CSIR- NATIONAL GEOPHYSICAL RESEARCH INSTITUTE--
[Council of Scientific & Industrial Research]
HYDERABAD 500 007

E- TENDER DOCUMENT

REF: NGRI-03/03/2024-WKS **COST OF TENDER DOCUMENT: Rs.1000.00**

NAME OF WORK: "RENOVATION OF STAFF QUARTERS TYPE-III- 10 NOS. AND TYPE-IV- 06 NOS. AT CSIR-NGRI HYDERABAD".

DOWN LOADING OF TENDERS STARTS FROM	**9.30 AM. OF 29.10.2024**
DOWN LOADING OF TENDERS END AT	**6:00 PM. ON 05.11.2024**
UPLOADING OF DULY FILLED TENDERS STARTS	**9.30 PM. ON 29.11.2024**
UPLOADING OF DULY FILLED IN TENDERS END AT:	**6.00 PM. OF 05.11.2024**
e-TENDERING OPENING DATE & TIME:	**10.00 AM. OF 07.11.2024**
PLACE OF TENDER OPENING:	**CSIR-NGRI CAMPUS, HYD.**

E.M.D. TO BE DEPOSITED WITH TENDER **Rs.3,89,160.00**

E.M.D. REMITTANCE DETAILS:

C O N T E N T S

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06.	SPECIAL CONDITIONS & GENERAL CONDITIONS OF CONTRACT, CPWD SPECIFICATIONS, ETC.	CAN BE SEEN IN THE OFFICE OF CIVIL ENGINEERING SECTION AT CSIR-NGRI, DURING OFFICE HOURS

TENDERER's NAME & FULL ADDRESS:

SIGNATURE & RUBBER STAMP
OF THE TENDERER.

CSIR- NATIONAL GEOPHYSICAL RESEARCH INSTITUTE
[Council of Scientific & Industrial Research]
HYDERABAD 500 007

REF: NGRI-03/03/2024-WKS **WORKS SECTION**
Dt.:26.09.2024

NOTICE INVITING TENDER

Online bids are invited by the Director, CSIR- National Geophysical Research Institute, Uppal Road, Hyderabad 500 007 from the Registered Civil Contractors of C.P.W.D., Railways, M.E.S., P.W.D., P&T, BSNL, etc., and from any Public Sector Undertakings, Autonomous Bodies aided by the Govt. of India for the work of **"RENOVATION OF STAFF QUARTERS TYPE-III- 10 NOS. AND TYPE-IV – 06 NOS. AT CSIR-NGRI, HYDERABAD".**

Estimated Cost of the Work : Rs. 194.58 Lakhs

Time for Completion of the entire work: 150 DAYS from the 10th day of Issue of work order to the successful Tenderer.

EMD TO BE DEPOSITED WITH TENDER: Rs.3,89,160.00 [Rupees THREE LAKHS EIGHTY NINE THOUSAND ONE HUNDRED AND SIXTY] Only

All the interested and eligible Civil Contractors can down load the tender document from e-procurement portal of Govt. of India during the dates and time indicated below.

DATE TO QUOTE ONLINE	**FROM 29/10/2014 TO 5/11/2024**
LAST DATE AND TIME OF SUBMISSSION OF TENEDER	**5/11/2024 UPTO 6:00 PM**
DATE AND OPENING OF TENDERS	**7/11/2024 @ 10:00 AM**
PLACE OF TENDER OPENING:	**CSIR-NGRI CAMPUS, HYD.**

The EMD amount and Tender Fee has to be paid given by below SBI Collect Link.
https://www.onlinesbi.sbi/sbicollect/icollecthome.htm?corpID=20666

All the tenderers must upload scanned copies of the following documents along with their technical bid, EMD amounts and Tender Fee.

1. Copy of Registration Certificate [as a Civil Contractor] issued by the CPWD, State P.W.D., Irrigation Department, Road & Building Division, Railways, M.E.S. BSNL, or any Public Sector under takings OR Govt. Autonomous Bodies.

2.Copies of works completion certificate for similar type of work means construction of Building, Renovation of Building, etc. for a minimum value of Rs.1,55,66,400/- and above under single contract/ (One) 01 work or 02(Two) Experience certificate of value of Rs.1,16,74,800 /- and above or 03(Three) Experience Certificate for a minimum value of Rs.77,83,200 /- and above issued by any Govt. Organization or Govt Autonomous Bodies or any Multi National Company] **of similar works only will be considered. [Experience related to Water line/Pipe line/Sewage line work/Road/Spetic Tanks/ Shed/Annual Maintenance/Railways Track works related works will not be considered]. The works completed on** or after **01.04.2016** only will be consideration for qualifying purpose.

3. Copy of Permanent Account Number [P.A.N. Card] issued by the Income Tax Department.

4. Copy of GST Registration Certificate issued by the Govt. of India

5. Proof of payment of EMD amount of Rs.3,89,160/- through SBI Collect given Link at https://www.onlinesbi.sbi/sbicollect/icollecthome.htm?corpID=20666.

6.Details of Tenderers Bank including Branch Name, Account No., IFSC Code No etc., [For refund/returning of EMD of the unsuccessful tenderer]

7. Name & address of the Tenderer, Contact Person Name & Designation including e-mail, cell Phone numbers, Land Line Numbers etc., duly typed on the letter head of the tenderer with signature and Stamp.

An amount of Rs.3,89,160.00 [Rupees Three Lakhs Eighty Nine Thousand One Hundred and Sixty only] as detailed above. EMD on any other mode will not be considered /accepted. In case, the contractor who wishes to make the EMD amount by way of Demand Draft drawn infavour or the Director,CSIR-NGRI Payable at Hyderabad has submit the scanned copy of the Demand Draft along with his/their technical bid through on-line and the original Demand Draft has to be submitted in the Civil Section by 05th November,2024 (on the last date for uploading of the tender). In case the Original DD is not received in the Civil Section, the tender of such tenderer will not be considered and it will be treated as tenders received without E.M.D.

The Tenders are to be submitted **Online** in two bids system as follows:

1. First Bid containing Technical Specifications, and the copies of documents indicated at S.No. 01 to 08 above etc.,
2. Second Bid Commercial Bid consisting of duly filled in B.O.Q. Online only. The BOQ is in Excel formate

Tenderers will not be permitted to Tender for works in the Concerned unit of All CSIR Lab in which a relative is posted in the grade between Controller of Administration and Junior Engineer [both inclusive]. They shall also inform the names of persons who are working with them in any capacity or subsequently employed by them and who are relative as mentioned above.

NOTE: A person shall be deemed to be relative of another if, and only, if (a) they are members of a Hindu Undivided family; or (b) they are husband and wife or (c) that he/she is related to the other in the following manner; Father, Mother [including step father/mother], Son [including Step Son/ Adopted Son], Daughter [including Step Daughter / Adopted Daughter], Son's wife, Father's Father, Son's Son, Daughter's Son, Daughter's Son's Wife, Son's Wife, Daughter's Daughter's Husband, Brother [including Step Brother/ Adopted Brother], Brother's Wife, Sister [including Step Sister / Adopted Sister], Sister's Husband.

Tenders sent offline [Courier / Speed Post or submitted in Person] will not be considered.

The interested tenderers can up-load their offer/Tender [Technical and Commercial Bids] upto **6:00 P.M. on 05.11.2024**. Thereafter no tenderer will be allowed to up-load their offer/Tender.

All the technical bids of the tenders uploaded by the tenderers within the stipulated time upto 6:00 P.M. on 05.11.2024 will be opened on 07.11.2024 at 10:00 A.M.

The Commercial bids of those tenderers whose technical bids are accepted after its verification/ scrutinization only will be opened. All other commercial bids of tenderers whose technical bids are rejected/ not accepted will not be opened.

The E.M.D. amount of success full tenderer will be retained by CSIR-NGRI and to be adjusted towards future recovery of Security Deposit.

The Scope of work includes all minor and petty civil & Electrical works which are not specifically not indicated but which are essential for the completion of the work.

The time for completion of the entire work will be 150 days from the 10th day of issue of work order to the successful tenderer.

ALL THE TENDERERS MUST VISIT THE SITE BEFORE SUBMITTING THEIR OFFER and get fully acquainted themselves with the site conditions and the quantum of associated works, for the satisfactory execution of the work contract and as such, nothing extra will be entertained on these account at a later stage.

The lowest tenderer is decided based on quoted rates/amount for all the components together in respect of all the schedules attached in tender document. It is mandatory and obligatory on the part of the main contractor (Civil Contractor) to sign the tender documents for all the components.

The CSIR-NGRI reserves the right to lays down criteria for agencies responsible for execution other than Civil Parts included in the schedule. Agencies engaged by the main (Civil) Contractor are required to fulfil the laid down criteria. [In case, the main contractor himself meets the required eligibility criteria as laid down by the CSIR-NGRI for such other than Civil Works, he will be allowed to execute the same after due verification etc].

In case the main Civil Contractor doesn't have experience for other components other than Civil Work indicated in the Schedule, he will be permitted/allowed to engage such experienced agencies/contractor for such works as a sub-contractor subject to the condition engagement of such sub-contractor/agencies has to be approved by the Concerned area of Engineer-In-Charge.

The final bill of the main contractor will be paid/released/admitted only after making payment to such sub-contractors/agencies engaged by the main contractor and on submission of NO Dues Certificate from such sub-contractor/agencies.

The successful main contractor has to submit copy of MOU/Work issued by him for engagement of sub-contractor/agencies other than Civil Work, approved by the concerned CSIR-NGRI Engineer. Failing which such sub-contractor/agencies will not be allowed to carry out the work at the site.

In case main contractor intends to change any agency/agencies during the operation of the contract, he shall obtain prior approval of respective Engineer-In-Charge of the agreement. The new agency/sub-contractor shall also have to satisfy the laid down eligibility criteria and necessary approval of such new agency/sub-contractor has to be obtained from the concerned Engineer-In-Charge. In case, the Engineer-In-Charge of respective discipline is not satisfied with the

performance of any agency, he can direct the main contractor to change the such agency/sub-contractor executing such items of work and this shall be binding on the contractor.

The composite work is treated as complete when all the components of the work are complete.

The main contractor has to submit detailed execution programme of the work which forms part of his agreement with the department. He has to indicate in the programme, the time/stage of the work when the agency of such sub-contractor/agency of work will be deployed by him. The main contractor has to maintain all materials register as per CPWD and after work completion the all material register submit to Engineering Incharge.

The successful tenderer has to carry out the work as per actual site requirements and as per the directions given by the Engineer-in-Charge.

The rates shall be inclusive of all taxes, GST etc., as applicable in Telangana State. The rates shall also include loading, unloading, transportation, labour charges, petty /minor civil and electrical works and scaffoldings etc., As such nothing extra will be entertained/paid at a later stage.

The charges shall also include all rental charges for any machinery, tools, plants, required for the execution of the work as a whole.

In addition to the above, the charges shall also be deemed as inclusive of all Preliminary works which may be required to commence the main work. The charges shall also be inclusive of clearing the site after completion of the entire work and for removal of debris/ rubbish etc., and the site has to be handed over to CSIR-NGRI in neat and clean manner.

The successful tenderer has to make their own arrangement for necessary tools, plants, scaffoldings, required for carrying out the work, labour forces etc., and CSIR-NGRI will not take any responsibility to provide anything on these account.

The successful tenderer has to make their own arrangement for the safety and security for the materials brought by them to the site for the usage/erection purpose. CSIR-NGRI will not take any responsibility on this account or pay any compensation or any extra amount in case of any loss/ damages/ theft etc., whatsoever.

In case of any damages caused to the structure or any machinery, property, fittings or fixtures of CSIR-NGRI after handing over of the site to the successful contractor, by the workers/ supervisors to be engaged by the successful tenderer due to carelessness, the same has to be rectified/ repaired/ serviced/ replaced by the successful tenderer at their own cost as the case may be, failing which the same will be carried out by CSIR-NGRI and the charges/expenditure incurred or likely to be incurred by CSIR-NGRI, as per the assessment made by the Engineer-in-Charge, such expenditures will be recovered from the contractors bill or from any money due to them.

Electricity charges will be recovered as per actual from the contractor's bill. The electrical power can be arranged on specific request of the successful tenderer at one point only. The contractor has to make their own arrangement for extension card, cable etc., to provide at their convenient at their own cost. All such temporary extension cards, cables etc., provided by the contractor has to be removed before making final bill for the work done by them.

Water charges will be recovered @ 1% of the total value of the work done without GST.

The work has to be carried out in a phased manner within the time schedule indicated above without causing any major disturbance to the Staff / Occupants of the Colony. It is the prime responsibility of the Contractor to Co-Ordinate with other Contractors working in the area/ building/ nearby site and in case of any delay due to other contractor, the contractor is entitled to request for extension of time only and no compensation under any circumstance will be entertained.

The successful tenderer must ensure safety and take all precautionary measures of the workers/ supervisors/ technicians/ labour forces to be engaged by them for this work and in case of any worker/ labour/ supervisor/ technician of the contractor met with any accident. Serious calamity or death etc., the payment of compensation rests with contractor and CSIR-NGRI will be free from all such encumbrances.

All the workers/ supervisors/ Labourers to be engaged by the contractor for this work are required to strictly follow the security rules of CSIR-NGRI while they are within the CSIR-NGRI Campus.

INCOME TAX & TDS on GST, Labour Cess, etc., will be recovered from the bills of the Contractors as per the instructions of the Govt. of India as applicable from time to time while making payment.

The tenderers are expected to go through the entire tender document, terms and conditions, specifications, special conditions, etc., before submitting/up-loading their offer. In case of any clarification is required the same has to be sent in writing to Shri Sunil Kumar A.E.E.[C][e-mail id: civil@ngri.res.in] at-least 48 hours before the due date for uploading the offer. No clarifications will be provided to the oral enquiries made in person or over phone.

Tenders shall remain valid for 90 days from the date of opening of commercial bids for award of work. Validity beyond 90 days from the date of opening of commercial bids by mutual consent.

Tenderer have to quote their rates in online upload BOQ. Any other placed writer/mention about BOQ rates/ regarding financial bid will not be accepted.

In case any tenderer wants to add their own terms and conditions or specifications will not be accepted at any circumstances. If offer any rebate they are most welcome to do so in their covering letter without mentain about price bid/quoted.

Some of the provisions of General Conditions of Contract are given below, Interpretation however shall be as given in the General Conditions of contract which is approved here.

A. DEFECTS & LIABILITY PERIOD: 01 YEAR [12 MONTHS] FROM THE DATE OF COMPLETION OF THE WORK AS CERTIFIED BY THE ENGINEER-IN-CHARGE.

B. **MINIMUM VALUE OF WORK FOR THE INTERMEDIATE CERTIFICATE/PAYMENT: Rs.30.00 LAKHS INTERIM PAYMENT/RUNNING BILLS. ONLY ONE RUNNING BILL WILL BE ENTERTAINED IN A CALENDER MONTH.**

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1. SECURITY DEPOSIT: A sum @ 10% of the gross amount of the bill shall be deducted from each running bill of the contractor till the sum along with the sum already deposited as earnest money, will amount to security deposit of 5% of the tender value of the work. In addition, the contractor shall be required to deposit an amount equal to 5% of the

tendered value of the contract as Performance Security within the period prescribed for commencement of work in the letter of award issued to contractor/firm.

C. COMPENSATION: Contractor shall pay as compensation an amount equivalent to 1% [ONE PERCENT] per week or part thereof, on the total value of work done, subject to a maximum of 10% of the gross value of work done as a Penalty/ Compensation for non-completion of the work within the time period.

The Engineer-in-Charge reserves the right to make part payment for any item or for all the items in the Running Account Bill, based on his own assessment, if required.

The Security Deposit will be refunded without any interest after the completion of the full defects liability period, provided all the defects pointed out during this period are rectified/ repaired/ replaced as the case may be at the contractors cost and further subject to the condition that the same is not forfeited for any other reason.

No part refund of Security Deposit during the currency of the Defects Liability period will be entertained.

No Bank Guarantee towards Security Deposit will be entertained.

In addition to the above said Security Deposit, the successful tender has to deposit 5% of their total awarded value towards Performance Deposit by way of Demand Draft/Banker's Cheque drawn in-favour of the Director, CSIR-NGRI, Hyderabad or by way of F.D.R. duly pledged in favour of the Director, CSIR-NGRI, Hyderabad at the time of entering into the formal agreement with the Director, CSIR-NGRI.

The Performance deposit amount will be refunded without any interest [in case of deposit made by BC or DD] and in case of F.D.R. the same will be returned as it is by duly discharging , at the time of making final bill, provided the work is completed satisfactorily and the same is not forfeited for any reason.

All the tenderers are expected to quote reasonable and workout able rates in their tender taking into consideration of the conditions of the site quantum of work to be done including anticipated minor modifications, if anything, to be done for the successful laying of the pipe line. In case the rates/ amount quoted by the first lowest tenderer appears to be very low and unworkout able in the opinion of the Engineer, the Director, CSIR-NGRI reserves the right to demand additional Performance Deposit from such tenderer, as per the recommendations of the Engineer-in-Charge.

The successful tenderer has to supply the materials as per the approved make informed/ indicated by the Engineer-in-Charge. In case the successful tenderer wants to use any other make due to non-availability of such approved make in the market or due to any other reason, all such alternative make have to be got approved from the Engineer-in-Charge by the contractor before they put into use or work. Otherwise the same will be rejected in to and no payment for such non approved make will be entertained. No extra/ additional claim for such modification re-doing of work will be entertained.

The successful tenderer has to execute a formal agreement with the Director, CSIR-NGRI on a Rs.100/- Non Judicial Stamp Paper within one week from the date of intimation and also submit

the Performance Deposit as indicated in this NIT along with stamp paper, failing which it will be presumed that the tenderer is not willing to execute the work and in that case, the EMD amount deposited along with the tender will be forfeited without any further notice/communication/intimation.

Canvassing in connection with the tenders is prohibited and tenders submitted by the contractors/ firms who resort to canvassing are liable for rejection.

In case, the tenderer other than those called for negotiation/ discussion/ specifically asked to give discount, give any rebate or discount after the tender opening the same will not be considered and in addition their tender become liable for rejection.

In case the tender opening date happens to be declared as a closed holiday due to any unforeseen reasons, the tenders will be opened on the next day without any change in the timings.

No Request for grant of exemption from the payment of Tender Fee, EMD or Performance Deposit will be entertained/considered.

The Employer does not find himself to accept the lowest or any Tender and reserves to himself/herself the right of accepting the whole or any part of the Tender and Tenderer shall be found to perform the same at the rates quoted.

IMPORTANT NOTES:

1) **No request for exemption of EMD or Performance Deposit will be entertained from any agency/contractor.**

2) **All the tenderers must submit their bank details, in order to refund the EMD amount through online for the unsuccessful tenderer.**

COMPLIANCE TO LABOUR LAWS & APPRENTICE ACT

The contractor shall comply with all the provisions of the Minimum Wages Act, 1948, Contract Labour (Regulation and Abolition) Act, 1970, and rules and orders framed there under and other labour laws affecting contract labour and Apprentice Act, 1961 and the rules and orders framed there under that may be in force or brought into force from time to time. Contractor shall obtain a valid license under Contract Labour (R&A) Act 1970 and Contract Labour (R&A) Central Rules 1971 before commencing work and which should be valid till the completion.

I. CONTRACTOR'S SITE SUPERINTENDENCE

Staff to be employed by contractor on works:

The contractor shall employ the following technical staff during execution of works:

For building and road works

One graduate Engineer, when the tendered cost of work exceeds Rs.10 lakhs

One qualified Diploma holder (overseer) with experience not less than 3 years when the tendered cost of work exceeds Rs.5 lakhs but less that Rs.10 lakhs

One qualified Diploma holder when the tendered cost of work is more than Rs.2 lakhs but less than Rs.5 lakhs

For sanitary and water supply works:

One qualified diploma holder with experience of not less than 5 years, out of which one year should be in sanitary and water supply works when the tendered cost of work is more than Rs.50,000/-

For electrical works

One qualified Graduate Engineer possessing Degree in Electrical Engineering from recognized university with an experience of not less than 3 years or a Diploma holder in Electrical Engineering with an experience of not less than 7 years when the tendered cost of the work is not less than Rs.1.5 lakhs

One Graduate Electrical Engineer with two years experience or a Diploma holder I Electrical Engineering with experience of not less than 3 years, when the tendered cost of the work is more than Rs.75,000/- but less than Rs.1.5 lakhs.

One Diploma holder in Electrical Engineering with experience of not less than 3 years when tendered cost of work is more than Rs.37,000/- but less than Rs.1.5 lakhs

One licensed Supervisor with experience of not less than 3 years when the tendered cost of work is more than Rs.7,500/- and less than Rs.37,000/-

1. In case the contractor fails to employ the technical staff as aforesaid, he shall be liable to pay reasonable amount not exceeding the amount shown below for each month of default. These recoveries are subject to modifications from time to time by CSIR based on CPWD:-

In case when a Graduate Engineer is to be employed

……. Rs.3,000/-

In case when a qualified Diploma holder is required to be employed

……. Rs.1,500/-

In case when a technical Supervisor is required to be employed

…….. Rs.750/-

ADDITIONAL CONDITIONS OF CEMENT, STEEL & BITUMEN CONDITIONS FOR CEMENT:

The contractor shall procure 33 grade (Conforming to IS: 269) or 43 grade (Conforming to IS: 8112) ordinary Portland cement, as required in the work, from reputed manufactures of cement having a production-capacity of one million tones per annum or more such has ACC, L & T, J.P, Rewa, Vikram, Shri Cement, Birla Jute and Cement Corporation of India etc, as approved by Ministry of Industry, Government of India, and holding license to use ISI certification mark for their product whose name shall be got approved from Engineer-inCharge. Supply of cement shall be taken in 50 Kg. bags bearing manufacture's name and ISI marking, samples of cement arranged by the contractor shall be taken by the Engineer-inCharge and got tested in accordance with provisions of relevant BIS codes. In case test results indicate that the cement arranged by contractor does not conform to the relevant BIS codes, the same shall stand rejected and shall be removed from the site by the contractor at his own cost within a week's time of written order from the Engineer-in-Charge to do so.

The cement shall be brought at site in bulk supply of approximately 50 tones or as decided by the Engineer-in-Charge.

The cement godown of the capacity to store a minimum of 2000 bags of cement shall be constructed by the contractor at site of work for which no extra payment shall be made. Double lock provisions shall be made to the door of the cement godown. The keys of one lock shall remain with the Engineer-in-Charge or his authorized representative and the key of the other lock remain with the contractor. The contractor shall be responsible for the watch and ward and safety of the cement godown. The contractor shall facilitate the inspection of the cement godown by the Engineer-in-Charge at any time.

The contractor shall supply free of charge the cement required for testing. The cost of tests shall be borne by the contractor.

The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in Clause 6 of the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in Clause 6 of the contract and shall be governed by conditions laid therein.

Cement brought to site and cement remaining unused after completion of work shall not be removed from without written permission of the Engineer-in-Charge.

CONDITIONS FOR STEEL:

The contractor shall procure steel reinforcement bars conforming relevant BIS codes from main producers as approved by the ministry of steel. The contractor shall have to obtain and furnish test certificate to the Engineer-in-Charge in respect of all supplies of steel brought by him to the site of work. Samples shall also be taken and got tested by the Engineer-inCharge as per the provisions in this regard in relevant BIS codes. In case the test results indicate that the steel arranged by the contractor does not confirm to BIS codes, the same shall stand rejected and shall be removed from the site of work by the contractor at his cost within a week's time from written orders from the Engineer-in-Charge to do so.

The steel reinforcement shall be brought to the site in bulk supply of 10 tonnes or more as decided by the Engineer-in-Charge.

The steel reinforcement shall be stored by the contractor at site of work in such a way as to prevent Distortion and corrosion and nothing extra shall be paid on this account. Bars of different size and lengths shall be stored separately to facilitate easy counting and checking.

For checking nominal mass, tensile strength, bend test, re-bend test etc.., specimen of

sufficient

length shall be cut from each size of the bar at random at frequency not less than that specified below:

Size of bar	For consignment below 100 tones	For consignment over 100 tones
Under 10mm dia.	One sample for each 25 tones or part thereof.	One sample for each 40 tones or part thereof.
10mm to 16mm dia	One sample for each 35 tones or part thereof.	One sample for each 45 tones or part thereof.
Over 16mm dia	One sample for each 45 tones or part thereof.	One sample for each 50 tones or part thereof.

The contractor shall supply free of charge the steel required for testing. The cost of tests shall be borne by the contractor.

The actual issue and consumption of steel on work shall be regulated and proper accounts

maintained as provided in clause 6 of the contract. The theoretical consumption of steel shall be worked out as per procedure in clause 6 of the contract and shall be governed by conditions laid therein.

Steel brought to side and steel remaining unused shall not be removed from site without the written permission of the Engineer-in-charge.

CONDITIONS FOR BITUMEN

The contractor shall bring the required grade of Bitumen as specified in the item of works in sealed Drums of ISI mark & standard company / Refinery of ISI grade.

The contractor shall test the bitumen free of charge in the standard approved. Laboratory as per ISI & CPWD practice for its quality.

The quality of Bitumen to be collected as per relevant codes of work as specified in ISI & CPWD practice.

In case the road work is done by Hot Mix Plant with mineral aggregate or at site the necessary relevant test of mix for quality and proportion of Bitumen to be carried out by the contractor on his own expenditures as per ISI codes & CPWD practice of the concerned works.

ADDITIONAL SPECIAL CONDITIONS

Plastic Emulsion and oil bound washable distemper & synthetic Enamel paint:

Material should be used of 1st qualify manufactured by reputed firms like M/s Jenson & Nicholson, M/s ICI, M/s Asian Paints. Once the material is approved it shall be brought to site in original sealed tins/drum directly from the supplier and shall be held at the joint custody of all the contractor and Engineer-in-charge from the Department at site. Contractor shall hand over all the remaining painting materials to office after the consumption. Supply in part or broken containers will not be accepted for the work. Empty tins/drums should be removed from site only when passed/ordered by the Engineer-in-charge.

Paints shall generally conform in the chemical composition and other characteristics to the relevant British standards or I.S. specifications.

External Paint: Manufacture of M/s Asian Paints

a) Storing of Paint: All the materials shall be kept properly when not actually in use. Lids of container shall kept closed and the surface of the paint in open or partially open containers shall be covered with a thick layer of turpentine to prevent the formation of skin. Materials which in the opinion of the Engineer-in-charge have become stale or fat shall not be used on the work and shall be removed from the site of the work forthwith.

b) Preparation of the surface: Surface shall be thoroughly cleaned of all dust, stains etc. All cracks, crevices and uneveness shall be made good by applying enamel putty, allowing it to dry and then papering the same to give a smooth and even surface.

c)Application: After the preparation of surface and having got the area approved by the Engineer-incharge paint shall be applied.

IV) a) Necessary cleaning of floors, doors windows and glass panes etc., after painting is to be done by the contractor, no extra payment will be made for such cleaning and washing of floors etc.

Contractor shall fully cover the house hold article with polythene sheet/cloth while painting inside the quarter.

Contractor shall clean sanitary and electrical installation including fans and also make good the damages if caused operation to any of the installations.

Contractor should quote rate for carrying out work up to any height as per scope of work and the location of the buildings in the campus.

All the Painting application have to carried out only be suitable paint brush/ Roller/Spray as required.

All reinforcement/ iron pipes/sheet shall be free from rust loose mill scale or coats of Oil, Paints etc. which may destroy bond and protected by anti-corrosive treatment before placing in position for concreting. The agency should use the steel manufactured by the Main Produces only. No re-rolled steel shall be incorporated in the work.

The owner shall supply one-point electricity connection on chargeable basis.

Clause Planning and Designing in purview of Vulnerability Atlas of India

Vulnerability Atlas of India (VAI) is a comprehensive document which provides existing hazard scenario for the entire country and present the digitized State/UT – wise hazard, maps with respect to earthquakes, winds and flood for district-wise identification of vulnerable areas. It also includes additional digitized maps for thunderstorms, cyclones and landslides. The main purpose of this Atlas is its use for disaster preparedness and mitigation at policy planning and project formulation stage.

This Atlas is one of its kind single point source for the various stakeholders including policy makers, administrators, municipal commissioners, urban managers , engineers, architects, planners, public etc. to ascertain proneness of any city/location/site to multi-hazard which includes earthquakes, winds, floods, thunderstorms, cyclones and landslides. While project formulation, approvals and implementation of various urban housing, buildings and infrastructures schemes, this Atlas provides necessary information for risk analysis and hazard assessment. The Vulnerability Atlas of India has been prepared by Building Materials and Technology Promotion Council under Ministry of Housing and Urban Affairs, Government of India and available at their website www.bmtpc.org.

It is mandatory for the bidders to refer Vulnerability Atlas of India for multi-hazard risk assessment and include the relevant hazard proneness specific to project location which planning and designing the project in terms of :

Seismic zone (II to V) for earthquakes

Wind velocity (Basic Wind Velocity 55,50,47,44,39 & 33 m/s)

Area Liable to Floods and Probable max. surge height

Thunderstorms history

Number of cyclonic storms/severe cyclonic storms and max sustained wind specific to coastal region

Landslides incidences with Annual rainfall normal

District wise Probable Max. Precipitation

Additional Conditions-02 (Misc. Civil works & Renovation)

After taking the necessary drawings/sketches only contractor has to start the work.

After the work completed, the surplus earth to be removed and disposed of even if labour force is involved. The disposed earth in the campus has to be leveled, dressed etc. to complete as per instructions of Engineer-In-Charge. The surplus unwanted earth/debris etc to be disposed out of the campus by the contractor.

Contractor should incorporate material only after getting written approval from the Engineer-incharge. The contractor has to bring the material in advance, considering the time required for testing of material, collecting of test reports, etc.

Time of Completion of work is essence of the contract. If the Contractor fails to complete the work within stipulated time, penalty will be imposed as per relevant clauses of Agreement.

The Contractor has to get the lives of concerned workers sufficiently insured before commencement of the work, failing which he shall be personally responsible. NGRI/CSIR will not be responsible for any such lapse.

The centering and shuttering with materials of steel jack system, steel plates etc only.

The contractor should provide necessary safety equipment to his labours, while executing the work. The contractor is fully responsible for the safety of the labours engaged by him solely and CSIR-NGRI, Hyderabad is not liable to any form of compensation for any untoward incident/accident on any cost.

The contractor has to submit the BAR Chart/PERT chart along the stamp how the materials are arranging, by showing the time schedule of different items along with stamp for making the agreement.

80% of work to be completed to the period of 70% time given to complete.

I read the CSIR Works Agreement Conditions also and work will be completed according to rules, conditions, additional conditions, special conditions, CPWD specifications, etc. and I will not claim for any additional amount over and above quoted rates to do the work including above conditions.

Stamp and Signature of the Tenderer

UNDERTAKING BY THE TENDERER

I/ We …….[Name of tenderer]have gone through the entire terms and conditions, special conditions, technical specifications and B.O.Q. related to this tender and also we have inspected the site, we fully understand the scope of work and agreeable to the same.

NAME & ADDRESS OF THE TENDERER SIGNATURE OF THE TENDERER.

e-mail id of the Tenderer :

Cell Phone No. of the Tenderer

Stamp and Signature of the Tenderer

CSIR-CENTRE FOR CELLULAR & MOLECULAR BIOLOGY
[Council of Scientific & Industrial Research]
HYDERABAD 500 007

GENERAL CONDITIONS FOR ELECTRICAL PART

1. आई.ई.ई. तार विनियम :

I.E.E. WIRING REGULATIONS :

The installation shall generally be carried out in conformity to the latest Indian Electricity, Rules, th Supplementary Regulations of State Electricity Departments and Electricity undertakings concerned and th practice recommended by the Institution of Electrical Engineers, England herein referred as I.E.E. wirin regulations out wire this specification or the special specification attached to the tender differ from thos regulations, this specification and special specification shall be followed. In addition all installations shall compl in all respects with the requirement of Indian Electricity Rules, 1956 for the time being in force.

2. परिभाषा एवं परंपरागत संकेताक्षर :

DEFINITIONS AND CONVICTIONAL SYMBOLS :

The definition of terms in I.E.E. wiring regulation (extract reprinted in Annexure B) shall apply except th definition of a 'point'. The attached list of conventional signs and symbols shall be used in all drawings, wirin plans etc. (Appendix E).

Point wiring shall include all work necessary in complete wiring of a tumbler switch circuit of any lengt from the taping point on the distribution circuit to the following via and switch.

(a) Ceiling rose (in the case of ceiling & exhaust fan points)

(b) Ceiling rose or connector (in the case of pendent points except stiff pendent points).

(c) Back plate (in the case of stiff pendents).

(d) Socket outlet (in the case of socket outlet points).

(e) Lamp holder in the case of wall bracket, batton points, bulk head fittings & similar other fittings.

(f) Call bell/buzzer (in the case of the words via 'the switch' shall be read as 'via the ceiling rose socket outlet or bell push where not ceiling rose (socket outlet is provided').

टिप्पणी : The wiring for call bel shall be terminated in a ceiling rose/socket outlet except where the push
NOTE : provided on the walls.

When there is only one point on the distribution circuit (one way) the same shall be measured in two parts, one as circuit wiring as per the definition for "CIRCUIT WIRING" and the other as point wiring as per the above definition for "POINT".

The following shall be deemed to be included in the point wiring :–

(a) Switch and ceiling rose as required.

(b) In the case of wall brackets, bulk head fittings and similar fittings. Cable as required upto the lamp holder.

(c) Bushed conduit or procelain tubing where cables pass through walls etc.

(d) Earth wire from three pin socket point to the common earth including connections to the dearth dollov. rose/socket outlet or bell push shall be measured along the run of the wiring, classified as above and treated as one point so derived.

When more than one call bell/buzzer point are controlled by the same celing rose/socket outlet or bell push, the length of the point shall be measured as given in Note 1.

३-A. सर्क्यूट वायरिंग :

CIRCUIT WIRING :

Length of wiring from the distribution board upto the taping point for the first point viz. upto the first switch shall be considered as circuit wiring. Such wiring shall be classified on the basis of length.

The length in this case shall mean the length from the distribution or sub-distribution board upto the switch or the first point measured along the run of the wiring.

Except as described previously for point wiring, different types of wiring shall be measured separately and given in running meters. The length shall be in actual length fixed and the number and size of cables fixed shall be stated.

The wiring shall be carried out on such a system as may be specified in the tender schedule or otherwise specified in the special specification. 'POWER' and 'HEATING' wiring shall be kept separate and distinct from LIGHTING' and 'FAN' wiring. The wiring shall be done on the distribution system which main and branch distribution boards at convenient physical and electrical centres and without isolated fuses. All conductors shall be run, as for as possible, along the walls and ceiling so as to be easily accessible and capable of being throughly inspected. In no case, the wiring shall be run above the ceiling without the approval of the Engineer-in-charge. In all types of wiring, due consideration shall be given for neatness and good appearance.

3 B. The balancing of circuits in three wire or poly phase installations shall be arranged before-hand to the satisfaction of the Engineer-in-charge. Circiuts of opposite side of a three wire system or on different phases of a poly phase system shall be kept apart at a minimum distance of a 2 m. (6 ft.) unless they are enclosed in earthed metal casing suitable marked to indicate the risk of dangerous shock due to the voltage between the conductors contained in them. In large or important rooms, light and socket outlet points shall be distributed over more than one circuit as directed by the Engineer-in-charge.

3 C. Medium prossure wiring and associated apparatus shall comply in all respect with the requirement of Rules 50 & 51 of the Indian Electricity Rules 1956 (see Appendix 24).

4. वायरिंग की स्थिति :

POSITION OF WIRING RUNS AND POINTS :

All runs of wiring and the exact position of all points and switch boxes shall be first marked on the building or on the plan of the building and approved by the Engineer-in-charge before actual commencement of work.

5. दाब और आवृत्ति की पूर्ति :

PRESSURE & FREQUENCY OF SUPPLY :

All current consuming devices shall be suitable for the pressure and frequency of the supply to which hese are to be connected.

6. आरेखण :

DRAWINGS :

All wiring diagrams shall be deemed to be "Drawings' within the meaning of the terms as used in clause 11 of the conditions of contract (PWD 7 or PWD 8). The design of a switch board, or special fixture or any point of an electrical installation as may be called for by the Engineer-in-Charge shall also be supplied by the contractor and got approved by him. On completion of the work, a wiring diagram shall be prepared and submitted to the Engineer-in-charge. All wiring diagrams shall indicate clearly in plan, the main switch board, the distribution fuse board, the runs of various mains and submains, and the position of all points and their controls. All circuits are already indicated and numbered in the wiring diagram and all points shall be given the same number as the circuit to which they are electrically connected.

7. कंडक्टर्स :

CONDUCTORS :

All conductors shall be of aluminium. The smallest conductor for the final sub-circuit shall be 1.5 mm. The Size of conductor for power wiring shall be 4 mm. The minimum cross sectional area of conductor for flexible cord shall be 0.0006 sq. inch (14/.0076"). In the case of power circuit, the *designed for the load which it is supposed to carry.

8. केबल :

CABLE :

All cables shall conform to I.S.I. speficications and each coil shall be accompanied by the I.S.I. certification mark stating the types or the class and the length of each coil.

9. लचीली केबल एवं लचीले कार्ड्स :

FLEXIBLE CABLE AND FLEXIBLE CORDS :

Unless these cables and cords are protected by armour or tough rubber or P.V.C. sheath those shall not be used in workshops where they are liable to be subjected to mechanical damage.

10. केबल अंत :

CABLE ENDS :

Conductors having a nominal area exceeding 10 mm. shall always be provided with cable socket, or all strands at the exposed end of the cable shall be soldered together.

11. दीप, पंखा कोटर निकास स्थान एवं निकासी पंखा का रेटिंग :

RATING OF LAMPS FANS SOCKET OUTLET POINTS & EXHAUST FANS :

In estimating the current to be carried by any conductor, incandescent lamp shall be rated at 60 watts, unless otherwise specified. Ceiling fans shall be rated at 100 watts, tabel fans and ordinary/sockets outlet points at 60 watts and power sockets outlet points at 1000 watts unless the actual values are known or specified. Exhaust fans, if any, shall be rated according to their capacity.

12. संधि & लूपिंग बैक :

JOINTS & LOOPING BACK :

Unless otherwise specified in the special specification the wiring shall be done in the 'Looping system'. Phase or live conductor can be looped either from the switch box or from the light, fan or socket outlet.

Where joint box system is specified in the special specification, all joints in the conductors shall be made by means of approved mechanical conductors in suitable and approved junction boxes.

In both systems of wiring, no bare or wist joints shall be made at intermediate points in the run of cable unless the length of the final sub-circuit, or submain or main is more than the length of the standard coil, as given by the manufacturer of the cable.

If any joint becomes unavoidable, such joints shall be made through proper cut-outs or through proper junction boxes open to easy inspection, but in looping back system, no such junction boxes shall be allowed.

13. पूर्ति के प्रवेश-स्थान पर नियंत्रण :

CONTROL AT POINT OF ENTRY OF SUPPLY :

There shall be linked main switch or switches and one main fuse on each live conductor of the supply mains at the points of entry. The wiring throughout the installation shall be such that there is no break in the neutral wire in the form of a switch or fuse unit. The neutral shall also be marked. In this connection Rule 32(2) of the Indian Electricity Rules 1956 (See Appendix A) shall also be referred.

The main switch gear shall be easily accessible and shall be situated as near as practicable to the termination of service line.

On the main switch gear, where the conductors include an earthed conductor of a two wire system or an earthered neutral conductor of a multiwire system or a conductor which is to be connected thereto, an indication of a permanent nature shall be provided to identify the earthed neutral conductor. In this connection Rule 32(1) of Indian Electricity Rules 1956 (see Appendix 1A) shall be referred.

14. मुख्य स्विच और स्विच बोर्ड स्विच उनका स्थान निर्धारण :

A MAIN SWITCHES AND SWITCH BOARD AND THEIR LOCATION :

All main switches shall be either of iron clad enclosed pattern or of any insulted enclosed pattern as specified in the specification of the work, which shall be fixed at close proximity to the point of entry of supply.

Open type switch boards shall be placed only in dry situation and all in well ventilated rooms and they shall not be placed in the vicinity of storage batteries and exposed to chemical fumes.

In a damp situation or where inflamable or explosive dust, vapour or gas is likely to be present, the switch boards shall be totally enclosed or made flameproof as may be necessitated by the particular circumstances.

A switch board shall not be installed so that its bottom is within 1.25 m. (4 ft.) above a floor, unless the front of the switch board is completely enclosed by a door or the switch board is located in a position to which only authorised persons have access.

*Switch boards, if unavoidably fixed in places likely to be exposed to weather, to drip or to abnormal moist atmosphere the outlet casing shall be weather proof and shall be provided with glands or bushing or adopted to receive screwed conduit according to the manner in which the cables are run.

Iron clad switch gear shall preferably be mounted on and of the following types of boards.

Hinged type metal boards (suitable for small switch boards for mounting iron clad switch gear connected to supply at low voltages).

For small switch boards for mounting iron clad switch gear, metal boards shall be used. Metal board shall consist of a box made of sheet metal not less than 3.175 mm. (1/8") thick and shall be provided with a hinged cover to enable the board to be swung open for the examination of the wiring at the back. The Joints shall be welded.

The boards shall be securely fixed to the full by means of rag bolts and shall be provided with a locking arrangement and earthing stud. All wires passing through the metalboards shall be bushed.

Alternatively metal boards may be made of suitable size angle iron or channel iron frame work suitably mounted on front with a 3.1/5 mm. (1/3") thick M.S. plate and on back with 1.588 mm. (1/6") M.S. sheet. In the case of wood casing or P.V.C. system of wiring the top and bottom members may be replaced by 2.54 c.m. (1"

eak wood batton. Except for the above change all other details mentioned above shall be applicable for the ıltemative also. Besides the front sheet shall be provided with suitable hinges.

There shall be a clear distance of 3.175 c.m. (1 1/4") between the front and back sheets in both the cases. Aore spare should be allowed wherever necessary.

A teak wood board of thickness not less than 6.35 m.m. (1/4") may be provided at the back, if so required ı the special specification in any particular work.

4. फिक्सड टाइप बोर्ड :

B FIXED TYPE BOARDS :

(Suitable for large switch boards for mounting large number of switch gears and/or higher capacity iron ;lad switch-gear).

These shall consists of an angle or channel iron frame fixed on the wall or on the floor and supported on he wall at the top. There shall be a clear distance of 1 m (3 ft.) in front of the board. A working distance of 1 m. 3 ft.) behind the switch board is preferable. If there are any attachment of bare connection at the back of the ;witch board. Rule 51 (1) of Indian Electricity Rules 1956 (see Appendix A) shall apply.

The connections between the switch gear mounting and to the out going cable upto the wall shall be ınclosed in a heavy gauge conduit pipe.

The detailed dimention and design of metal boards and angle iron frame work for switch gears, including he disposition of the various mountings, whcih shall be systematically and neatly arranged for arriving at over ıll dimension shall be prepared and submitted before hand and shall have the prior.

5. प्रतिसरण बोर्ड :

RECESSING BOARD :

Where so specified in the schedule of work or in the special specification, switch boards shall be recessed nto the wall. The front shall be fitted with hinged panel of teak wood or other suitable material such as bakelite, ı teak wood frame with locking arrangement, the outer surface of the doors being flush with the walls. Ample oom be provided at theback for connections and at the front between gear mountings and the door.

6.(A) उपकरण की व्यवस्था :

ARRANGEMENT OF APPRATUS :

Equipment which is on the front of a switch board shall be so arranged that inadvertant personal contact vith live parts is unlikely during the manipulation of switches, changing of fuses or like operaions.

(b) No appratus shall project beyond any edge of the panel. No fuse body shall be mounted within 2.5 c.m. (or 1") of any edge of the panel and no hole other than the holes by means of which the panel is fixed shall be drilled closer than 1.3 c.m. (or 1/2") from any edge of the panel.

(c) The various live parts, unless they are effectively screened by substantial barriers of non-hygroscopic, non-inflamable insulating material, shall be so spaced that an are cannot be maintained between such parts and earth.

(d) The arrangement of the gear shall be such that they shall be readily accessible and their connections to all instruments and apparatus shall also be easily traceable.

(e) In every case in which switches and fuses are fitted on the same pole, these fuses shall be so arranged that the fuses are not alive when their respectable switches are in the 'off' position.

(f) No fuses other than fuses in instrument circuit shall be fixed on the back of or behind a switch board panel or frame.

17.(A) उपकरण का तयारा :

MAKING OF APPARATUS :

When a board is connected to voltage higher than 250 volts, all the terminals or leads of the appratus mounted on it shall be marked in the following colours to indicate the different poles or phases to which the apparatus or its different terminals may have connected.

A.C.	*D.C.*
Theree phases-Red, Blue & Yellow	Three wire system 2 out-wires-Red and Blue
1 Neutral - Black	1 Neutral - Black

Where four wire three phase wiring is done, the neutral shall preferably be in one colour and the other three wires in another colour.

(B) Where a board has more than one switch, each such switch shall be marked to indicate which section of the installation it controls. The main switch shall be marked as such and where *is more than one main switch in the building, each * there such switch shall marked to indicate which section of the installation it controls.

All marking required under this rule shall be clear and permanent.

18.(A) मुख्य एवं शाखा वितरण बोर्ड :

MAIN AND BRANCH DISTRIBUTION BOARDS :

Unless otherwise specified in the special specification, main and distribution fuse board shall be of the iron clad type or any type mentioned above.

(b) Main distribution boards shall be provided with a switch or circuit breaker on each pole of each cirtuit a fuse on the phase or live conductor and a link on the neutral or earthed conductor of each circuit. Switches shall be always be linked.

(c) Branch distribution boards shall be provided with a fuse on the live conductor of each circuit and the earthed neutral conductor shall be connected to a common link and be capable of being disconnected individually for testing purposes. One spare circuit of the same capacity shall be provided on each branch distribution board. Lights and fans may be wired on a common circuit. Such sub circuits shall not have more than total of ten points of light, fan and socket outlets or a load of 800 watts, whichever is less. If a separate fan circuit is adopted the number of fans in the circuit shall be eight. As regards power sub-circuits, the outlet shall be provided according to the load design of those circuits but in no case shall there be more than two outlets on each circuits.

19.(A) संस्थापन वितरण बोर्ड :

INSTALLATION DISTRIBUTION BOARDS :

The distribution fuse board shall be located as near as possible to the centre of the load they are intended to control.

(b) These switch boards (as per clause 14) shall be fixed on suitable stand or on wall and shall be accessible for replacement of fuses.

(c) These shall be of either iron clad type or all insulated type. But, if exposed to weather or damp situations, they shall be of the weather proof type and if installed where exposed to explosive dust, vapour or gas, they shall be flame proof type.

(d) Where there are more distribution fuse boards feeding low pressure circuits are fed from a supply at medium voltage, these distribution boards shall be –

(i) Fixed not less than 2 m. (or 6 ft.) a part, or

(ii) Arranged so that two cannot be opened at a time, nearly they are interlocked and the metal cas is marked 'Danger' – 400 Volts', or

(iii) Installed in ..... or enclosure accessible to only authorised persons.

(e) All distribution boards shall be marked 'lighting' or 'power' as the case may be and also marked wit the pressure and number of phases of the supply. Each shall be provided with a circuit list giving details or eac circuit which it controls and the current rating of the circuit and size of the fuse element.

20.(A) वितरण बोर्ड का तारीकरण :

WIRING OF DISTRIBUTION BOARDS :

In wiring a branch distribution board, the total load of the consuming device shall be divided, as far a possible evenly between the number of ways of the board, leaving the spare circuit for future extension.

(b) All connections between pieces of apparatus or between apparatus and terminals on a board sha be neatly arranged in a definite sequence, following the arrangement of the apparatus mounted thereon, avoidin unnecessary crossing.

(c) Cables shall be connected to terminal only by soldered lugs, unless the terminal is of such a forr that they can be securely clamped without cutting away of cable strands.

(d) All bare conductors shall be rigidly fixed in such a manner that a clearance of at least 2.5 cm. (or 1' is maintained between conductors of opposite polarity or phase and between the conductors and any material other than insulating material.

(e) In a hinged board, the in-coming and out-going cables shall be neatly bunched and shall be fixed i such a way that the door shall be capable of swinging through an angle of not less than 90 deg.

(f) If required in the special specification, a pilot lamp shall be fixed and connected through an independer single pole switch and fuse to the bus bars of the board.

21.(A) दीवार के जरिये जानेवाले तार :

PASSING THROUGH WALLS :

Where conductor pass through walls, any one of the following methods shall be employed. Care sha be taken to see that wires pass very freely through protective pipe or box and that wires pass through in straight line without any twist or cross in wires, on either ends of such holes.

(a) A teak wood box extending through the whole thickness of the wall shall be burried in the wall an casings or conductors shall be carried so as to allow 1.3 cm. (or ½ in) clear space on three sides of the casin of conductor.

(b) The conductors shall be carried in an approved heavy gauge solid drawn or lap welded conductor a porcelain tube of such a size that it permits easy drawings, in. The ends of conduit shall be neatly bushed wit porcelain, wood, or other approved materials.

(B) Where a wall tube passes outside a building so as to be exposed to weather, the outer end shall b bell mouthed and turned down-wards and properly bushed on the open end.

22. दीवार एवं छत में स्थिरीकरण :

FIXING TO WALLS AND CEILING :

Plug for ordinary walls or ceiling shall be of wall seasoned teak or other approved hard wood not less tha 5 cm. (or 2 in) long by 2.5 cm. (or 1 in) square on the inner end and 2 cm. (¾") square on the outer end. The shall be cemented into walls within 6 mm. (or ½") of the surface the remainder being finished according to th nature of the surface with plaster or lime punning.

Where owing to irregular coursing or other reasons the plugging of the walls or ceiling with wood plugs present difficulties, the wood casing, wood batton, metal conduit or cleat (as the case may be) shall be attached to the wall or ceiling in an approved manner. In the case of new buildings, the teak wood plugs shall be fixed in the walls, as far as possible before first coat of white washing.

Plugging of walls or ceiling can be done in a better way where neatness is the first consideration. In all cases an approved type of asbestos or fibre fixing Plug (Rawl or phil plug) with correct size of tools shall be used and done in a workman-like manner.

Where it cannot be done, wooden plugs as described above can be used with a special permission of the Engineer-in-charge.

23. शाखा स्विच :

BRANCH SWITCHES :

Where the supply is derived from two wire or four wire source and the distribution is done on the two wire system, all branch switches shall be placed in the outer or live conductor of the circuit and no single pole switch or fuse shall be inserted in the middle wire, earth or earthed neutral conductor of the circuit, Single pole switches (other than for multiple control) carrying not more than 15 amperes may be of the tumbular type and the switch shall be 'ON' when the handle or knob is down.

24. फिट्टिंग एवं सहायक उपकरण :

FITTING & ACCESSORIES :

(a) A ceiling rose or any other similar attachment shall not be used on a circuit, the voltage of which normally exceeds 250 volts.

(b) Normally only one flexible cord shall be attached to a ceiling rose. Specially designed ceiling roses shall be used for multiple pendants.

(c) A ceiling rose shall not embody fuse terminal as an integral of it.

25. साकेट निर्गम एवं प्लग :

SOCKET OUTLETS & PLUGS :

(a) A socket outlet shall not embody fuse terminals as an internal part of it. But the fuse may be embodied in plug in which case plug shall be non-reversible and shall be so arranged and connected that the fuse is connected to an outer or phase conductor or the non-earthed conductor of the circuit.

(b) Every socket outlet shall be controlled by a switch.

(c) The switch controlling the socket outlet shall be on the 'Live' side of the line.

(d) Ordinary socket outlet shall normally be fixed at any convenient place 23 cm (or 9 in) above the floor level or such nearer level in a special cases and desired by the Engineer-in-charge of the works. It shall be controlled by a switch placed at the normal switch level.

Where use of shutter type or the interlocking type of socket is required for any special installation, if item should be separately and specifically listed in the schedule and specification of that particular work.

Where socket outlets are placed as a lower level, they shall be enclosed in a suitable wooden or metallic box, as the case may be, to harmonize with the system of work used.

Note: In place of the three pin plug and socket outlet, two pin reversible socket outlet with an earthing attachment may be used, if necessary.

26. फिट्टिंग्स :

FITTINGS :

(a) Every light fitting shall be controlled by a switch and where control at more than one point is necessary, by as many two ways and intermediate switches as there are control points. Lights, fans and socket outlets shall be located as to provide maximum comfort to the occupant and to enable him to utilise the elecricity in the most economical manner.

(b) Where conductors are required to be drawn through tube or channel leading to the fitting, the tube or channel must be free from sharp angles or projecting edge and of such a size as will enable them to be wired with the conductors used for the final sub-cirtcuit without removing the braiding or taping. As far as possible all tubes or channels should be of sufficient size to permit of looping back.

(c) Where a light fitting is supported by one or more flexible cord, the maximum weight to which the twin flexible cords can be subjected shall be as follows –

SIZE OF TWIN FLEXIBLE CORDS

Nominal cross sectional area in sq. inch.	No. & Diameter in Inches of wires	Maximum Permissible weight	
		Kgm.	Lbs.
0.0006	14/0.0076"	1.4	3
0.0010	23/0.0076"	2.3	5
0.0017	40/0.0076"	4.5	10

Where a weight greater than 4.5 kgm. (or 10 lbs.) has to be supported two or three twin flexible cords shall be used so that the maximum weight to which any cord is subjected does not exceed the above values, or alternatively other means of support, namely suitable metal pipe or suitable chain shall be provided.

(d) No inflamable shade shall form a part of a light fitting unless such shade is well protected against all risks of fire. Celluloid shade or light fitting shall not be used under any circumstances.

(e) Enclosed type fittings shall be provided with a removable glass recepticle, arranged to enclose the lamp completely and of such size or construction as to prevent undue heating of the lamp or if the position of fitting be such that the glass receptacle is liable to mechanical damage, the glass shall be protected by a suitable wire guard.

(c) In an earthed system of supply, a socket outlet and plug shall be of the three pin type, the third terminal shall be connected to earth.

Conductors connecting current consuming devices shall be of flexible twin cord with an earthing cord and the earthing cord shall be secured by connecting between the earth terminal of plug and the current consuming devices.

27. फिट्टिंग वायर :

FITTINGS WIRE :

The use of fitting shall be restricted to the internal wiring of the light-fitting. Where fittings wire is used for wiring fittings, the sub-circuit leads shall terminate in a ceiling rose or connector from which they shall be carried into the fittings.

28. लेम्प होल्डरस :

LAMP HOLDERS :

Lamp holders for use on brackets and the like shall have not less than a 1.3 cm. (or ½ in.) nipple and all those for use with flexible pendant shall be provided with cord grips. All lamp holders shall be provided with

shade carriers. Where centre contact Edision Screw Lamp holders are used the outer or screw contact shall be connected to the middle were or the neutral or to the earthed conductor of the circuit.

29. बाहर रखेजानेवाले लेम्प्स :

OUTDOOR LAMPS :

External and road lamps shall have weather proof fittings of approved design so as to effectively prevent the admission of moisture. An insulating distance piece of moisture proof material shall be inserted between the lamp holder nipple and the fitting. Flexible cord conductors and cord grip lamp holders must not be used where exposed to weather. In verandha and similar exposed situations, where pendants are used, they should be of fixed rod type.

30. लेम्प्स :

LAMPS :

All incandescent lamps, unless otherwise required, shall be hung at height of 2.5 m. (or 8 ft.) above the floor level. They shall be provided with lamps of the following patterns.

Upto and including 200 watts.	..... standard Bayonut (B).
Above 200 watts and not exceeding 300 watts	..... Edision Screw (E.S.)
Above 300 watts	..... Golliath Screw (G.S.)

31. पंखा नियंत्रक और शिंकजा :

FANS REGULATORS AND CLAMPS :

(i) Ceiling Fans : Ceiling fans including their suspension shall conform to I.S. 374-1951 and to the following requirements :

(a) All ceiling fans shall be wired to ceiling roses or to special connector boxes and suspended from hooks or shackles with insulators between hooks and suspension rods. There shall be no joint in the suspension rod but if joints be unavoilable then such joints shall be screwed to special couplers of 5 cm. (or 2 inch) minimum length and both ends of the pipes shall touch together within couplers and shall in addition be secured by means of split pins; alternatively the two pipes may be welded.

(b) For wooden joints and beams, the suspension shall consist of M.S. flat of sized not less than 4 cm. 6X4 mm. (12 in X ¼") secured on the sides of the joints or beams by means of two coach screws of size not less than 5cm. (or 2 inch) for each flat. Where there is space above the beam, a through bolt of size not less than 1.5 cm. (or 5/8") dia, shall be placed above the beam from which the flat are suspended. In the later case the flats shall be secured from movements by means of another bolt and not to the bottom of the beam. A hook consisting of M.S. rod of size not less than 1.5 cm. (or 5/8") dia shall be inserted between the M.S. flat through oval holes on their sides. Alternatively the flats may be bent inwards to hold tightly between them by means of a bolt and nut, a hook of 'S' form.

In the case of (II) beams, flats shall be shaped suitably to catch the flanges and shall be held together by means of a long bolt and nut. For concrete roots, ceiling for hooks shall be got burried in the concrete during construction. A M.S. flat of size 4 cm X 6.4 mm. (or 1½ X ¼") bent in the form of an inverted 'U' supported on two cross bolts or cross flats 60 cm. (or 2 ft.) long which are bound together to the top reinforcement of the roof shall be used. The distance between the vertical legs shall not be less than 15 cm. (or 6 in.) and the legs shall project at least 13 cm. (or 5 in.) below the ceiling and oval holes shall be made in the for carrying a 15 mm. (or 5/8") dia rod hook.

Alternatively a 15 mm. (or 5/8") dia. M.S. rod in the shape of 'U' with their vertical legs bent horizontally at the top at least 19 cm. (or 7½") on either side and bound to the top reinforcement of the roof shall be used as shown in the atttached drawings.

(c) Canopies on top of suspension rod shall effectively hide the suspensions.

(d) The leading in wire shall be of nominal cross sectional area not less than 2.5 mm. and shall be protected from abrasion.

(e) Unless otherwise specified, all ceiling fans shall be hung 2.79 m. (or 9 ft.) above the floor.

(ii) Exhaust Fans – shall be erected at the places indicated by the Engineer-in-charge. For fixing an exhaust fan, a circular hole shall be provided in the wall to suit the size of frame, which shall be fixed by means of rag bolts embedded in the wall. The hole shall be neatly plastered to the original finish of the walls. The exhaust fan shall be connected to exhaust fan point which shall be wired as near to the hole as possible, by means of a flexible cord, care being taken that the blades rotate in the proper direction.

32. फिट्टिंग्स और सहायक उपकरणों के संयोजन :

ATTACHMENT OF FITTINGS AND ACCESSORIES :

(i) In other than conduit wiring, all ceiling roses, socket outlets, switches, regulators, brackets, pendants and accessories attached to the wall or ceiling shall be mounted on substantial teak wood blocks, twice varnished both inside and outside including backside after all fixing holes are made in them. Blocks shall not be less than 4 cm (or 1½ in.) deep. Brass screws only shall be used for attaching fittings and accessories to their base blocks.

(ii) Groups of accessories and regulators shall be mounted on well seasoned and properly secured double teak wood boards of suitable size to accommodate the number of fittings. The board shall be well varnished with pure shetllac on all sides, both inside and outside, irrespective of being painted to match the surroundings. The board shall be divided into two sections, one for the switches which shall be flush mounted and the other for regulators, fixed with suitable washers and round head iron screws (or any other type of screws as required)

Alternatively in the case of surface type wiring switches may be surface mounted on teak wood boxes. But in this case, the rate shall be suitably reduced and suitably amended them entered in the Scheduled of work.

33. विनिमेयता :

INTERCHANGEABILITIES :

Similar parts of all switches, lamp holders, distribution fuse boards, ceiling rose, brackets pendants, fans and all other fittings of the same type shall be interchangeable in each installation.

34. भवनों का संरचनात्मक परिवर्तन :

STRUCTURAL ALTERNATE TO BUILDINGS :

No alternation which shall effect the structure of building shall be done unless sanction of the competent authority has first been obtained and request for the same shall be made through the Engineer-in-charge. All chases, ducts, holes etc. required in connection with the electrical works shall be provided and filled by the contractor at his own cost to the original architectureal finish of the building. For new buildings, these chases, ducts holes etc. shall be provided when the buildings is in progress.

35. भवनों के अधिभोक्ताओं की सुविधाएँ :

CONVENIENCE OF OCCUPANTS OF THE BUILDING :

When the building is occupied and major portion of the work is required to be done under that condition the work shall be carried out in such a way as not to cause any inconvenience to the occupants. In such cases, it may be necessary to work before and after office hours are required.

36. संस्थापन का आरंभ :

INSTALLATION IN COMMISSION :

Before the workman leaves the work finally the must make sure that the installation is in commission.

37. कारीगरी :

WORKMANSHIP :

Good workmanship is an essential requirement for compliance with the clauses in this specification. Th work shall be carried out under the direct supervision of a first class licenced foreman or of a person holding certificate of competency issued by the State Government for the type of work involved, employed by th contractor who shall rectify then and there the defects pointed out by the Engineer-in-charge during the progres of work.

38. अधिकतम भारण का प्रबंध :

PROVISION FOR MAXIMUM LOAD :

All conductors, switches and accessories shall be of such size as to be capable of carrying without the respective rating being exceeded the maximum current which will normally flow through them.

39. संस्थापन केलिए परिवर्धन :

ADDITION TO AN INSTALLATION :

An addition, temporary or permanent, shall not be made to the authorised load of an existing installatic until it has definitly ascertained that the current carrying capacity and the condition of the existing accessorie: conductors switches etc. affected including those of the supply authorities are adequate for the increased loa

40. अभिकल्पन एवं निर्माण :

DESIGN & CONSTRUCTION :

The design and construction of all electrical apparatus including cables shall comply with the requireme of section 13 of the I.E.E. wiring regulations. All materials supplied shall be new.

41. विशेष दायित्व :

SPECIAL RISKS :

Special forms of construction such as flame proof enclosures shall be adopted where there is risk of fire explosion and wherever indicated in the schedule of work or special specification.

42. अनुषंगी भवनों में कनेक्सन्स :

CONNECTION TO ANCILLARY BUILDINGS :

Unless otherwise specified, electrical connections to ancillary buildings such as out houses, garage etc adjacent to the main building at a distance not greater than 3 m. (or 10 ft.) and when no road intervenes shall b taken in an earthed G.I. pipe of suitable size in the exposed portion at a height of not less than 2.5 m. (or 8 ft This applies to both runs of mains of submains or final sub circuit wirings between the buildings.

When the distance between the buildings exceeds 3 m. (or 10ft.) or a road intervenes, separate, mains suib-mains shall be run from the main building to ancillary buildings and the portion of the same exposed weather shall be carried in weather roof cable on G.I. bear wire at a height not less than 5 m. (or 13 ft.) above th ground.

भाग II नली वायरिंग पद्धति

SECTION II CONDUIT WIRING SYSTEM

a) *सतह नाली वायरिंग पद्धति :*
Surface conduit wiring system :

43. नली के प्रकार एवं आकार :
TYPE AND SIZE OF CONDUIT :

All conduit pipes shall be of approved gauge (not less than 16 SWG for conduits of sizes upto 32 mm. (or 1¼ in.) diameter and not less than 14 SWG for conduits of size above 32 mm. (or 1¼ in.) diameter, solid drawn or lap welded finished with galvanised or stove enamelled surface. All conduit accessories shall be of threaded type and under no circumstances pin grip type or clamp grip type accessories shall be used. The capacity of conduits shall be in accordance with Table and shall never be exceeded.

No steel conduit less than 19 mm. (or ¾") in diameter shall be used.

44. तार समूह :
BUNCHING OF CABLES :

Cables carrying direct current may, if desired be bunched whatever their prolarity, but cables carrying alternating current, if installed in metal conduit shall always be bunched so that out going and return cables are drawn into the same conduit.

45. नली संधि :
CONDUIT JOINTS :

Conduit pipes shall be joined by means of screwed couplesand screwed accessories only, in long distance straight run of conduit, inspection type couplers at reasonable intervals shall be provided or running threads with couplers and Jamnuts (in the latter case the bare threaded portion shall be treated with anti-corrosive preservative shall be provided. Threads on conduit pipes in all cases shall be between 13 mm. (or ½ ") to 19 mm (or ¾") long sufficient to accommodate pipes of full threaded portion of couplers or accessories. Cut ends of conduit pipes shall have no sharp edge nor any burrs left to avoid damage to the insulation of conductors while pulling them through such pipes.

TheEngineer-in-charge with a view to ensure that the above provision has been carried out may require the separate lengths of conduit etc. after they have been prepared shall be submitted for inspection before being fixed.

46. कीडों से बचाव :
PROTECTION AGAINST INSECTS :

In order to minimise condensation or seating inside the tube, all out lets of cond. system shall be properly drained and ventilated in such a manner as to prevent the entry of insects if so required by the Engineer-in charge.

47. जंग से नली का बचाव :
PROTECTION OF CONDUIT AGAINST RUST :

The outer surface of conduit including all bends, unions, tees, junction boxes etc. forming part of the conduit system shall be adequately protected against rust when such system is exposed to weather by being galvanised or enamelled or painted with two coats of oxide paint applied before they are fixed. In all cases, no bare threaded portion of conduit pipe shall be allowed unless such bare threaded portion is treated with anti corrosive preservative or covered with approved plastic compound.

48. नली का स्थिरीकरण :

FIXING OF CONDUIT :

Conduit pipes shall be fixed by heavy guage, saddles, secured to suitable wood plugs or other approve plugs with screws in an approved manner at an interval of not more than one meter (or 3 ft.) but on either sid of the couplers or bends or similar fittings, saddles shall be fixed at a distance of 30 mm. (or 1 ft.) from the centr of such fittings.

49. नली में मुडाव :

BENDS IN CONDUIT :

All necessary bends in the system including diversion shall be done by bending pipes or by insertin suitable solid or inspection type normal bends, elbows or similar fittings, or by fixing cast iron inspection boxe whichever is most suitable. Conduit fittings, shall be avoided as far as possible on conduit system exposed t weather, where necessary solid type fittings shall be used. Radius of such bends on conduct pipes shall not b less than 7.5 cm (or 3") no length of conduit shall have more than the equivalent of four quarter bends outlet t outlet.

50. निकास :

OUTLETS :

The switch or regulator box shall be made of metal on all a sides, except on the front. In the case of cas iron boxes, wall thickness shall be at least 3 mm. (or $^1/_8$") and in case of welded mild steel sheet boxes the wa thickness shall not be less than 1.6 mm. (or $^1/_{16}$"). Except where otherwise stated 3 mm. (or $^1/_8$") thick bakolit sheets shall be fixed on the front with brass screws. Clear depth of the box shall not be less than 7.5 cm. (or 3" and this shall be increased suitably to accommodate mounting of fan regulators in flush pattern.

Only a portion of the above box shall be sunk in the wall, the other portion being projected out for suitabl entry of conduit pipes into the box.

51. कंडक्टर्स :

CONDUCTORS :

All conductors used in conduit wiring shall be stranded unless otherwise stipulated in the item of work.

52. नली का उत्थापन एवं भूयोजन :

ERECTION & EARTHING OF CONDUIT :

The conduit of each circuit or section shall be completed before conductors are drawn in. The entir system of conduit after erection shall be tested for mechanical and electrical continuity through out and permanent connected to earth conforming to the requirements specified under section IV by means of special approve type of earthing clamp efficiently fastened to conduit pipe in a workman like manner for a perfect continuit between earth wire and conduit. Gas or water pipe shall not be used as earth medium. If conduit pipes are liabl to mechanical damage, they shall be adequately protected. In a conduit system pipe must be continuous whe passing through walls or floors and no other form of insulating or protecting type is required.

(B) कंड्यूट वायरिंग पद्धति :

Recessed conduit wiring system :

53. चौक की तैयारी :

MAKING OF CHASE :

Recessed conduit wiring system shall comply with all the requirements of surface conduit wiring syste specified in clause 43 to 52 and in addition to the requirements specified in the following clauses 53 to 56.

The chase in the wall shall be neatly made and of ample dimensions to permit the conduit to be fixed in the manner desired. In the case of buildings under construction, chases should be left in the wall, ceiling etc., at the time of construction and shall be filled up neatly after erection of conduit and brought to the original finish of the wall.

54. चौकी में नली की स्थापना :

FIXING OF CONDUIT IN CHASE :

The conduit pipe shall be fixed by means of stapples or by means of saddles not more than 60 mm (or 2 ft.) apart. Fixing of standard bends or elbows shall be avoided as far as practicable and all curves maintained by bending the conduit pipe it self with a long radius which will permit easy drawing in of conductors. All threaded joints of conduit pipes shall be treated with some approved preservative compound to secure protection against rust.

55. परीक्षण बक्स :

INSPECTION BOXES :

Suitable inspection boxes shall be provided to permit periodical inspection and to facilitate removal of wires, if necessary. These shall be mounted flush with the wall, suitable ventilating holes shall be provided in the inspection box covers.

56. उपयोग किये जानेवाले सहायक सामग्री के प्रकार :

TYPES OF ACCESSORIES TO BE USED :

All outlets such swithches wall sockets etc., may be either of flush mounting type or of surface mounting type.

The outlet box shall be same as in clause 50 and shall be mounted flush with the wall. The metal box shall be effienciently earthed with conduit by an approved means of earth attachment.

भाग III पालथीन वल्कनित तार वायरिंग

SECTION III POLYTHENE VULGANIZED CABLES WIRING

57. सामान्य :

GENERAL :

This system of wiring is suitable for low pressure installation, and shall not be used in places exposed to sun and rain nor in damp places but can be installed in the above places, provided they are sheathed in special approved protective covering against atmosphere and well protected to withstand dampness. This system of wiring is suitable in situations where acids – and alkalies are likely to be present.

(a) All Polythene vulganized cables on brick walls, stone or plastered walls and ceiling shall be run on well seasoned, perfect straight and well varnished on four sides teak wood or any approved hardwood, battens not less than 10 mm. (or $^3/_8$") finished thick; width of which shall be such as to suit total width of cables laid on the batten. Prior to erection, these shall be painted with one coat of varnish or approved paint of colour to match with the surroundings. Those battens shall be secured to the walls and ceilings by flat head wood screws to rawl plyg or phil plug at an interval nor exceeding 75 cm. (or 2½ ft.) wood plugs as per clause 22 can be used only with the special approval of the Engineer-in-charge. The flat head wood screws shall be counter sunk within wood batten and smoothened down with file.

(b) Where wiring is to be carried along the face of the rolled steel joints, wooden batten of adequate width shall first be laid on the same and clipped to it as inconspicuously as possible.

The wiring shall then be fixed to this backing in the ordinary way. Where wiring passed through structural steel work the holes shall be suitably bushed to prevent the abrasion of the cables.

59. लिंक क्लिप्स :

LINK CLIPS :

Only tinned brass link clips shall be used. Link clips shall be so arranged that the single clip shall not hold more than two twin core PVC cables upto 2.5 mm. above which a single clip shall hold a single twin core cables. The clips shall be fixed on varnished wood battens with brass pins and spaced at intervals of 15 cm (or 6") both in the case of horizontal and vertical runs. For the wiring and runs of mains exposed to heat and rain; clips specially made for outdoor use from a durable metal resistant to weather and atmospheric corrosion shall be used.

60. वायरिंग में मुडाव :

BENDS IN WIRING :

The wiring shall not in any circumstance be bent so as to form a right angle but must be rounded off at the corners to a radius not less than six times the over all diameter of the cable.

61. यांत्रिक क्षति से वायरिंग का संरक्षण :

PROTECTION OF WIRING FROM MECHANICAL DAMAGES :

(a) In cases where there are chances of any damage to the wiring, such wiring shall be covered with a sheat metal protective covering, the base of the covering being flush with the plaster, or brick work as the case may be, or the wiring shall be drawn through a heavy guage metal conduit pipe and complying with all the requirements of conduit wiring system.

(b) Such protective covering shall in all cases be fitted on all down drops within 1.5 m. (or 5') from the floor.

62. फर्श द्वारा तार उतारना :

PASSING THROUGH FLOORS :

All cables taken through floors shall be enclosed in heavy guage steel conduit extending 1.5 m (or 5') above the floor and flush with the celling below or by means of any other approved type of metalling covering. The ends of all conduits or pipes shall be neatly bushed with procelain wood or other approved material. The conduit pipes, wherever accessible, shall be securely earthed.

63. दीवारों के जरिये तार उतारना :

PASSING THROUGH WALLS :

The method to be adopted shall be that said down in clause 21. In the later case there shall be one conduit for every twin corecable or two runs of single core cable and the conduit shall be neatly arranged so that the cables enter them without bending.

64. भूस्थापित केबल :

BURIED CABLES :

The P.V.C. cable shall not normally be buried directly in plaster; where so specified in the special specification they may be taken in teak wood channelling of ample capacity or conduit pipe buried in the wall.

65. बाह्य आवरण हटाना :

STRIPING OF OUTER COVERING :

While cutting and stripping of the outer covering of the cable, care shall be taken that the sharp edge of the cutting instrument does not tough theinsulation of the conductors. The protective outer covering of the cables shall be stripped off near connecting terminals and this protective covering shall be maintained upto the close proximity of connecting terminals as far as practicable. Care shall be taken to avoid hammering on link clips with any metal instrument, after the cables are laid. Where junction boxes are provided, they shall be mde moisture proof with a plastic compound.

66. रगाइ :

PAINTING :

The wiring shall after erection be neatly painted with two coats of oil cracking paint suitable for painting of P.V.C. to the satisfaction of the Engineer-in-charge.

भाग IV भूयोजन

SECTION IV EARTHING

The earthing arrangements to be provided shall be any one of the following types as may be specified in the schedule of work and shall be in accordance with the approved drawing.

67. एर्थ इलैक्ट्रोड :

EARTH ELECTRODE :

All earth connections unless otherwise specified shall be of galvanised iron pipe of approved length and diameter or any galvanised iron plate or copper earth plate, copper wire shall be used as lead-in-wire.

68. **ARRANGEMENT OF PIPE EARTH :**

भूनलिका की व्यवस्था :

The galvanised iron pipe shall not be less than 38.1 mm (ior 1½") in diameter and 2 m (or 6½ ft.) long. The length of the galvanised iron pipe shall be increased to 2.75 m (or 9 ft.) if the nature of the soil so required in dry or rocky places. They shall be buried in the earth vertically with their top not less than 2.75 m (or 9 ft.) below ground level.

69. प्लेट एर्थ व्यवस्था :

ARRANGEMENT OF PLATE EARTH :

The galvanised iron plate shall be of size not less than 60 cm. X 60 cm. X 6.35 mm. (or 2' X 2' X ¼") the copper plate 60 cm. X 60 cm. X 3.18 mm. (or 2' X 2' X 2"$^{1}/_{8}$").

They shall be buried in the earth with their faces vertical and their tops not less than 3 m (or 10 ft.) below ground level.

70. भवनों से भूयोजन की दूरी :

DISTANCE OF EARTH FROM BUILDINGS :

Normally an earth shall not be situated less than 1.5 m (or 5 ft.) from any building. Care shall be taken that the excavations for earthing may not effect the footing of the foundation of the building, in such case the distance being suitably increased. The location of the earth will be such where the soil has reasonable change of remaining moist as far as possible. Pavements and roadways are definitely avoided for locating the earths.

71. मुख्य भूयोजन क्षमता :

MAIN EARTHING LOAD :

The main earthing load shall be of galvanised iron wire in the case of galvanised iron pipe and galvanised iron plate and it shall be of copper wire in the case of copper plate. The nominal cross sectional area of wire shall be at least 0.020 sq. in. or 12.97 mm2 (No. 8 SWG) and in general not less than one half that of the largest of the conductors to be protected, but that a wire larger than 0.1 sq. in. or 70.88 mm2 in nominal cross sectional area (2/0 SWG) or 19/0.083" standard in the case of copper conductor or equivalent current carrying capacity in the case of GI wire) need not be used.

72. निरंतर भूयोजन कंडक्टरों का आकार :

SIZE OF EARTH CONTINUITY CONDUCTORS :

The nominal cross sectional area of an earth continuity conductor not contained within a cable or flexible cord shall be at least 0.0045 sq. in. (No. 14 SWG or 7/0 29" in standard) of copper and in general not less than

one half that of each current carrying conductor to be protected but an earth continuity conductor larger than 0. sq. in. nominal sectional area (2/0 SWG or 190.083" standard in the case of copper conductor or equivalen current carrying capacity in the case of GI wire) need not be used.

73. भूयोजन का रक्षण :

PROTECTION OF EARTH LEAD :

The earthing lead shall be suitably protected from mechanical injury by a 12.7 mm (or ½ in.) galvanise iron pipe recessed in wall and floor. The portion within ground shall be buried at least 60 cm. (or 2ft) deep an the portion within the building in walls and floors to adequate depth and carried in 12.7 mm. (or ½ in.) GI pip upto the earth plate or pipe as the case may be.

74. भूयोजन से भूयोजना उत्थापक को जोडने की पद्धति :

METHOD OF CONNECTION OF EARTH LEAD WITH EARTH ERECTION :

The earthing lead shall be securely bolted and soldered to the plate or pipe as the case may be. In th case of the plate, the lead shall be connected by means of a cable socket with two bolts and nuts. All bolts, nut and washers shall be of the same material of the plate or pipe. All iorn bolts, nuts and washers shall be galvanised. The earthing lead shall be secured connected at the other end of the main board and the all it mounting sand looped to all other iron clad switches and distribution fuse boards.

75. संस्थापन केलिए भूयोजन विद्युदग्र की संख्या :

NUMBER OF EARTH ELECTRODES FOR INSTALLATIONS :

(a) In all cases, the relevant provisions of Rules 33 and 61 of the Indian Electricity Rules 1956 (se appendix A) shall be compiled with.

(b) The metalic coverings or supports of all the medium pressure and conductors shall in all cases, hav not less than two separate and distinct earths including electrodes.

76. भूयोजना विद्युदग्र के संस्थापन की पद्धति :

METHOD OF INSTALLING EARTH ELECTRODE :

The earth plate of pipe shall be surrounded by alternate layers of charcoal or coke and salt. There shall b a 19.05 mm. (or ¾") G.I. pipe running from the top of the plate or pipe. The top of this pipe shall be provided wi a funnel and mesh for watering the earth. This will be house in a massonary enclosure not less than 30 cm. X 3 cm. X 30 cm. (or 1' X 1' X 1') deep. A cast iron frame with cover shall be suitably embedded in the masonry.

77. भूयोजन का प्रतिरोध :

RESISTANCE OF EARTH :

No earth electrode installed shall have a great ohmic resistance than five ohms or measured by an approve earth testing apparatus; in rocky soils the resistance may be 8 (eight) ohms.

भाग V संस्थापन का परीक्षण

SECTION V TESTING OF INSTALLATION

(a) The insultation resistance shall be measured by applying between earth and the whole system conductors or any section there of with all fuses in place and all switches closed and except in earthed concentr wiring all lamps in position or both poles of the installation otherwise electrically connected together, a dire current pressure of not less than twice the working pressure provided that it need not exceed 500 volts fi medium voltage circuits. Where the supply is derived from the three wire (A.C. or D.C.) or a ploy phase syster the neutral pole of which is connected to earth either direct or through added resistance, the working pressu shall be deemed to be that which is maintained between the outer or phase conductor and the neutral.

(b) The insulation resistance measured as above shall be not less than 50 divided by the number of poin on the circuit provided that the whole installation shall not be required to have an insulation resistance great than one megohm.

(c) Control rheostat, heating and proper appliances and electric signs may, if required be disconnected om the circuit during the test, but in that event the insulation resistance between the case of frame work, and ll live parts of earth rheostat, appliance and sign, shall be not less than that specified in the relevant Indian tandard Specification or where there is not such specification shall be not less than half a megohm.

(d) The insulation resistance shall also be measured between all conductors connected to one pole or hase conductor of the supply and all the conductor connected the middle wire or the neutral or the other pole r phase conductors of the supply and its value shall be not less than that specified in Sub Clause (b).

(e) On completion of an electric installation (or an extension to an installation) certificate shall be furnished y the contractor countersigned by the certified supervisor under whose direct supervision the installation was arried out. This certificate shall be in the prescribed form as required by the local electric supply Authorities.)ne such recommended form is given in APPENDIX D.

9. भूयोजन अवस्थिति पथ का परीक्षण :

TESTING OF EARTH CONTINUITY PATH :

The earth continuity conductor including metal conduits and metallic envelopes of cables in all cases shall e tested for electric continuity and the electrical resistance of the same along with the earthing lead but excluding ny added resistance or earth leakage circuit breaker measured from the connection with the earth electrode to ny point in the earth continuity conductor in the completed installation shall not exceed one ohm.

0. ध्रुवीयता से असंयुक्त एक पोल बटन का परीक्षण :

TESTING OF POLARITY NON LINKED SINGLE POLE SWITCHES :

(a) In a two wire installation a test shall be made to verify that all non linked single pole switches have been tted in the same conductor through out and such conductor shall be labelled or marked for connection to an uter or phase conductor or to the non-earthed conductor of the supply.

(b) In a three wire or a four wire installation, a test shall be made to verify that every non-linked single pole witch is fited in a conductor which is labelled or marked for connection to one of the outer or phase conductor f the supply.

CONDUCTOR OF CABLES		Approx. overall dia. of cables	MAXIMUM NUMBER OF CABLES											
			19.8 mm (¾")		25.4 mm (1")		31.8 mm (1¼")		38.1 mm (1½")		50.8 mm (2")		63.8 mm (2½")	
Area sq. inches.	No. & dia of wires inches.	250 vol. inch.	V.R.	P.V.C.	V.R.	P.V.C.	V.R.	P.V.C.	V.R.	P.V.C.	V.R.	P.V.C.	V.R.	P.V.C.
.0015	1/.044	0.150	6	7	10	13	14	20						
.002	3/.029	0.165	6	7	10	13	14	20						
.003	3/.036	0.180	5	5	10	10	14	16						
sq.	mm.	mm.												
1.5	1/1.40	3.65	6	6	10	10	14	16						
2.5	1/1.80	4.05	5	6	10	10	14	16						
4.0	1/2.24	4.70	4	5	10	10	10	16						
6.0	1/2.80	5.25	4	3	6	7	10	10	–	14				
10.00	1/3.55	6.30	2	2	4	5	8	8	–	11				
16.00	7/1.70	8.05	–	–	2	3	4	5	5	17				
25.00	7/2.24	10.00	–	–	–	–	2	3	3	4	–	6	7	7
35.00	7/2.50	11.05	–	–	–	–	2	3	2	4	5	6	6	–
	19/1.80		–	–	–	–	–	–	–	3	3	5	5	–

Note:– The above table shows the maximum capacity of conduits for a simultaneous drawing in of Aluminium cables. The table applies to 250 volt grade VIR & PVC cables and the maximum number of cables shown in the table shall apply to all types of conduits irrespective of weather they are light gauge or heavy gauge.

LIST OF APPROVED MAKES

S.No.	Description of Component	Approved Make
01.	MCCB	Schneider/ ABB/ Siemens / L&T with microprocessor based release.
02.	MCB	Legrand/ Hager/ ABB/ Siemens
03.	FRLSH/ FRLS/ FR Wires	Finolex/ L&T/ Polycab/ Anchor
04.	Power Cables	Universal/ Polycab/ Havells/ Finolex/ L&T/ Polycab/ Anchor/ Nicco
05.	Energy Meters/ Multi Function Meters	Schneider Conzerv/ L&T/ ABB/ Siemens
06.	Indication Lamps	L&T/ Schneider/ Siemens
07.	Current Transformers	Rishab/ Kalpa/ Kappa/AE
08.	Cable Glands & Lugs	DOWELLS/ 3D/ COMET/ HMI
09.	Rubber mat	Vardaman/ Electrosafe
10.	Modular Switch& Sockets for Switch boards	Anchor/ Legrand
11.	Modular Switch& Sockets for Plastic Trunking	Legrand / MK
12.	LED Light Fittings /Lamps	Philips / Wipro / CG/ Osram/ BJB
13.	Junction Boxes	Rittal / Hensel / Sintex
14.	DLP Trunking	Legrand / MK
15.	Wire mesh Cable Tray	Legrand / ABB
16.	PVC Conduits and its accessories	Sudhakar
17.	Terminal Blocks (Polyamide)	Elmex/ Connectwell
18.	Contactors	Schneider/ ABB/ Siemens / L&T
19.	Casing & Caping	Legrand / Modi
20.	Digital Programmable Timers	L&T Crono / Legrand / Siemens
21.	Metal Cable Trays	Schneider / ABB
22.	MCB DB	Legrand / ABB / Siemens / L&T

Note: Preference shall be given to first option. Incase 2nd or subsequent option is opted, the prior approval with compelling reasons has to be invariable obtained. The material used without approval is likely to be rejected.

NAME & ADDRESS OF THE TENDERER SIGNATURE OF THE TENDERER