided on each truck / carriage to prevent maloperation and in particular to ensure that:

i) The truck cannot be moved in or out of its cubicle with the circuit breaker closed.

ii) The circuit breaker can only be closed when the truck is in one of the three positions i.e. the service position, a definitely located test position or fully out of the cubicle in the maintenance position- The necessary contacts for the same shall be provided on the truck/ carriage at these locations.

iii) The truck cannot be pushed to service position, if either set of safety shutters is not free and not in its normal closed position.

iv) The truck cannot be pushed to service position without making the connections of control isolating contacts.

v) In case of plug and socket connections for isolating contacts, it shall be ensured that the correct sequence of connections is maintained.

1.2..3.4 Isolating contacts and shutters

a) Power isolating contact assembly shall have self aligning silver faced contacts with replaceable fingers or equivalent construction. The moving contact shall engage with the fixed contacts through opening in the bus bar and current transformer chambers. Each opening shall be covered by vermin proof spring loaded automatic safety shutters. With the safety shutter dosed, it shall not be possible to introduce even small tools such as screwdrivers and complete protection shall be offered against accidental contact with live terminal, in line with protection class of enclosure specified in the design criteria.

b) i) Independently operable, bus bar and cable end shutters shall be provided, operated by the movement of the truck/ carriage, so that when the breaker truck is moved out of service position, the shutters shall enclose the live terminals to prevent inadvertent access to these terminals.. The shutters shall be provided with independent locking arrangement.

ii) The shutters shall preferably be of transparent polycarbonate material to enable visual inspection of bus bar terminals and finger contacts with the shutters closed.

iii) Shutters shall be positively operated by the travel of the truck/carriage, each shutter independently of the other.

iv) Bus bar shutters shall be labelled to distinguish them from feeder shutters and both shutters shall be independently lockable in the dosed position.

1.2..3.5 Auxiliary control connections

The small wiring on each truck / carriage shall be connected to the wiring on its cubicle by means of plug and socket connections or by means of spring loaded sliding finger contacts.

In case of plug and socket arrangement interlock shall be provided so that plug is removed before the breaker is withdrawn to maintenance position and breaker cannot be moved into service position without inserting the plug into the socket. Further there shall be an interlock to prevent improper connections.

In case of finger contact arrangement, perfect alignment of male and female contacts shall be ensured and the contacts shall be of high conductivity, electrical grade copper with silver facing. Clear distinction shall be made between the contacts, those available in test and service position and those available in service position only.

1.2.3.6 Cable termination

- a) The cubicle shall be suitable for terminating cables as specified. Sufficient space and support arrangements shall be provided for terminating specified number of power cables with bottom / top entry as specified. If the required number of cable terminations cannot be accommodated in the respective cubicle, additional dummy panel with necessary bus bars shall be provided. Required number of compression type tinned copper lugs shall be provided. Where core balance types CTs are specified, the same shall also be enclosed inside the cubicle
- b) Blank G.I gland plates gasketed and bolted to the cubicle for glanding and terminating low voltage control and power cables shall be provided.
- c) Double compression type brass cable lands shall be supplied for HT cables and control cables of specified type and size. Heavy duty tinned copper lugs of crimping type shall be provided

1.2.4 Instrument transformers

1.2.4.1 Current transformers

- a) The instrument and protection current transformers shall be supplied as specified and shall have the ratings, outputs and accuracies as specified or required. The current transformers ratio specified are provisional and are subject to alteration and confirmation later. Where outputs and accuracies are not specified, these shall be such as may be required by the metering or protective circuit in which they are used
- b) Separate cores shall be used for metering and protection
- c) All current transformers shall be designed to have over current factors to withstand the fault currents of the associated system as applicable to the switchboard.
- d) Current transformers used for protection shall have an accuracy limit factor not less than 15. Those used for metering shall have a saturation factor of 5

All current transformers shall have 5 Amp. secondaries and shall be of the air insulated, plain ring type encapsulated in thermal setting resin and with bar primary. All CTs shall be mounted in a separate chamber on the fixed portion of the cubicle, on the outgoing side of the circuit breakers, so that circuit breaker, trucks of same rating and of different circuits having different C T ratios, are interchangeable.

Polarity of primary and secondaries of all the CTs shall be clearly marked.

- e) Short time thermal rating and dynamic fault outlet withstand rating of CTs shall match with the switch board rating

1.2.5 ACCESSORIES

1.2.5.1 Relays

1.2.5.1.1 General

- a) The application, performance & testing of relays shall comply with IEC 255. All relays shall be flush mounted in dust & moisture proof cases conforming to IP51 as per IEC529 and shall match the appearance of the instruments mounted on the same panel. Each relay shall be identified with relay number indicated in the approved control schemes both on its case and on the draw out part
- b) Protective relays shall be of the easy withdrawable type. Trip circuits shall be automatically broken and current transformer secondary circuits shorted, when a relay is withdrawn from its case. A marking strip shall be provided in front of each terminal block and a diagram plate at the back of each case to identify connections.
- c) Relay contacts shall withstand repeated operation and shall make or break the maximum currents in their circuit without deterioration. All spare contacts shall also be wired upto the external terminal blocks in the cubicle
- d) Relays shall carry their normal currents indefinitely and such currents as can occur under fault conditions. Relay mechanism shall not be affected by vibration or external magnetic fields, which may occur in normal operation
- e) All relays shall operate satisfactorily from 50 to 110% of rated voltage

1.2.5.1.2 Protective relays

- a) Numerical relays with built-in protection, control, measurement, event fault & disturbance recording, monitoring & self diagnosis, display, serial communication and time synchronisation features shall be used for protection and control. The relays shall be complete with all units / interfaces / interconnections required for achieving the above features and ready for connection to "SCADA".
- b) Non-directional O/C & E/F relays shall be provided for transformer feeders. Directional O/C & E/F relays shall be provided for all other outgoing and incomer feeders. For Directional O/C & E/F relays, it shall be possible to select the direction of operation at site.
- c) The relays shall have the following min. functions / features:

i) Protection:

- independent stages of phase over current (50, 51 & 67 for directional relays & 50, 51 for non-directional relays) and earth fault protection (50N, 51 N & 67N for directional relays, 50N & 51 N for Non-directional relays).
- 2 thermal OIL thresholds (49).
- 2 UN thresholds (27)
- Circuit breaker failure detection (50 BF).
- Broken conductor detection (BC)
- Lockout feature (self reset / hand reset and software selectable)

ii) Control

- Circuit breaker control from local! remote with local! remote selection through password
- Blocking logic
- Selective relay scheme logic
- Two independent setting groups with provision for switch over from one setting group to another locally / remotely via. a dedicated logic input. All settings to be stored in E²PROM (Non volatile rewriting memory).
- Programmable relay inputs & outputs

iii) Measurement

- Voltage
- Current
- Frequency
- Power factor
- kW
- kVA
- kVAR
- kWh
- kVARh
- Storage of measurements in memory

iv) Event, fault & disturbance recording

- Storage of min. 75 logic events (Change of status, alarms, contact operations etc) time stamped to 1 ms.
- Storage of min. last 5 faults (each with record number, fault time, active setting group, faulted phase, protection operation & magnitude).
- Storage of min. 5 records (voltage & current wave forms distortions)

v) Monitoring

- Circuit breaker status
- Circuit breaker condition
- Trip circuit supervision
- CT & VT secondary circuit monitoring

vi) Self diagnosis

- Automatic tests including power on diagnostic & continuous self monitoring

vii) Display

- 32 alphanumeric back lit LCD in English with key information (status, faults, measurements, settings etc) Menus with pull down structure
- Dedicated LED's to indicate status of relay (trip order, alarms, power on, watch dog etc.)
- Local! Remote acknowledgement of alarm & trip LED's.
- User programmable LED's, Min 4 Nos.

viii) Communication

- Local & remote ports Front port for local communication and rear port for remote communication
- Remote communication to be based on RS485 voltage levels and suitable for IEC 60870-5-103 protocol.

- Communication parameters to be programmed through HMI front port.
Software interface to be Windows last version compatible.
- Key pad on the front panel for easy access by user to any data.
- On line setting change

ix) Other features

- Sampling rate at min. 40 samples per cycle.
- Nos. IEC twice over current curves
- CT inputs
- Same relay to be suitable for 1A & 5A C1; inputs. Separate terminals shall be available for convenient use.
- .4 VT inputs
- Programmable inputs & outputs freely configurable. Atleast two output relays changeover type suitable for trip commands
- Common relay for Wider range of aux Supply voltage
- Password protection for local & remote
- Non volatile memory for lockout state, display state, setting values, recorded events / faults etc
- Inrush current monitoring
- Power quality monitoring
- Software support for setting, measurements, faults, alarms, events, disturbance .records, monitoring & fault analysis
- Time synchronisation.
- Commissioning aids such as connection check, direction determination, status Indication of Inputs/outputs and display of test records

d) Relays which rely for their operation in an external DC supply shall be rated for 110V D.C supply. A separate potential free contact shall be provided for DC supply monitoring and alarm. The signal must be reset and the relay made automatically ready for service when the supply returns. DC/DC converters shall provide galvanic isolating between the internal static circuits and the external station battery circuits. An integrated DC voltage buffer shall ensure uninterrupted performance of the relays in case of DC voltage interruptions" 50 ms.

e) For integration into a numerical coordinated substation automation system through SCADA, relays shall be provided with necessary serial interfaces / communication modules / accessories. These interfaces/modules/accessories shall be wired up to the protective relays and shall be suitable & ready for connection to substation automation system / SCADA. Interfaces & protocols shall be unified to ensure compatibility between different manufacturers.

Communication shall use the standard protocol IEC 60870 -5 -'103. Interfaces must comply with the requirements of DIN VDE 0435 Part 303 with respect to the insulation and interference values given for circuits which are connected to external terminals The "interference radiation test" and 'test with electrostatic discharge (ESD)" and the "fast transient disturbance test" must be observed The necessary measures may also be fitted in the plug module of the corresponding interface

f) Numerical relays shall be interrogated both from an integral keypad! HMI and from the serial port. Relay settings / resetting shall be possible from relay front as well as from remote. On line setting shall be possible with out affecting the relay operation & performance Selection of indications in the display must be possible, on the relay and from remote For setting and interrogation of the set values, relay must have integral operating elements These functions must be possible without reference to the handbook, menu guided or sufficient instructions on the relay Input which are outside the design range must be rejected. Design must prevent accidental or careless alteration of set values, e.g. a password High level of security must be built in the relay to avoid maloperation causing over protection of the system or any no operation of the relay causing under protection.

g) Provision must be available which will allow information to be interrogated from serial ports (for off-line PCs and on-line central, units). Scope of data dependent on protection type and application, e.g: System fault reporting Fault records, Status indications, Relay monitor, Line parameters, Setting values

h) Reference list and performance certificates from minimum 2 customers for the protective relays shall be furnished.

i) Copies of type tests conducted on the relays as per relevant Indian / International standards shall be furnished.

j} The vendor shall ensure availability of spare parts & maintenance support services for the relays for at least 10 years from the date of supply

1.2.5.1.3 Auxiliary Relays

Required no. of auxiliary relays shall be provided for achieving various interlocks as per approved drawings.

1.2.5.2 Indicating / Measuring instruments

1.2.5.2.1 Microprocessor based composite digital meters incorporating the features of indicating instruments and integrating meters shall be provided for 11 kV switchgear panels as shown in the single line diagram. The meters shall be capable of simultaneously measuring, displaying & communicating various electrical parameters.

1.2.5.2.2 The meters shall be suitable for 110 V, 50Hz PT supply and 5A CT secondary as shown in single line diagram. The aux Power supply shall be 110 V DC

1.2.5.2.3 The meters shall be of modular construction, 96mm x 96mm size in IP 54 enclosure.

1.2.5.2.4 The accuracy of meters shall be 0.2 and shall be true RMS type

1.2.5.2.5 Separate ports shall be available for local & remote communication Local communication shall be through HMI / Lap Top / Local PC The remote communication shall be based on RS 485 voltage levels and port shall be available for IEC60870-5-103 protocols. All necessary interfacing & wiring shall be provided making the meters ready for connection to sub-station automation system / SCADA.

1.2.5.2.6 Password protection shall be provided.

1.2.5.2.7 The following parameters shall be measured, displayed & communicated

- Voltage
- Current
- Frequency
- Power factor
- Active power (kW)
- Reactive power (kVAR)
- Apparent power (kVA)
- Active energy (kWh)
- Apparent Energy (kVAh)
- Reactive energy (kVARh)
- Max. Demand
- CT ratio
- PT ratio

1.2.5.2.8 The meters shall conform to IEC 1036, IEC 688, IEC 359 & IEC 529

1.2.5.2.9 Meter shall also have the necessary software for predictive demand forecast and alarm by means of potential free arrangement shall be provided in order to prewarn for the demand being exceeded to enable load shedding when required

1.2.5.3 Control switches

1.2.5.3.1 All circuit breaker operating switches shall be of the pistol grip type, spring return to neutral and lockable in that position. They shall be arranged to close the breaker by being turned clockwise. The trip neutral and close positions shall be clearly indicated. The movement shall be such that the switch cannot be operated inadvertently and it is mechanically interlocked to trip before close

1.2.5.3.2 Control switches shall be suitable for use in DC circuits up to 110V and AC circuits up to 440V. The switch shall have break rating of 5A at 110V DC and 16A at 440V AC. Where required, the switch shall have lost motion device. However, as a minimum one no. NAC and one no. NAT may be considered for the breaker control switch

1.2.5.3.3 Switches for any purpose other than circuit breaker operation shall be of a different design. Local remote control switches shall be stay put type, lockable in any position The switch shall be quick make, quick break type.

1.2.6 Wiring and ferrules

1.2.6.1 All control wiring shall be carried out with 1100 volts grade single core wires having stranded copper conductor of 2.5 sq.mm and power control shall be carried out with 4 sq mm minimum. The wire shall be insulated with fire resistant material HP- PVC-105 deg.C or equivalent approved by engineer

1.2.6.2 All control wiring shall be terminated using eye type tinned copper lugs on to the stud type terminals More than two wires shall not be terminated onto a single terminal.

1.2.6.3 All holes or tubes for wiring runs shall be bushed and shall have room for reasonable future additions.

1.2.6.4 Control cables when laid in HT busbar chamber, cable shall be taken through PVC conduits. No joints or tees shall be made in wires between terminals. The wire shall be identified by numbered ferrules at each end, all in accordance with the connection diagram, equipotential terminals shall have the same ferrule numbers.

1.2.6.5 All ferrules shall be made of non-deteriorating materials. They shall be white except in case of warning ferrules, which shall be red. Ring type ferrules shall have the character engraved on it. The ferrules shall be firmly located in each wire so that they cannot move freely on the wire. Wiring across hinges shall be by flexible wires. Further interlocked terminals shall be used for multiple ferruling.

1.2.6.6 The color code for control wiring shall be as enumerated below

- a) Spring charging motor and metering circuits- Black
- b) Closing, tripping, protection relays and main power supply circuits -Red.
- c) Annunciation and indication circuits -White

Alternatively colored sleeves may be provided as above at terminal connections.

1.2.7 Control circuit protection

1.2.7.1 All incoming control and power circuits shall be fed through isolating ON/OFF rotary switch and HRC fuses. Closing circuit, tripping and control circuit, lamp circuit shall be segregated and protected by independent fuses.

1.2.7.2 All fuses shall be HRC fuses with insulating base and holder All fuses shall be easily accessible by standing on the floor. Supply side shall be connected to the bottom of the fuse which shall be shrouded and the local circuit shall be taken from the top All fuses fittings shall be of same make Fuse ratings shall ensure protection coordination.

1.2.8 Inscriptions

1.2.8.1 Each unit and each component shall be clearly labeled to indicate its purpose

1.2.8.2 Owners name plates at front and back of each cubicle shall be engraved on white back ground with black lettering of 10mm size.

1.2.8.3 Each component label shall include the component symbol shown on the connection or schematic diagram.

1.2.8.4 All components mounted inside the cubicle shall be provided with screwed inscription plates

1.2.8.5 The characters to be engraved on the cubicle labels shall be furnished at a later stage

1.2.9 Earthing .

1.2.9.1 Two earth terminals shall be provided on each switch cubicle, at the back near the floor An earth bus of adequate cross section shall be fixed to these terminals The earth bar shall be electrically continuous and shall run the full extent of each board The earth bar shall be of same material as the busbars and shall have a minimum cross section of 300 sq mm copper Each unit shall be constructed to ensure satisfactory electrical continuity between all metal parts not intended to be alive and the earth terminals of the unit.

1.2.10 Painting

The switch unit cubicle shall be finished with approved color shade shall be Siemens Grey RAL 7032 Breaker truck to have same colour as cubical The sheet metal parts shall be subjected to following pre- treatment before final painting including the seven tank pre-treatment

- a) Degreasing
- b) Pickling for complete rust removal
- c) Phosphating
- d) Corrosion resistant primer painting. Two final coats spray painting shall be given.

Considering the chemically corrosive atmosphere at the location, Epoxy based primer! paint shall be used Further electrostatic powder coating is preferred..

1.2.11 Special tools

The switch board shall be supplied with a set of special tools required for its normal operation and maintenance.

1.2.11.1 Removable handles for charging the spring by hand in case of emergency, shall be provided Minimum 2 nos shall be supplied per switch board

1.2.12 Testing and commissioning

Each cubicle and switchboard shall be tested at works and at site as specified in 1.2.14.1.

1.2.13 Drawings

1.2.13.1 The following drawings / documents shall be submitted for approval after award of contract. Copies of approved drawings along with reproducible shall be furnished at the time of supply of equipment. In case testing and commissioning is carried out by the supplier/contractor in lieu of final drawings.. as built drawings incorporating site modifications along with reproducible shall be furnished. No. of copies and distribution of copies shall be as specified.

- Type test certificates and technical details of breakers, cubicles being supplied
- Type test certificates and Technical details of CTs, PTs being supplied
- Dimensional GA drawing of HT switchgear indicating foundation details, cable gland plate location for each cable
- Cross sectional drawing of cubicle indicating busbars, CTs, cable, breaker, seal-off bushing, 1 V chambers etc
- Details of busbar such as material, sizes, clearances, insulation details etc.
- Front view of the switchboard indicating arrangement of relays, controls, operating heights.
- Control schemes of each incomer / outgoing / feeder / breakers with complete bill of materials.
- Terminal plan and internal wiring drawings of all the cubicles.
- Inter panel wiring drawings.
- External wiring drawings.
- Excitation characteristics of protection CTs with specification.
- Operating and maintenance manuals.
- Catalogues, wiring diagrams, operating and maintenance instructions of relays, meters. However item Sl.Nos. a, b, d, g shall also be supplied along with the offer.

1.2.14 Tests

The following tests shall be conducted as per relevant IEC/IS standards and test certificates shall be furnished.

1.2.14.1 Switchgear

1.2.14.1.1 At works

- a) Dielectric test on the main circuit..
- b) Dielectric test on control and auxiliary circuits.
- c) Measurement of the resistance of the main circuit.
- d) Mechanical operation test.
- e) Tightness test..
- f) Design, functional & visual checks.

1.2.14.1.2 At site

- a) Di-electric test on the main circuit..
- b) Di-electric test on control and auxiliary circuit.

c) Measurement of resistance of main circuit.

d) Physical inspection

1.2.14.2 Current transformers

1.2.14.2.1 At works

- a) Ratio test
- b) Verification of terminal making and polarity.
- c) Accuracy class test.
- d) Power frequency high voltage test for 1 minute
- e) Measurements of knee point voltage and secondary winding resistance
- f) Insulation resistance test
- g) Physical inspection as per the approved drawings

1.2.14.2.2 At site

- a) Ratio test
- b) Measurement of terminal marking and polarity
- c) Measurement of knee point voltage and secondary winding resistance
- d) Power frequency withstand test for one minute along with switch board
- e) Insulation resistance test if required.
- f) Physical inspection as per approved drawing ~

2.0 DISTRIBUTION TRANSFORMER**2.1 OIL TYPE TRANSFORMER.****2.1.1 DESIGN CRITERIA**

2.1.1.1 3 phase power supply system in which transformer is to be used

- | | |
|--|-----------------------------------|
| a) Primary side (HV) max voltage | 12kV |
| b) System earthing | Secondary Neutral Solidly earthed |
| c) Max. Fault level on primary side (HV) | 350 MVA RMS |

2.1.1.2 Direction of power flow Unidirectional

2.1.1.3 Transformer application Industrial distribution

2.1.1.4 Transformer type

- | | |
|--|--------------------|
| a) Indoor/ outdoor | Outdoor |
| b) Dry type/liquid filled Mineral oil filled | Mineral Oil filled |
| c) Core type/shell .type | Core type |
| 2.1.1.5 No.of windings | Two winding |
| 2.1.1.6 Number of phases | Three |
| 2.1.1.7 Rated frequency | 50 Hz |

2.1.1.8 Rated no load voltage

- | | |
|---------------|----------|
| a) HV winding | 11kV |
| b) LV winding | 0.433 kV |

2.1.1.9 Cooling

- | | |
|----------------------|-------------|
| a) Cooling liquid | Mineral oil |
| b) Method of cooling | ONAN |

2.1.1.10 Rated kVA at no load voltage and principle tap 1000 kVA as specified

2.1.1.11 Ref. IS and whether over loading as per IS 6600-1972 required Ref. IS 2026-1977 over loading required

2.1.1.12 Max Temp.rise at rated kVA and principle tap

- | | |
|--|--------|
| a) Top oil by thermometer method over design ambient temp of 45Deg C | 450 C |
| b) Any winding (HV & LV) by resistance method over design ambient temp of 45°C | 550 C |
| c) Hot spot temp. based on the design ambient of 450 C | 1050 C |

2.1.1.13 Percentage impedance voltage at rated 4.75% current, frequency, principle tap and 75°C

2.1.1.14 Tappings

- | | |
|---|---------------------------------|
| a) Off-circuit/ON load | Off circuit |
| b) Manual/automatic | Manual |
| c) No of steps | +5%, +2½%, 0, -2½%, -5%, -7.5 % |
| d) Percentage variation/step | 2½% |
| e) Winding in which tappings are required | HV |

2.1.1.15 Short circuit withstand capability of transformer on any tapping for 3 phase and line to ground faults across LV winding Not less than 3 sec

2.1.1.16 Insulation

- | | |
|--|-------------------------|
| a) One minute power frequency withstand voltage | |
| HV winding | 28 kV RMS |
| LV winding | 2.5 kV RMS |
| b) 1 2 x 50 micro second impulse withstand voltage level | |
| HV winding | 75 kV Peak |
| LV winding | |
| c) Induced over voltage withstand | |
| HV winding kV(RMS) | As per IS 2026 Part III |
| LV winding KV(RMS) | -do- |
| d) Insulation material | Class 'A' |

2.1.1.17 Winding insulation category

- | | |
|------------------------------|---------|
| a) HV -uniform / non uniform | uniform |
| b) LV –uniform/ non uniform | uniform |

2.1.1.18 Winding data

- | | |
|--------------------------|---|
| a) No.of windings | Two |
| b) Winding material | Copper |
| c) Winding connection | |
| HV winding | Delta |
| LV winding | Star with neutral brought out fully insulated for connection to earth |
| d) Vector groups (HV-LV) | Dyn 11 |

2.1.1.19 Core laminations

- a) Type CRGO
 b) Material Silicon steel
 c) Thickness, mm 0.3

2. 1.1.20 Noise level in dB scale when measured Not more than 5 db above N EMA 4ft.from the transformer edge at a height of Standard publication TR-1 and 5ft. above the floor at rated voltage and load

2.1.1.21 Bushings

- a) Line bushing HV Porcelain, 3 Nos.
 LV Porcelain, 3 Nos.
 b) Neutral bushing HV LV 2kV, 2 Nos.
 c) Current rating in Amps HV 100 A
 LV 2500A for 1000kVA
 d) Creepage distance Not less than 31 mm/kV of rated voltage of the bushing.
 f) Short time rating As applicable for transformer.

2.1.1.22 Terminal arrangement

High voltage Cable end box with air insulated disconnect chamber for cables
 Low voltage Cable end box with provision for bus ducting

2.1.1.23 Radiators

Welded / detachable Detachable with shut off valves and air release plugs.

2.1.1.24 Fittings & accessories

- a) 150 mm dial type oil temp. indicator with max. reading pointer and with 2 sets of independently adjustable potential free NO contacts for alarm and tripping.
 b) 150 mm dial type winding temperature indicators with features same as OTI.
 c) Double float buchholz relay with potential free alarm and trip contacts, connecting pipe, isolating valves on tank side and conservator side
 d) Double diaphragm explosion vent
 e) Dehydrating breather with silica gel and oil seal.
 f) Radiators with top and bottom stop valves and drain and air release plugs.
 g) Conservator with sump and drain valve with cover plate and oil filling hole with cover plate and oil level indicator
 h) Marshalling box
 i) Air release plugs on tank cover and on radiator banks
 j) Valves with cover plates.
 -Top and bottom sampling valves.
 -Top and bottom filter valves.
 -Drain valve
 -Residual drain plug
 -Shut off valves on radiators
 k) Jacking pads and towing lugs
 l) Lifting lugs
 -For tank cover
 -For core and winding
 m) For complete transformer with oil Grounding pads
 n) Magnetic oil level gauge with alarm contact
 o) HV Cable end box with air insulated disconnect chamber
 LV Cable end box and separate LV neutral bushing for earthing with provision for bus ducting
 p) Rating and diagram plates, identification plate
 q) Removable bi-directional rollers
 r) Inspection opening with covers
 s) Necessary Double compression cable glands and tinned copper lugs

2.1.2 TECHNICAL SPECIFICATION**2.1.2.1 General**

This specification covers design, manufacture, inspection and testing at manufacturer's/their sub- supplier's works, packing and forwarding, delivery at site of oil type distribution transformers conforming to this specification and enclosed design criteria. Tenderer shall furnish data of the equipment offered along with the tender as required under questionnaire.

2.1.2.2 Transformer rating and over loading

- a) Transformers shall be capable of delivering the rated current at a voltage equal to 105 percent of the rated voltage, without exceeding the temperature limits specified for oil, winding and hot spot.
 b) Transformers shall operate satisfactorily without injurious heating at rated kVA, at any voltage within 10% of the rated voltage of the particular tap.

- c) Transformer shall be designed for 50 Hz :t 3% unless specified otherwise..
- d) Transformers for two or more limits of voltage or frequency or both shall operate satisfactorily at its rated kVA with out injurious heating under all the rated conditions of voltage or frequency or both provided an increase in voltage is not accompanied by decrease in frequency
- e) Transformers shall be suitable for over loading as per IS 6600 Unless specified otherwise off circuit tap switch, terminal bushings, other auxiliary components/equipments shall be designed for maximum permissible overloading. Short time over loading to the extent of 50% shall be considered for this purpose, for all transformers, unless specified otherwise
- f) Hot spot temp specified in the data sheet shall be based on design ambient temp.

2.1.2.3 Short circuit withstand capability

Transformers shall be capable of withstanding thermal and mechanical stresses during 3 phase, line to line, double line to earth and line to ground dead short circuits at the transformer terminals, for a period specified, without any injury Temp.. of the windings prior to the short circuit shall be considered as max permissible value in the normal operation. For this purpose, infinite supply system and solidly earthed systems shall be considered.

2.1.2.4 Vibration and noise level

Design and manufacture of transformer shall be such as to reduce noise and vibration level, The noise level shall not be more than 5 dB above NEMA standard publication TR-1,

2.1.2.5 Harmonics

The transformer shall be designed with particular attention to the suppression of harmonics, especially the third and fifth

2.1.2.6 Flux density

a) The max flux density in any part of the core and yokes., at normal voltage and frequency, shall be such that the flux density under over voltage condition as per clause no 2.1 22 a to d shall not exceed the max permissible values for the type of laminations used and core construction adopted.

b) Transformer shall be designed to withstand the following over fluxing conditions, 110% of max.flux density continuous (corresponding to rated voltage.)140% for 5 seconds and 125% for 1 minute

2.1.2.7 Magnetic circuit

a) The cores shall be constructed from high grade, low loss, high permeability cold rolled non-ageing grain oriented silicon steel laminations. Thickness of laminations shall be 0.3 mm or less, Surface insulation of laminations shall be rust resistant and have high inter laminar resistance insulation shall withstand annealing temperature as high as 850 degrees centigrade, The insulation shall be resistant to the action of hot oil. The insulation structure for the core to bolts and core to damp plates shall be such as to withstand a voltage of 2000V AC for one minute.

b) Whenever the CRGO sheets are punched or sheared into laminations, laminations shall be annealed in a nonoxidizing atmosphere to relieve stresses and restore the original magnetic properties of CRGO sheets. The laminations shall be free of all burrs and sharp projections

c) The design of magnetic circuit shall be such as to avoid static discharges, development of short circuit paths with in itself or to the earthed damping structure and production of flux components at right angles to the plane of the laminations which may cause local heating

d) Oil ducts shall be provided where necessary to ensure adequate cooling The winding structure and major insulation shall not obstruct the free flow of oil in such ducts

e) All steel sections used for supporting the core shall be shot or sand blasted after fabrication.

f) The finally assembled core and coil assembly shall be rigidly fixed to the tank to avoid shifting during transport, handling and short circuits Adequate provision shall be made for lifting the complete core and coil assembly.

g) The supporting frame work of the cores shall be so designed as to avoid the presence of pockets which would prevent complete emptying of the tank through the drain valve, or cause trapping of air during filling.

2.1.2.8 Windings

a) Transformers shall be suitable for isolated/non- effectively earthed neutral system as specified.

b) The coil clamping arrangement and the finished dimensions of any oil ducts shall be such as not impede the free circulation of oil through the ducts.

c) The windings/and connections of all transformer shall be braced to withstand shocks which may occur during transport or due to short circuits, repeated peak loads and other transient conditions during service

d) Windings shall be subjected to a shrinkage treatment before final assembly, so that no further shrinkage occurs during service. Adjustable device shall be provided for taking up any possible shrinkage of coils in service

e) The conductors shall be transposed at sufficient intervals in order to minimise eddy currents and equalise the distribution of currents and temperature along the windings

f) Coil clamping rings shall be of steel or of suitable insulating material. Axially laminated material other than bakelised paper shall not be used.

g) Completed core and winding assembly shall be dried in full vacuum to eliminate presence of moisture. After drying process, the full assembly shall be impregnated with oil immediately

h) No strip conductor wound on edge shall have a width exceeding six times its thickness.

- i) The winding material shall be copper.
- j) Windings shall not have sharp bends, which might damage insulation and/or produce dielectric stresses.
- k) Coil shall be supported using dried and high pressure compressed wedge type insulation spacers at frequent intervals.
- l) All insulating materials used shall be compatible with transformer oil, under all service conditions.
- m) All threaded connections shall be locked. Leads from the winding to the terminal board and bushings shall be rigidly supported to prevent injury during short circuits/vibration.
- n) Permanent current carrying joints in the windings and leads shall be welded or brazed
- o) Clamping bolts for current carrying parts inside the transformer shall be compatible with oil under all service conditions. specified, to be lifted by cranes or jacks, transported by road, rail or water without over straining any joints and without causing subsequent leakage of oil

2.1.2.9 Tap changer

- a) Tap changer Tappings as specified shall be provided on the higher voltage winding of each transformer and shall be arranged so as to maintain as far as possible the electromagnetic balance of the windings
- b) Tap changer shall be manual off circuit tap changer with no of steps and percentage variation per step as indicated is design criteria.

2.1.2.10 Oil

All transformers and all associated oil filled equipment shall normally be supplied along with first filling of oil and 10% excess quantity of oil shall also be supplied in non-returnable drums The oil shall conform to IS-335.

2.1.2.11 Transformer cooling

a) Radiators

- i) Transformers shall have detachable type directly mounted radiators unless specified otherwise
- ii) Bolted, gasketed, and flanged connection shall be used for connecting the radiators to the tank. All radiators shall be detachable type and shall be provided with machined or ground flanged inlet and outlet branches.
- iii) Separately mounted radiator banks if specified shall be connected to the tank by flanged pipe connections It shall be possible to withdraw the transformer from service position without disturbing radiators Shut off valves blanking plate, drain plug, air release vents, shall be provided in each interconnecting pipe.

iv) Accessories

The following accessories shall be provided for each Radiator / Radiator bank Top and bottom shut off valve and blanking plate.

-19 mm dia bottom drain plug and 19mm dia top filling cum air release plug.

-Lifting lugs

-Thermometer pockets in the inlet and out let pipes with thermometers fitted, (in case of separately mounted radiator banks)

-Top and bottom filter valves for each separately mounted radiator bank.

2.1.L12 Tank

- a) Tank shall be made from high quality low carbon steel and shall be oil tight welded construction.
- b) The tanks of all transformers shall be complete with all accessories and shall be designed so as to allow the complete transformer filled with oil, where oil.
- c) Fully assembled transformer together with its radiators, conserva10r and other fittings shall withstand for one hour, a pressure corresponding to twice the normal head of oil or 10 the normal pressure plus 35 kN/m²(5 lb/in sq) whichever is higher. measured at the base of the tank. The permanent deflection after the excess pressure has been released, shall not exceed the following.

Horizontal length of Permanent flat plate (mm)	deflection in mm
upto and including 750	5.0
751 to 1250	6.5
1251 to 1750	8.0
1751 to 2000	9.5
2001 to 2250	11.0
2251 to 2500	12.5
2501 to 3000	16.0
Above 3000	19.0

- d) The base of each tank shall be so designed that it shall be possible to move the complete transformer unit by skidding in any direction without injury when using plates or rails.
- e) Tank cover shall be of adequate strength and shall not distort when lifted. Inspection openings shall be provided as necessary to give easy access to bushings, testing earthing connection without removing tank cover Atleast. two openings of adequate size shall be provided at each end of the tank. Inspection covers shall have lifting arrangement and weight shall not exceed 25 kg

f) Tank covers shall have pockets for bulbs of oil and winding temperature indicators wherever specified, thermometer pockets shall have captive screwed top to prevent ingress of water. The pockets shall be located in the position of maximum oil temperature and it shall be possible to remove the instrument bulbs without lowering the oil in the tank

2.1.2.13 Ufting and haulage facilities

Lifting lugs shall be suitable for lifting the transformer with oil. Minimum of 4 jacking lugs, in accessible positions shall be provided to raise or lower the complete transformer with oil using hydraulic or screw jacks. Minimum height of the lugs above base shall be 300 mm excluding under base dimensions if detachable, for transformers up to 10 T weight and 500 mm for transformers above 10 T Transformer shall be provided with detachable, bi-directional

flanged wheels or rollers as specified. Means shall be provided for locking the 90 degrees swivel movements in positions parallel to and at right angles to the longitudinal axis of the tank Wherever specified, flanged wheels shall be provided suitable for use on gauge track as specified

2.1.2.14 Terminations

a) Cable end boxes shall be provided for terminations of cables.

b) The cable box shall be air insulated type suitable for the type and number of cables specified. The size of cable box shall meet the minimum dimensional requirement of i cable termination. Double compression type brass cable glands and tinned copper lugs shall be supplied. Cable boxes shall be air insulated type with clearances as specified. Further, air insulated disconnecting chamber shall be provided with inspection opening. Transformer may thus be withdrawn from its pen without disturbing cable connection. The gland plate shall be bolted type and shall be sufficiently big to remove the trifurcated cable from the cable box, without damaging the terminations

c) Cable sealing kits of specified type along with associated accessories like stress relieving cones, insulating tapes, trifurcating boot, HT insulating paste etc. shall be supplied along with transformer.

2.1.2.15 Bushings

a) Electrical characteristics of bushings shall be in accordance with 15-3347 and 15-2099. Minimum rated current of the line end bushing shall be 1.5 times the rated current of the corresponding winding. Where repeated peak loads are specified, bushing rating shall be selected accordingly.

b) Oil communicating type bushings shall be used for voltage ratings upto 36 kV. Oil used in bushings shall conform to 15-335.

c) Oil gauge shall be provided when oil in bushings is not in communication with that in the transformer

d) Clamps and fittings made of steel or malleable iron shall be hot dip galvanized Bushings rated more than 400A shall have non-magnetic clamps and fittings only.

e) Clearances in air between live conductive parts and live conductive part to earthed structure shall be as follows:

Nominal Impulse Clearances

system voltage kV RMS	test voltage	phase to phase (mm)	Phase to earth (mm)
11	75	280	140

f) For altitude exceeding 1000m above sea level, the clearance should be increased by 3% for every additional 300m

g) Bushings shall be suitable for atmosphere present in the place of installation.

2.1.2.16 Conservator

a) Conservator shall be located in such a position as not to obstruct the electrical connections to the transformer The conservator volume shall be sufficient to maintain the oil seal from ambient temp. of 5 degrees centigrade to oil temp of 90 degrees centigrade, with oil level varying within min. and max. levels.

b) Prismatic type oil level gauge with min. and max. levels marked shall be provided. Taps or valves shall not be fitted to the oil gauge.

c) Drain valve shall drain completely. One end of conservator shall be bolted into position so that it can be removed for cleaning purposes. If the sump is formed by extending the feed pipe into the conservator vessel the extension shall be for atleast 25 mm Oil filling hole with cap shall be provided

d) A silica gel breather with inspection window and oil seal shall be mounted at 1.4 meter above transformer base and connected to the conservator.

2.1.2.17 Buchholz Relay

i) Double float relay as per IS 3639

ii) 25 mm diameter connecting pipe

iii) Shut off valves on either sides of the buchholz relay

iv) Pot cocks at the top and bottom of relay, drain plug, inspection window, calibrated scale, terminal box with oil tight double compression type brass gland.

v) Potential free, self reset independent alarm and trip contacts rated to make, break and carry 2 amps at 110V DC. No auxiliary relay shall be used to multiply the contacts. Contacts are to be wired to the marshalling box

2.1.2.18 Valves and connections

All valves shall be of gun metal/cast steel, full way type with internal screw and shall be opened by turning counter clockwise when facing the hand wheel All valves opening to atmosphere shall be fitted with blank flanges. Means shall be provided for padlocking the bottom valves in open and closed position. All valves shall be provided with an indicator to show clearly the position of the valve. Oil sampling valves shall be provided at top and bottom of the main tank and these shall not be fitted on the filter valves. All transformers shall have bottom drain valve, top and bottom filter valves suitable for connecting to oil filtration unit

2.1.2.19 Joints and gaskets

All gaskets used for making oil tight joints shall be of proven material such as granulated cork-bonded synthetic rubber or synthetic rubber gaskets compatible with oil.

2.1.2.20 Explosion vent/ pressure relief device.

- a) Pressure relief device provided shall be of sufficient volume for rapid release of any pressure that maybe generated within the tank and which might result in damage to the equipment. The device shall operate at a static pressure of less than the hydraulic test pressure for transformer tank. Means shall be provided to prevent ingress of rain water.
- b) The relief device shall be mounted on the main tank and if on the cover shall be fitted with skirt projecting 25mm inside the tank and of such a design to prevent gas accumulation.
- c) If diaphragm is used, it shall be of double diaphragm type and material and situated above max oil level.
- d) The equaliser pipe connecting the pressure relief device and conservator shall be provided for relieving or equalising the pressure in the pressure relief device

2.1.2.21 Thermometer

- a) 150 mm dial type top oil, thermometer and winding temperature indicator for the I V windings shall be provided for all transformers.
- b) Each thermometer, shall have potential free N.D alarm contact and trip contact No multiplying contactor / relay shall be used Temp. setting of each contact shall be independently adjustable at site. A manual reset type max.temp indicator shall be provided for each thermometer Each winding temp indicator shall have temp sensing element, image coil and bushing mounted current transformer.
- c) Each thermometer shall be provided with remote temp. indicator along with associated accessories. The remote temp. indicators shall be connected to the marshalling box.
- d) All contacts shall be rated to make 1A and break 0.5 A at 110V DC. All contacts shall be wired to marshalling box
- e) In addition to the above winding temperature indicators controllers shall be provided, for control of forced cooling system of the transformer

2.1.2.22 Local Control Boxes

- a) Sheet steel of 3 mm thick/cast aluminium enclosed, transformer mounted, outdoor weather proof marshalling box conforming to IP-55 enclosure shall be provided for auxiliary equipment of the transformer
- b) Marshalling box shall accommodate temp indicators & controllers, terminal blocks made up of molded, non inflammable plastic material with adequate size terminals, washers, binding screws / nuts for external wire connections, white marked strips for circuit identification and molded transparent plastic cover.
- c) Space heaters with temp. controller, illuminating lamp and toughened glass windows shall be provided.
- d) Suitable brass glands & gland plates for terminating incoming and outgoing cables etc shall be provided in each box. All auxiliary equipment, protection and signaling contacts shall be wired to these transformer-mounted cabinets.

2.1.2.23 Earthing arrangements

- a) All metal parts of the transformer with the exception of individual core laminations, core bolts and associated individual clamping plates shall be maintained at some fixed potential by earthing. The main tank top cover shall be provided with min. 2 Nos. tinned copper terminals for earthing Two nos earthing pads at diagonally opposite external ends of main tanks at its bottom, capable of carrying short circuit current for 3 seconds without injurious heating shall be provided with clamp type terminal for external connection. In addition, HV & LV cable boxes shall be provided with 2 Nos. tinned copper stud type terminals for earthing
- b) Core clamping structure earthing
The top main core clamping structure shall be connected to the tank body by a copper strip of adequate cross section. The bottom clamp structure shall also be connected to the tank by one or more of the following methods.
 - i) By connection through vertical tie rods of the top structure.
 - ii) By direct metal to metal contact with tank base maintained by the weight of the core and windings.
 - iii) By connection to the top structure on the same side of the core as the main earth connection to the tank.
- c) Earthing of coil clamping rings

Where coil clamping rings are metal at earth potential, each ring shall be connected to the adjacent core clamping structure on the same side of the transformer as main earth connections.

- d) Earthing of magnetic circuit

Magnetic circuit shall be earthed at one point only. This shall be brought out of the tank cover through a suitably rated bushing and earthed through a removable link. This bushing shall be clearly identified with inscription plate. When the magnetic circuit is divided into pockets by cooling ducts parallel to the planes of laminations or by insulating material above 0.25 mm thick, tinned copper strip bridging pieces shall be inserted to maintain electrical continuity between pockets.

e) Size of Earth connection

All earth connections, except those from the individual coil clamping rings shall be done by copper conductor with min cross section of 80 sq.mm copper. Connections inserted between laminations of different sections of core shall not be less than 20 sq.mm.

2.1.2.24 Fittings and Accessories

Transformer shall be provided with fittings and accessories as specified in design criteria

2.1.2.25 Tests

a) Routine tests:

All the transformers shall be subjected to the following routine tests at the manufacturer's works. Test procedures as specified in 15-2026 shall be adopted.

i) Transformers shall be fully assembled with all fittings and accessories including I wheels to ascertain that all the parts fit correctly.

ii) Resistance of each winding of each phase at principal tap and at all other taps.

iii) Voltage ratio at all taps.

iv) Checking of voltage vector relationship.

v) Impedance voltage at rated frequency and principal tap, lowest and highest taps.

vi) Load loss at rated current.

vii) Zero sequence impedance at principal tap rated frequency.

viii) No load loss and no load current at rated frequency and 100%, 110%, of rated voltage on HV side. Test shall be repeated with 415 V, 3phase supply connected to LV side (if the LV side rated voltage is more than 415V).

ix) One minute power frequency withstand voltage test. **x)** Induced over voltage withstand test.

xi) Calibration of winding and oil temp. indicators.

xii) Following tests shall be conducted on oil samples drawn from transformer tank.

-break down voltage

-tan delta

-water content

-acidity

xiii) Fully assembled transformer with all fittings and accessories including conservator, radiators shall be subjected to a pressure corresponding to twice the normal head of oil or to the normal pressure plus 5 lb/sq.in, whichever is lower, measured at the base of the tank and shall be maintained for one hour.. Oil leakage shall not occur.

Permanent deflection in flat plates shall not exceed the values specified.

xiv) Measurement of noise level at rated voltage and rated current.

Type test: Copies of type test conducted as per IS 2026 shall be furnished for one transformer of each rating.

2.1.2.26 Drawings

The following drawings shall be submitted for approval.

a) Dimensional GA drawings of transformer indicating maximum limiting over all dimensions, location of fittings and accessories, weights, shipping dimensions, accessories dismantled for transporting, dimensions of wheels/rollers, details of cable end boxes, clearances and insulation levels, bushing details etc.

b) GA drawing., terminal plan, wiring diagram, front view of marshalling box.

c) Rating and diagram plate: Specification, excitation characteristics, and terminal plan of bushing CT's. GA drawing of HV, LV, and neutral bushings with specification Manufacturer's catalogues for all relays, WTI with repeater dial, OTI etc., Operation and maintenance manual for transformer.

Scope of Work includes:

1. Obtaining CEA safety license.

2. Supplying and laying of necessary control cable between transformer auxiliary relays to HT panel, Battery charger to HT panel, incoming for the battery are included in the scope of the work with suitable cable tags for identification of cables.

3. Removing of existing HT/LT / Control cables, earthings and re terminating the same if necessary for the completion of work.

4. Painting identification to be done for the equipments/cables/busbar size etc as per the instruction of the Engineer In-charge.

5. Minor civil works if any.

LIST OF APPROVED MAKE

S.NO	DESCRIPTION	NAME
1	Main switches	L & T/GE/Siemens
2	LT UG Cables-1100 volt grade	Universal/Gloster/Polycab
3	Cable glands	Dowells/Cabend/Jainson/Comet
4	Lugs/sockets (copper & Aluminium)	Dowells/Jainson/Comet
5	Current Transformers	Kappa/Sceintific/Jothi
6	HRC Fuse bases & links	L&T/GE/SIEMENS
7	Control fuses & HRC fuses	GE/ L & T/Standard/C & S
8	Insulation tape-PVC	Steel grip/Deer
9	Cable joint	RPG heat shrinkable/Delton heat shrinkable
10	GI Pipes	TATA/JINDAL(Class-B – Medium)
11	HT vacuum circuit breaker	Siemens
12	Distribution transformer	Volt amp/Siemens/Alstom/Crompton Greaves BHEL
13	Battery & Battery chargers	Amarraja/HPL knife
14	HT UG cable	Universal/NICCO/CCI
15	MV Panels	CPRI approved panel builders

Signature of the Contractor

**Signed-
Consultant (Elect)**

**Signed-
Executive Engineer (Elect)**